

BULLETIN NO. 15.

The Indian Association for the Cultivation of Science.

Contents:

**On the Mechanical Theory of the Vibrations of Bowed Strings
and of Musical Instruments of the Violin Family, with
Experimental Verification of the Results: Part I.**

*By C. V. Raman, M.A., Life-Member and Vice-President, Indian
Association for the Cultivation of Science.*

CALCUTTA:

**Printed at the Baptist Mission Press and Published by the Indian
Association for the Cultivation of Science,
210, Bow Bazar Street, Calcutta.**

1918

Price, Rs. 2/8/-; or 3s. 4d.

PREFATORY NOTE.

The importance in Acoustics of a detailed experimental and theoretical study of the dynamics of bowed stringed instruments can hardly be overestimated, especially in view of the prominent position occupied by the violin family of instruments in music. Prof. E. H. Barton and his pupils have shown the way on the experimental side of this subject by their photographic studies of the vibrations of different parts of stringed instruments. But much still remains to be done, and the position of the subject considered as a whole must be described as unsatisfactory unless it is transferred from the more or less empirical basis on which it has stood hitherto to a solid foundation of deductive dynamical reasoning. This is precisely what I have attempted to do in the present work, which is a first instalment. An adequate theory of the excitation of strings by bowing is only possible when the communication of energy from the string to the instrument through the supports and the effect of the yielding of these supports on the free periods of the string are taken into account, and a consideration of the forced vibrations of the instrument is thus the first step in the dynamical theory.

The following is the general plan of the treatment adopted. Section II (pages 3 to 7) is devoted to elementary considerations regarding the effect of a periodic force applied at a point on a string which is mounted on the bridges of an instrument, the latter being assumed to have a single free period of its own. The relation between the frequency of the string and the natural frequency of the instrument is shown to be of great importance as is illustrated by the phenomenon of the "wolf-note." Section III discusses the *modus operandi* of the bow in broad outline, and it is shown that the velocity of the bowed point on the string is *not* necessarily a constant quantity either in the forward or backward motion, though, ordinarily, if the pressure of the bow be sufficient, the *forward* velocity would attain a limiting value equal to that of the bow. The velocity in the stage or stages of *backward* motion need not be uniform, though under certain conditions, uniformity

may be approached. In Sections IV and V, the kinematical theory of the motion of bowed strings is discussed, and it is shown that when the bowed point is assumed to divide the string in an irrational ratio, the mode of vibration approaches one or other of certain ideal types which are completely defined by the motion of one, two, or more equal discontinuous changes of velocity moving along the string. If there be n such discontinuities, the ratio of the forward and backward velocities of the bowed point is the same as the ratio of the distances of this point from the two nearest nodes (one on either side) of the n^{th} harmonic. In Sections VI, VII, VIII and IX, these 'irrational' modes of vibration are further discussed, and the remarkable general result is obtained that if n , the number of discontinuities, be a *prime integer* greater than unity, a two-step zig-zag motion is always possible at the bowed point except when this is at or near an end of the string: whereas, if n be *not* a prime integer, the motion at the bowed point is necessarily of a more complicated type if it lies outside certain sections of the string. In Section X, it is shown how the 'irrational' types of vibration are modified by the dropping out of certain sets of harmonics when the bowed point divides the string in a rational ratio. In Section XI, it is shown how all the experimental curves figured by Krigar-Menzel and Raps in their paper may be deduced theoretically to a close approximation. In Section XII, the treatment is extended to the case in which the instrument on which the string is mounted has any number of free periods of vibration, and the relation between the pressure and speed of bowing and the mode of vibration elicited is discussed with reference to (a) the position of the bowed point, (b) the frictional properties of the bow, (c) the finite width of the bow, (d) the dynamical constants of the instrument on which the string is mounted and the effect of altering such constants by loading or 'muting' the instrument, and (e) the thickness, length and tension of the string. A detailed discussion is given of the special cases in which the motion at the bridge is considerable owing to the resonance of the instrument. By considering the form of the frictional-force curves and the kinematics of various modes of vibration possible under the action of bow, a new and very important class of vibration-forms is indicated, the characteristic of

which is that the forward motion at the bowed point has a uniform velocity equal to that of the bow, but the backward motion has a non-uniform velocity. These have been called by me 'transitional modes of vibration,' as they are intermediate in form between the various 'irrational' types and their 'rational' modifications, and can be controlled by varying the pressure of the bow. The kinematical theory of these 'transitional modes,' especially of those allied to the first irrational type which are of musical interest, has been fully discussed and illustrated.

Twenty-six full-page plates and numerous drawings illustrate the present monograph. The concluding pages of Part I (which include the Bibliography, summary and index), are not as yet in print and will be issued separately as another number of the series of Bulletins. These pages will deal principally with the theory of the 'cyclical' modes of vibration obtained at the wolf-note pitch and other analogous cases, with the experimental tests of the various results indicated by the dynamical theory, and with a detailed study of the dynamical constants of the violin family of instruments, from which the strength and quality of their tone under any given mode of bowing can be calculated. Experiments with mechanically-played violins are in progress which have largely confirmed the results indicated by the dynamical reasoning. It is my object also to study and elucidate many of the constructional features of the bridge and belly of the violin by applying the principles of Analytical Mechanics, and also by finding their effect experimentally on the dynamical constants of the instrument. The quantitative explanation of the effect of a mute on the quality of violin tone is one of the most interesting results of the present investigation.

C. V. RAMAN.

Calcutta :

The 18th September, 1918.

On the Mechanical Theory of the Vibrations of Bowed Strings and of Musical Instruments of the Violin Family, with Experimental Verification of the Results: Part I.

By C. V. Raman, M.A.

CONTENTS.

- SECTION I.—Introduction.
SECTION II.—Effect of Periodic Force applied at a point.
SECTION III.—The *Modus Operandi* of the Bow.
SECTION IV.—Simplified Kinematical Theory.
SECTION V.—Classification of the Vibrational Modes.
SECTION VI.—The First Type of Vibration.
SECTION VII.—The Second Type of Vibration.
SECTION VIII.—The Third Type of Vibration.
SECTION IX.—The Fourth and Higher Types of Vibration.
SECTION X.—Construction of the Velocity-Diagram when the Bow is applied at a Node.
SECTION XI.—Some Examples of the Graphical Determination of the Vibration-Curves.
SECTION XII.—The Effect of the Variation of the Pressure and Velocity of Bowing.
SECTION XIII.—Some Experimental tests of the Theory.
SECTION XIV.—Summary and Outline of Further Research.
SECTION XV.—Bibliographical Appendix.

SECTION I.—INTRODUCTION.

The vibrations of stretched strings excited by bowing and their practical application in musical instruments of the violin class present many important and fascinating problems to the mathematician and to the physicist. In the present monograph which is the first part of a more complete work on the whole sub-

ject, I propose to deal with the theory of the excitation of these beautiful and characteristic types of vibration under various conditions, and of their communication to the resonator on which the string is stretched. Experimental results in confirmation of those obtained from dynamical theory are also presented.

The problem which it is proposed to consider has formed the subject of investigation by many mathematicians and physicists. A list of the works and original papers that I have consulted is given in the Bibliographical Appendix. The present position of the subject cannot be considered satisfactory, in view of the fact that no complete and detailed dynamical theory has been put forward which could predict and elucidate the many complicated phenomena that have already been found empirically by those who have worked in the field and that could also point the way for further research. It was this defect in the present state of knowledge of the subject that induced me to undertake the investigation. Some preliminary work had already been carried out by me on the vibrations of bowed strings and the physics of bowed instruments. Reference may be made here to three papers which may be regarded as the starting points of this investigation¹; the exposition given in the present paper is however self-contained. In the paper on "Discontinuous Wave-Motion" by myself and another that has appeared in the *Philosophical Magazine* for January 1916, it has been shown how the well-known principal mode of vibration of a bowed string discovered by Helmholtz² can be reproduced experimentally as a free oscillation by imposing on a stretched string a certain simple distribution of initial velocities involving a discontinuity. This experiment which was first made in September 1914, suggested my undertaking a thorough investigation of the general problem. Free use has been made of a simplified form of

¹ C. V. Raman, M.A., "Photographs of Vibration-Curves," *Philosophical Magazine*, May 1911.

C. V. Raman, M.A., "The Motion of Bowed Strings," Bulletin No. 11 of the Indian Association for the Cultivation of Science, 1914. See also Science Abstracts, February 1915, and *Nature*, August 13, 1914, page 622.

C. V. Raman, M.A., and S. Appaswamiyar "On Discontinuous Wave-Motion," *Philosophical Magazine*, January 1916.

² "Sensations of Tone," English Translation by Ellis.

the theory of discontinuous wave-motion given by Harnack, Davis and others, which I have extended so as to cover cases not considered by these writers.¹ The whole subject is considered in the light of dynamical theory, and an attempt has been made to divest it of empiricism as far as possible. Emphasis is laid upon the cases which are of practical interest in music. To make the present monograph as comprehensive as possible in respect of the matters dealt with, I shall develop the theory, step by step, in detail. A summary of the treatment and of the results obtained will be found in Section XIV. Many illustrative diagrams, photographic curves and numerical results will be found in the paper. Not only does the theory succeed in explaining all the known phenomena, but it has also justified itself by predicting many new relations and results which have been tested experimentally. These are also referred to in the course of the paper and in the summary.

SECTION II.—EFFECT OF PERIODIC FORCE APPLIED AT A POINT.

It is clear that the motion of a bowed string is a case of maintained vibration, and an adequate treatment of the subject is only possible if the dissipative forces to which the string is subject are taken into account. The dissipation may be due, (*a*) to the direct communication of energy to the surrounding medium from the string, or (*b*) to motion set up in the supports between which the string is stretched. The forced oscillation of a string in the presence of dissipative forces of the first kind, is readily found on the assumption that each element of the string is resisted by a force proportional to its velocity. Lord Rayleigh and others have discussed the motion that would ensue under such conditions when a periodic force is impressed at one point on the string. In practice, however, it is known that the second source of dissipation is generally of much greater importance than the first. The energy of the vibrating string is conducted through

¹ Two preliminary notes on the subject have been published by me: "On Some New Methods in Kinematical Theory," *Bulletin of the Calcutta Mathematical Society*, Vol. IV, pages 1—4, "On the summation of certain Fourier Series involving discontinuities," *Ibid.*, Vol. V, pages 5—8.

the bridges over which it is stretched to the sides of the box on which the bridges are fixed, and ultimately to the atmosphere as sound-waves.

We shall now consider the motion of a string, one end of which is supposed to be rigidly fixed at the point $x=0$ and the other end of which ($x=l$) passes over a bridge. A periodic force $E \cos mt$ is assumed to act at the point $x=x_0$. The string may be taken to be perfectly uniform and not subject to any resistance, so that the communication of energy to the surroundings takes place only through the bridge. The equation of motion of the string is

$$\mu \frac{d^2 y}{dt^2} = T_0 \frac{d^2 y}{dx^2} \dots \dots \dots (1)$$

The solution of the equation for values of x between 0 and x_0 may be written

$$y = F_1 \sin px \sin mt + G_1 \sin px \cos mt \dots \dots (2)$$

where

$$\mu m^2 = T_0 p^2 \dots \dots \dots (3)$$

From $x=x_0$ up to $x=l$ we may write,

$$y = D_2 \cos p(l-x) \sin mt + E_2 \cos p(l-x) \cos mt \\ + F_2 \sin p(l-x) \sin mt + G_2 \sin p(l-x) \cos mt. \dots (4)$$

Since y must be continuous at the point x_0 ,

$$F_1 \sin px_0 = F_2 \sin p(l-x_0) + D_2 \cos p(l-x_0) \dots (5)$$

$$G_1 \sin px_0 = G_2 \sin p(l-x_0) + E_2 \cos p(l-x_0) \dots (6)$$

The discontinuous change in the value of $\frac{dy}{dx}$ at the point of x_0 is due to the force $E \cos mt$. From this we get the two equations

$$F_1 \cos px_0 + F_2 \cos p(l-x_0) - D_2 \sin p(l-x_0) = 0 \\ G_1 \cos px_0 + G_2 \cos p(l-x_0) - E_2 \sin p(l-x_0) = \frac{E}{p T_0} \dots (7, 8)$$

At the point $x=l$,

$$y = D_2 \sin mt + E_2 \cos mt$$

and this motion at the bridge must be due to its yielding under the transverse periodic components of the tension. If the equation of motion of the bridge is

$$M \frac{d^2 y}{dt^2} = -T_0 \frac{dy}{dx} - f^2 y - g^2 \frac{dy}{dt}$$

where M is the mass of the bridge and associated parts, we obtain, by substitution, the equations

$$(f^2 - M m^2) D_2 = T_0 p F_2 + g^2 m E_2 \quad \dots \quad (9)$$

$$(f^2 - M m^2) E_2 = T_0 p G_2 - g^2 m D_2 \quad \dots \quad (10)$$

From the six equations numbered (5) to (10), the six unknowns F_1, F_2, G_1, G_2, D_2 and E_2 should obviously be capable of complete determination. Putting

$$\frac{T_0 p}{f^2 - M m^2} = \tan \theta \text{ and } \frac{g^2 m}{f^2 - M m^2} = \tan \phi,$$

the equations may be solved by first eliminating D_2, E_2 and then F_1, G_1 . Using for brevity the expression $\tan \psi = \tan \theta \cos^2 \phi$ and $\delta = \tan \theta \sin \phi \cos \phi$, the eliminant equations obtained are

$$F_2 \sin (pl + \psi) + G_2 \delta \cos \psi \cos pl = 0$$

$$F_2 \delta \cos \psi \cos pl - G_2 \sin (pl + \psi) + \frac{E \cos \psi \sin px_0}{p T_0} = 0$$

Solving these two equations, we obtain

$$F_2 = \frac{-E \delta \cos^2 \psi \cos pl \sin px_0}{p T_0 [\sin^2 (pl + \psi) + \delta^2 \cos^2 \psi \cos^2 pl]}$$

$$G_2 = \frac{-E \cos \psi \sin (pl + \psi) \sin px_0}{p T_0 [\sin^2 (pl + \psi) + \delta^2 \cos^2 \psi \cos^2 pl]}$$

If the impressed force $E \cos mt$ is regarded as an arbitrarily determined quantity, the interpretation of the preceding result is a simple matter, provided $\tan \phi$ (which involves the damping factor g^2) is regarded as very small. The second term in the denominators is then very small relatively to the first, and the maximum of F_2 is obtained when the first term in the denominator is zero, i.e. when

$$(pl + \psi) = v \pi \text{ or } pl = v \pi - \theta,$$

† being then practically equal to θ . G_2 is found to be zero when F_2 has its maximum value.

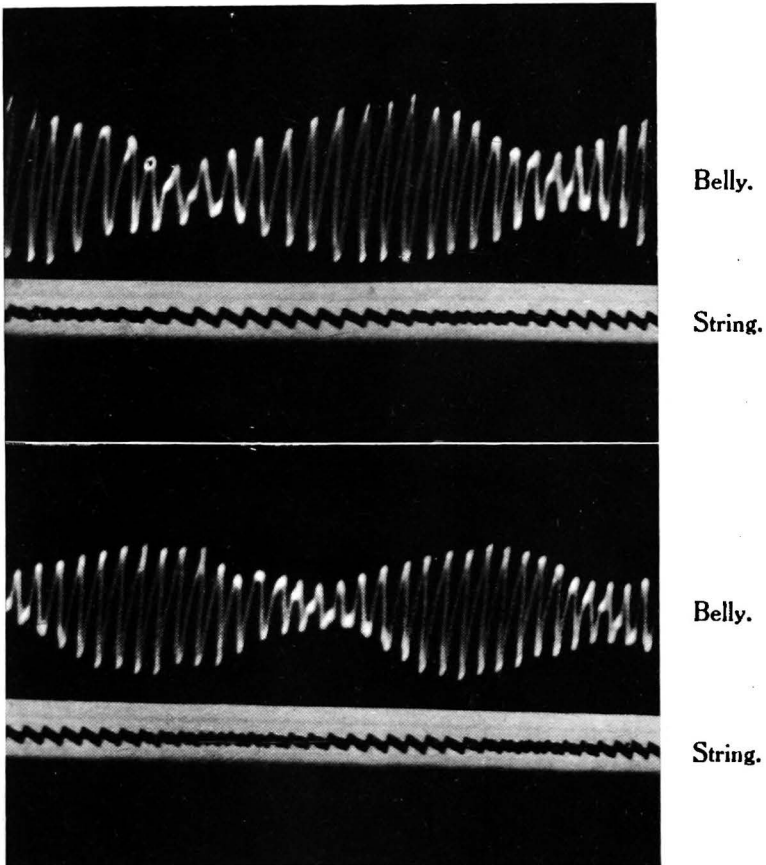
When $\sin px_0$ is zero, it is found from equations (5) to (10) that F_2, G_2, D_2, E_2 and F_1 are all equal to zero. The significance

of this is that when the point of application of the force coincides with a node of the string for the particular frequency of oscillation, the whole of the string between the bridge and the point of application remains completely at rest. Only the portion of the string between the fixed end and the point of application has any movement, this being of very small amplitude, viz., $\frac{E}{\rho T_0} \sin \rho x \cos mt$. It is thus seen that a periodic force of given magnitude produces an effect which is insignificant when it is applied at a node of the resulting oscillation, and which gradually increases as the point of application is removed further and further from the node. This result has many applications, as we shall see later on.

Generally speaking, the angle θ may also be taken to be very small, the quantity $(f^2 - M m^2)$ being either positive or negative and large compared with $T_0 \rho$. We then find, as may have been expected, that the vibration set up by the periodic force is a maximum when its frequency is the same as that of the free vibrations of the string of length l with both ends rigidly fixed. But the case is otherwise when $(f^2 - M m^2)$ is small, that is, when the free periods of vibration of the string and the bridge, taken separately, are nearly equal to one another. If the two periods are nearly equal to one another, the amplitude of the vibration of the string set up by the application of a periodic force of given magnitude and of frequency equal to that of its free oscillations is considerably smaller than if the natural periods of the string and of the bridge differed appreciably. To elicit the same amplitude of vibration, therefore, a comparatively much larger force would have to be applied when the frequency of the vibration is the same as that of the free period of the bridge and associated parts. This is the explanation of the difficulty noticed in bowing a string steadily when its pitch is that of the maximum resonance of the instrument. In Section XII, we shall consider the special effects observable under these conditions when the pressure of the bow is insufficient to maintain a steady vibration, and also those produced by loading the bridge.

In dealing with the motion of bowed strings, we have to consider the effect, not of a simple harmonic force, but of a system of forces whose frequencies form a harmonic series acting

PLATE I.



Simultaneous vibration-curves of Belly and G-Strings of Violoncello at the "Wolf-note" pitch showing Cyclical changes.

over a finite region of the string which may, by courtesy, be styled the "bowed point." As the bridge over which the string passes, together with its associated masses, may have several free periods of vibration, it is obvious that the formulae connecting the various harmonic components of the periodic force brought into play by the bow, with the respective components of the resulting motion, would not, in general, be of a simple character. Fortunately, however, as will be shown in the course of the paper, it is possible to build up a theory, which successfully predicts the phenomena observable under a very wide variety of conditions. The only assumptions that need be made for the present are (1), that the string is uniform and of negligible stiffness, and (2), that the yielding at the bridge is negligibly small in comparison with the motion of the string at the bowed point, or at any other point actually chosen for observation. These assumptions, which may be approximated to, in practice, as closely as desired, greatly simplify the treatment. The main result of the preceding treatment that is utilized, is that the effect of any of the harmonic components of the impressed force depends upon the point at which it is applied, vanishing when it is applied at a node, and increasing gradually as it is removed further and further from it.

The assumptions of the uniformity and flexibility of the string are made to ensure the treatment being as far as possible rigorous. Except, however, in the case of very complicated types of vibration, these assumptions are not essential, provided the frequencies of the normal modes of vibration are not so far from forming a harmonic series as to prevent the bow eliciting all the members of the series which are of importance, as components of a strictly periodic forced oscillation. Owing to this restriction and the dispersion which the waves suffer in travelling on a non-uniform string, the treatment then requires modification, as will be referred to again, later on.

SECTION III.—THE *Modus Operandi* OF THE BOW.

The function of the bow as normally applied is both to elicit and to maintain the vibrations of the string. The two processes are interdependent, but it is well to remember that they should

not be confused with each other, inasmuch as it may well happen that the character of the motion in its initial stages is not necessarily the same or even analogous to that maintained in the final steady state. For the present, however, we need not enter into these intricacies, but may simply assume that the motion is maintained in some perfectly periodic manner by the action of the bow, and proceed to find its character. It is obvious that on the assumptions set forth in the preceding section the period of the maintained oscillation is the same as that of the free vibrations of the string.

In a well-known paper on "Maintained Vibrations" (*Phil. Mag.*, 1883) reproduced in his *Theory of Sound*, Vol. I, page 81, Lord Rayleigh has discussed the general theory of vibrations elicited by generators and has shown that the supply of energy to the system through the action of the generator in any given time, may sometimes actually exceed that lost by the system in the same time through dissipative forces. When this happens, the excited vibrations continue to increase indefinitely in amplitude, until some physical limit is reached beyond which the equations of motion originally assumed cease to apply. The motion of a bowed string is evidently a case of this kind, the physical limit beyond which the vibrations cannot increase being imposed by the finiteness of the velocity of the bow. It has been suggested (with more or less definiteness) by the previous writers on the subject, that the bowed point on the string does attain or nearly attain the velocity of the bow in its movement in one direction. As will be seen presently, the question whether the forward velocity of the bowed point is *absolutely* the same as that of the bow is one of fundamental importance in the theory of the subject, and in one of my own previous publications,¹ I have shown how this identity of velocities can be brought experimentally to a test. What I propose to do here is to discuss the dynamical principles underlying the case in some detail, and then to pursue the argument to its logical conclusions.

The magnitude of the frictional force due to the bow at any instant must obviously depend upon the pressure with which it

¹ See Science Abstracts (Physics), Feb. 1915, page 87 (C. V. Raman).

is applied and upon the relative velocity at the point of contact. It is also clear that this relative velocity cannot ordinarily change sign during the motion, for, if it did, the entire frictional force would also change sign and the excess velocity of the bowed point would be immediately damped out. (An excellent illustration of this principle may be had by bowing a fork vigorously and then suddenly reducing the velocity of the bow. It will then be found that the amplitude of vibration of the fork also falls with practically equal suddenness.) With an efficient generator, e.g., a bow with rosined horse-hair acting on the string, the frictional force exerted would be much greater when the relative-velocity is nearly but not quite zero, than when it is large. On the other hand, when the relative velocity is actually zero, the friction ceases to be a determinate function of the relative velocity. From these premises, it is clear that, when the bow is applied with sufficient pressure and not too great a velocity, the maintaining forces brought into play would be far in excess of those required to maintain the vibration of the string (the mass and damping of the latter both being small), so long as the relative velocity at the point of contact does not actually become zero during any part of the vibration. On the other hand, we know that a steady state of vibration is only possible when the energy gains and losses balance each other, i.e., when the harmonic components of the force exerted by the bow are just sufficient to maintain the motion. The only possible inference that can be drawn under the circumstances is that the bowed point does actually attain the velocity of the bow during part of its motion and ultimately throughout the fractional part or parts of the period of vibration during which it has a forward movement. During these stages, the bow merely carries forward the point of the string with which it is in contact, and it is important to notice (accordingly to the preceding argument) that the frictional force then acting on the bowed point would actually fall below the maximum statical value; by how much it would fall below this maximum, would depend on the circumstances of the case, viz., the magnitude of the friction during the other stages of the motion as determined by the relative velocity, and the magnitude of the forces required to sustain the motion.

When the bowed point has the velocity of the bow in all the stages of forward movement, there is necessarily a discontinuous change of velocity¹ when it starts moving backward. The preceding argument may be pressed a little further if we assume that the forces required to maintain the motion are very small compared with the variation of frictional force due to a finite change of relative velocity. (Such an assumption would, in general, be justifiable if the pressure of bowing were sufficient and the damping co-efficient were sufficiently small). It would then follow that the frictional force exerted by the bow is practically constant throughout the whole motion, and that during all the intervals in which the relative value is not zero, it has a finite constant value which is the same for all such intervals. The relative velocity changes from this value to zero and *vice versa* in a discontinuous manner.

From a consideration of dynamical principles and of the relative order of magnitudes of the quantities involved, we thus arrive at the following two results: (*a*) during one or more intervals in each period of vibration, the bowed point has a forward movement which is executed with constant velocity exactly equal to that of the bow; (*b*) during the other interval or intervals, the bowed point moves backwards, also with constant velocity, this being the same for all such intervals (if there be more than one). The preliminary treatment of the vibrational modes given in the succeeding sections is mainly founded on these two results. It must be observed, however, that as the argument by which the second result was deduced, is rigorous only in the limiting case of a vanishingly small damping co-efficient, this particular result, viz., the constancy of velocity in the backward movement, cannot be regarded as holding good with the same completeness and generality as the first result, i.e. the constancy of velocity in the forward movement. We are thus led by the argument to anticipate the existence of cases in which the velocity of the bowed point varies in a continuous manner, particularly in the stages in which the movement is in a direction opposite to

¹ Equal to the velocity of the bow plus the initial speed of backward movement.

that of the bow. This is a feature which becomes of great importance in certain cases, specially in those of musical interest, and which therefore requires to be emphasised. For the present, however, it is advantageous to consider the constancy of the velocities of the bowed point as holding good rigorously, both in the forward and backward movements. This assumption serves admirably as the basis on which the kinematical theory of the various possible modes of vibration may be discussed. We shall accordingly proceed on this basis.

We may call the two velocities possible at the bowed point, v_B and v_A respectively, v_B being the velocity of the bow, and v_A the velocity of the bowed point when it travels against the bow. The intervals of time T_1, T_3, T_5 etc. in each period of vibration during which the velocity is v_A and the intervals T_2, T_4, T_6 etc. in which it is v_B are obviously connected by the equations,

$T_1 + T_2 + T_3 + T_4 + T_5 + T_6 + \dots = T$ (the complete period of vibration).

$$(T_1 + T_3 + T_5 + \dots) v_A + (T_2 + T_4 + T_6 + \dots) v_B = 0.$$

As already remarked, the argument shows that in the presence of dissipative forces, the constancy of velocity in the intervals of backward movement is not by any means so generally assured as the intervals of forward movement, and a steady state of motion in which the total of the time intervals of movement in the direction opposite to that of the bow, exceeds that of the intervals of movement with the bow, is altogether out of the question. The only cases, therefore, whose kinematics need be considered in detail are those in which v_A is numerically not less than v_B .

SECTION IV.—SIMPLIFIED KINEMATICAL THEORY.

From the general results indicating the nature of the motion at the bowed point obtained in the preceding section, we now proceed to build up a detailed kinematical theory of the motion of the bowed string. For this purpose the ordinary Fourier analysis is unsuitable, as it is neither convenient nor suggestive. I have therefore devised a simple graphical treatment which is based

upon the use of the velocity-diagram of the string and appears admirably adapted for the present investigation.

The general solution of the equation of wave propagation on an infinite string not subject to damping is,

$$y = f_1(x - at) + f_2(x + at). \quad \dots \quad (11)$$

It is well known that this solution for the case of an infinite string can be used to represent the configuration at any instant of a vibrating string of finite length, by arranging the form of the displacement waves in such manner that the motion is periodic and satisfies the terminal condition $y=0$ at the two ends of the string.

Similarly, the solution obtained by differentiating (11) with respect to time, viz.,

$$\frac{dy}{dt} = -a f_1'(x - at) + a f_2'(x + at). \quad \dots \quad (12)$$

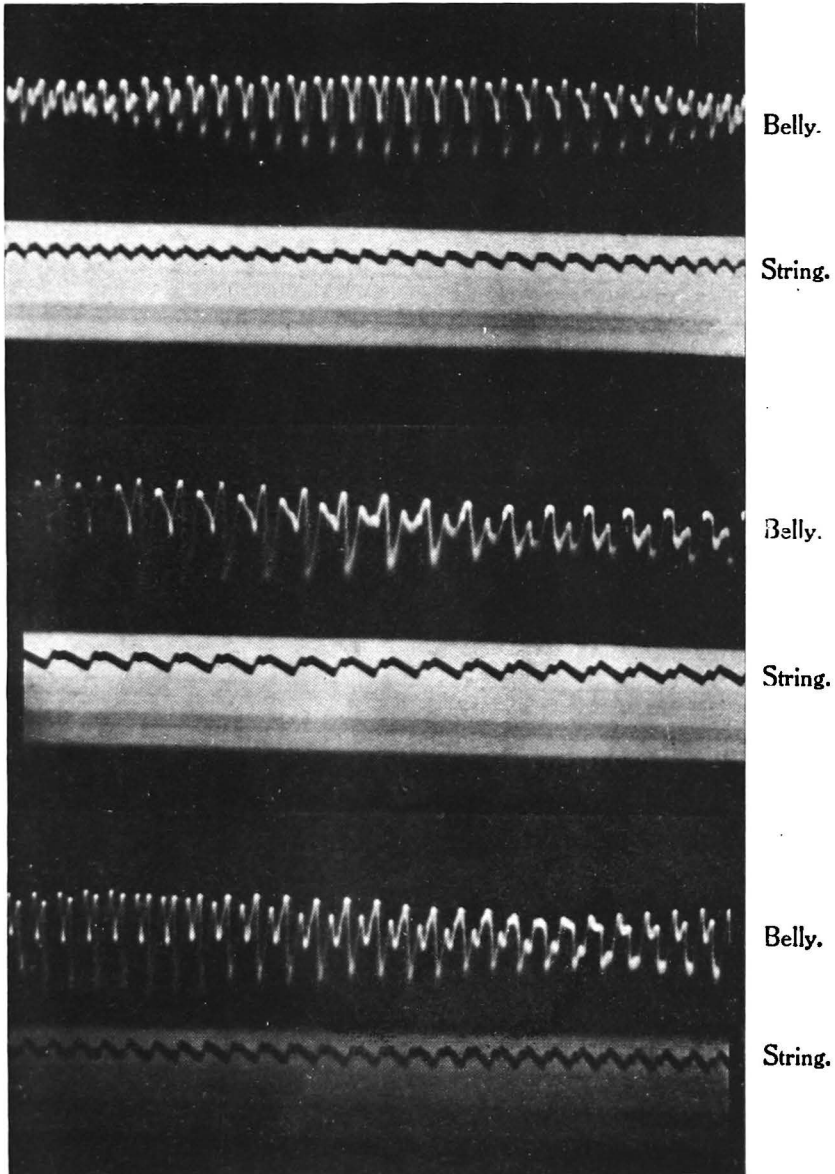
can be applied to represent the velocity diagram of a finite string at any instant during its vibration, if the periodicity of the motion and the terminal conditions of velocity are secured. It is obvious that solution (12) as it stands, represents the velocity waves that travel on an infinite string without change of form in the positive and negative directions respectively. In the case of a finite string of length l , the reflexions that take place at the two ends have to be taken into an account and we may write

$$\frac{dy}{dt} = \theta(x - at) + \phi(x + at). \quad \dots \quad (13)$$

The functions $\theta(x - at)$ and $\phi(x + at)$ represent the positive and negative velocity waves which must be imagined as extending to infinity in both directions. Further they must each of them be periodic with wave length equal to twice the length of the string, and must be so related that at the two ends of the string

$x=0$ and $x=l$, the terminal condition $\frac{dy}{dt} = 0$ is always satisfied.

This can be secured by arranging the form of the velocity waves in much the same way as the displacement waves would be arranged to secure the terminal condition $y=0$, i.e. the form of the positive velocity wave from $x=0$ up to $x=l$ in its initial position



Simultaneous vibration-curves of Belly and G-String of Violoncello at half the "Wolf-note" pitch showing the resonance of the octave and Cyclical changes.

is an inverted and reflected image of the negative wave from $x=l$ up to $x=2l$, and *vice versa*.

The cases in which the positive and negative velocity waves are completely identical in their initial positions, present features of special interest. Half the initial velocity at each point on the string is then due to the positive wave, and the other half to the negative wave, and there are no initial displacements, i.e., the string is everywhere in its position of statical equilibrium. After the expiry of half a period, i.e., when the positive and negative waves have each moved through a distance equal to the length of the string, the latter is again everywhere in its position of equilibrium. This is so because one half of each wave is merely the inverted and reflected image of the other half, and the displacements resulting from the initial velocities are annulled during the same half period. During the second half period the velocity at every point on the string goes back again to its original value through exactly the same stages; in other words, the velocity is everywhere an even periodic function of the time which when plotted gives a figure with the symmetry characteristic of such functions. It is thus seen that the positive and negative velocity waves are necessarily identical in any case in which the changes of velocity at points on the string take place in a symmetrical manner with respect to time.

We now proceed to consider cases in which the velocity changes that take place at some particular point on the string, say the point $x=x_b$, can be assumed to have a specified form. Then the form of the velocity waves $\theta(x-at)$ and $\phi(x+at)$ must be such that by their movement and superposition, the known changes of velocity at the point x_b are reproduced. For example, let us assume that the string at the point x_b moves during the vibration with a succession of constant velocities, the velocity passing in a discontinuous manner from each value to the next. Then at the point x_b , $\frac{d^2y}{dt^2}$ is always zero, except at certain instants in each period of vibration when it becomes \pm infinity.

Differentiating (13) with respect to time, we have

$$\frac{d^2y}{dt^2} = -a \theta'(x-at) + a \phi'(x+at). \dots \dots \dots (14)$$

Since at the point x_b , $\frac{d^2y}{dt^2}$ is generally zero, we must have

$$\theta'(x_b - at) = \phi'(x_b + at). \quad \dots \dots \dots (15)$$

If the velocity-waves $\theta(x - at)$ and $\phi(x + at)$ are represented graphically, equation (15) may be given a geometrical significance; if any two points are taken, one on the positive wave and the other on the negative wave, the distances of which from the point x_b , measured along the string are equal but in opposite directions, we should find the *slopes* of the waves at these two points to be equal. We have already seen that the positive and negative waves must satisfy certain other conditions, viz., that they are periodic with wave-length $2l$, and that, initially the form of the positive wave from $x = 0$ up to $x = l$ is the inverted and reflected image of the negative wave from $x = l$ up to $x = 2l$ and *vice versa*. It is a definite geometrical problem to find the configuration of the waves which would simultaneously satisfy these three conditions. By inspection, we get the following remarkably simple and significant solution: if the point x_b divides the string in an *irrational* ratio, the only possible form of the velocity waves is that in which the slope is everywhere the same, in other words, they are representable by a number of straight-lines which are all parallel to one another, a discontinuity intervening wherever one straight-line leaves off and the next begins. Velocity-waves having this form also satisfy the geometrical criteria when the point x_b divides the string in a rational ratio (i.e., in the ratio of two whole numbers), but in the latter case, this is not the only form of velocity-waves *geometrically* possible. This result is not a matter for surprise, for the point x_b would then coincide with a node of one of the harmonics of the string, and the ordinary Fourier analysis of the kinematics of the vibration shows that the motion of the string as a whole is not fully determinate, even though the motion at one nodal point on the string is fully ascertained.

It is noteworthy, however, that the result stated above was obtained solely from geometrical considerations without any reference to the methods of harmonic analysis.

The utility of the preceding discussion is obvious. For, we have seen in Section III that at the bowed point, generally speaking, the velocity alternates between two and only two constant values, once or oftener in each period of vibration. The condition $\frac{d^2y}{dt^2} = 0$ is thus generally satisfied at the bowed point, except at the instants at which the velocity changes from one value to the other and *vice versa*. At these instants, $\frac{d^2y}{dt^2}$ becomes \pm infinity. The preceding arguments are thus applicable, and it follows that when the bow is applied at some point dividing the string in a *irrational* ratio, the form of the velocity-waves is that of a number of straight-lines parallel to one another, with intervening discontinuities. It can now be seen that this is the case even when the bow is applied at a point dividing the string in any *rational* ratio, i.e., at some node on the string. For, the kinematical uncertainty in the latter case is due only to the harmonic components in the motion which have a node at the point of application of the bow, and we have established from dynamical principles that such harmonics are not excited by the bow and do not therefore exist in the motion under consideration. The quantities that determine the motion at the bowed point must therefore also determine the motion at every other point on the string whose position is known. These quantities, in the case of the bowed point, are its initial velocity and the magnitudes and positions of the discontinuities in the velocity-waves. For, the slopes of the positive and negative velocity-waves passing over the bowed point in opposite directions being equal, the velocity at that point remains unaffected except when a discontinuity passes over it, the velocity then suddenly changing by a quantity equal to the magnitude of the discontinuity: the *times* at which these changes occur are determined by the initial *positions* of the discontinuities and *vice versa*. As stated above, these quantities must also completely determine the motion at all other points on the string, and this is only possible when, between the points of discontinuity, the velocity-waves consist of straight-lines that are all parallel to one another.

It is thus seen that the problem of finding the mode of

vibration of the string under the action of the bow reduces itself to one of finding the number, position and magnitudes of the discontinuities in the velocity-waves. From the mode of construction of the positive and the negative waves, it is obvious that the number of discontinuities in a wave-length of either of the two waves is the same, and is equal to the *total* number of discontinuities actually on the region of the string at any instant during the vibration. When a discontinuity travelling with the positive wave reaches the end of the string, it is reflected and returns as a discontinuity in the negative wave; moving on towards the other end, it reaches it and is again reflected and brought on to the positive wave. This process then repeats itself indefinitely. In Section III it was shown that the velocity at the bowed point is alternately v_A and v_B , changing discontinuously from one value to the other, and *vice versa*. The positions and magnitudes of the discontinuities in the velocity-waves must be such that by their passage over the bowed point, the specified changes of velocity at that point are produced. The simplest case possible is that in which the discontinuities pass in succession over the bowed point, belonging alternately to the positive and negative waves, i.e., pass alternately over the bowed point in opposite directions. It is obvious that the discontinuities must then be all of the same magnitude and sign, i.e., $v_A - v_B$. In other words, the discontinuities are all equal in magnitude to one another and to the arithmetical sum of the two speeds possible at the bowed point, i.e., to the relative velocity of the bowed point with respect to the bow during the backward movement. Other cases that may possibly arise are the following:—(a), two discontinuities of the same magnitude and sign may pass simultaneously over the bowed point in opposite directions. (b), two discontinuities differing in magnitude or sign or both may simultaneously pass over the bowed point in opposite directions. (c), two or more discontinuities may pass over the bowed point in succession in the same direction instead of alternately in opposite directions. The contingency in (c) does not however actually arise, as it is impossible to construct positive and negative waves which would give rise to it and which would at the same time satisfy the condition that the velocity at the bowed point should alternate between two

values only. Further, it is found that if the bow is applied at a point dividing the string in an irrational ratio, the contingency in (b) is also impossible, and the discontinuities in the velocity-waves are necessarily all equal to one another and to $v_A - v_B$. This result is of great importance in the theory of the subject.

The reason why the discontinuities are all equal to $v_A - v_B$ if the bowed point divides the string in an irrational ratio, is not very difficult to see. The result has already been demonstrated for cases in which the discontinuities pass in succession over the bowed point and never simultaneously. If two equal discontinuities pass over the point in opposite directions at the same instant, the velocity of the point is left unaffected. Further, if two discontinuities thus cross at the bowed point, they cannot again pass simultaneously over the bowed point when returning after one reflexion at the ends of the string (the distance of the bowed point from the two ends being unequal). On the return journey, the discontinuities must therefore pass the bowed point either separately or else simultaneously with certain other discontinuities. In the former case their magnitudes are necessarily equal to $v_A - v_B$. In the latter case also, a precisely similar result holds good, except when all the discontinuities of a given set pass over the bowed point in twos and twos and never singly. From very simple geometrical considerations it can be shown that the discontinuities would so all pass in twos and twos only if they were situated at regular intervals equal to an aliquot part of the wave-length, and the bow were itself applied at a point of division of the string into an equal number of aliquot parts, i.e., at a point or node dividing the string in a rational ratio.¹ We thus

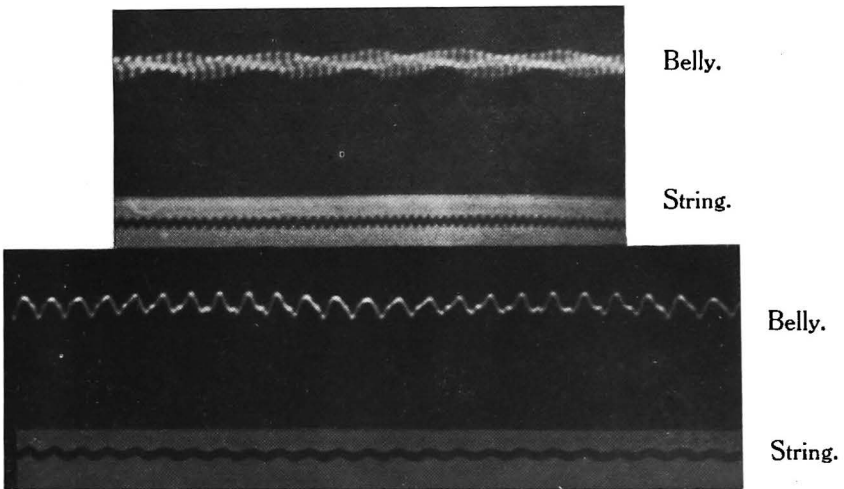
¹ The following simple model serves very effectively to picture the movement and successive reflexions of the discontinuities in the velocity-waves. Consider the motion of an endless cord which runs on two parallel axes between which it is stretched straight. A number of particles fixed to the cord at intervals may represent the discontinuities. If there are N particles fixed at equal intervals along the cord, the particles moving towards one axis would pass those moving the other way, at points dividing the distance between the axes into N equal parts. No particle would ever pass these points singly, i.e., by itself. A similar result would not be possible if the particles were fixed to the cord at unequal intervals or if any other point of observation were chosen. This model may be used for a lecture demonstration of the results given in Sections VII to X with reference to types of vibration in which there are two, three or any larger number of discontinuities.

arrive at the following two general results regarding the form of the velocity-waves:—1. When the bow is applied at a point dividing the string in an irrational ratio, the velocity-waves consist of straight lines that are all parallel to one other with intervening discontinuities all equal to $v_A - v_B$, and the number of such discontinuities per wave length is the same in the positive and negative waves. 2. When the bow is applied at a point dividing the string in a rational ratio, the velocity-waves also consist of parallel straight lines with intervening discontinuities, the number of which is the same per wave-length in the positive and negative waves; the magnitude of the discontinuities is not however the same as in (1). The argument shows that in this case, the non-appearance of the harmonics having a node at the bowed point results in a number of discontinuities being present at regular intervals equal to an aliquot part of the wave-length in the positive and negative waves, viz., at intervals of $2l/s$ when the bow is applied at one of the points of division of the string into s aliquot parts.¹ The discontinuities pass in pairs (never singly) in opposite directions over the bowed point and also over the other points of rational division of the string.

From the foregoing it is seen that in any case in which the bow is applied at a point of rational division of the string, the form of the velocity waves can be derived by a very simple geometrical construction from velocity-waves of the irrational type, i.e., those in which the discontinuities are all equal to $v_A - v_B$; the construction is equivalent to the abolition or removal of those harmonics which have a node at the bowed point and leaves the resulting motion at the bowed point and at the other points of rational division unaffected. Examples of the method will be dealt with later. Its usefulness is evident from the fact that all the possible types of vibration may thus be considered as special cases of what may be termed the irrational types of vibration, the theory of which can be worked out geometrically with the greatest ease and simplicity and which we shall now proceed to discuss.

¹ s is taken to be the smallest possible number of aliquot parts.

PLATE III.



Simultaneous Vibration-Curves of Belly and G-String of Violoncello
at 264 Vibrations per second, showing Cyclical changes.

SECTION V.—CLASSIFICATION OF THE VIBRATIONAL MODES.

From the results given in the preceding section it is obvious that the vibrational modes in the cases in which the bow is applied at a point of irrational division of the string can be very simply classified according to the total number of discontinuities in the velocity waves. If there is one discontinuity, we may call it the first type of vibration of a bowed string. If there are two discontinuities, it may be called the second type of vibration, and so on. Generally speaking, each of these types of vibration includes the complete series of harmonics.

We may now proceed to deduce a few results of general application, examples which will be met with in the detailed graphical discussion of individual cases to be given later in the course of the paper.

Since the positive and negative velocity waves are representable by parallel lines separated by equal intervening discontinuities, the points at which the x - axis is cut by the parallel lines (or would be cut by them if produced) must be equi-distant from one another. If there are n discontinuities per wave length, the intercepts on the x - axis are evidently $2l/n$. If $n = 1$, the intercepts are equal to $2l$, i.e., to the wave-length, and it is obvious that in this case the positive and negative waves are necessarily of the same form (symmetrical about the x - axis) and are completely coincident twice in each period of vibration.

If the inclination of the lines to the x - axis is $\tan^{-1} c$ and there are n discontinuities per wave-length each equal to $(v_A - v_B)$, we have

$$2cl = n (v_A - v_B). \quad \dots \dots \dots (16)$$

By summation of the ordinates of the positive and negative waves, the velocities at all points on the string can be ascertained and represented graphically. The velocity graph thus obtained for the string must evidently consist of parallel straight lines in-

clined to the x - axis at an angle $\tan^{-1} 2c$, the maximum number of such straight lines being $(n+1)$, (there being n discontinuities on the string, some of which might be instantaneously coincident in

position). Further, these $(n+1)$ lines on the velocity diagram pass through fixed points on the x - axis situated at equal intervals. Since the two ends of the string have always zero velocity, these fixed points are in fact the $(n+1)$ nodes of the n^{th} harmonic, and we thus obtain the result that the lines of the velocity diagram pass, or would pass if produced through some or all of the $(n+1)$ nodes of the n^{th} harmonic, if the particular type of vibration elicited by the bow is that in which there are n equal discontinuities.

From the preceding result, we may very readily deduce an expression for the ratio v_A/v_B of the two velocities possible at the bowed point, which besides being of perfectly general application is also valid for all points on the string, the velocity at which alternates between two constant values only, once or oftener in each period of vibration. Assume first that the bow is applied at a point of irrational division of the string and the mode of vibration elicited is that in which there are n equal discontinuities. Consider the motion at a point on the string lying between the r^{th} and $(r+1)^{\text{th}}$ nodes of the n^{th} harmonic (counting from one end) and whose distance x from that end of the string is therefore greater than $(r-1)l/n$ and less than rl/n . The velocity of this point on the string at any instant during the vibration is given by the ordinate of the velocity diagram. As we have just seen, this velocity-diagram consists of parallel lines drawn through the successive nodes of the n^{th} harmonic at an inclination of $\tan^{-1} 2c$ to the x - axis, with intervening discontinuities. If the velocity at the particular point on the string alternates between two and only two constant values, it must be because the ordinate drawn through it intersects alternately the two lines of the velocity diagram passing through the two nodes of the n^{th} harmonic on either side of it, as a result of the movement of the discontinuities. In other words, the two velocities at the point considered are $2c(x - \overline{r-1}l/n)$ and $2c(x - rl/n)$. The ratio of these velocities is merely the ratio of the distances of the point from the two nodes, and if (for brevity) the symbol x_n is used to denote the shorter of the two distances, and ω is used to

denote the total fraction of the period of vibration in which the point moves with the larger of the two velocities, we have

$$\omega = \frac{nx_n}{l} \dots \dots \dots (17)$$

The algebraic difference of the two velocities at the point is $2cl/n$ and this is equal to $(v_A - v_B)$, vide equation (16). Since the result given in (17) is true for all points on the string at which the velocity alternates between two constant values once or oftener in each period of vibration, it applies also at the bowed point, x_n denoting its distance from the nearest node of the n^{th} harmonic.

The result given in (17) above is noteworthy by reason of its simplicity and perfect generality as also by reason of the simplicity and perfect generality of the reasoning from geometrical considerations by which it was deduced. The result is equally applicable in cases in which the motion at the bowed point is of the simplest possible type (one ascent followed by a descent) as well as those in which the motion is one of the so-called complicated types, a succession of several ascents and descents within the period of vibration. In deducing the result, it has been assumed that the vibration is elicited by applying the bow at a point of irrational division of the string, so that the type of motion maintained is one in which the discontinuities present in the velocity waves are all equal to $(v_A - v_B)$. Even this restriction may be removed, i.e., we may also include the cases in which the bow is applied at a point of rational division of the string, the only difference being that the result given in (17) would then be applicable only at the bowed point and at some or all of the other nodes of the principal member of the missing series of harmonics, and not at any other point on the string. For, as already referred to in the preceding section, any type of vibration elicited by applying the bow at a nodal point on the string can be considered as one of the modes of vibration of the 'irrational' type with the series of harmonics having a node at the bowed point dropped out. The process leaves the motion at the bowed point and at the other nodes of the principal member of the missing series of harmonics, unaffected.

When $n = 1$, equation (17) reduces to the well-known relation discovered by Helmholtz, i.e., the ratio of the velocities of ascent and descent at the point considered is the same as the ratio of its distances from the two ends of the string. Krigar-Menzel and Raps found in their experimental work that Helmholtz's relation was satisfied when the bow was applied in the normal manner at any point very close to an end of the string or else very exactly at one of the nodal points distant $\frac{l}{2}, \frac{l}{3}, \frac{l}{4}, \frac{l}{5}, \frac{l}{6}$ or $\frac{l}{7}$ from the end. The value of ω for other points of application of the bow was also measured by Krigar-Menzel and Raps, and they state as the result of these measurements that no general algebraic relation connecting the value of ω at the bowed point with its position on the string could be found even when the motion at the bowed point was of the simplest possible type representable by a two-step zig-zag. Their deliberate conclusion on this question was that, except when the bow was applied close to the end of the string or at one of the nodes of some fairly important harmonic, the value of ω was to be regarded as a purely empirical quantity depending on the experimental conditions. It is obvious that if the value of ω is thus regarded as an arbitrary quantity determinable by experiment, no complete theoretical discussion of the kinematics of the string is possible, and in fact Krigar-Menzel and Raps did not attempt any such complete discussion. While on the experimental side their paper was a notable contribution to the subject, the treatment given by them on the theoretical side was thus obviously defective and incomplete. The general kinematical analysis set out in the present paper shows that the value of ω in all cases (i.e. both for rational and irrational points of bowing) should satisfy the relation given in equation (17), n being given by the appropriate integral value, 1, 2, 3, 4 or 5, etc. The failure of Krigar-Menzel and Raps to discover this general algebraic relation, or rather this series of relations connecting the value of ω at the bowed point with its position on the string, must be attributed to their having adopted an almost exclusively empirical method of treatment. If, instead of relying solely on the result of the measurements which were necessarily subject to experimental error in some degree, they had investi-

gated in detail the kinematics of some of the simpler types of vibration other than those known through the work of Helmholtz, e.g., that obtained by applying the bow at a point close to but not coincident with the centre of the string, the functional relation connecting the value of ω at the bowed point with its position on the string could have been looked for with a greater chance of success. That such a functional relation exists must indeed have been evident from the fact that the characteristic vibration-curves in such cases also are perfectly reproducible, time after time, with strings of any length, diameter or material.

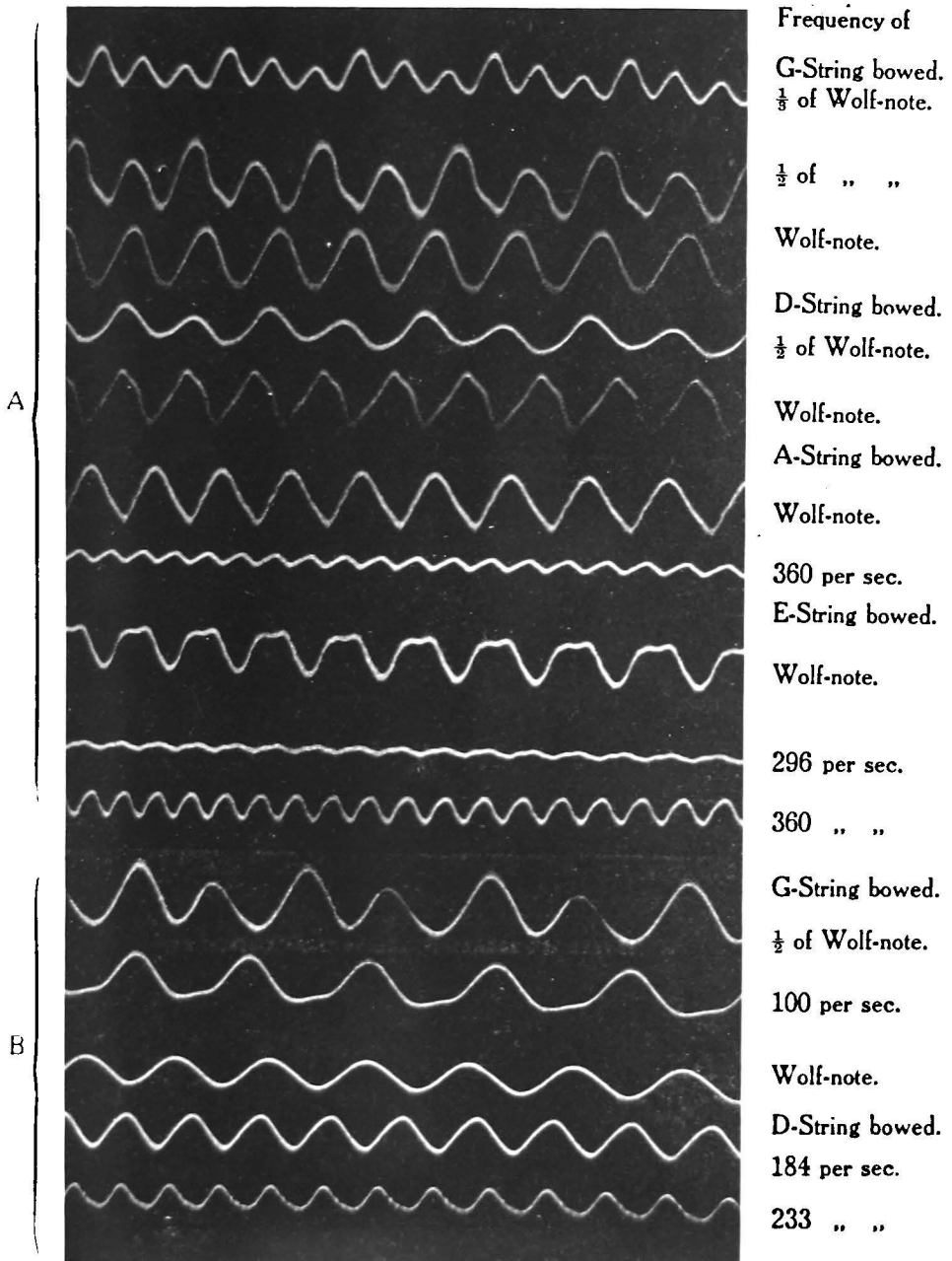
The failure to establish a proper scheme of classification of the vibrational modes and to find the general form of the functional relation connecting ω at the bowed point with its position anywhere on the string was also one of the fundamental defects in the paper by A. Stephenson cited in the Bibliography. In this paper (published in 1911) only the work of Helmholtz is referred to, and a perusal of it shows that Stephenson was unacquainted with the work of Krigar-Menzel and Raps published in 1891, and that he was, indeed, unaware of many facts which anyone who has experimented with a bow and monochord could readily observe for himself. It is not a matter for surprise therefore that, though Stephenson's paper is noteworthy as an attempt to treat the motion of a bowed string as a case of maintained vibration, it takes us little beyond the work of Helmholtz. Stephenson also failed to realise that the Fourier analysis is obviously incapable of giving any useful indication of what would happen if the bow is applied at a point of irrational division of the string, i.e., at a point not exactly coinciding with any nodal point of importance, and it is precisely such indication that is required to explain the phenomena observed in experiment.

We may now pass on to consider the kinematics of the irrational types of vibration more in detail. If there are n equal discontinuities, the velocity-diagram of the string consists of not more than $(n+1)$ parallel lines passing through the $(n+1)$ nodes of the n^{th} harmonic. As the discontinuities move one way or the other, the lines of the velocity-diagram increase in length or else shorten and sometimes vanish altogether, and given the form of the velocity-diagram at any epoch of the vibration, it is quite

an easy matter to find its form, at any subsequent epoch or to trace directly the succession of velocity-changes at any point on the string and thus to determine the form of the vibration curves. If the positive and negative velocity-waves are of identical form, it is obviously convenient to commence with the epoch at which they are completely coincident and the string everywhere passes through its position of statical equilibrium. At that epoch, the discontinuities are everywhere situate in pairs along the string, the odd discontinuity, if any being at one end of the string, and the lines of the velocity-diagram pass through the *alternate* nodes of the n^{th} harmonic. In the subsequent motion, the discontinuities situate along the string separate and move off in opposite directions, the odd discontinuity, if any, situate at the end of the string moving straight off towards the other end. After half a period, the positive and negative waves again coincide and the velocity-changes at every point on the string are gone through in the reverse order, as already described in Section II of the paper. It should be remarked that the positive and negative waves are necessarily of the same form when the motion at any one point on the string is representable by a simple two step zig-zag, or by any other curve possessing a similar type of symmetry. As normally applied, the bow excites the vibrations of the string from an initial state in which the latter is everywhere in its position of equilibrium. The tendency is thus, in a large majority of cases, to set up vibrations having this characteristic type of symmetry.

SECTION VI.—THE FIRST TYPE OF VIBRATION.

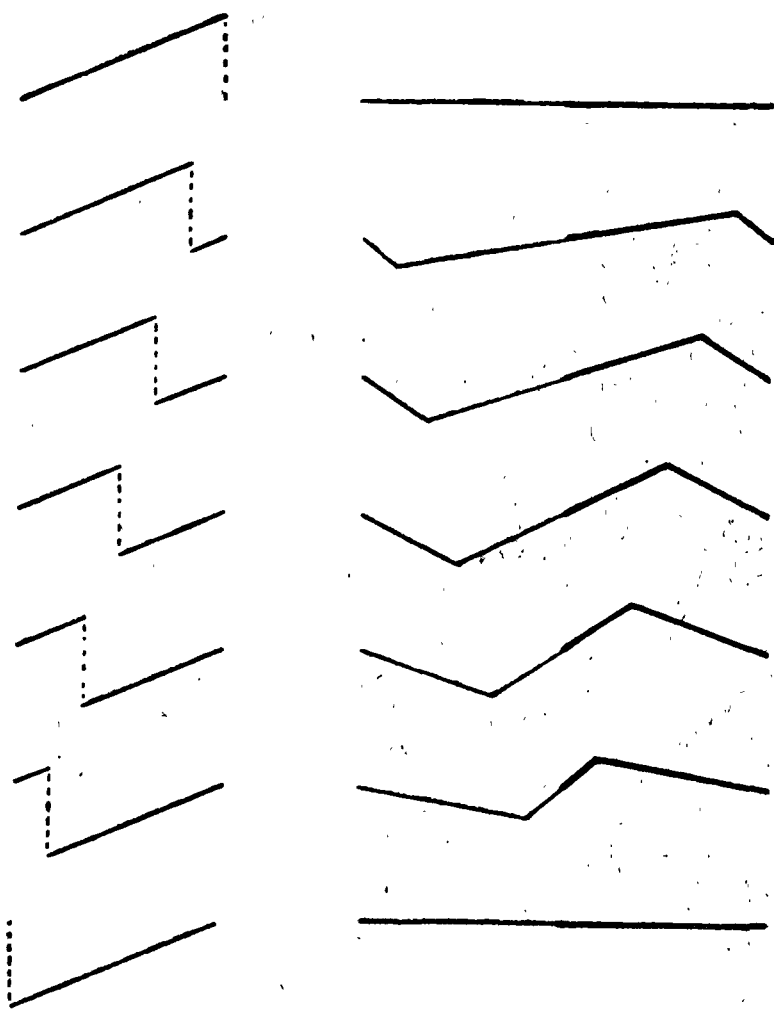
Of the possible types of vibration set up by the application of the bow at a point of irrational division, the first type with only one discontinuity on the velocity-diagram is the simplest and most important. In this case, as already remarked, the positive and negative velocity-waves are necessarily of the same form, and at the instant at which they are coincident, the velocity-diagram is a straight line passing through one end of the string ($x=0$), with a discontinuity at the other end ($x=l$). As this discontinuity moves in along the string, the velocity-diagram consists of parallel lines passing through its two ends, and the velocities at



Resonance-Curves of Belly of Violoncello.

- A. Without any load on the bridge: Wolf-note frequency 176 vibrations per second.
- B. With a load of 40.4 grammes fixed on top of bridge. Wolf-note frequency 137 vibrations per second.

any point before and after its passage are respectively proportional to the distances from the two ends. When the discontinuity reaches the end $x=l$, it is reflected and the velocity-diagram then passes back through the same stages to its original form.



Velocity-Diagrams.

Vibration-curves and Displacement Diagrams.

Fig. 1.—First Type of Vibration.

Fig. 1 (first column) shows the successive velocity-diagrams at intervals of one-twelfth of an oscillation.

Fig. 1 (second column with the heavy and thin lines taken separately) also shows the displacements of the string from its initial position at similar equal intervals throughout the complete period of vibration. These configuration-diagrams, as we may call them, evidently consist of two straight lines passing through the ends of the string and meeting at the point up to which the discontinuity in the velocity-diagram has travelled at any instant. (It should be remarked here that the displacements are always measured from the position of equilibrium of the string under the steady frictional force exerted by the bow, and not from the position of equilibrium attained when the bow is removed). The second column of Fig. 1, with the heavy and thin lines taken together represents on the same scale of ordinates, the vibration curves for the complete period, of points situated on the string at successive equal intervals of one-sixth of its length, commencing from one end. When extended on either side for a number of complete periods, the vibration-curves are seen to consist of simple two-step zig-zags, the fraction ω of the complete period during which any point moves with the larger of the two velocities being given by the relation

$$\omega = x_1/l \quad \dots \dots \dots (18)$$

where x_1 is the distance of the point from the nearer of the two ends of the string.

The correspondence noticed above between the configuration of the string as a whole and the vibration-curves of individual points on it is not peculiar to the present case, but may be established with generality for any possible type of vibration of a stretched string in which the positive and negative velocity-waves are of the same form. A geometrical proof is very readily given by noticing that the displacement at any point is the time-integral of the velocity and is therefore representable by the area enclosed by two ordinates drawn at equal distances on either side of the point under consideration, to intersect the velocity-wave. The following is an analytical proof. In such cases we have

$$y = \sum_1^{\infty} a_n \sin \frac{n\pi x}{l} \sin \frac{2\pi nt}{T} \quad \dots \dots \dots (19)$$

If x is regarded as constant and t as a variable, equation (19) represents the form of the vibration-curves. On the other hand, if t is regarded as constant and x as the variable, the equation gives us the configuration of the string. By taking only half the complete period into consideration, i.e., from $t=0$ up to $t=T/2$ or from $t=T/2$ up to $t=T$, we can get identical geometrical representations for the motion at individual points on the string, and for the configuration of the string as a whole, provided that the times for the latter and the positions for the former are so chosen that $2t/T=x/l$.

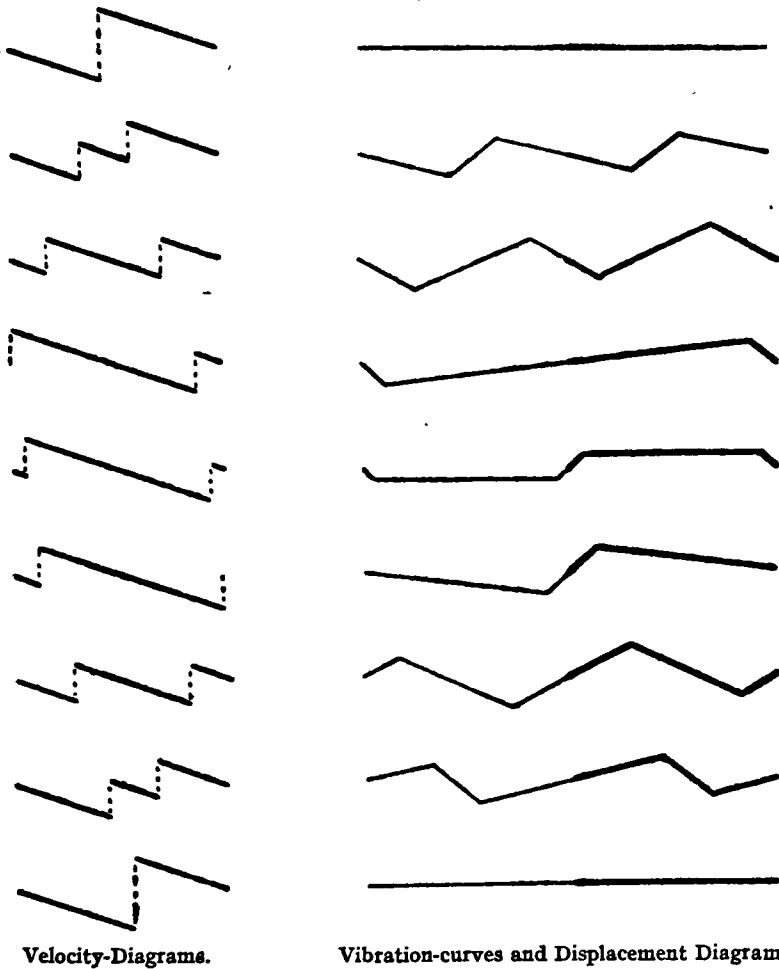
Two other important consequences of equation (19) may also be noticed here. If two points are taken on the string, one on either side of the centre at equal distances from it, the form of their vibration-curves are the mirror-images of one another with respect to the centre of the string. The second consequence is that the vibration-curve at a point very close to the end of the string from $t=0$ to $t=T/2$ or from $t=T/2$ up to $t=T$ is, in the limit, of the same form as the *velocity-diagram* of the string at time $t=0$ or $t=T/2$ as the case may be. This may be regarded as a particular case of the correspondence of form noticed in the preceding para. obtained by putting the chosen values of t and x very small. For, when t is very small but not actually zero, the small displacement at any point is proportional to the initial velocity at the point.

SECTION VII.—THE SECOND TYPE OF VIBRATION.

We now pass on to consider the case in which there are two discontinuities in the velocity-diagram.

At some epoch or other of the vibration, the two discontinuities must necessarily coincide, and we thus see that in the second type of vibration also, the positive and negative velocity-waves are necessarily of the same form. The particular point on the string at which the discontinuities cross, remains, however, at our disposal. If this point is the centre of the string, the discontinuities would again cross at that point after half a period, and it is obvious that the string would vibrate in two segments, the frequency of vibration being twice that of the fundamental,

and the vibration-curves would everywhere be simple two-step zig-zags. If, however, the discontinuities cross at a point distant $l/2 + b$ from one end, their second crossing after the expiry of a



Velocity-Diagrams.

Vibration-curves and Displacement Diagrams.

Fig. 2.—Second Type of Vibration.

half-period would be at a point distant $l/2 - b$ from the same end, and the frequency of the vibration would be that of the fundamental. Fig. 2, first column, shows the velocity-diagrams for this case. Initially, the velocity-diagram consists of two parallel

lines passing through the two ends of the string and separated by the two coincident discontinuities. When these move off in opposite directions, the third line that forms on the velocity-diagram and extends both ways, passes through the centre of the string. During the greater part of each half-period, therefore, the centre of the string remains at rest,¹ displaced from the position of equilibrium first to one side and then to the other, the movement from one position to the other being executed with great velocity (equal to $v_A - v_B$). The two stationary positions of the centre of the string should therefore appear very brilliantly visible on a dark ground. The vibration-curves of any desired points on the string can be very readily set down by inspection of the velocity-diagrams or otherwise. They are shown in the second column of Fig. 2. At the centre, the motion is of the type already described.² The nature of the movement at points intermediate between the limits $x = l/2 \pm b$ is not shown, but this the reader can find for himself from the velocity-diagram. At the points $x = l/2 \pm b$, the vibration-curve is a simple two-step zig-zag, the ratio ω of the time of movement with the larger velocity to the total period of vibration being given by the simple relation

$$\omega = 2b/l. \quad (20)$$

Outside the limits $x = l/2 \pm b$ the motion is representable by a four-step zig-zag, the velocity alternating twice between two constant values, ω being given by the relation

$$\omega = 2x_2/l \quad (20a)$$

¹ This phenomenon of which, it is believed, the simplest explanation is here given, and the analogous appearances at the respective nodes in the case of the third, fourth and higher types of vibration were observed and figured so long ago as 1800 by Dr. Thomas Young in the Philosophical Transactions for that year. Young obtained them by applying the bow at points close to but not coincident with the points of aliquot division of the string. He appears to have fully understood the fact that the types of vibration thus set up were totally different from those obtained by applying the bow at the points of aliquot division, and not merely modifications thereof. His explanation of the difference in terms of the impulses which he assumed the bow to send out and of their interference at the bowed point, was remarkably near the truth.

² Three typical vibration-curves of the type here described appear among the photographs published by Krigar-Menzel and Raps, but these authors failed to observe the essential kinematical relation given in (20) necessary to connect them together.

where x_2 is the distance of the point of observation from the centre of the string or from the end, whichever is less.

A motion of the type here described would, normally speaking, be excited if the bow were applied at one or other of the two points $x = l/2 \pm b$. It is obvious, however, that it might also be excited, if the bow were applied outside these limits, the motion at the bowed point then being a four-step zig-zag. In either case, the maximum value of b is $l/4$, since this would make ω in (20) equal to $\frac{1}{2}$.

As already explained in Section V, the relation $\omega = 2x_2/l$ would hold good at the bowed point even if this divided the string in a rational ratio, as the dropping out of the harmonics having a node at the bowed point would leave the motion there unaffected. It is instructive to compare the values of ω for various points on the string, for the first and second types of vibration. These are shown in Table I. The distance of the point from the end of the string is given as a fraction of the total length. For convenience, the ratio of two large numbers prime to one another may be used as practically equivalent to an irrational ratio. If the motion at

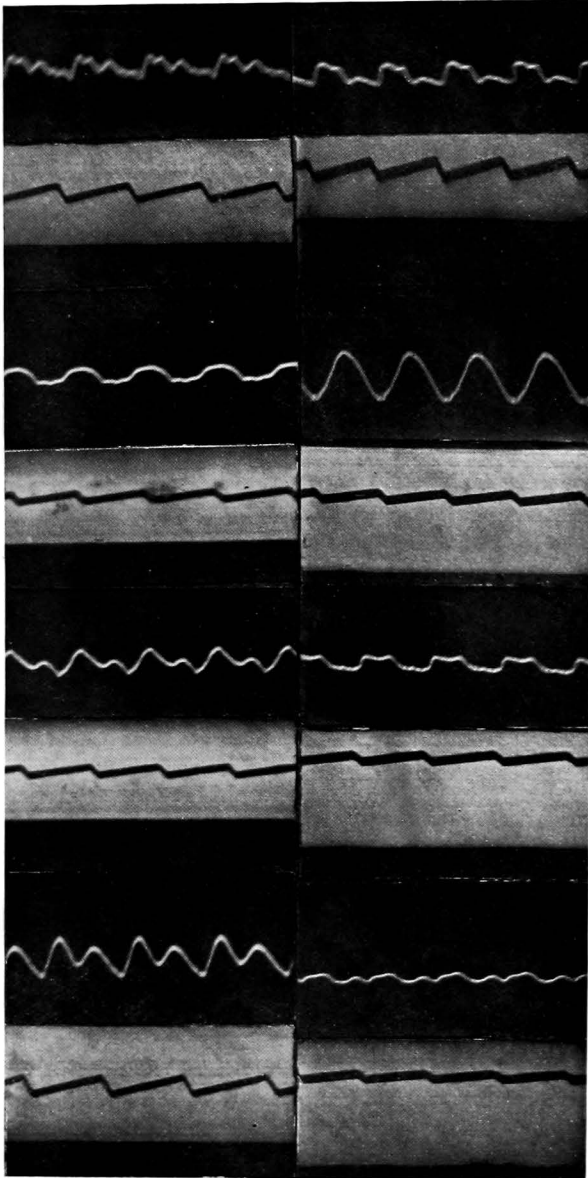
TABLE I.

Position of Bowed point ..	$\frac{1}{2}$	$\frac{10}{21}$	$\frac{22}{61}$	$\frac{17}{36}$	$\frac{7}{15}$	$\frac{5}{11}$	$\frac{9}{20}$	$\frac{4}{9}$	$\frac{3}{7}$	$\frac{2}{5}$	$\frac{4}{11}$	$\frac{1}{3}$	$\frac{2}{7}$	$\frac{3}{11}$	$\frac{1}{4}$
Value of ω for the first type ..	$\frac{1}{2}$	$\frac{10}{21}$	$\frac{22}{61}$	$\frac{17}{36}$	$\frac{7}{15}$	$\frac{5}{11}$	$\frac{9}{20}$	$\frac{4}{9}$	$\frac{3}{7}$	$\frac{2}{5}$	$\frac{4}{11}$	$\frac{1}{3}$	$\frac{2}{7}$	$\frac{3}{11}$	$\frac{1}{4}$
Value of ω for the second type ..	$\frac{1}{\infty}$	$\frac{1}{21}$	$\frac{3}{61}$	$\frac{2}{36}$	$\frac{1}{15}$	$\frac{1}{11}$	$\frac{2}{20}$	$\frac{1}{9}$	$\frac{1}{7}$	$\frac{1}{5}$	$\frac{3}{11}$	$\frac{1}{3}$	$\frac{2}{7}$	$\frac{3}{11}$	$\frac{5}{12}$

the bowed point is of the simplest possible type, a two-step zig-zag, it is seen from the third row of figures in Table I that one of the sides of the zig-zag becomes very steep if the bow is applied close to the centre of the string. It becomes less and less steep as the bow is removed farther and farther from the centre of the string, but it continues steeper than in the vibration-curve for the first type until the point $l/3$ is reached when ω becomes identical for the first and second types of vibration; the significance of this is that in the second type of vibration the octave is the

PLATE V.

G-String Bowed. D-String Bowed.



Without load.

With load of 17
grammes fixed on
top of bridge.

Ditto ; fixed on left
foot of bridge.

Ditto ; fixed on right
foot of bridge.

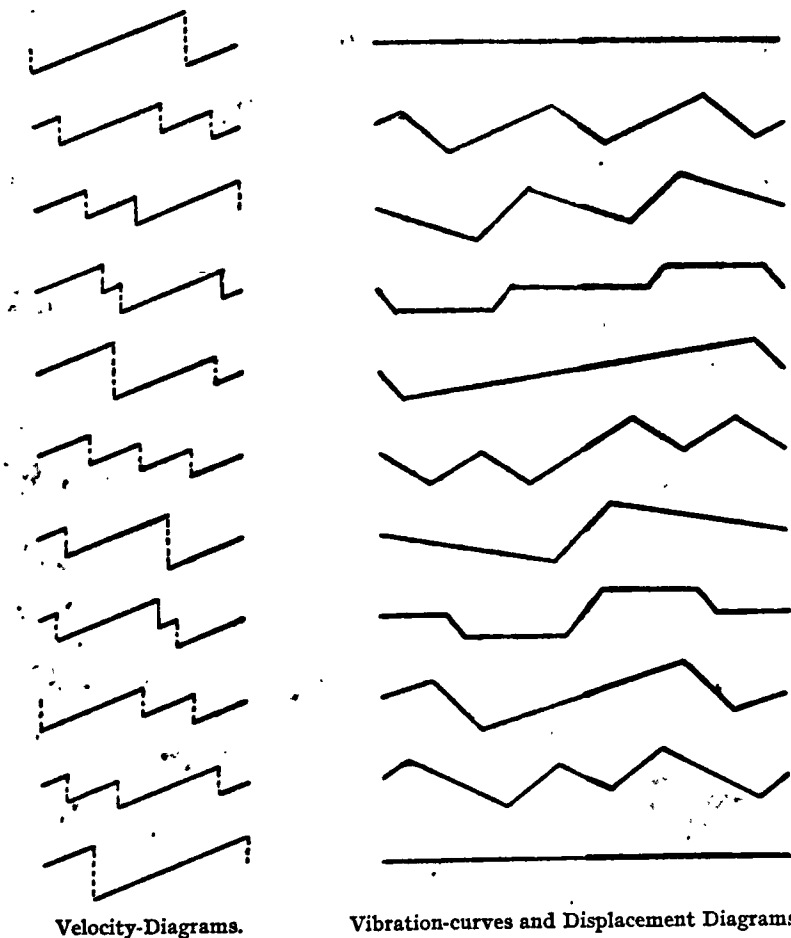
Simultaneous Vibration-Curves illustrating effect of loading the violin bridge on its horizontal motion transverse to the strings, (observed at the G-String corner).

dominant harmonic and far more powerful than the fundamental when the point of application of the bow is close to the centre of the string, but the difference becomes less and less marked as the bow is removed farther from the centre; when the bow is applied at a distance $l/3$ from the end of the string, the octave and the fundamental are present in the same proportion in the second type of vibration as in the first, and, in fact, the two types of vibration then become identical owing to the dropping out of all harmonics having a node at $l/3$. Similar relations are met with in the theory of the third and higher types of vibration, and a fuller discussion of this identity of vibration types in certain cases will be given when dealing in detail with the theory for rational points of bowing. Between $l/3$ and $l/4$, the value of ω is actually less for the second type than for the first, and the octave becomes feebler and feebler as the bow is removed from the centre, till at $l/4$, it vanishes altogether, ω being equal to $\frac{1}{2}$.

SECTION VIII.—THE THIRD TYPE OF VIBRATION.

When there are three equal discontinuities on the velocity-diagram, the positive and negative velocity-waves are not necessarily of the same form. If at an epoch at which two of the discontinuities are coincident in position, the third is at one of the ends of the string, then, obviously, the positive and negative waves are of the same form and actually coincident at that instant; the vibration at every point on the string is then of the symmetrical type. At the epoch referred to, the velocity-diagram would consist of only two parallel lines, one of which passes through an end of the string, and the other through the point of trisection farthest from it. In the subsequent motion, the number of lines in the velocity-diagram would, in general, be four, and at certain instants, three or two. On the other hand, in the unsymmetrical cases, the number of lines is never less than three and is generally four. Apart from this, the form of the vibration-curve at any point on the string can be found in precisely the same way in the unsymmetrical cases as in the symmetrical ones, i.e., by considering the changes of velocity due to the movement of the discontinuities.

As the symmetrical cases are much the more important, we shall now consider them a little more fully. Figs. 3 and 4 illustrate the mode of vibration, the initial coincident position of the two discontinuities lying outside the two points of trisection of the



Velocity-Diagrams. Vibration-curves and Displacement Diagrams.
Fig. 3.—The Third Type of Vibration (Negative).

string in Fig. 3 and between them in Fig. 4. If this position is at $x = 2l/3 \pm 2b$, the two discontinuities again coincide after a half period at the point $x = l/3 \mp 2b$. It can be seen that at the points $l/3 + b$ and $2l/3 - b$ in Fig. 3 and at the points $l/3 - b$ and

$2l/3 + b$ in Fig. 4, the vibration-curve is a simple two-step zig-zag, these being also points at which discontinuities cross. At the points $l/3 - 2b$ and $2l/3 + 2b$ in Fig. 3, and at the points $l/3 + 2b$ and

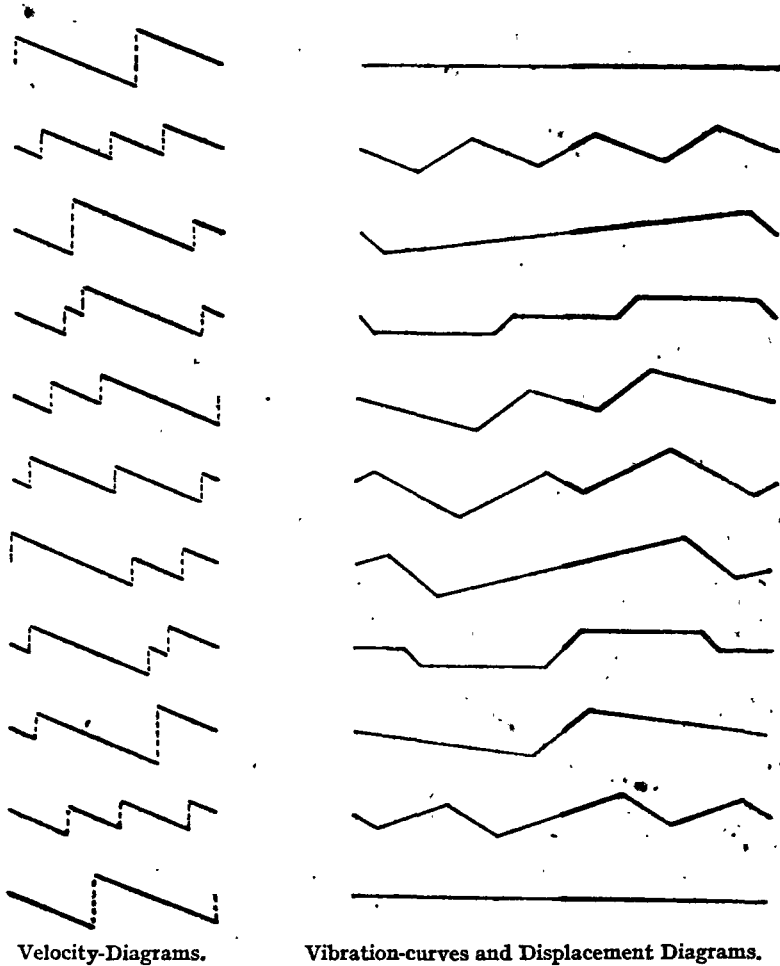


Fig. 4.—The Third Type of Vibration (Positive).

$2l/3 - 2b$ in Fig. 4, the vibration-curve is seen to be a four-step zig-zig. Except in the region on either side of the points of trisection between the limits $l/3 - 2b < x < l/3 + b$ and $2l/3 - b < x < 2l/3 + 2b$ in Fig. 3 and the limits $l/3 - b < x < l/3 + 2b$ and $2l/3 - 2b < x$

$< 2l/3 + b$ in Fig. 4, the velocity at any point on the string alternates between two constant values thrice in each vibration-period. The fraction ω of the complete period during which the larger velocity subsists is given by the relation

$$\omega = 3x_0/l \dots \dots \dots (2I)$$

where x_0 is the distance of the point of observation from either point of trisection or from the end of the string whichever is the *least*. The types of vibration shown in Figs. 3 and 4 may be regarded as set up by application of the bow at a point distant b from one of the points of trisection, and lying between them in respect of Fig. 3, and outside of them in Fig. 4. The motion at the bowed point is then of the simplest possible type (representable by a two-step zig-zag), the value of ω there being given by the relation

$$\omega = 3b/l \dots \dots \dots (2Ia)$$

The maximum value of b is $l/6$ as ω is then equal to $\frac{1}{2}$.

The values of ω as given by equation 2I (a) for various values of b within the limit stated above, are shown in Table II. The distance of the bowed point from one end of the string is shown as a fraction of the total length l .

TABLE II.

Position of bowed point	$\frac{1}{3}$	$\frac{5}{11}$	$\frac{4}{9}$	$\frac{3}{7}$	$\frac{2}{5}$	$\frac{5}{13}$	$\frac{3}{8}$	$\frac{4}{11}$	$\frac{5}{14}$	$\frac{23}{65}$	$\frac{6}{17}$
Value of ω for the third type ..	$\frac{1}{2}$	$\frac{4}{11}$	$\frac{3}{9}$	$\frac{2}{7}$	$\frac{1}{5}$	$\frac{2}{13}$	$\frac{1}{8}$	$\frac{1}{11}$	$\frac{1}{14}$	$\frac{4}{65}$	$\frac{1}{17}$
Position of bowed point	$\frac{1}{3}$	$\frac{5}{16}$	$\frac{17}{55}$	$\frac{3}{10}$	$\frac{5}{17}$	$\frac{2}{7}$	$\frac{3}{11}$	$\frac{1}{4}$	$\frac{2}{9}$	$\frac{1}{5}$	$\frac{1}{6}$
Value of ω for the third type ..	$\frac{1}{\infty}$	$\frac{1}{16}$	$\frac{4}{55}$	$\frac{1}{10}$	$\frac{2}{17}$	$\frac{1}{7}$	$\frac{2}{11}$	$\frac{1}{4}$	$\frac{3}{9}$	$\frac{2}{5}$	$\frac{1}{2}$

From Table II it will be seen that ω is very small at the bowed point when this is situate close to the point of trisection. One side of the zig-zag vibration-curve at the bowed point is then much steeper than the other and, as can be seen from Figs. 3 and 4, the third harmonic is dominant in the resulting motion, being

in fact far more powerful than even the fundamental. As the bow is removed from the node, ω becomes larger and the ampli-

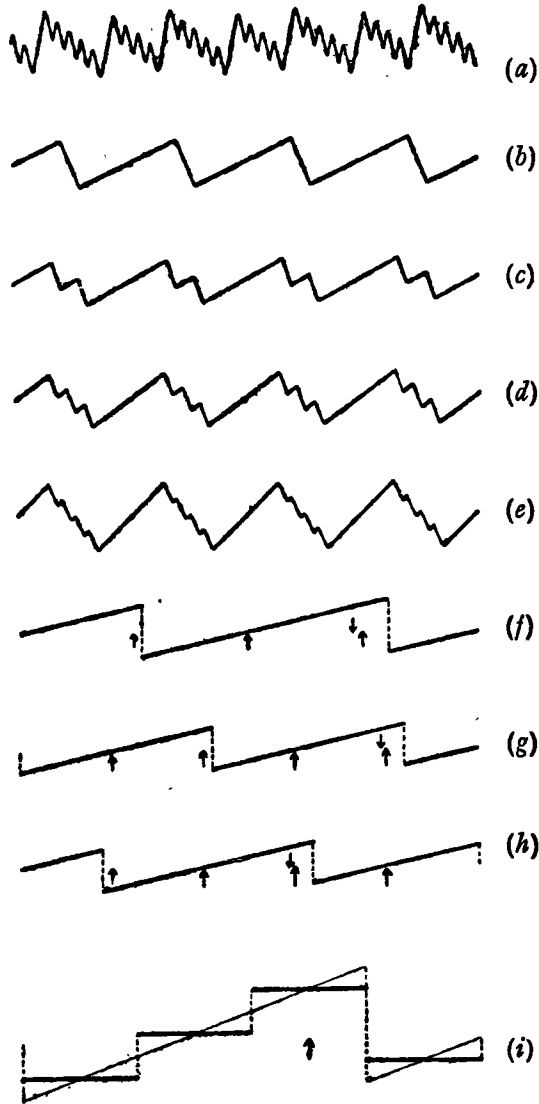


Fig. 5.—(For explanation see below).

tude of the third harmonic falls off rapidly, and vanishes completely when the bow is applied at the points $x = 4l/9$ or $2l/9$, the

value of ω being then exactly $\frac{1}{3}$. A distance of $l/9$ either way from any of the nodes of the third harmonic may thus in a sense be regarded as the range of application of the bow for the excitation of the third type of vibration. On comparing the values of ω in Table II with those for the first and second types shown in Table I, it will be noticed that at the point $2l/5$ the second and third types both give the ratio $\frac{1}{3}$ and that at the point $l/4$ the first and third types both give $\omega = \frac{1}{4}$. It is instructive to note the gradual changes in the form of the vibration-curves for the third type at the centre of the string and at $l/5$ as the point at which the bow is applied approaches $l/4$ and $2l/5$ respectively.

Fig. 5 (a), Vibration-curve of the 9th type, bowed at $5l/9 - l/135$ and observed at $l/15$.

Fig. 5 (b), (c), (d), (e), Vibration curves at the bowed point for the 2nd, 4th, 6th and 8th types respectively, when the bow is applied close to the centre of the string.

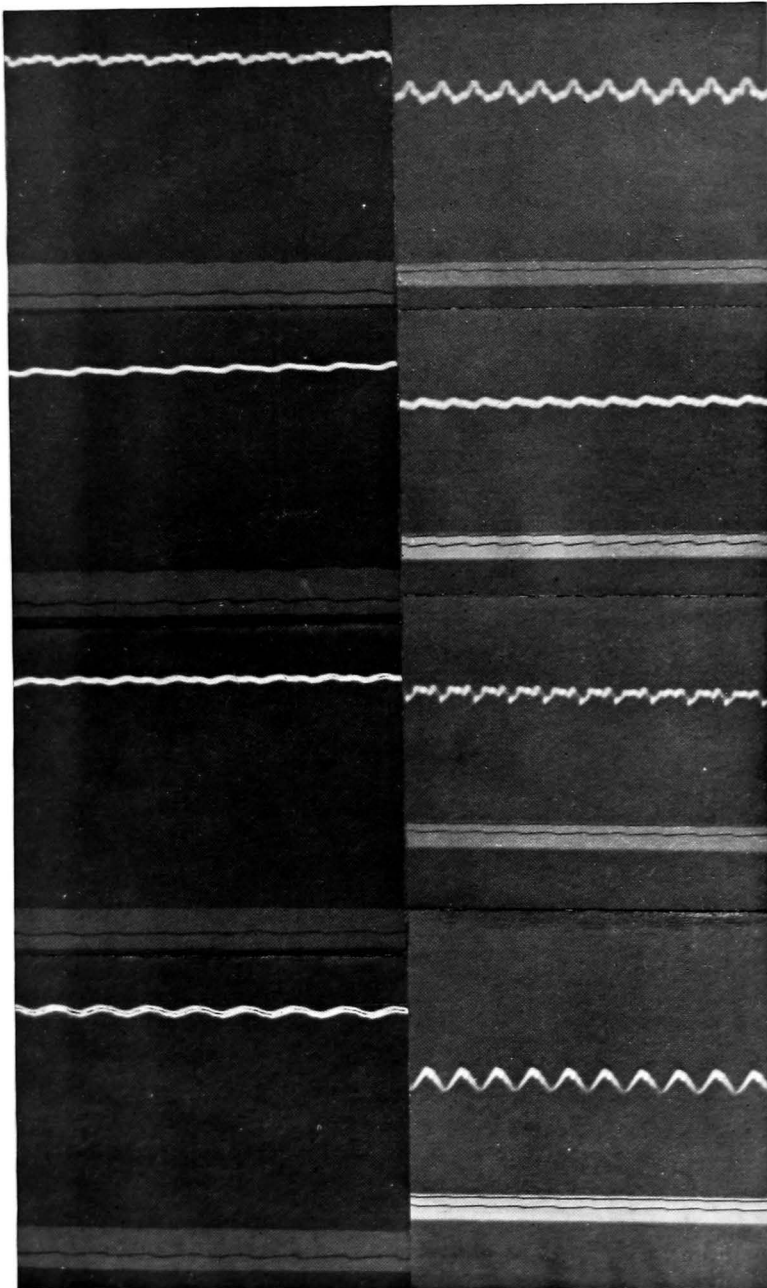
Fig. 5 (f), Velocity-diagram of the 4th type: (g) and (h), Velocity diagrams of the 5th type: (i), Velocity-diagram of 3rd type, bow applied at $5l/8$.

SECTION IX.—THE FOURTH AND HIGHER TYPES OF VIBRATION.

The cases in which there are four or more equal discontinuities moving on the velocity-diagram of the string are also capable of investigation with facility by the graphical method. Certain general laws are readily established of which we have already seen instances in the second and third types of vibration. Certain important and very remarkable differences are also noted between the cases in which n (the number of discontinuities) is a prime integer, e.g., 5, 7 or 11, and the cases in which n is not prime, e.g., 4, 6, 8, 9 or 10. One result that holds good for all values of n is that the motion at every point on the string lying outside certain limits is representable by a vibration curve consisting of $2n$ straight lines, alternate ones being parallel to one another. In other words, outside certain limits the velocity at every point on the string alternates between two constant values, n times in each complete period, the fractional part of the period ω during which

A-String Bowed.

E-String Bowed.



Without load.

With load of 17
grammes fixed on
top of bridge.

Ditto ; fixed on left
foot of bridge.

Ditto ; fixed on right
foot of bridge.

Simultaneous Vibration-Curves illustrating effect of loading the bridge on its horizontal motion transverse to the Strings, (observed at the G-string corner).

the larger velocity subsists being given by the relation $\omega = \frac{nx_n}{l}$ already found (equation 17).

The regions within which the velocity may have more than two values in each period, lie on either side of the $(n-1)$ intermediate nodes of the n^{th} harmonic and are bounded by points at which discontinuities moving in opposite directions cross one another. The vibration curve of a point at which one such crossing takes place consists of $(2n-2)$ straight lines in each complete period; if two crossings occur at one point in each period, its vibration curve consists of $(2n-4)$ straight lines and so on. If $(n-1)$ crossings take place at a point, the vibration curve at that point is of the simplest possible form, i.e., a two-step zig-zag.

We now proceed to find the conditions that must be satisfied if the motion at some specified point on the string is to be of the simplest possible type.

Choosing as origin of time, the instant at which the positive and negative waves are completely coincident, it is easy to find the positions on the string at which the coincident discontinuities in the waves should lie, if the motion at some specified point on the string is to be representable by a simple two-step zig-zag. Take first, the case in which $n=4$ and let the x -co-ordinate of the specified point be $3l/4-b$. The velocity-diagram at time $t=0$ consists of three parallel lines passing through the centre and the two ends of the string respectively. Let the co-ordinates at time $t=0$ of the two pairs of coincident discontinuities be $l/4+c$ and $3l/4+d$ respectively, see Figure 5 (*f*). In this diagram the positions of the nodes and of the specified point are shown by arrow-heads. In the subsequent movement, the discontinuities would pass over the point referred to, after times corresponding to the following distances of travel: $(b+d)$, $(l/2-c-b)$, $(l/2-d+b)$, $(l+c-b)$, $(l-c+b)$, $(3l/2+d-b)$, $(3l/2+c+b)$ and $(2l-b-d)$. It is seen that by putting $c=b$ and $d=3b$, the alternate distances (excluding the first and the last) become equal to one another. The condition for the vibration curve at the point $3l/4-b$ being a simple two-step zig-zag is thus that the initial positions of the coincident discontinuities should be $(l/4+b)$ and $(3l/4+3b)$. We may then mark off the following scheme of points on the string;

$$\begin{array}{cccccc}
 & 0 & l/4 & l/2 & 3l/4 & l \\
 \left(\frac{l}{4}-3b\right), & \left(\frac{l}{4}+b\right), & \left(\frac{l}{2}-2b\right), & \left(\frac{l}{2}+2b\right), & \left(\frac{3l}{4}-b\right), & \left(\frac{3l}{4}+3b\right) \\
 \text{6-step} & \text{2-step} & \text{4-step} & \text{4-step} & \text{2-step} & \text{6-step} \\
 & & & & & \text{zig-zags.}
 \end{array}$$

The nature of the motion at the points marked off is indicated below them in the scheme. If the point at which the motion is of the simplest possible type is $(3l/4+b)$, then we get instead the following scheme:—

$$\begin{array}{cccccc}
 & 0 & l/4 & l/2 & 3l/4 & l \\
 \left(\frac{l}{4}-b\right), & \left(\frac{l}{4}+3b\right), & \left(\frac{l}{2}-2b\right), & \left(\frac{l}{2}+2b\right), & \left(\frac{3l}{4}-3b\right), & \left(\frac{3l}{4}+b\right) \\
 \text{2-step} & \text{6-step} & \text{4-step} & \text{4-step} & \text{6-step} & \text{2-step} \\
 & & & & & \text{zig-zags.}
 \end{array}$$

It will be noticed that in both schemes, the region on either side of the central node is bounded by points at which the motion is representable by a four-step zig-zag. It is not possible, by assigning arbitrary values to c and d or in any other way, to secure that the region round the central node should be bounded by points at which the vibration-curve is a two-step zig-zag, so long as we are dealing with the fourth type of vibration. This result has a very important significance. If the fourth type of vibration is excited by applying the bow near either of the two nodes $l/4$ or $3l/4$, the motion at the bowed point might be (and, in fact, generally would be) of the simplest possible type, i.e., having a two-step zig-zag as the vibration-curve. On the other hand, if the bow is applied near the centre of the string (which is also a node of the fourth harmonic), the fourth type of vibration, if elicited, would not give a motion of the simplest possible type at the bowed point. Nor, for that matter, would the sixth, eighth or tenth types, if elicited. For the second type of vibration, a simple two-step zig-zag vibration-curve for the bowed point is possible. But for the fourth type, if elicited by bowing near the centre of the string, the minimum number of lines in the vibration-curve at the bowed point for each complete period is *four*; for the sixth type, it is six, for the eighth type, it is eight, and so on.

Figs. 5 (b), (c), (d) and (e) illustrate the preceding remarks. They were drawn from the initial velocity-diagrams of the respective cases, which were disposed so as to give a vibration-curve of the minimum complexity admissible at the bowed point.

Kinematical analysis by the method described above leads to analogous results in every case in which n is not a prime integer and the vibration is elicited by application of the bow near a point which is a node of the n^{th} harmonic but is also a node of some harmonic of lower frequency. For instance, the sixth type of vibration, if elicited by bowing near a point of trisection, would not give a vibration-curve at the bowed point of a simpler type than a four-step zig-zag; the ninth type under similar circumstances would give a vibration-curve at the bowed point with not less than six lines per period; the twelfth type would not give less than eight lines per period, and so on. Near the point of quadrisection of a string, the eighth type would give a vibration-curve at the bowed point with at least four lines per period and so on. As a final example we may mention the case in which the bow is applied very close to one end of the string. Only the first type ($n=1$) would then give a simple two-step zig-zag at the bowed point. For other values of n , i.e., 2, 3, etc., the vibration-curve at the bowed point would consist of 4, 6, or more lines as the case may be, in each complete period.

When n is a prime number, e.g., 5, 7, or 11, the corresponding type of vibration may be elicited by applying the bow on either side of any one of the intermediate nodes of the n^{th} harmonic on the string, with a simple two-step zig-zag as an admissible vibration-curve for the bowed point. The initial positions of the coincident discontinuities in the velocity-diagram differ very considerably, however, according to the particular node selected, and the character of the vibration-curves elsewhere than at the bowed point is correspondingly different in the respective cases. On the other hand when n is not a prime, a two-step zig-zag would be possible as the vibration-curve at the bowed point, only if this is at the boundary of the region on either side of a node of the n^{th} harmonic which is not also a node of some harmonic of lower frequency; e.g., $1/6$ or $5/6$ for the sixth type, $1/8$, $3/8$, $5/8$, or $7/8$ for the eighth type and $1/9$, $2/9$, $4/9$, $5/9$, $7/9$, or $8/9$ for the

ninth type. Near the other nodes, the motion at the bowed point for these types is necessarily of a less simple type, as we have already seen.

We shall now consider one after another the fifth and higher types of vibration confining our attention to those cases in which the motion at the bowed point has the simplest character possible under the circumstances, that is, a two, or four, or a six-step zig-zag, etc., as the case may be. It is obvious, from considerations of symmetry, that it is sufficient to consider the cases in which the bow is applied at some point between the centre and one end of the string, that is between $x=l/2$ and $x=l$. For any given value of n , as we have seen, the velocity-diagram consists of parallel lines passing through the nodes of the n^{th} harmonic, and it follows that at these nodes the state is alternately one of rest and of motion in one direction or the other. These positions of rest at intervals during the vibration at the respective nodes are readily visible to the eye on inspecting the string, appearing the brighter, the longer the intervals of rest. If two such positions coincide, the line of rest seen is twice as bright, and so on. For instance, in the fourth type of vibration already discussed, three lines of rest are visible at the centre of the string, and four lines at the points $x=l/4$ and $x=3l/4$.

The Fifth Type of Vibration.

This may be elicited by applying the bow at the points

$$\left(\frac{4l}{5}+b\right), \quad \left(\frac{4l}{5}-b\right), \quad \left(\frac{3l}{5}+b\right) \text{ or } \left(\frac{3l}{5}-b\right)$$

the motion at the bowed point being in each case a simple two-step zig-zag. In the first case the initial positions of the discontinuities in the velocity-diagram are

$$0, \left(\frac{2l}{5}-2b\right) \text{ and } \left(\frac{4l}{5}-4b\right)$$

By writing b for $-b$ in the above, the initial position of the discontinuities in the second case is found at once. The initial velocity-diagram for this case is shown in Fig. 5 (g). In the third case the initial positions of the discontinuities are

$$\left(\frac{l}{5} + 2b\right), \left(\frac{3l}{5} - 4b\right) \text{ and } l.$$

The solution for the fourth case is obtained by writing $-b$ for b in the preceding. The initial velocity-diagram for the fourth case is shown in Fig. 5 (h).

On working out the form of the vibration-curves from the velocity-diagrams, it is found that in all these cases, five lines of rest should be visible at each of the four nodes $l/5, 2l/5, 3l/5$ and $4l/5$. Except in the limited regions lying on either side of each of these nodes, the vibration-curve at any point on the string is a ten-step zig-zag in which the alternate lines are all parallel to one other. The boundaries of the regions about the nodes and the character of the motion at the limiting points are indicated in the following table:—

TABLE III.
(Fifth Type of Vibration).

$(l/5 - b)$: 2-step.	$(l/5 - 4b)$: 8-step.	$(l/5 - 3b)$: 6-step.	$(l/5 - 2b)$: 4-step.
$(l/5 + 4b)$: 8-step.	$(l/5 + b)$: 2-step.	$(l/5 + 2b)$: 4-step.	$(l/5 + 3b)$: 6-step.
$(2l/5 - 2b)$: 4-step.	$(2l/5 - 3b)$: 6-step.	$(2l/5 - b)$: 2-step.	$(2l/5 - 4b)$: 8-step.
$(2l/5 + 3b)$: 6-step.	$(2l/5 + 2b)$: 4-step.	$(2l/5 + 4b)$: 8-step.	$(2l/5 + b)$: 2-step.
$(3l/5 - 3b)$: 6-step.	$(3l/5 - 2b)$: 4-step.	$(3l/5 - 4b)$: 8-step.	$(3l/5 - b)$: 2-step.
$(3l/5 + 2b)$: 4-step.	$(3l/5 + 3b)$: 6-step.	$(3l/5 + b)$: 2-step.	$(3l/5 + 4b)$: 8-step.
$(4l/5 - 4b)$: 8-step.	$(4l/5 - b)$: 2-step.	$(4l/5 - 2b)$: 4-step.	$(4l/5 - 3b)$: 6-step.
$(4l/5 + b)$: 2-step.	$(4l/5 + 4b)$: 8-step.	$(4l/5 + 3b)$: 6-step.	$(4l/5 + 2b)$: 4-step.

zig-zags.

It will be seen that the distance between the two points on either side of each node as shown in the Table, is in all cases equal to $5b$.

The Sixth Type of Vibration.

By applying the bow at either of the two points $\frac{5l}{6} \pm b$ the type of vibration with six equal discontinuities on the velocity-diagram may be elicited with a two-step zig-zag as the vibration-curve at the bowed point.

It is obvious that for this to be possible, the discontinuities should cross at the bowed point five times in each period of vibration, and the initial positions of the discontinuities are thus found to be $\frac{l}{5} \mp b$, $\frac{3l}{6} \mp 3b$ and $\frac{5l}{6} \mp 5b$, the upper minus signs being taken for the first case and the plus signs for the second. The following are the eight points on the string at which crossings of discontinuities take place during the vibration and the character of the vibration-curve determined by the number of such crossings is indicated below the respective points:—

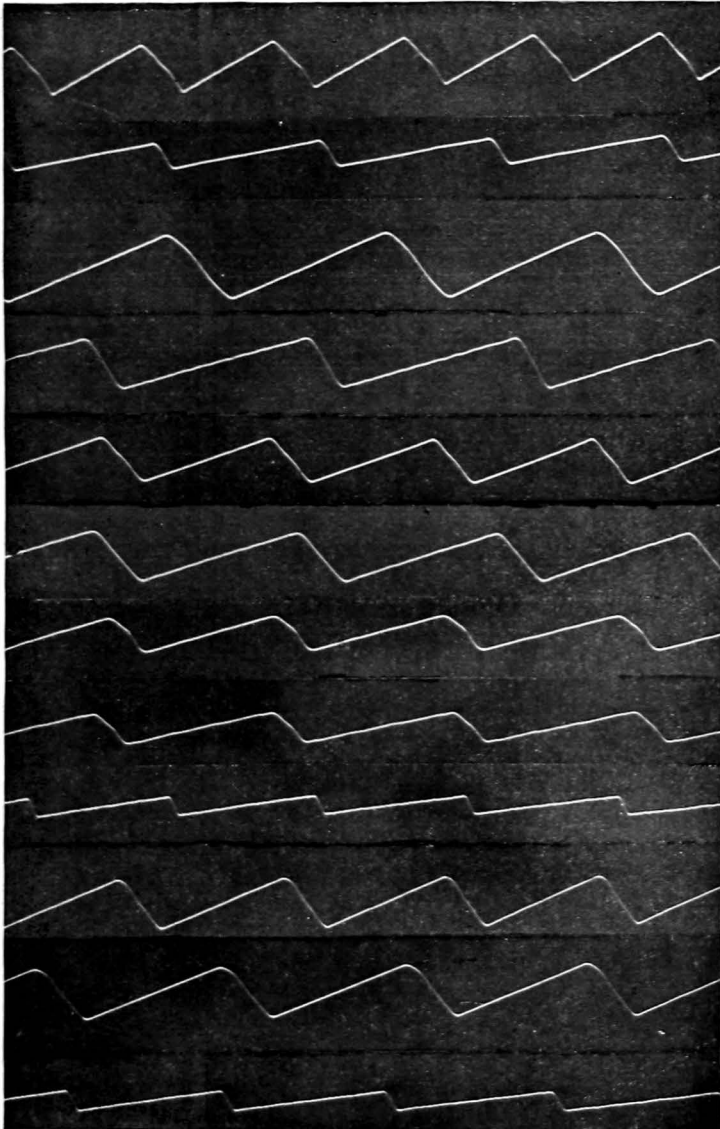
First Case.

$$\begin{array}{ccccc} \left(\frac{l}{6} - b\right), & \left(\frac{l}{6} + 5b\right), & \left(\frac{2l}{6} - 2b\right), & \left(\frac{2l}{6} + 4b\right), & \left(\frac{3l}{6} - 3b\right) \\ \text{2-step} & \text{10-step} & \text{4-step} & \text{8-step} & \text{6-step} \\ \left(\frac{3l}{6} + 3b\right), & \left(\frac{4l}{6} - 4b\right), & \left(\frac{4l}{6} + 2b\right), & \left(\frac{5l}{6} - 5b\right) & \text{and } \left(\frac{5l}{6} + b\right) \\ \text{6-step} & \text{8-step} & \text{4-step} & \text{10-step} & \text{2-step} \\ & & & & \text{zig-zags.} \end{array}$$

Second Case.

$$\begin{array}{ccccc} \left(\frac{l}{6} - 5b\right), & \left(\frac{l}{6} + b\right), & \left(\frac{2l}{6} - 4b\right), & \left(\frac{2l}{6} + 2b\right), & \left(\frac{3l}{6} - 3b\right) \\ \text{10-step} & \text{2-step} & \text{8-step} & \text{4-step} & \text{6-step} \\ \left(\frac{3l}{6} + 3b\right), & \left(\frac{4l}{6} - 2b\right), & \left(\frac{4l}{6} + 4b\right), & \left(\frac{5l}{6} - b\right) & \text{and } \left(\frac{5l}{6} + 5b\right) \\ \text{6-step} & \text{4-step} & \text{8-step} & \text{2-step} & \text{10-step} \\ & & & & \text{zig-zags.} \end{array}$$

It will be noticed that the regions on either side of the nodes are all of the same length $6b$. (With the fifth type of vibration, this length was found to be $5b$, with the fourth type $4b$, with the third $3b$, and with the second type $2b$, the motion at the bowed



Bowed and
observed at
L/3:26

Low pressure.

Higher pressure.

L/3:52

Low pressure.

Higher pressure.

L/4:23

with
successive
increments
of pressure.

L/3:73

Low pressure.

Ditto.

High Pressure.

Modified two-step zig-zag vibration-curves at the bowed point, showing the practical constancy of the velocity of ascent with the bow, and the variability of the velocity of descent against the bow.

point being in each case a simple two-step zig-zag. The generalization of the result is obvious).

From the vibration-curves, it is found that six lines of rest should be visible at each of the nodes $l/6$ and $5l/6$ in the case discussed above, five lines of rest at each of the nodes $2l/6$ and $4l/6$, and four lines of rest at the central node $3l/6$.

Passing on to the cases in which the bow is applied in the neighbourhood of the node $\frac{4l}{6}$, it is found that the maximum number of crossings in each period possible at the bowed point is four. (If we attempt to find the position of the discontinuities on the assumption that there are five crossings, the resulting equations are inconsistent with each other). A four-step zig-zag thus represents the least complicated motion possible at the bowed point in this case. We have then three pairs of coincident discontinuities in the initial velocity-diagram of the string, and as there are two crossings of discontinuities at the bowed point in each half period, we get two simple algebraic equations connecting the position of the bowed point with the initial positions of the discontinuities. Thus if the position of the bowed point is at $\frac{4l}{6} + b$, and the initial positions of the three pairs of discontinuities are $\frac{l}{6} + c$, $\frac{3l}{6} + d$, and $\frac{5l}{6} + e$, we obtain the two equations $(e - b) = (b - d)$, and $(e + b) = (c - b)$. It is obviously not possible from these two equations alone to determine the three quantities c , d and e , uniquely in terms of the known quantity b . While c , d and e are thus in a sense arbitrary quantities, in practice owing to the flexibility of the dynamical conditions under which the motion is maintained (this will be referred to again later on), the vibration would tend to settle down into a type in which b , c , d and e are all integral multiples of one and the same quantity, these multiples being as small as is consistent with the kinematical conditions referred to above and the dynamical conditions of maintenance in the presence of dissipative forces. For instance, by putting $c = 5b$, $d = -b$, and $e = 3b$, we get a solution which satisfies the two kinematical equations and gives a characteristic type of vibration.

The case in which the sixth type is elicited by applying the bow in the neighbourhood of the node $3l/6$, i.e., near the centre of the string, may be similarly dealt with. In this case, the maximum number of crossings of discontinuities at the bowed point in each period is three and the simplest type of motion at the bowed point is a six-step zig-zag. The initial position of one pair of discontinuities then necessarily coincides with the bowed point. To find the initial positions of the other two pairs, we have only one equation which is given by the crossing that takes place within each half-period. The case has therefore to be dealt with in a manner analogous to that described in the preceding. Thus if the position of the bowed point is at $\frac{3l}{6} + b$, the discontinuities may initially be taken to be at the positions $\left(\frac{l}{6} - 3b\right)$, $\left(\frac{3l}{6} + b\right)$ and $\left(\frac{5l}{6} + 5b\right)$.

The Seventh Type of Vibration.

For this type, we have to consider the bowed point as being at one or other of the six positions $\left(\frac{6l}{7} \pm b\right)$, $\left(\frac{5l}{7} \pm b\right)$, and $\left(\frac{4l}{7} \pm b\right)$. Each of these cases gives a mode of vibration characteristically different from the others, though at the bowed point the vibration-curve is the same in all the cases, a two-step zig-zag. When the bow is applied at $\frac{6l}{7} + b$, the discontinuities are initially at the positions 0, $\left(\frac{2l}{7} - 2b\right)$, $\left(\frac{4l}{7} - 4b\right)$ and $\left(\frac{6l}{7} - 6b\right)$. In the resulting vibration, if b be small, the seventh harmonic is very strong. By writing $-b$ for b in these quantities, we get the solution for the second case in which the bow is applied at $\left(\frac{6l}{7} - b\right)$. Both the sixth and the seventh harmonics are then powerful in the mode of vibration set up. If the position of the bowed point is shifted to the point $\left(\frac{5l}{7} + b\right)$ the initial positions

of the discontinuities are found to be $\left(\frac{l}{7} - 4b\right)$, $\left(\frac{3l}{7} + 2b\right)$, $\left(\frac{5l}{7} - 6b\right)$ and l respectively. In the resulting vibration the fourth and seventh harmonics are dominant. By writing $-b$ for b as before, the solution for the bowed point $\left(\frac{5l}{7} - b\right)$ is obtained. The third and seventh harmonics are then dominant. When the bow is applied at the point $\left(\frac{4l}{7} + b\right)$, the initial positions of the discontinuities are 0, $\left(\frac{2l}{7} + 4b\right)$, $\left(\frac{4l}{7} - 6b\right)$ and $\left(\frac{6l}{7} - 2b\right)$. It can be shown that the second, fifth and seventh harmonics are then dominant. The solution for the case in which the bow is applied at $\left(\frac{4l}{7} - b\right)$ may be obtained as above by changing the sign. The second and seventh harmonics are found to be dominant in the resulting vibration.

The eighth, ninth and higher types may be readily discussed in accordance with the general principles already outlined. The form of the vibration-curve for the ninth type of vibration elicited by bowing at the point $\left(\frac{5l}{9} - \frac{l}{135}\right)$ and calculated for the point of observation distant $\frac{l}{15}$ from one end of the string is shown in Fig. 5 (a) above. It will be seen from the general form of the vibration-curve that the second and ninth harmonics are dominant in the resulting motion.

SECTION X.—CONSTRUCTION OF THE VELOCITY-DIAGRAM
WHEN THE BOW IS APPLIED AT A NODE.

The discussion of the vibrational modes given in Sections VI to IX proceeded on the assumption that the bow is applied at a point of irrational division of the string and that the pressure of bowing is sufficiently large in relation to its velocity to ensure that the motion at the bowed point alternates between two and only two rigorously constant velocities, once or oftener in each

period of vibration. When these conditions are satisfied, the resulting mode of vibration should in general include the complete series of harmonics. We shall now pass on to consider the cases in which owing to the position of the bow coinciding exactly with a point of rational division of the string, the series of harmonics having a node at that point is completely absent in the resulting vibration. The absence of these harmonics is evidently necessary if the mode of vibration of the string is to be fully determinate in terms of the motion at the bowed point, and in Section IV it has been shown to follow from this and the known characteristics of the motion at the bowed point that the form of the velocity waves must then be that of a number of straight lines parallel to one another with intervening discontinuities. The velocity-diagram of the string at any epoch of the vibration must therefore also consist of parallel straight lines with intervening discontinuities. It will now be shown that these straight lines are all parallel to the x -axis, i.e., to the position of equilibrium of the string.

Let the velocity-diagram of the string at a certain epoch in the corresponding irrational type of vibration consist of parallel straight lines inclined to the x -axis at an angle α , with discontinuities of magnitude d_1, d_2, d_3 , etc., intervening at the points $x=c_1, c_2, c_3$, etc., respectively. This velocity-diagram may be readily analyzed into its Fourier components. Let the velocity at any point on the string at the epoch referred to, be represented by $\psi(x)$. Then,

$$\psi(x) = \sum_{n=1}^{n=\infty} A_n \sin \frac{n\pi x}{l},$$

where the value of A_n is determined by the equation

$$A_n = \frac{2}{l} \int_0^l \psi(x) \sin \frac{n\pi x}{l} dx.$$

$\psi(x)$ is equal to $x \tan \alpha$ between the limits $x=0$ and $x=c_1$. From $x=c_1$ up to $x=c_2$, it is equal to $(x \tan \alpha - d_1)$ and then changes to $(x \tan \alpha - d_1 - d_2)$ retaining this value up to $x=c_3$, and so on. Integrating by parts, we have

$$A_n = -\frac{2}{n\pi} \left[\psi(x) \cos \frac{n\pi x}{l} \right]_0^l + \frac{2}{n\pi} \int_0^l \tan \alpha \cos \frac{n\pi x}{l} dx$$

Since $\tan \alpha$ is a constant, the second term reduces to zero and the equation may be written in the form

$$A_n = -\frac{2}{n\pi} \left[d_1 \cos \frac{n\pi c_1}{l} + d_2 \cos \frac{n\pi c_2}{l} + \text{etc.} \right]$$

When $n = 1$, we have

$$A_1 = -\frac{2}{\pi} \left[d_1 \cos \frac{\pi c_1}{l} + d_2 \cos \frac{\pi c_2}{l} + \text{etc.} \right]$$

When $n = s$, A_s may be written in the form

$$A_s = -\frac{2}{\pi} \left[\frac{d_1}{s} \cos \frac{\pi c_1}{l/s} + \frac{d_2}{s} \cos \frac{\pi c_2}{l/s} + \text{etc.} \right]$$

The summation of the series $\sum_{n=1}^{n=\infty} A_n \sin \frac{n\pi x}{l}$ of which $A_1 \sin \frac{\pi x}{l}$

is the leading term gives us the original velocity-diagram $\psi(x)$ which consists of parallel straight lines inclined to the x -axis at an angle α and has a discontinuity d_1 at the point $x = c_1$, a discontinuity d_2 at the point $x = c_2$, and so on. From this, it

follows that the series $\sum_{n=1}^{n=\infty} A_{ns} \sin \frac{n\pi x}{l/s}$ of which $A_s \sin \frac{s\pi x}{l}$ is

the leading term would similarly give us when summed, a diagram also consisting of straight lines inclined to the x -axis at the same angle α , the magnitudes of the discontinuities in it being $\frac{d_1}{s}, \frac{d_2}{s}, \frac{d_3}{s}$, etc., and the series being periodic for successive increments of x by the length $2l/s$ instead of $2l$ as with the original series. Subtracting the ordinates of the diagram thus derived from those of the original diagram $\psi(x)$, the resulting figure in which the $s^{\text{th}}, 2s^{\text{th}}, 3s^{\text{th}}$ harmonics, etc., are all absent, is seen to consist of straight lines parallel to the x -axis with intervening discontinuities. We have already seen that with the irrational types of vibration, d_1, d_2, d_3 , etc., are all numerically equal to

$(v_A - v_B)$, some belonging to the positive wave and some to the negative. In the particular cases in which the positions c_1, c_2, c_3 , etc., of the discontinuities are such that the motion at the bowed point is a simple two-step zig-zag, the summation of the series of harmonics to be left out gives, when graphically represented, a diagram of the simplest possible form, that is, one straight line terminated by one discontinuity in each length of abscissa $2l/s$, the s^{th} harmonic being the first of the series. This is very readily proved. Taking the first type of vibration in which there is only one discontinuity in the velocity-diagram (Fig. 1 in Section VI), we see that at the epoch chosen as the origin of time, $c_1 = l$. From the expression for A_s given above, it follows that the series

$\sum_{n=1}^{n=\infty} A_{ns} \sin \frac{n\pi x}{l/s}$ has a discontinuity equal to $\frac{v_A - v_B}{s}$ at the

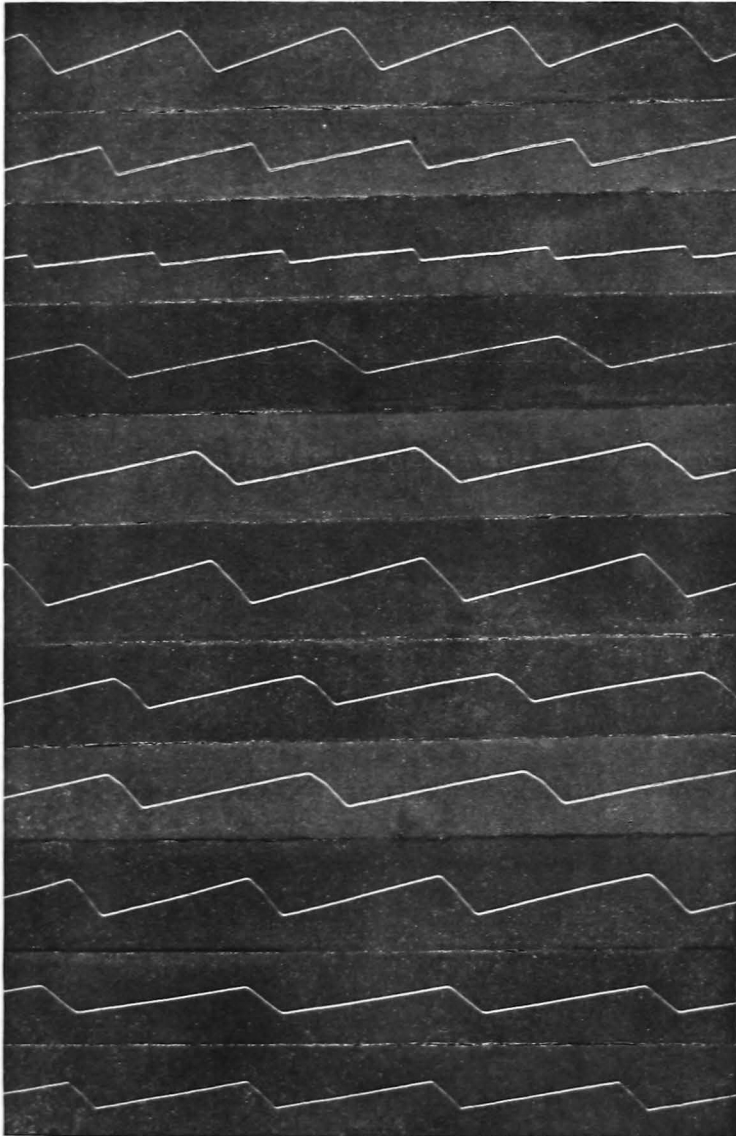
same point $c_1 = l$. The next discontinuity would be at $x = \frac{(s-2)l}{s}$,

the line of the diagram passing through the intervening node at $x = \frac{(s-1)l}{s}$. For the second, third, fourth types of vibration,

etc., discussed in Sections VII, VIII and IX, a precisely similar construction holds good when the motion at the bowed point is a simple two-step zig-zag. For, the positions of the discontinuities c_1, c_2, c_3 , etc., in the initial velocity-diagram are such that if the bow is applied at a node of a given harmonic, the discontinuities are also situated at certain other nodes of the same harmonic. A sufficient illustration of this fact and of the method of construction is given in Fig. 5 (i). This shows the initial velocity-diagram for the third type of vibration elicited by bowing at the node $\frac{5l}{8}$.

The thin inclined lines show the velocity-diagram with the complete series of harmonics, the thick horizontal lines show the velocity-diagram obtained by dropping out the 8th, 16th harmonics, etc., and the dotted vertical lines show the intervening discontinuities. From the subsequent movement of the discontinuities in the diagram thus drawn, the vibration-curve at any desired point on the string is readily obtained.

The types of vibration set up by bowing the string at the



Bowed and
observed at
L/4:50
Low pressure.

High pressure.

L/4:73

High pressure.

Low pressure

L/5:24

with two
different
pressures.

L/5:50

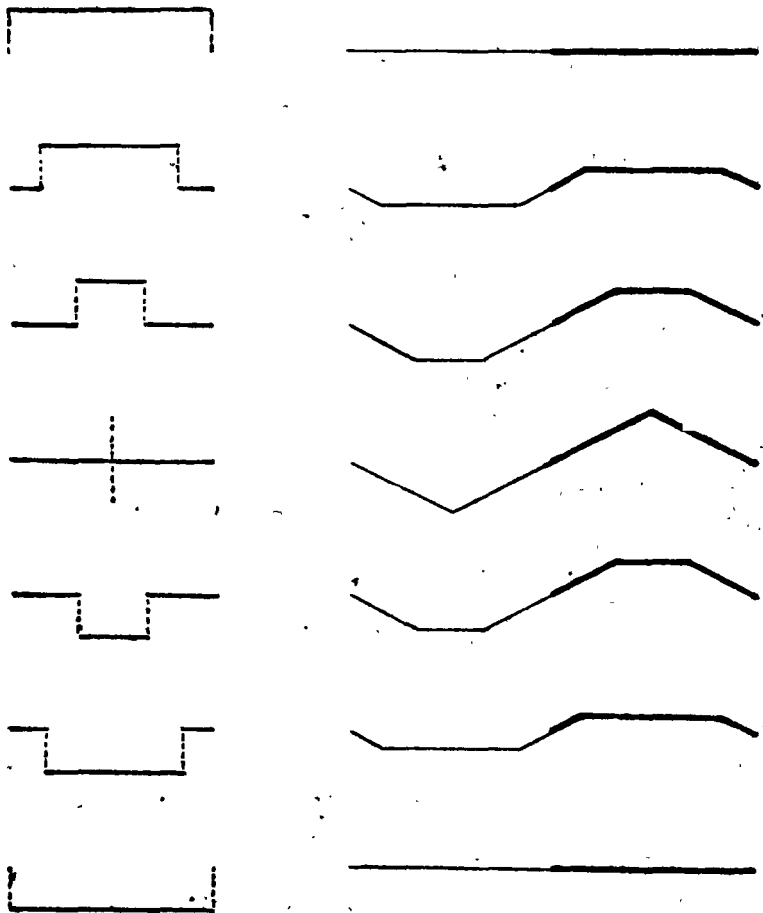
with three
different
pressures.

L/5:74

L/6:46

Modified two-step zig-zag vibration-curves at the bowed point, showing the practical constancy of the velocity of ascent with the bow, and the variability of the velocity of descent against the bow.

nodal points $\frac{l}{2}, \frac{2l}{3}, \frac{3l}{4}, \frac{4l}{5}$, etc., are of special interest. The initial velocity-diagram in these cases is readily derived from the



Velocity-Diagrams. Vibration-curves and Displacement-Diagrams.

Fig. 6.—The string bowed at the centre.

first irrational type of vibration by the method of construction described above. We shall now consider these cases a little more fully.

Fig. 6 illustrates the first case. The initial velocity-diagram

is a straight line parallel to the string with a discontinuity at each end. These discontinuities move in towards the centre of the string, and when they meet at the expiry of a quarter-period, the

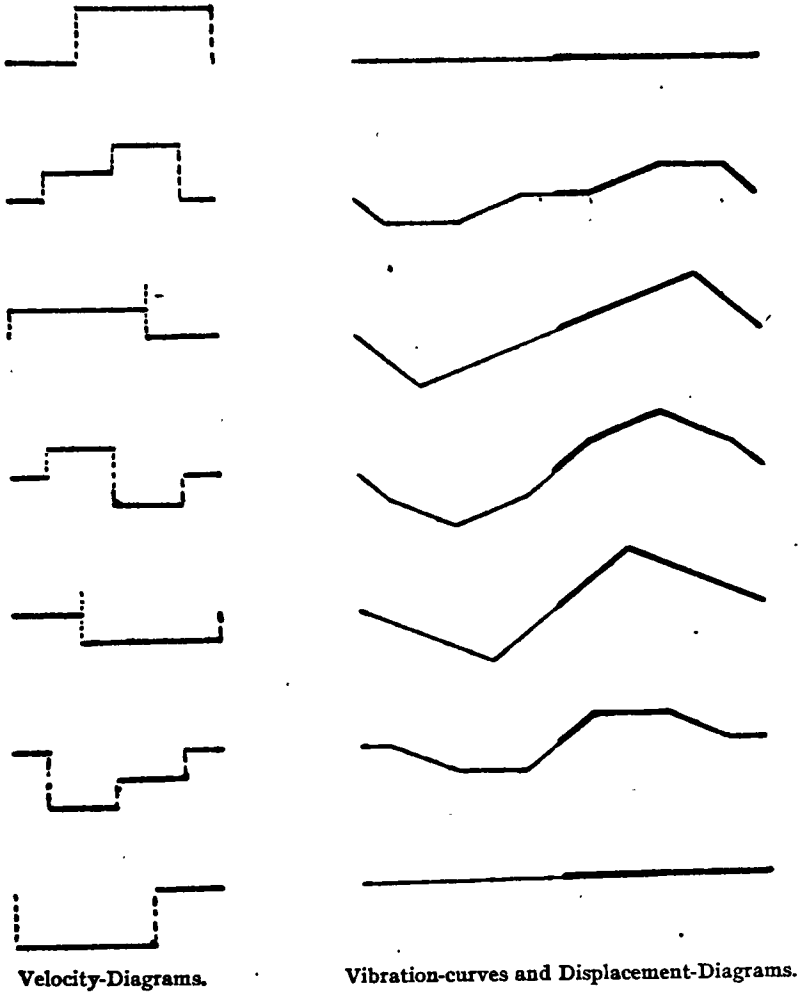


Fig. 7.—The string bowed at a point of trisection.

velocity at every point on the string, except the centre itself, is zero. At this epoch, the form of the string consists of two straight lines meeting at the centre, being the same as at the

corresponding epoch in Fig. 1. Incidentally, it will be noticed that the mode of vibration of a string bowed at the centre is the same as that obtained when it is plucked at the centre.¹

Fig. 7 illustrates the case of a string bowed at a point of trisection. At the two points of trisection, the vibration-curve is a simple two-step zig-zag, and at two corresponding epochs, the configuration of the string consists of two straight lines meeting at the point of trisection. The nature of the motion as observed at the centre of the string is of special interest in this case. Commencing from the position of extreme displacement in one direction, the complete period of vibration is seen to be made up of six phases of equal duration, in the first and third of which the velocity of the centre of the string is the same as that of the bow applied at the point of trisection. In the fourth and sixth phases the velocity is also the same numerically but in the opposite direction. In the second and fifth phases, the velocity is numerically double that of the bow, having the same sign in the second phase, and the opposite sign in the fifth phase. Only the first, fifth, seventh, eleventh harmonics, etc., contribute towards making up the motion at the centre of the string in this case.

Fig. 8 illustrates the case in which the bow is applied at a point exactly a quarter of the length of the string from one end, the initial velocity-diagram of the string being obtained by the geometrical construction from the first type of vibration. The cases in which the bow is applied at a point one-fifth or one-sixth or one-seventh, etc., of the length from one end may be similarly dealt with.

Passing on to consider the modifications of the second, third and higher irrational types of vibration caused by the coincidence of the bow with a point of rational division of the string, we find no difficulty in constructing the initial velocity-diagram of the

¹ It is also readily seen that the velocity-diagram of a string plucked at any other point and released should consist of a straight line parallel to the x -axis and bounded by two discontinuities which are initially coincident at the point of plucking and start off with the velocity of wave propagation in opposite directions. The form of the vibration-curves in this and other analogous cases is much more readily found by the aid of the velocity-diagram than by tracing the configuration of the string.

string in any specified case, and as we have already seen, the construction becomes further simplified when the motion at the bowed point is representable by a two-step zig-zag. Certain in-

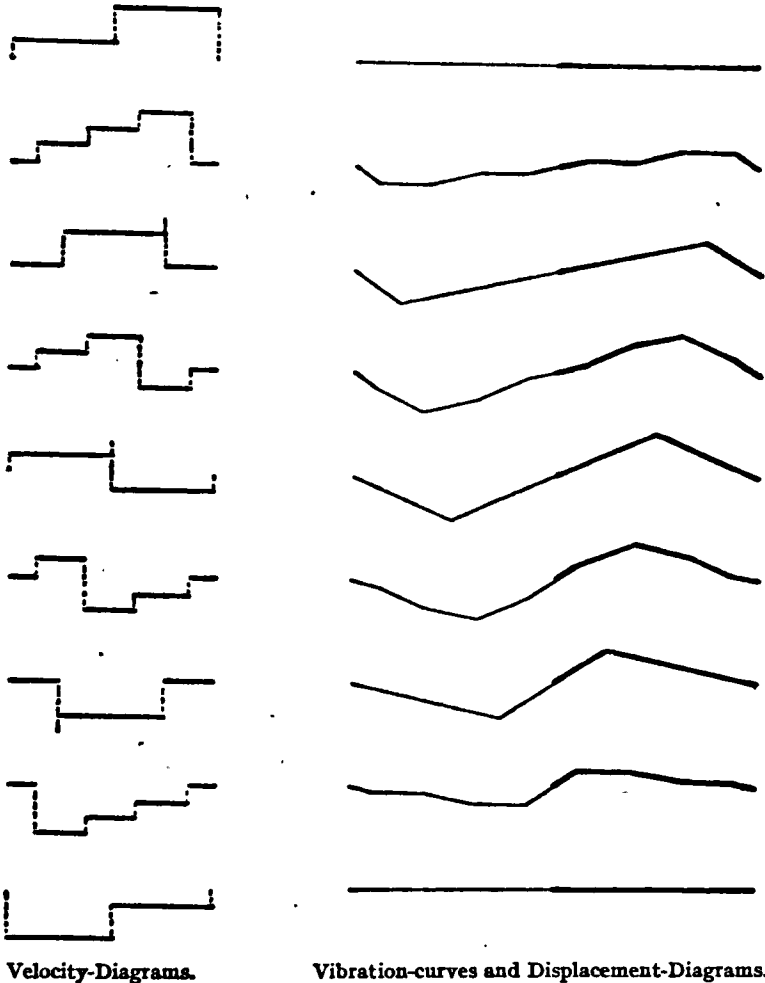


Fig. 8.—String bowed at point of quadrisection.

teresting relations then become evident. The velocity-diagrams derived from the first and second types of vibration are found to be identical when the bow is applied at a point of trisection (*cf.*

Section VII in which it was shown that these two types then become completely identical). Similarly, the first and third types become identical when the bow is applied at a distance $l/4$ from one end, the first and the fourth when it is applied at $l/5$ from one end and so on. Further, the second and third types give the same results when the bow is applied at a distance $2l/5$ from the end, the ratio ω being $\frac{1}{5}$ in both cases. The third and fourth

types both give the ratio $\omega = \frac{1}{7}$ when the bow is applied at $\frac{2l}{7}$, and so on. These relations may be stated and proved in the following general form.

When the motion at the bowed point is given by a simple two-step zig-zag, the p^{th} and q^{th} types of vibration give identical vibration-curves, provided the bowed point coincides with an intervening node of the $(p+q)^{\text{th}}$ harmonic.

The proof of the relation stated above follows very simply from the general relation given in equation (17). Let x_0 define the position of the bowed point and let the nearest nodes of the p^{th} and q^{th} harmonics be the $(r+1)^{\text{th}}$ and the $(s+1)^{\text{th}}$ respectively, counting from one end. For the p^{th} type, the ratio $\omega = (x_0 - rl/p) \div \frac{l}{p}$. For the q^{th} type, the ratio $\omega = (sl/q - x_0) \div \frac{l}{q}$, it being assumed that $\frac{rl}{p} < x_0 < \frac{sl}{q}$. The p^{th} and q^{th} types give the same vibration-curves when the value of ω is the same for both at the bowed point. Equating ω for the two cases, we deduce $x_0 = (r+s)l/(p+q)$, in other words that the bowed point coincides with the $(r+s+1)^{\text{th}}$ node of the $(p+q)^{\text{th}}$ harmonic. Similarly, if x_0 lies outside the limit sl/s and sl/q , the p^{th} and q^{th} types become identical when the bow coincides with the $(r-s+1)^{\text{th}}$ node of the $(p-q)^{\text{th}}$ harmonic.

As an illustration of the results, we may consider the case in which the bow is applied at the point $\frac{3l}{11}$. The fourth and seventh types of vibration both give the ratio $\omega = \frac{1}{11}$ and are thus identical in this case, but the third type gives the ratio $\omega = \frac{2}{11}$,

the first type gives the ratio $\omega = \frac{3}{11}$ and the second type gives the largest ratio of all, viz., $\omega = \frac{5}{11}$.

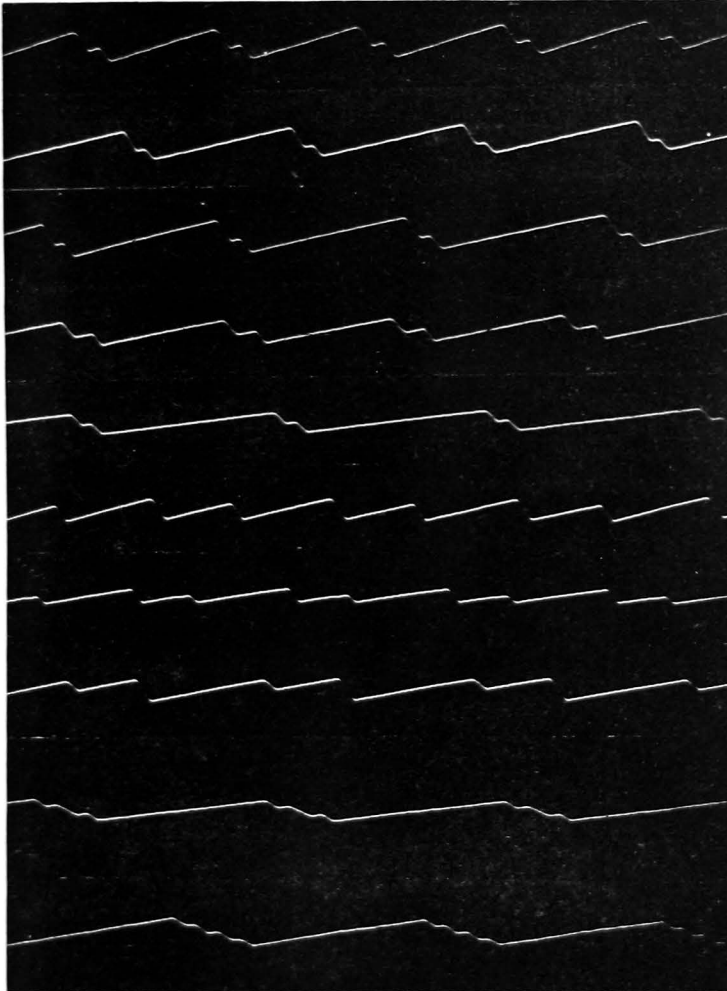
SECTION XI.—SOME EXAMPLES OF THE THEORETICAL DETERMINATION OF THE VIBRATION-CURVES.

We shall now proceed to figure a number of vibration-curves whose forms can be calculated by the aid of the theoretical principles set out in the preceding sections. To trace the vibration-curve at any given point on the string, we require data regarding the position of the bowed point and also as to the particular type of vibration (according to the method of classification explained in Section V) which may be assumed to be actually elicited. In the next section we shall consider at some length the general relation connecting the position of the bowed point and the pressure, velocity and other features of the bowing adopted, with the mode of vibration elicited. Meanwhile, as a working rule, it will be assumed that if the bow is applied at a point not far from a node of the n^{th} harmonic, n being one of the first seven or eight natural numbers, the n^{th} type of vibration is elicited. It will be further assumed that the motion at the bowed point is a simple two-step zig-zag except in cases in which, as shown in Section IX, it is necessarily of a more complicated type. These assumptions are justifiable, provided the pressure of bowing is sufficient and other circumstances are favourable.

The detailed method of tracing the vibration-curves is as follows: the initial velocity-diagram of the string is first set down according to the principles already explained. The ordinate at the point whose vibration-curves is to be drawn, gives its initial velocity. The positions and magnitudes of the discontinuities and the direction of their motion, positive or negative, being known, the successive changes of velocity at the point of observation and the intervals of time at which they take place are obvious to inspection. The successive intervals and the resulting displacements may then be pricked off on a time-displacement diagram and when joined up, give us the desired vibration-curve.

In Figs. 1 to 8 we have already had a number of illustrations

PLATE IX.



Bowed and
observed at
L/3:26

L/4:23
with three
different
pressures.

L/4:15

L/15
with three
different
pressures.

L/3:08

L/3:08

Modified four-, six-, and eight-step zig-zag vibration-curves at the bowed point, showing the practical constancy of the velocity of ascent with the bow, and the variability of the velocity of descent against the bow.

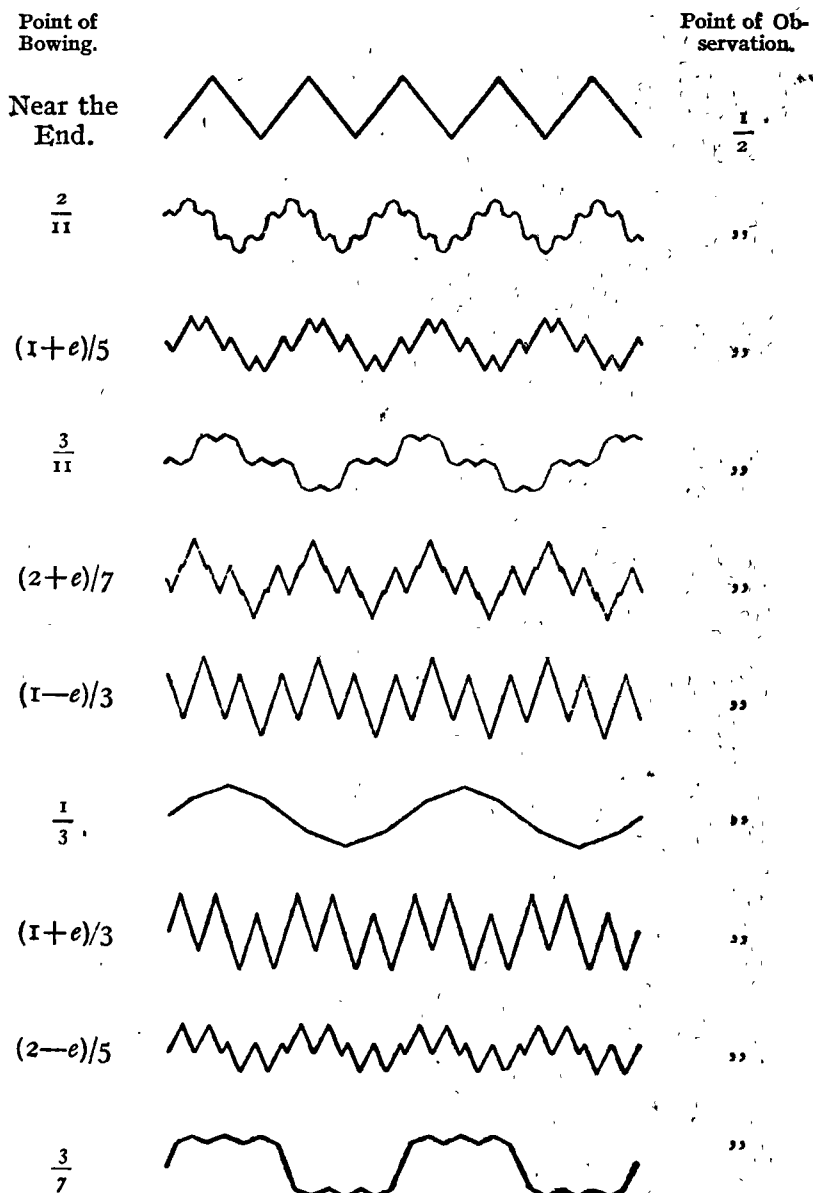


Fig. 9.—Examples of Vibration-Curves of a Bowed String, found "a priori."

of the graphical process worked out in detail. The succeeding Figs. 9, 10, 11 and 12 present additional examples of vibration-curves determined by the entirely *a priori* method set forth above. They were specially drawn for comparison with the first forty of the curves found *experimentally* by Krigar-Menzel and Raps and published with their paper.¹

N.B.—In these and the succeeding figures, the symbol ϵ represents a small fraction whose value was variously assumed.

The first curve in Fig. 9 belongs to the first type of vibration. The second and third curves belong to the fifth type of vibration, the bow being applied on opposite sides of the node of the fifth harmonic in the two cases.² The former curve is modified owing to the absence of the eleventh harmonic. The fifth and sixth types of vibration both give the ratio $\omega = \frac{1}{11}$ when the bow is applied at the point $\frac{2l}{11}$. (At the same point, the first type of vibration would give the ratio $\omega = \frac{2}{11}$). The fourth curve in Fig. 9 is a combination of the fourth and seventh types which become identical when the bow is applied at the point $\frac{3l}{11}$, the ratio ω at the bowed point being $\frac{1}{11}$ for both types. The fifth curve belongs to the seventh irrational type of vibration and the sixth curve to the third irrational type. It will be noticed that these two forms are closely analogous and it can be readily shown that they merge into one another when the bow is applied exactly at the point $\frac{3l}{10}$, where they both give the ratio $\omega = \frac{1}{10}$. The close approximation of the form of the seventh curve to that of a pure sine-wave will be noticed. The eighth curve belongs to the third irrational type of

¹ The other experimental curves (twenty-four in all) that appear with the paper of Krigar-Menzel and Raps are mostly simple two-step zig-zags. See also Barton's Text-Book of Sound, page 432.

² The position of the bowed points for the two corresponding experimental curves have been erroneously shown interchanged in the paper of Krigar-Menzel and Raps.

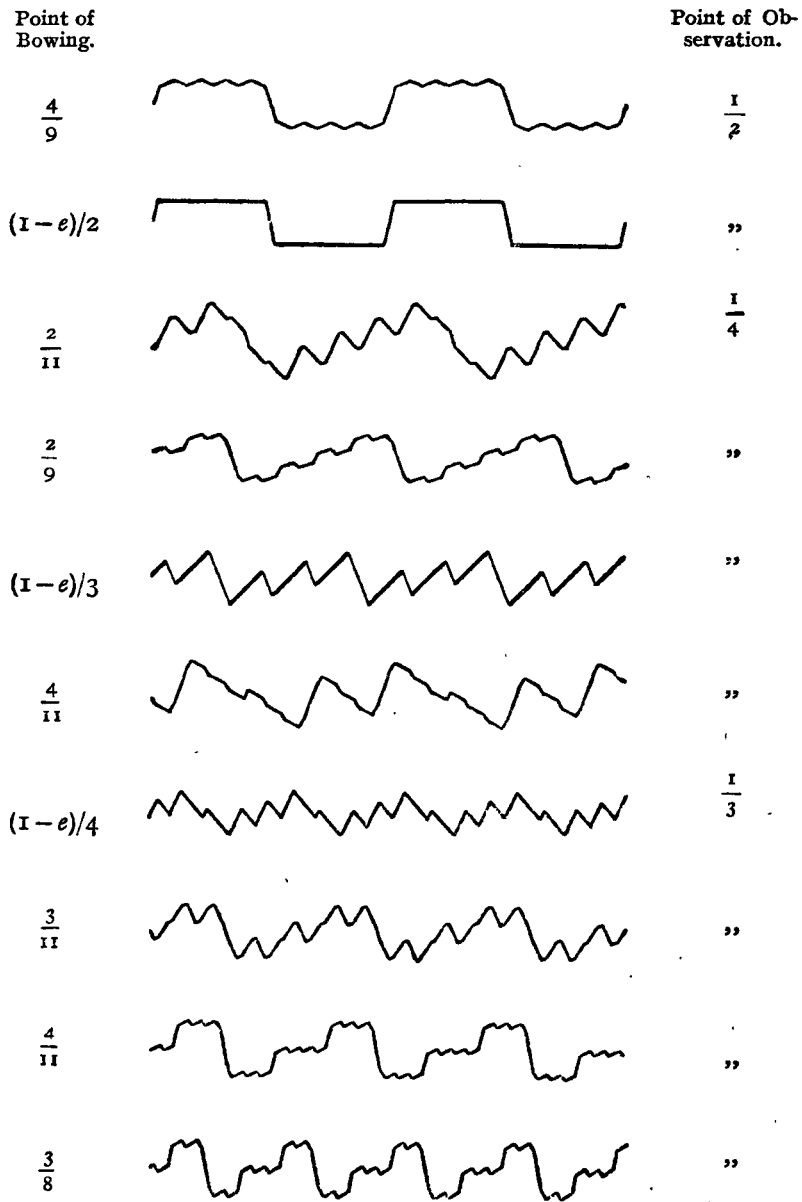


Fig. 10.—Examples of Vibration-Curves of a Bowed String, found "a priori."

vibration which is pictured in greater detail in Fig. 3. The ninth curve belongs to the fifth irrational type of vibration. The tenth is a combination of the fifth and second types of vibration which become identical when the bow is applied at the point $\frac{3l}{7}$, both types giving the ratio $\omega = \frac{1}{7}$.

The first curve in Fig. 10 is a combination of the second and seventh types which give a common ratio $\omega = \frac{1}{9}$ when the bow is applied at the point $\frac{4l}{9}$. The second curve represents the second irrational type of vibration (see also Fig. 2 in which this is worked out in greater detail). The third curve is a combination of the fifth and sixth types which give a common ratio $\omega = \frac{1}{11}$ at the bowed point $\frac{2l}{11}$. The fourth curve is similarly a combination of the fourth and fifth types ($\omega = \frac{1}{9}$ at the bowed point $\frac{2l}{9}$). The fifth curve represents the third irrational type of vibration (see Fig. 4 for a treatment in greater detail). The sixth curve is a combination of the third and eighth types, ω being equal to $\frac{1}{11}$ at the bowed point $\frac{4l}{11}$. The seventh curve in Fig. 10 is representative of the fourth irrational type of vibration. The eighth curve is a combination of the fourth and seventh types ($\omega = \frac{1}{11}$ at the bowed point $\frac{3l}{11}$ for both). The ninth curve is a combination of the third and eighth types and the tenth is a combination of the third and fifth types ($\omega = \frac{1}{11}$ and $\frac{1}{8}$ respectively).

The first curve in Fig. 11 belongs to the second irrational type of vibration (compare with the graphs in Fig. 2). The second and third curves in Fig. 11 need no further remarks. The fourth curve is a combination of the sixth and seventh types of

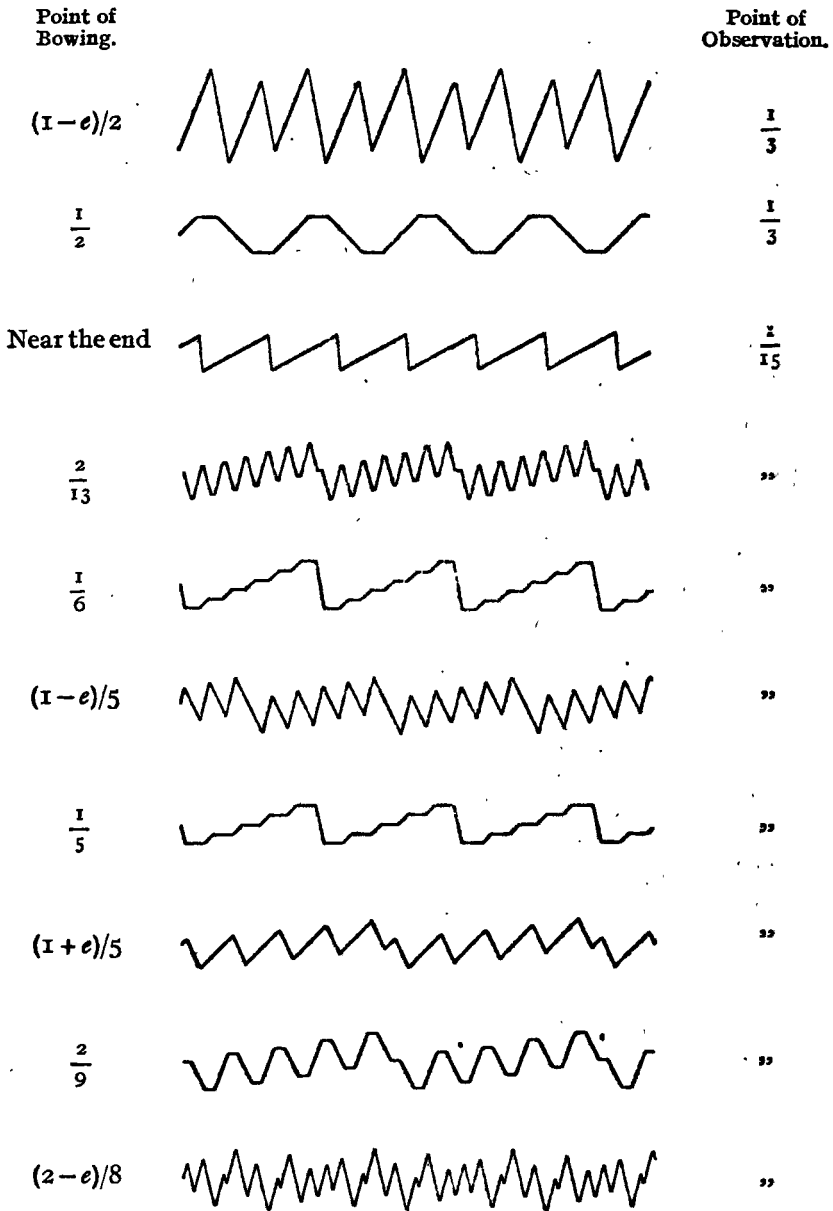
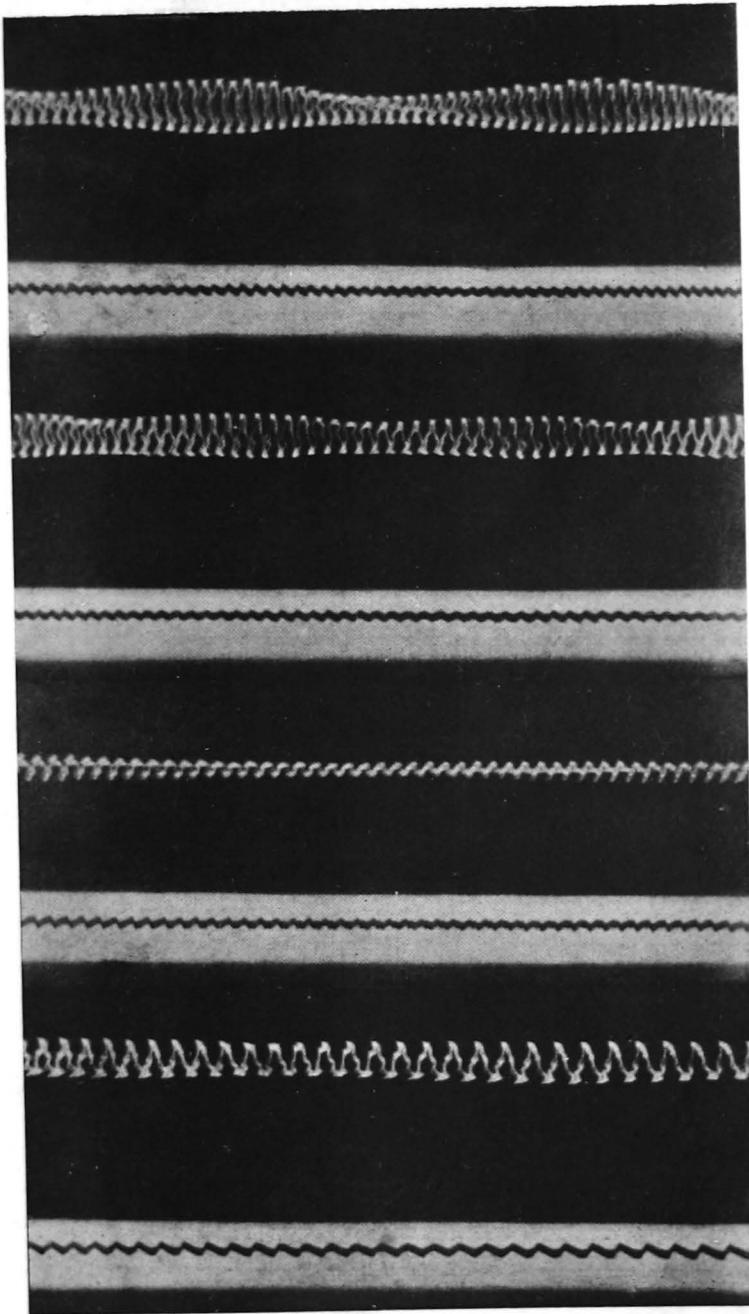


Fig. 11.—Examples of Vibration-Curves of a Bowed String, found "a priori."

vibration, ω being equal to $\frac{1}{13}$ at the bowed point $\frac{2l}{13}$ for both types of vibration. The fifth and seventh curves are examples of the well-known "staircase" figures discovered by Helmholtz. The sixth and eighth curves represent two cases of the fifth irrational type of vibration. The ninth curve is a combination of the fourth and fifth type of vibration, ω being equal to $\frac{1}{9}$ at the bowed point $\frac{2l}{9}$ for both types. The last curve in Fig. 11 is of special interest, as it is a case of the eighth type of vibration maintained with a complicated motion at the bowed point. In Section IX, it was shown that the motion at the bowed point cannot be a simple two-step zig-zag, if the eighth type of vibration is elicited by applying the bow near the point $l/4$. In the initial velocity-diagram from which this vibration-curve was drawn, two of the discontinuities were situated at the two ends of the string respectively, and the other six were taken to be situated in pairs at the points $(2+3e)/8$, $(4-2e)/8$ and $(6+e)/8$ respectively, corresponding to the position of the bowed point $(2-e)/8$.

The first vibration-curve shown in Fig. 12 is of the type dealt with in greater detail in Fig. 8. The second curve is of special interest, as the eighth irrational type of vibration which it represents, is elicited by applying the bow near a node of the fourth harmonic and the motion at the bowed point for this case is thus necessarily of a "complicated" type, viz. a four-step zig-zag instead of a two-step. The position of the bowed point being $(2+e)/8$, the discontinuities in the initial velocity-diagram were taken to be situated in pairs at the positions $(1-e)/8$, $(3-5e)/8$, $(5+e)/8$ and $(7-3e)/8$ respectively. The third curve in Fig. 12 represents the eleventh irrational type of vibration. The velocity-diagram of the eleventh type from which this was drawn gives a simple two-step zig-zag as the vibration-curve at the point $(1+e)/11$. An entirely different curve (in which the 4th and 11th harmonics are dominant) is however obtained from the velocity-diagram which gives a two-step zig-zag at the point $(3-e)/11$, and actual experimental trial, I find, gives a result in agreement with this, and not the curve shown in Fig. 12. Krigar-Menzel and Raps

PLATE X.



Bridge.

D-String bowed,
frequency 360
vibrations per sec.

Bridge.

D-String bowed,
frequency 360
vibrations per sec.

Bridge.

D-String bowed,
frequency 240
vibrations per sec.

Bridge.

D-String bowed,
frequency 240
vibrations per sec.

Simultaneous Vibration-Curves of the Bridge and D-String of a Violoncello, showing Cyclical changes at frequencies other than that of the "Wolf-note."

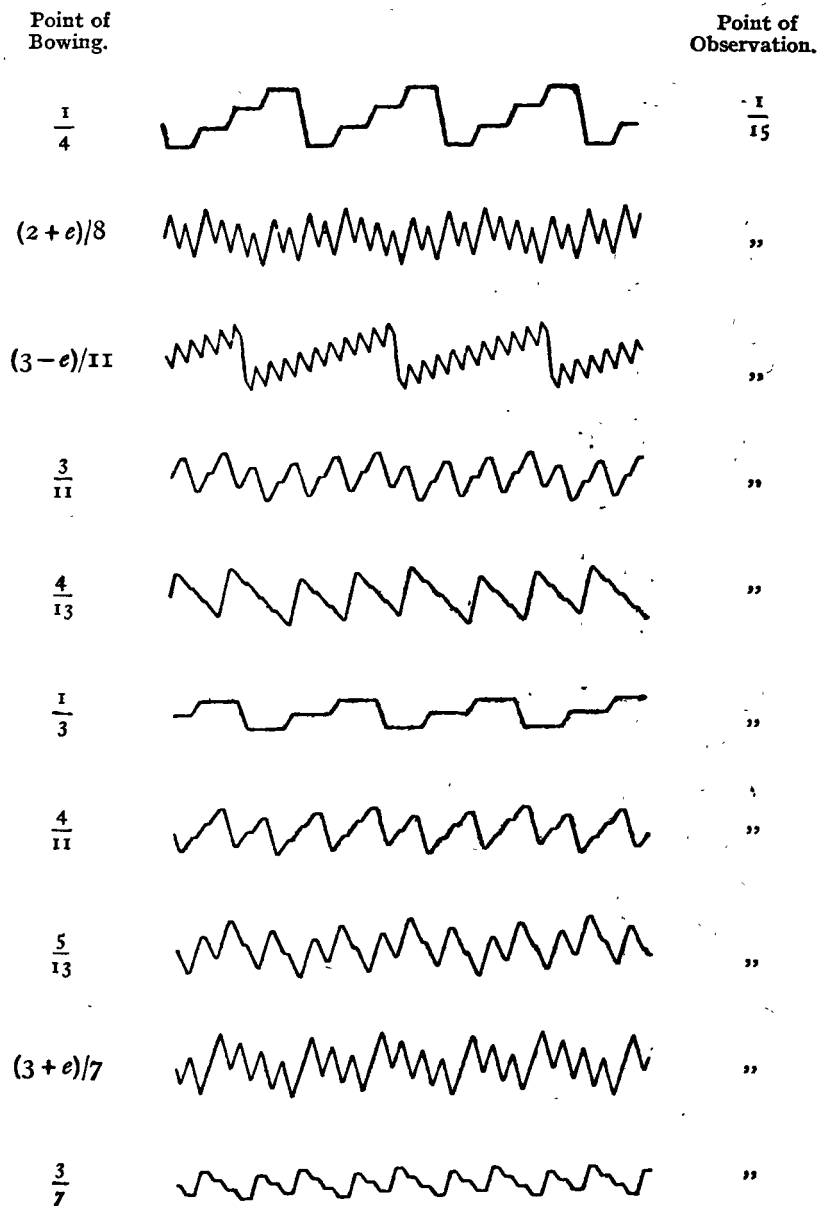


Fig. 12.—Examples of Vibration-Curves of a Bowed String, found "a priori."

however describe one of their experimental curves which is very similar to the third in Fig. 12 as that produced by bowing at the point $(3 - e)/11$. If this description were correct, the motion at the bowed point could not have been a simple two-step zig-zag.

The other vibration-curves obtained theoretically and shown in Fig. 12 do not require any special remarks. The fourth curve is a combination of the fourth and seventh types which give identical motions ($\omega = \frac{1}{11}$) at the bowed point $\frac{3l}{11}$. The fifth curve is the third irrational type of vibration modified by the absence of the 13th harmonic with the node of which the bowed point coincides. The sixth curve is of the well-known stair-case type. The seventh curve is a combination of the third and the eighth types given by the ratio $\omega = \frac{1}{11}$. The eighth curve is similarly a combination of the fifth and the eighth irrational types which become identical when the bow is applied at the point $\frac{5l}{13}$. The ninth curve illustrates the seventh irrational type of vibration, and the tenth curve is a combination of the second and fifth types of vibration which give a common ratio ($\omega = \frac{1}{7}$) at the bowed point in the position $\frac{3l}{7}$.

SECTION XII.—THE EFFECT OF THE VARIATION OF THE PRESSURE AND VELOCITY OF BOWING.

Preliminary Discussion.

In the previous sections of the paper, we have considered the kinematics of all the possible modes of vibration of a bowed string in which the motion at the bowed point consists of ascents and descents with strictly constant velocities. It now remains to consider various subsidiary questions that arise. What are the modifications in the kinematical theory necessary, when, as foreshadowed in the discussion on the *modus operandi* of the bow, the motion at the bowed point is not rigorously of the kind postulated? In other words, what is the effect produced if the velocity with

which the bowed point slips past the hairs of the bow is not exactly constant in each period of vibration? Then again, what is the effect produced by the finiteness of the region with which the bow is in contact, a region which for the purpose of discussion we have so far taken as equivalent to a mathematical point? Does any slipping occur when the string is being carried forward by the bow? Is it possible in practice that by simply removing the bow from a nodal point to another closely contiguous to it, the missing harmonics in any given type of vibration are suddenly restored to their full strength as our kinematical discussion tacitly assumed? Finally we have the all-important question, what are the conditions of excitation, e.g., pressure and velocity of bowing and so on, required for any given type of vibration to be elicited? What part does the instrument on which the string is mounted and the handling and properties of the hairs of the bow play in determining these conditions? What, for instance, is the effect on the motion of the string produced by loading the bridge over which it passes with a mute or otherwise? This is a most formidable array of questions, but it does not seem entirely hopeless to find answers to them all, provided we proceed step by step, seeking answers to the questions one at a time.

We may commence by retaining the assumption that the region of contact of the bow may be treated as a mathematical point and that the velocities of ascent and descent of this point are rigorously constant. We have already seen that on this assumption all the possible modes of vibration can be classified in a series of which the ordinal number n is the same as the total number of discontinuities in the velocity-diagram of the string, the bowed point being taken to divide the string in an irrational ratio. If the point of bowing divides the string in a rational ratio, the mode of vibration may be derived from one of the irrational types by dropping out the series of harmonics having a node at that point (see Section X). Another important point elicited by the discussion is that if n be not a prime number, a two-step zig-zag motion at the bowed point is kinematically impossible for that type of vibration if the bowed point lies within a distance of $l/2n$ from any node of the n^{th} harmonic which is also a node of some harmonic of lower frequency. Further, if the

position of the bowed point be specified and its motion is representable by a simple two-step zig-zag, the entire mode of vibration is uniquely determined by the number n of the discontinuities. But if the motion at the bowed point consists of several ascents and descents in each period, the number n does not uniquely determine the motion. One or more additional constants expressing the initial position of the discontinuities in the velocity-diagram must then be specified for the motion to be completely determinate.

From the preceding, it is obvious that the first step for establishing the mode of vibration in any given case is to find the number n of the discontinuities. *Prima facie*, we may exclude the consideration of all types of vibration of which the ordinal number n is very large. This is evident, for the larger the number of discontinuities, the more important is the part which harmonics of high order contribute to the motion,¹ and it is known from various considerations that these harmonics of high order are difficult to elicit and maintain as part of a perfectly periodic motion with the frequency of the gravest mode. As has been well shown by Prof. E. H. Barton,² the higher the frequency of any given component in the motion, the more sensitive it is to any departure from the exact adjustment for resonance. Under ordinary circumstances, the free periods of vibration only approximate to, and do not actually form a harmonic series. We are therefore led to conclude that any type of vibration in which the number of discontinuities is very large and in which therefore harmonics of high order are dominant would not, in practice, be elicited by the bow.

Two other considerations also point to the same result as that noted above. It is very probable that the higher harmonics are subject to a greater degree of damping and the bow would therefore tend to elicit types of vibration in which they are relatively

¹ This becomes almost self-evident on attempting to draw a velocity-diagram for the string consisting of parallel straight lines inclined at a constant angle α to the x -axis and separated by a large number of equal discontinuities situated at various intervals along the string.

² Prof. E. H. Barton, "On the Range and Sharpness of Resonance to Sustained Forcing," Bulletin No. 13, Indian Association for the Cultivation of Science.

subordinate. Then again, we see that the finiteness of the region with which the bow is in contact would operate in the same direction. For, from equation (17)

$$\omega = \frac{n x_n}{l}$$

which expresses the ratio of the time during which the string moves past the hairs of the bow to the whole period of the vibration, we see that the larger n is, the more rapidly does the value of ω change with any alteration in the position of the bowed point, x_n being the distance of this point from the nearest node of the n^{th} harmonic. The disturbing effect of applying the bow over a finite region instead of at a mathematical point would therefore be much greater when the value of n is large, and would thus have an unfavourable effect on the production of types of vibration involving a large number of discontinuities.

We thus see that if the motion at the bowed point admits only of discontinuous changes of velocity from one value to another and *vice versa*, the possible modes of vibration would be confined to a restricted number of types and their variants. Each type would, according to equation (17), have a characteristic value of ω if the position of the bowed point were specified, and a passage from one type to another would involve a sudden change from one value of ω at the bowed point to another.

Taking the results summarised above, together with those arrived at in the discussion on the *modus operandi* of the bow in Section III, it is now possible to trace the general effects of varying the pressure or velocity with which the bow is applied. If there is a change of type, the value of ω undergoes the concomitant discontinuous change given by equation (17). If the pressure of the bow is increased or its velocity decreased, the value of ω in the concomitant change of type decreases as a rule, so that the bow and string move with a common velocity for an increased fraction of the period. The change would be in the opposite direction if the pressure of the bow were decreased or its velocity increased. The change of type may or may not, according to the circumstances, involve a change in the motion at the bowed point from a simple

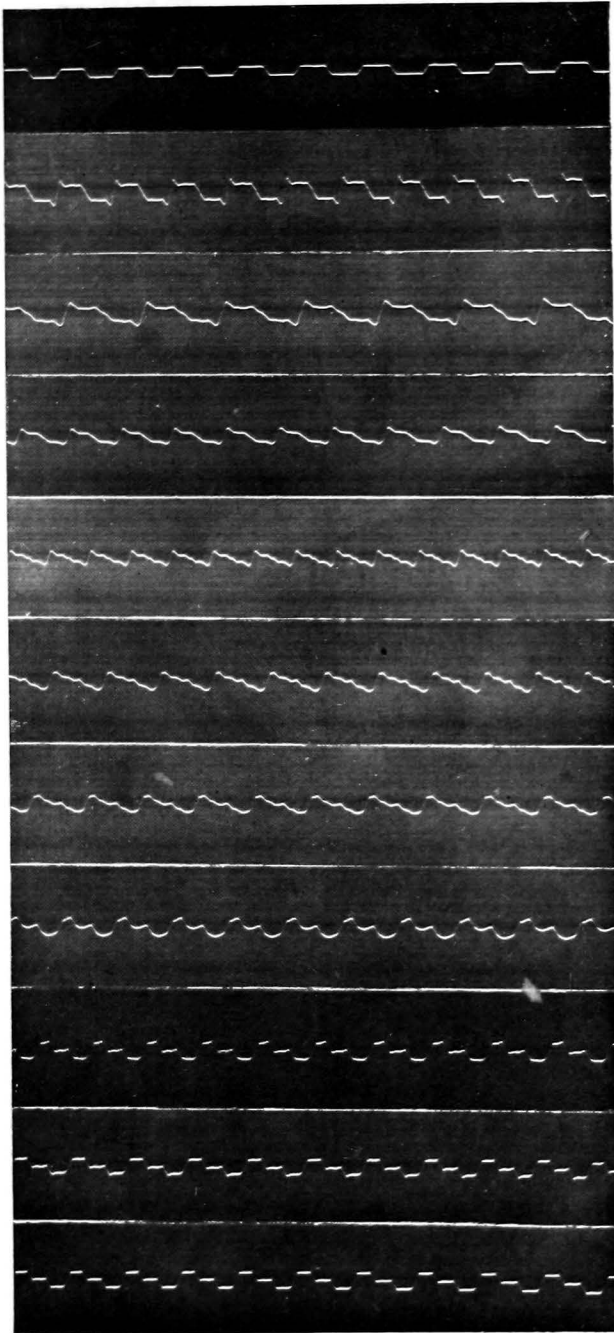
two-step zig-zag to one with several ascents and descents, or *vice versa*. Another variety of change that may be caused by the alteration of the pressure or velocity of the bow is a re-adjustment of the positions of the discontinuities with the corresponding changes in the relative amplitudes of the harmonics, the value of ω which is determined by the number of discontinuities in the motion remaining unaltered. This species of change, as already shown, would only be possible if the motion at the bowed point involved several ascents and descents in the period.

When the pressure with which the bow is applied is considerable and the other circumstances are favourable, the maintained motion would be the one which gives, as nearly as possible, the smallest value of ω at the bowed point. When the bowed point is in the neighbourhood of a node of some fairly important harmonic, say the n^{th} , it is readily seen from equation (17) that the n^{th} type would give a very small value of ω and is therefore the type that would be maintained. This is the justification of the result which was assumed in Section XI for theoretically determining the vibration-curves and comparing them with those obtained experimentally by Krigar-Menzel and Raps. From the published account of these experimenters it appears that the style of bowing actually adopted by them was the one referred to above. For smaller pressures of bowing than those adopted by them, it might be expected that the modes of vibration figured therein would be incapable of being maintained and would yield place to types giving larger values of ω .

Graphical Treatment.

A clearer comprehension of the foregoing results may be obtained by discussing the specific cases in which the bow is applied at some point between the extreme end of the string and the node of the fifth harmonic distant $l/5$ from the same end. This includes the "musical range" of bowing. When the bow is applied very close to the end of the string, only the first type of vibration is kinematically capable of giving a two-step zig-zag motion at the bowed point. This also gives the smallest value of ω and is accordingly the type that is elicited by firm bowing. The higher

Observed at L/10.



Bowed at

L/2:00

L/2:13

L/2:26

L/2:32

L/2:39

L/2:43

L/2:50 or 2 L/5

L/2:65

L/2:74

L/2:85

L/2:91

The first type of vibration : its rational and transitional modifications.

types give four, six, or eight-step zig-zags, etc., as the case may be at the bowed point, with correspondingly larger and larger values of ω , and can thus be obtained only by increasing the velocity or reducing the pressure of bowing. As the position of the discontinuities in these cases is susceptible of variation, each of these types is itself capable of modification by altering the pressure or velocity of bowing, and the relative amplitudes of the harmonics may be profoundly modified without any change in the value of ω .

When the bow is removed from the extreme end to a point at some distance from it, some of the higher types also are capable of giving a two-step zig-zag motion at the bowed point. Let us now assume for simplicity that the bow does not elicit vibrations involving more than nine discontinuities, so that the ninth type is the highest that need be considered. Within the range between 0 and $l/5$, the bow may elicit the first type anywhere. The following table shows for the other types the maximum ranges within which the bow must be applied for a two-step motion to be even kinematically possible.

TABLE IV.

$$0 < x_b < l/5.$$

Ninth Type	..	..	$l/18 < x_b < l/6.$
Eighth Type	..	..	$l/16 < x_b < 3l/16.$
Seventh Type	..	..	$l/14 < x_b < 3l/14.$
Sixth Type	..	..	$l/12 < x_b < l/4.$
Fifth Type	..	..	$l/10 < x_b < 3l/10.$
Fourth Type	..	..	$l/8 < x_b < 3l/8.$
Third Type	..	..	$l/6 < x_b < l/2.$

While this table gives the maximum ranges, the *effective* ranges should be considerably less. For, taking the ninth type for example, the value of ω is $\frac{1}{9}$ when the bow is applied at the point $8l/81$ or at the point $10l/81$. The ninth harmonic which is the dominant of the type then entirely vanishes. The effective range for eliciting this type must thus lie within the limits noted above. Proceeding on this principle, the limits within which the effective ranges for the different types should lie are calculated and shown in Table V.

TABLE V.

$$0 < x_b < l/5.$$

Ninth Type	..	..	$l/10\frac{1}{2} < x_b < l/8\frac{1}{5}$.
Eighth Type	..	..	$l/9\frac{1}{2} < x_b < l/7\frac{1}{2}$.
Seventh Type	..	..	$l/8\frac{1}{2} < x_b < l/6\frac{1}{2}$.
Sixth Type	..	..	$l/7\frac{1}{2} < x_b < l/5\frac{1}{2}$.
Fifth Type	..	..	$l/6\frac{1}{2} < x_b$.
Fourth Type	..	..	$l/5\frac{1}{2} < x_b$.

From this table it is seen that, practically speaking, the first type is the only one that can be elicited with a two-step motion at the bowed point if this lies between 0 and $l/10$. If the bow is applied between $l/10$ and $l/5$, the higher types may also give a two-step motion at the bowed point within their respective ranges. The values of ω within these ranges for the several types as ascertained from equation (17) are shown graphically in Fig 13.

In this diagram, the heavy line is the graph of ω for the first type, and the thin lines meeting in pairs at the points $l/9$, $l/8$, etc., give the values of ω for the 9th, 8th types, etc., respectively. The most noticeable feature in the diagram is the extreme steepness

of these lines compared with that for the first type. At the nodal points $l/10, l/9, l/8$, etc., the diagram shows the value of ω to be either zero, or else $1/10, 1/9, 1/8$, etc., respectively as the case may be. Rejecting the zero value for ω as inadmissible, we find that at the nodal points $l/10, l/9, l/8$, etc., the value of ω is $1/10, 1/9, 1/8$, etc., respectively. The lines for the higher types intersect in pairs at the points whose abscissae are $2l/19, 2l/17, 2l/15, 2l/13$, and $2l/11$ respectively. At these points, the first type gives the

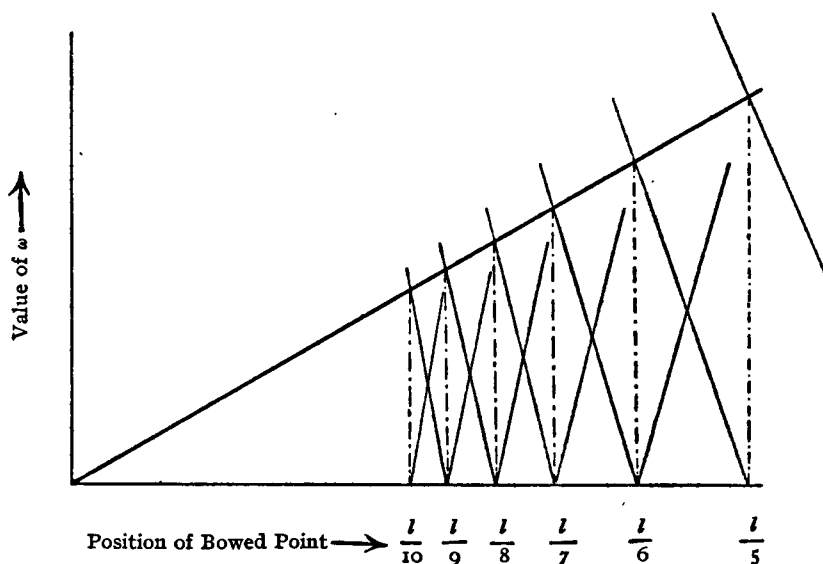


Fig. 13.—Showing the chief types of vibration, their ranges and characteristics and the effect of variation of the pressure of bowing.

value of ω to be $2/19, 2/17, 2/15$, etc., respectively. But the higher types give the value of ω at these same points to be $1/19, 1/17, 1/15$, etc. If, therefore, these types are to be elicited, considerable pressure and small velocity of bowing must be adopted, and at the same time, the region with which the bow is in contact must be very narrow. With a short, heavily-damped string such as that of a violin, these conditions are not readily obtainable and, at any rate, they differ from those actually adopted in the whole range of violin practice. We are therefore led to conclude

that in the musical applications of the subject, we have to deal only with the first type of vibration and its modifications. On an ordinary monochord, however, by suitable bowing the higher types of vibration may be obtained within the ranges considered. The diagram shows that except at the nodal points already mentioned, 3 or even 4 different values of ω are possible.

Fig. 14 shows the different types of vibration with discon-

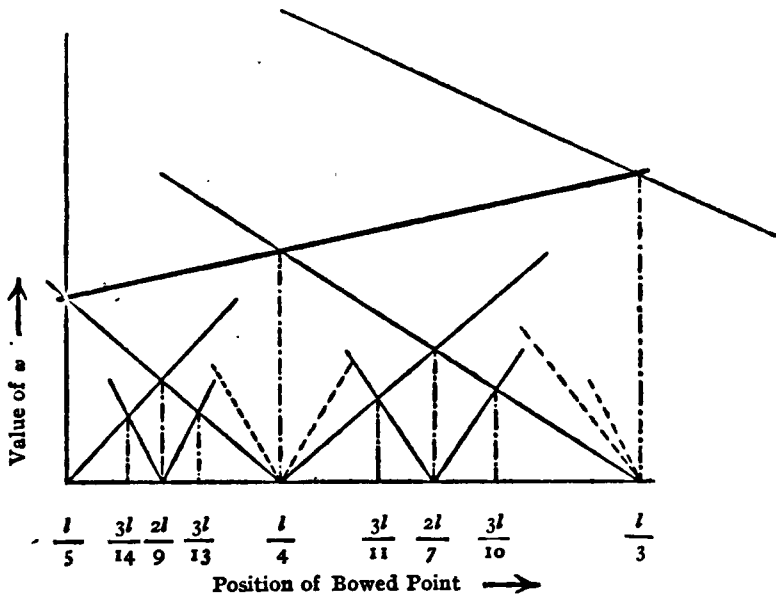


Fig. 14.—Showing the chief types of vibration, their ranges and characteristics and the effect of the variation of the pressure of bowing.

tinuous changes of velocity that may be obtained by applying the bow anywhere within the region lying between $l/5$ and $l/3$. The heavy line, as before, is the graph for the first type. The other types are shown by lines passing through the nodes of the corresponding harmonics, thin continuous lines representing types which may give a simple two-step motion at the bowed point, and broken lines (— — — —) representing types which necessarily involve more complicated motions at the bowed point. For in-

stance, through the point $l/3$, we have one continuous line representing the third type and two broken lines representing the sixth and ninth types respectively. Similarly, through the point $l/4$, we have two continuous lines, one on each side, representing the fourth type and two broken lines, one on each side, representing the eighth type. The diagram enables us to find at a glance, the general effect of applying the bow at any given point within the range and of any considerable variation of the pressure or velocity

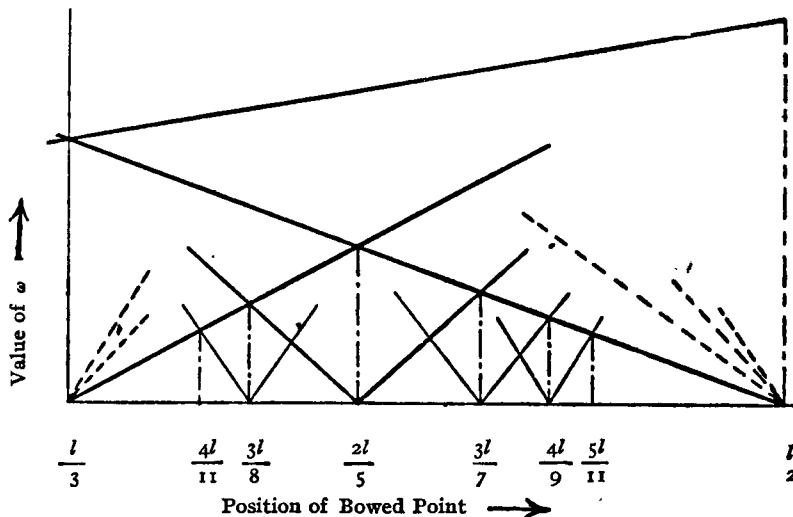


Fig. 15.—Showing the chief types of vibration, their ranges and characteristics and the effect of the variation of the pressure of bowing,

with which it is applied. At the two nodal points $l/5$ and $l/3$, for a two-step zig-zag motion, the diagram shows that the value of ω can only be $\frac{1}{5}$ and $\frac{1}{3}$ respectively. At the point $l/4$, ω has generally the value $\frac{1}{4}$, but another value, i.e., $\frac{1}{2}$ belonging to the second type, is barely on the limit of possibility. Elsewhere, three, four, five or even six different values of ω are possible, the number being determined by the position of the bowed point, and the particular value out of those possible which is actually

obtained being determined by the pressure, velocity and other features of the bowing adopted in any given case.

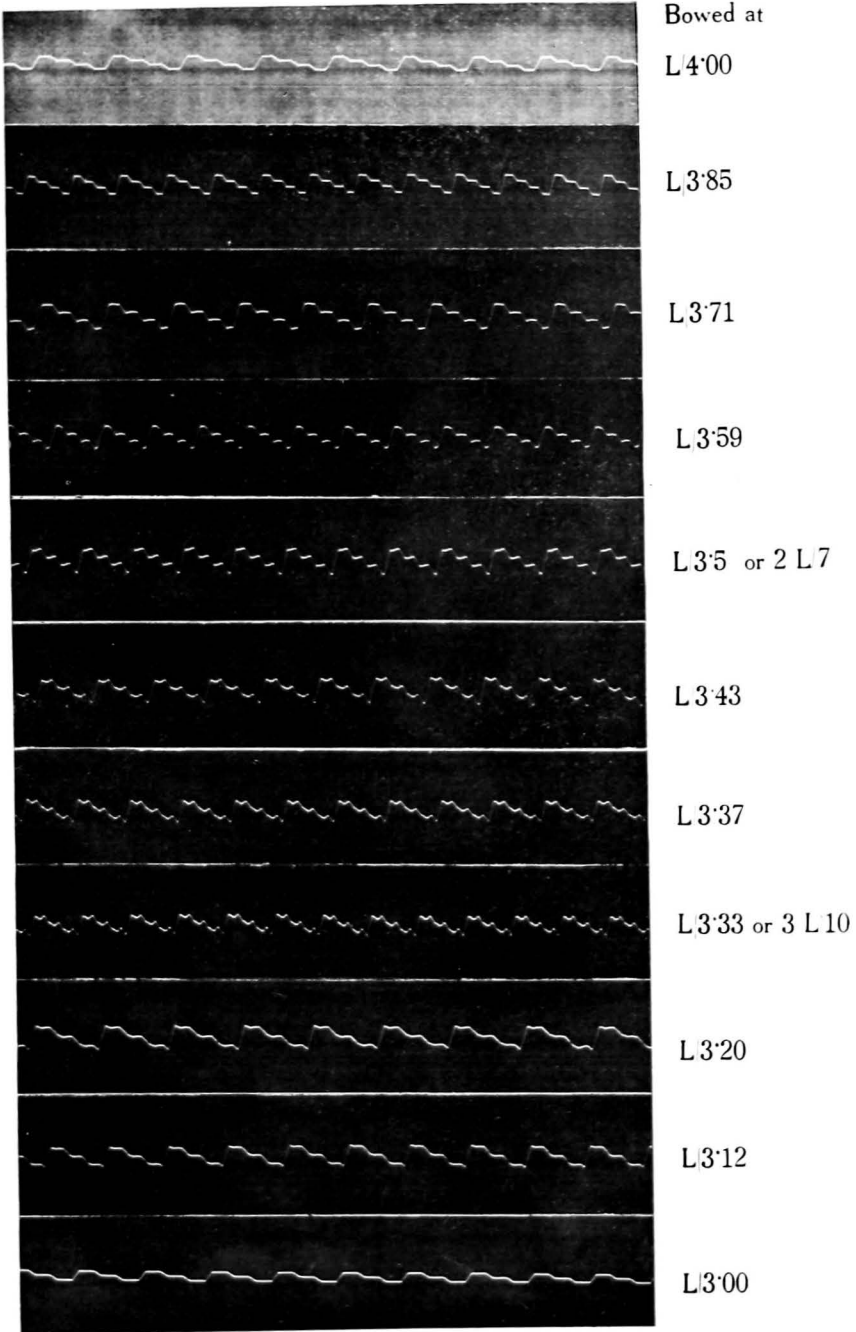
Fig. 15 similarly represents the types of vibration that may be obtained by bowing at points lying between $l/3$ and $l/2$. It is noteworthy that all the three diagrams give the values of ω at the bowed point, both in the cases in which this point divides the string in a rational ratio as well as in those in which it divides the string in an irrational ratio. In cases of the latter kind, the diagrams may also be used to find the value of ω elsewhere than at the bowed point.

There is another and a very instructive point of view from which the effect of the variation of pressure may be regarded. In Section II of the paper, it was shown that if the bow is applied at a point of rational division of the string, the harmonics having a node at that point are not excited. It is obvious also that if the bowed point is situated at some little distance from the node instead of actually coinciding with it, the forces required to maintain the harmonics in question with appreciable amplitudes would be of considerable magnitude relatively to those required for the maintenance of the other components in the motion. We are led therefore to conclude that the types of motion maintained would tend to be those in which harmonics having a node near the bowed point are relatively large or small in amplitude according as the pressure with which the bow is applied is much or little. We are also led to conclude that as an increase of the velocity of the bow involves an increase of the amplitude of vibration, its effect on the character of the motion would be analogous to that of a decrease in the pressure of the bow. The preceding results are in agreement with those already arrived at from somewhat different considerations.

Mathematical Theory.

We now proceed to consider the mathematical theory of the subject. For the present, we shall adhere to the simplifying assumption already made that the region of contact may be regarded as a mathematical point. Let the motion of the string in any actual case be represented by the Fourier series

Observed at L/10



The first type of vibration: its rational and transitional modifications.

$$y = \sum_{n=1}^{n=\infty} \sin \frac{n\pi x}{l} \left[a_n \sin \frac{2n\pi t}{T} + b_n \cos \frac{2n\pi t}{T} \right]$$

or more briefly

$$y = \sum_{n=1}^{n=\infty} B_n \sin \frac{n\pi x}{l} \sin \left(\frac{2n\pi t}{T} + e_n \right)$$

From the formulae found in Section II of the paper it is seen that the force required to maintain this motion may be represented by

$$\sum_{n=1}^{n=\infty} k_n B_n \frac{\sin \left(\frac{2n\pi t}{T} + e_n + e'_n \right)}{\sin \frac{n\pi x_0}{l}},$$

when k_n and e'_n are quantities independent of the position of the bowed point and x_0 is the distance of this point from the fixed end of the string. If for a particular value or values of n the denominator $\sin \frac{n\pi x_0}{l}$ of the term in the series is very small but not actually zero, and if at the same time the amplitude B_n of the corresponding harmonic or harmonics remains finite, the magnitude of the respective term or terms in the expression for the maintaining force is necessarily great. But if $\sin \frac{n\pi x_0}{l}$ is actually zero for certain values of n , the corresponding terms B_n in the maintained motion must necessarily vanish as we must obviously exclude the possibility of infinitely large values for the maintaining force. The series given above represents the variable part of the frictional force at the point of contact. This force is a function of the pressure P with which the bow is applied and the relative velocity $(v - v_B)$ at the point of contact. It may be written in the form $F(P, v - v_B)$, the function remaining determinate and always of the same sign so long as the relative velocity $(v - v_B)$ does not become zero or change sign. We may therefore write

$$F(P, v - v_B) = P_0 + \sum_{n=1}^{n=\infty} k_n B_n \frac{\sin \left(\frac{2n\pi t}{T} + e_n + e'_n \right)}{\sin \frac{n\pi x_0}{l}} \dots \quad (22)$$

where P_0 is the non-periodic part of the frictional force.

Equation (22) may be regarded as the dynamical relation from which the motion at the bowed point and therefore also the entire mode of vibration of the string is to be determined. For, if the velocity v of the bowed point be expressed as a function of the time, the amplitudes B_n of the harmonics can be found therefrom by integration over the complete period. The various types of vibration whose kinematical theory was discussed in the first part of the paper may be regarded as forming a series of *limiting solutions* of this dynamical equation to one or other of which the actual results approximate more or less closely according to circumstances. How these limiting solutions are obtained has already been indicated in the discussion on the *modus operandi* of the bow. We now proceed to examine more closely the degree of approximation within which the limiting solutions represent the actual results.

Our knowledge of the form of the function $F(P, v - v_B)$ is not at present very definite for surfaces of the kind we are concerned with in this paper. It may however be accepted as demonstrably correct that when the relative velocity $(v - v_B)$ is actually zero, the friction is not greater than a certain maximum statical value P_s , which increases continuously for increasing values of the pressure P with which the bow is applied. We may also suppose that when the relative velocity $(v - v_B)$ is greater than zero, the magnitude of the friction decreases with increasing values of the relative velocity, at first somewhat rapidly and later on perhaps not so rapidly. Arguing from these premises, the relation given in (22) enables us to arrive at certain important conclusions. In the first place, since the quantities k_n, e'_n depend on the construction of the sounding box on which the string is stretched, the summation of the series on the right-hand side of (22) cannot, in general, result in our finding a constant value for the relative velocity $(v - v_B)$ in any or all of the epochs in which it is greater than zero. The relative velocity may however approach or attain practical constancy in any or all of the epochs referred to, if the variation of the sum of the series on the right-hand side of equation (22) within those epochs is negligibly small. It is seen that such practical constancy would be attained if the pressure P with

which the bow is applied is sufficiently large to ensure that the necessary variation in the value of the function $F(P, v - v_B)$ can be secured by negligibly small changes in the relative velocity $(v - v_B)$. The practical constancy in the relative velocity during the epochs referred to may also be secured even for moderate values of the pressure P , provided that in the series on the right-hand side of (22) there are no large, rapidly-varying terms. For instance, if the string were bowed at important nodes such as $l/3$ or $l/4$ even with very moderate pressure, the absence of the corresponding series of harmonics in the resulting motion removes terms which would otherwise introduce large and rapidly varying fluctuations in the value of the series for the maintaining force. The constancy of the velocity of the bowed point in slipping past the hairs of the bow is thus remarkably perfect in such cases.

Assuming the solution of (22) to be one of the limiting types in which the relative velocity $(v - v_B)$ has a constant value in all the epochs in which it is not actually zero, we may easily find an inferior limit to the pressure with which the bow must be applied for the given type of vibration to be possible. Thus, let $(v_A - v_B)$ be the constant value of the relative velocity during any such epoch and let P_A be the sum of the series on the right-hand side of (22) for that epoch. Then we must have

$$F(P, v_A - v_B) = P_0 + P_A \quad . . . \quad (23)$$

Further, let P_A' be the maximum value of the series during any of the epochs in which the relative velocity is zero. Then, we must have

$$P_s \text{ (the statical friction)} \leq P_0 + P_A' \quad . . . \quad (24)$$

Subtracting the quantities in (23) from the two sides of the inequality in (24), we find that the pressure with which the bow must be applied is such that

$$P_s - F(P, v_A - v_B) \leq P_A' - P_A$$

If μ be the coefficient of statical friction for the pressure P , and μ_A be the coefficient of dynamical friction for the pressure P and relative velocity $(v_A - v_B)$, the inequality may be written thus,

$$P \leq \frac{P_A' - P_A}{\mu - \mu_A} \quad . . . \quad (25)$$

If the pressure of the bow is less than the critical value given by (25), the vibration would no longer be maintained and would therefore alter in character. We may now consider the effect of *increasing* the pressure above this critical value. It is obvious from equation (22) that if the relative velocity ($v - v_B$) is assumed to have a constant value in all the epochs in which it is not actually zero, the increase in the frictional force $F(P, v - v_B)$ caused by an increase of the pressure of the bow might merely result in raising the non-periodic constant P_0 on the right-hand side of the equation and thus leave the periodic part of the forces acting on the string unaltered. When, therefore, any one of such types of vibration is once thoroughly established, considerable latitude is permissible in the pressure of the bow so long as it does not fall below the critical value. It must not however be understood from this that the pressure can be increased indefinitely. For, if there be some other possible type of vibration whose critical pressure be higher than the first, the motion originally maintained would be relatively less stable and would yield place to the other, when the pressure of the bow exceeds the critical value of the latter. The manner in which an increase of pressure sets up an instability of the original type of vibration is best understood by analogy with that of the equilibrium of a system with one degree of freedom. The equation of motion about the position of equilibrium of such a system under the action of the bow is

$$\ddot{x} + (k - \lambda) \dot{x} + n^2 x = 0$$

where k is the damping coefficient and λ is a positive quantity proportional to the velocity-rate of change of the frictional force which may be increased by increasing the pressure of the bow. When the velocity as given by \dot{x} is initially zero, there is apparently nothing to cause the system to depart from the position of equilibrium. If, however, by increasing the pressure of the bow, λ is increased till it exceeds k , the equilibrium becomes unstable and any small motion is magnified continuously till it reaches the limit set by the velocity of the bow. The mechanical disturbance caused by laying on the bow or by increasing its pressure is sufficient to give effect to the instability. Similarly in the case of the bowed string, a steady state of vibration in any

given type is obviously out of the question if any slight disturbance results in a progressive change and re-adjustment of the amplitudes of the harmonics. Referring to equation (22), it is seen that an increase in the non-periodic part P_0 of the frictional force caused by an increase in the pressure P of the bow would tend to set up such instability if an alternative mode of vibration with a higher critical pressure were possible.

On comparing equations (22) and (25), it is seen that, in general, the type of vibration which has a higher critical pressure than another would also contain the harmonics having nodes near the bowed point with relatively larger amplitudes.

Analysis of the Motion.

$$y = \sum \sin \frac{n\pi x}{l} \left[a_n \sin \frac{2n\pi t}{T} + b_n \cos \frac{2n\pi t}{T} \right]$$

Differentiating, we have

$$\frac{dy}{dt} = \sum \frac{2n\pi}{T} \sin \frac{n\pi x}{l} \left[a_n \cos \frac{2n\pi t}{T} - b_n \sin \frac{2n\pi t}{T} \right] \dots (26)$$

But in Section X, we found that the analysis of the velocity-diagram consisting of parallel straight lines gives

$$\frac{dy}{dt} = \sum A_n \sin \frac{n\pi x}{l}$$

where

$$A_n = - \frac{2}{n\pi} \left[d_1 \cos \frac{n\pi c_1}{l} + d_2 \cos \frac{n\pi c_2}{l} + \text{etc.} \right],$$

d_1, d_2, d_3 , etc., being the magnitudes of the discontinuities in the velocity-diagram situated at points whose abscissae are c_1, c_2, c_3 , etc., respectively. Since some of the discontinuities move towards the origin and others away from it, it is convenient to use instead of c_1, c_2, c_3 , etc., the quantities C_1, C_2, C_3 , etc., where $c_r = C_r + at$ if the discontinuity d_r belongs to the positive wave, and $c_r = 2l - (C_r + at)$ if it belongs to the negative. We then have, as a relation true for the whole period of vibration,

$$A_n = - \frac{2}{n\pi} \left[d_1 \cos \frac{n\pi(C_1 + at)}{l} + d_2 \cos \frac{n\pi(C_2 + at)}{l} + \text{etc.} \right] \dots (27)$$

Comparing (26) and (27), we may write

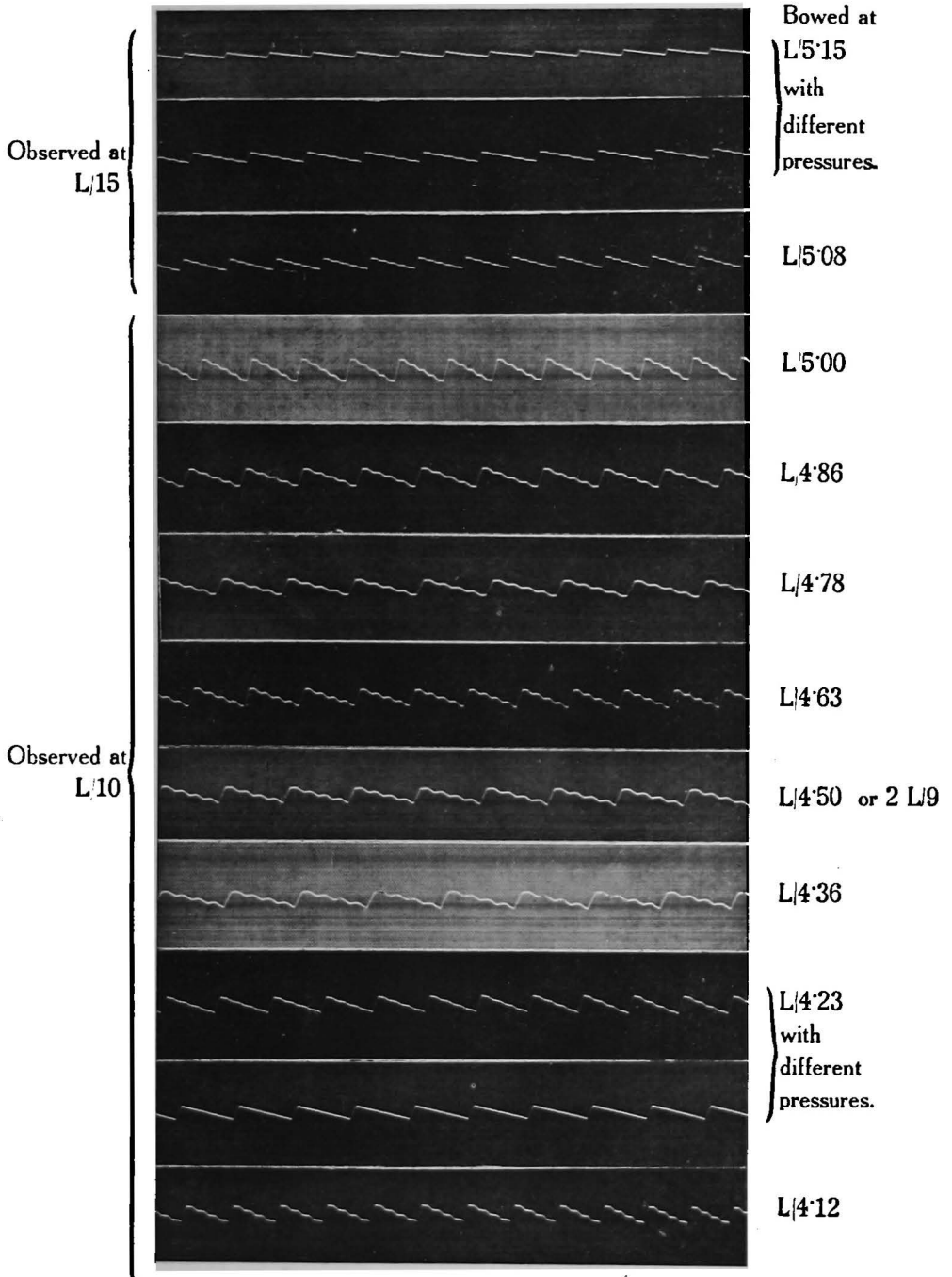
$$\begin{aligned}
 a_n &= -\frac{1}{n^2 \pi^2 T} \left[d_1 \cos \frac{n\pi C_1}{l} + d_2 \cos \frac{n\pi C_2}{l} + \text{etc.} \right] \\
 b_n &= -\frac{1}{n^2 \pi^2 T} \left[d_1 \sin \frac{n\pi C_1}{l} + d_2 \sin \frac{n\pi C_2}{l} + \text{etc.} \right] \\
 B_n &= (a_n^2 + b_n^2)^{\frac{1}{2}} \dots \dots \dots (28)
 \end{aligned}$$

This gives the amplitudes of the series of harmonics in terms of the discontinuities and their initial positions. In the case of the bowed string we have

$$d_1 = d_2 = d_3 = \dots = (v_A - v_B) \dots \dots (29)$$

From (28) and (29), it is easy to verify the remark already made that when the number of discontinuities is large, the higher harmonics gain considerably in their relative importance.

Substituting the values of the amplitudes B_n of the harmonics found from the preceding analysis in the expression for the maintaining force on the right-hand side of equation (22), the interesting question arises whether this expression for the maintaining force is really a convergent Fourier series. If k_n varies as n^z where $z > 1$, the expression for the force on the right-hand side of (22) is a non-convergent series and it follows that under such circumstances, the bow would be even theoretically incapable of eliciting an infinite series of harmonics. Even when k_n varies as n^z where z is not greater than unity, the existence of the factor $\sin \frac{n\pi x_0}{l}$ in the denominator of each term in the series brings in a very interesting difficulty as to its convergency. If we assume $\frac{x_0}{l}$ to be an irrational fraction, it is obviously possible by assuming a suitable and sufficiently large value of n to make the quantity $\sin \frac{n\pi x_0}{l}$ smaller than any specified fractional number, and, further, it is evidently possible to find an infinite number of such values of n which would reduce $\sin \frac{n\pi x_0}{l}$ to a value below the specified limit. Under the circumstances it becomes rather a delicate mathematical question whether the expression for the force given in (22) would then be a convergent series, and, if so, for



The first type of vibration : its rational and transitional modifications.

what values of z . This difficulty does not arise if $\frac{x_0}{l}$ be a rational fraction, for the values of $\sin \frac{n\pi x_0}{l}$ then form a recurring series and the expression for the force is obviously convergent for values of z not greater than unity. It is of great interest to determine and represent the form of the expression for the force at the bowed point graphically and compare it with the form of the vibration-curve at the bowed point; if the values of k_n be arbitrarily assumed and the amplitudes B_n are determined from the formulae given in (28) and (29), it is to be expected that, in general, the equation for the maintaining forces given in (22) is not rigorously satisfied even if the value of the constant P_0 and the initial positions C_1, C_2, C_3 , etc., of the discontinuities be suitably assumed. In other words, the motion at the bowed point cannot in general be rigorously of the type on which our kinematical discussion was based, that is, having forward motions which involve no slipping and backward motions with uniform velocity of slipping. But in a special class of cases, as we shall presently see, the motion at the bowed point may be exactly of such type consistently with the dynamical conditions expressed in equation (22).

Frictional-Force Curves and Motion at the Bowed Point.

As indicated above, it is a most important matter to determine and represent graphically the nature of the variation of the frictional force at the bowed point. If the maintained motion, the position of the bowed point and the magnitudes of the series of constants k_n and e_n are all known, the harmonic components in the frictional force are all determinate, except those, the frequencies of which are the same as that of the missing harmonics having a node at the bowed point. If such components be assumed to be zero, or at any rate be assigned specific magnitudes, the frictional-force curve at the bowed point may be drawn by the aid of a machine for harmonic synthesis. Such curves would be very useful for comparison with the form of the vibration-curve at the bowed point, specially during these epochs at which the bowed

point slips past the hairs of the bow ; they could also be used for determining the critical value of the pressure of the bow for the possibility of the type of vibration considered.

The form of the frictional-force curves may be found analytically and drawn without the aid of a harmonic machine in an important class of cases which may be regarded as representative of the phenomena actually met with in experiment. We shall assume that the values of e_n ' can all be put equal to $\frac{\pi}{2}$. This would be a very close approximation to the truth, as may be seen from the formulæ given in Section I, if the natural frequencies of vibration of the string form a strictly harmonic series and the yielding at its ends is negligible. Further, we shall assume that the values of k_n are proportional to n . This assumption cannot be very wide of the mark, for, if k_n were proportional to a power of n higher than unity, the expression for the frictional force would not be a convergent Fourier series and it would no longer be possible to consider the motion of the string as comprising an infinite series of harmonics. In practice, moreover, it seems very unlikely that the damping coefficients of the higher harmonics increase at a much lower rate than that given by the formula $k_n \propto n$, as the higher harmonics would otherwise be more conspicuous in the maintained vibration than they usually are.¹

On these assumptions, the expression for the frictional force assumes the form

$$\sum_{n=1}^{n=\infty} \frac{nkB_n \cos\left(\frac{2n\pi t}{T} + e_n\right)}{\sin \frac{n\pi x_0}{l}}$$

To effect the summation of this series, we have to assume that x_0/l is a rational fraction and the values of the denominators therefore form a recurring series. For those values of n for which the

¹ It may be noted that the assumptions $e_n = \frac{\pi}{2}$ and $k_n \propto n$ are quite correct when the dissipation of the energy of the string is solely due to a frictional force proportional to the velocity resisting each element of the string. Cf. Andrew Stephenson. *Phil. Mag.*, Jan. 1911.

denominator is zero, B_n is also equal to zero, and the series therefore contains a series of indeterminate terms. In the most general case in which the vibration-curve at the bowed point can be represented by a number of straight lines of which alternate ones are not necessarily parallel to one another, we may write the expression for the force in the form

$$\sum_{n=1}^{\infty} \frac{n k \left(a_n \cos \frac{2n\pi t}{T} - b_n \sin \frac{2n\pi t}{T} \right)}{\sin \frac{n\pi x_0}{l}},$$

the values of a_n and b_n being given by the formulae (see page 78),

$$a_n = -\frac{1}{n^2 \pi^2 T} \left[d_1 \cos \frac{n\pi C_1}{l} + d_2 \cos \frac{n\pi C_2}{l} + \text{etc.} \right],$$

$$b_n = -\frac{1}{n^2 \pi^2 T} \left[d_1 \sin \frac{n\pi C_1}{l} + d_2 \sin \frac{n\pi C_2}{l} + \text{etc.} \right].$$

The summation of the expression for the force is thus seen to depend upon the summation of a number of separate sine and cosine series of the form

$$\sum_{n=1}^{\infty} \frac{\cos \frac{n\pi C}{l}}{\sin \frac{n\pi x_0}{l}} \cos \frac{2n\pi t}{T} \quad \text{and} \quad \sum_{n=1}^{\infty} \frac{\sin \frac{n\pi C}{l}}{\sin \frac{n\pi x_0}{l}} \sin \frac{2n\pi t}{T}.$$

Since x_0/l is, by assumption, a rational fraction, we have to exclude the indeterminate terms in which the denominator $\sin \frac{n\pi x_0}{l}$ is zero, in order to effect the summation of these series.

The form of the expression suggests that the graph representing the sum of each of the series given above should consist of a number of straight lines parallel to the axis of time, separated by intervening discontinuities. The summation of the series then reduces itself to finding the positions and magnitudes of these discontinuities. Taking, for instance, any one of the cosine series, we may assume that its graph has a discontinuity δ_1 at either of

The several series contained in the expression for the frictional force may thus be added up and their sum represented graphically. It is obvious that the frictional-force curve assumes the least complicated form, that is, has fewest discontinuities when the initial positions C_1, C_2, C_3 , etc., of the discontinuities in the velocity-diagram of the string coincide with the nodes of the principal member of the missing series of harmonics. For, the fractions $\frac{x_0}{l}$ and $\frac{C_1}{l}, \frac{C_2}{l}, \frac{C_3}{l}$, etc., would then have the smallest possible common denominator. It may be noted that the method given above for drawing the frictional-force curve is applicable in the general case when the vibration-curve at the bowed point consists of any number of straight lines forming a continuous "curve," and is thus not restricted to the cases in which the velocities in the forward and backward movements are both constant and uniform. If these velocities are constant and uniform, the discontinuities d_1, d_2 , etc., in the velocity-diagram of the string are all equal to one another (see Section IV).

When the vibration-curve at some one point on the string (not necessarily at the bowed point) is a simple two-step zig-zag, the calculation of the form of the frictional-force curve becomes particularly simple. When the motion at the bowed point is itself of this type, the expression reduces to the form

$$\frac{K(v_A - v_B)}{\pi^2 T} \sum \frac{(-1)^n \sin n\pi\omega}{n \sin^2 \frac{n\pi x_0}{l}} \cos \frac{2n\pi t}{T}.$$

When the motion at a point x_1 which is not the bowed point is of the two-step zig-zag form, the expression for the frictional force may be written as

$$\frac{K(v_A' - v_B')}{\pi^2 T} \sum \frac{(-1)^n \sin n\pi\omega'}{n \sin \frac{n\pi x_0}{l} \sin \frac{n\pi x_1}{l}} \cos \frac{2n\pi t}{T},$$

the quantities v_A', v_B' and ω' having reference to the motion at the point x_1 . The two formulae given above may be readily verified

from (22) by analysing the motion postulated at the bowed point and substituting the values thus obtained for the quantities B_n .

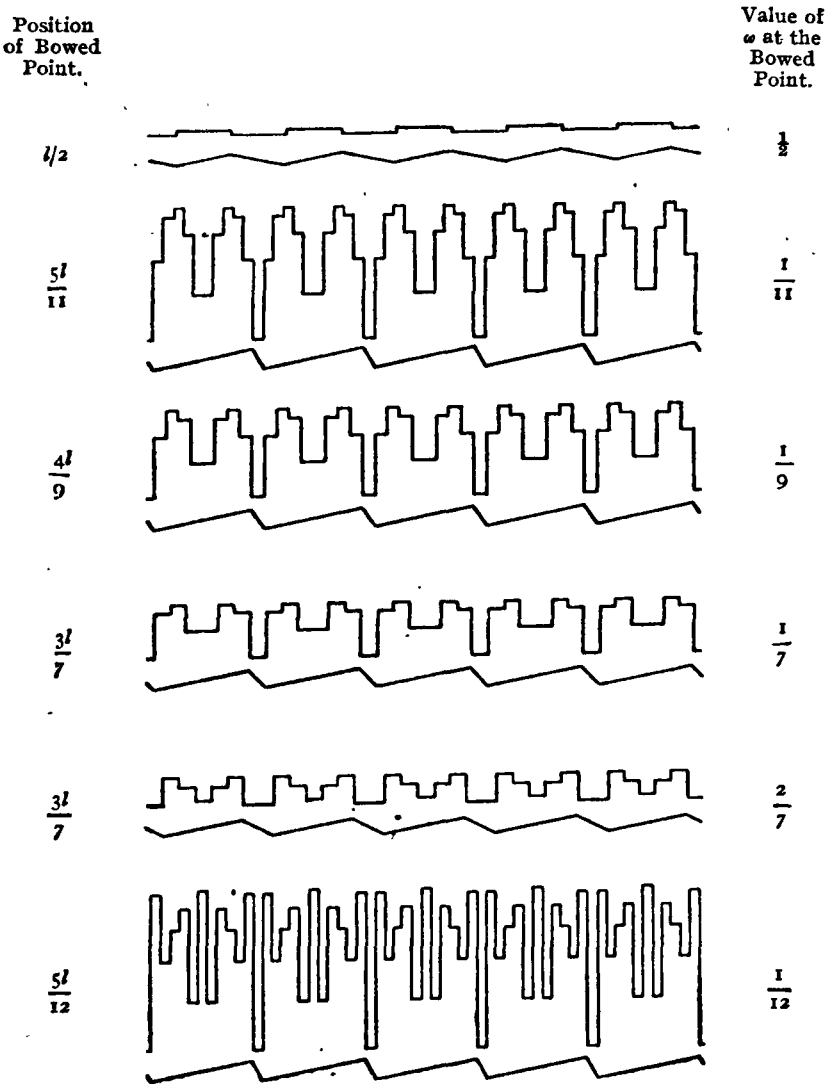
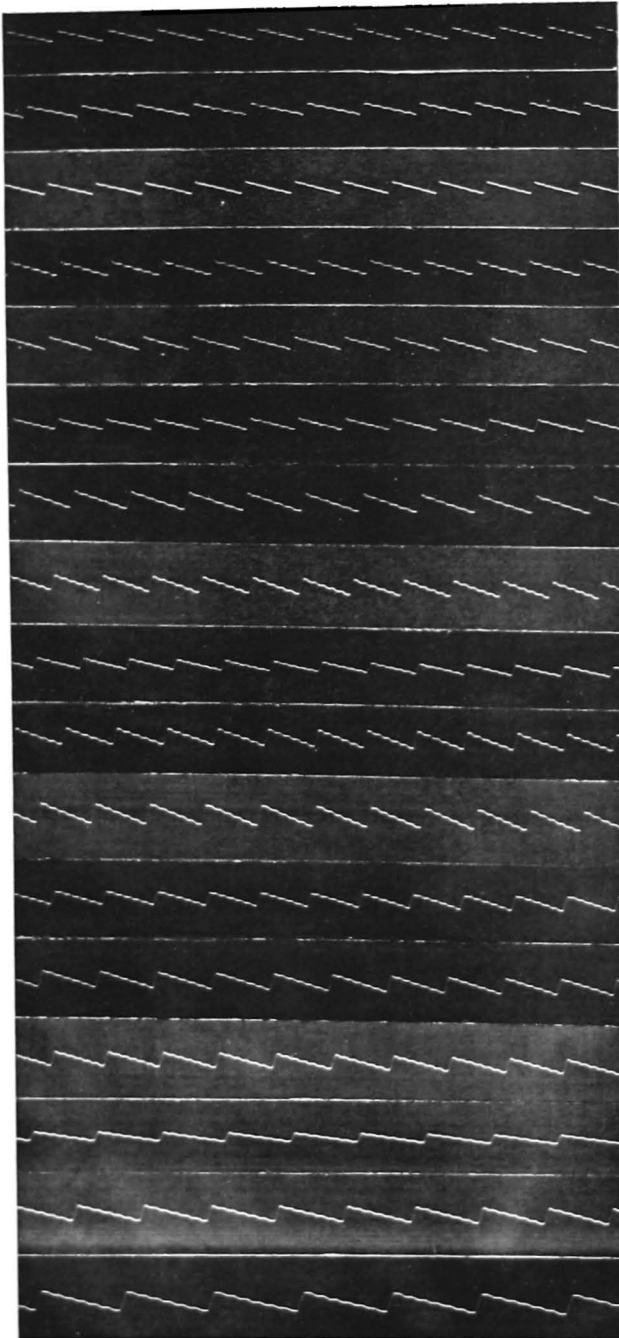


Fig. 16.—Frictional-Force Curves and Motion at the Bowed Point.

Figures 16, 17, 18, 19, 20 and 21 in the text represent no fewer than 45 curves for the frictional force calculated for various cases

Observed at L/15.



Bowed at
L/5:22

L/5:35
with
different
pressures.

L/5:49
with
different
pressures.

L/5:61

L/5:81
with
different
pressures.

L/6:00

L/6:25

L/6:50
with
different
pressures.

L/6:75

L/7:00

The first type of vibration : its rational and transitional modifications.

from the expressions given above, the vibration-curve at the bowed point which forms the basis of the calculation being shown alongside for comparison. Figs. 16 to 19 represent cases in which the vibration-curve at the bowed point is assumed to be of the simple two-step zig-zag type, and Fig. 20 represents cases in which it is taken to be a four-step or a six-step zig-zag, though at some other point on the string the vibration-curve is a two-step zig-zag.

As examples of the method of calculation, we may consider a few of the cases illustrated in the figures. Let the string be bowed at a distance of one-seventh of its length from one end. From Fig. 13 it is seen that in this case $\omega = \frac{1}{7}$. The expression for the force then reduces to

$$\frac{7k v_B}{\pi^2 T} \sum \frac{(-1)^{n-1} \cos \frac{2n\pi t}{T}}{n \sin \frac{n\pi}{7}}$$

The positions of the discontinuities in the frictional-force curve must therefore be

$$\pm \frac{\pi}{7}, \pm \frac{2\pi}{7}, \pm \frac{3\pi}{7}, \pm \frac{4\pi}{7}, \pm \frac{5\pi}{7} \text{ and } \pm \frac{6\pi}{7}.$$

We then get the set of equations

$$\begin{aligned} \delta_1 \sin \frac{n\pi}{7} + \delta_2 \sin \frac{2n\pi}{7} + \delta_3 \sin \frac{3n\pi}{7} + \delta_4 \sin \frac{4n\pi}{7} + \delta_5 \sin \frac{5n\pi}{7} \\ + \delta_6 \sin \frac{6n\pi}{7} = (-1)^{n-1} \frac{7k v_B}{2\pi T \sin \frac{n\pi}{7}}, \end{aligned}$$

of which only the first six are independent (i.e., $n=1, 2, 3, 4, 5$ or 6). On writing down the equations, it is found at once that $\delta_1 = \delta_3 = \delta_5 = 0$. Multiplying both sides of the equation by $\sin \frac{n\pi}{7}$, simplifying and utilizing the relation

$$\cos \frac{\pi}{7} - \cos \frac{3\pi}{7} + \cos \frac{5\pi}{7} = \frac{1}{2}$$

we find that

$$\delta_2 : \delta_4 : \delta_6 \text{ as } 1 : 2 : 3, \text{ and } \delta_2 = \frac{2kv_B}{\pi T}.$$

The frictional-force curve for this case is shown in Fig. 19. As another example, we may take the position of the bowed point to be $\frac{2l}{11}$ and that $\omega = \frac{1}{11}$. (Referring to Fig. 13, it will be seen that this gives a combination of the fifth and sixth types of vibration). On writing down the equations as before, it is found that $\delta_1 = \delta_3 = \delta_5 = \delta_7 = \delta_9 = 0$ and that the equations reduce to the form

$$\begin{aligned} \delta_2 \sin \frac{2n\pi}{11} + \delta_4 \sin \frac{4n\pi}{11} + \delta_6 \sin \frac{6n\pi}{11} + \delta_8 \sin \frac{8n\pi}{11} + \delta_{10} \sin \frac{10n\pi}{11} \\ = (-1)^{n-1} \frac{11kv_B \cdot \sin \frac{n\pi}{11}}{2\pi T \cdot \sin^2 \frac{2n\pi}{11}} \end{aligned}$$

Multiplying both sides by $2 \sin^2 \frac{2n\pi}{11}$, i.e., by $(1 - \cos \frac{4n\pi}{11})$ and simplifying, the equations may be easily solved by grouping together all the terms which have a common coefficient $\sin \frac{\pi}{11}$, all those which have the coefficient $\sin \frac{2\pi}{11}$ and so on. The solution is found to be

$$\delta_2 : \delta_4 : \delta_6 : \delta_8 : \delta_{10} \text{ as } 3 : -5 : 9 : -10 : 15 \text{ and } \delta_2 = \frac{6kv_B}{\pi T}.$$

On plotting these values, a very interesting figure is obtained in which the fifth and sixth harmonics are very prominent and by their superposition, give an appearance similar to that of "beats." (See Fig. 19.) All the curves shown in Figs. 16 to 21 were calculated by methods closely analogous to those employed in these two examples. They were all drawn to exactly the same scale, the velocity of the bow being taken to have a fixed value, and the curves are thus all strictly comparable.

From a scrutiny of the 45 frictional-force curves shown in Figs. 16 to 21, a number of important generalisations can be arrived at, which we now proceed to consider.

The curves shown in Figs. 16 to 21 are of special interest in many ways. The 29 curves shown in Figs. 16 to 19 all deal with

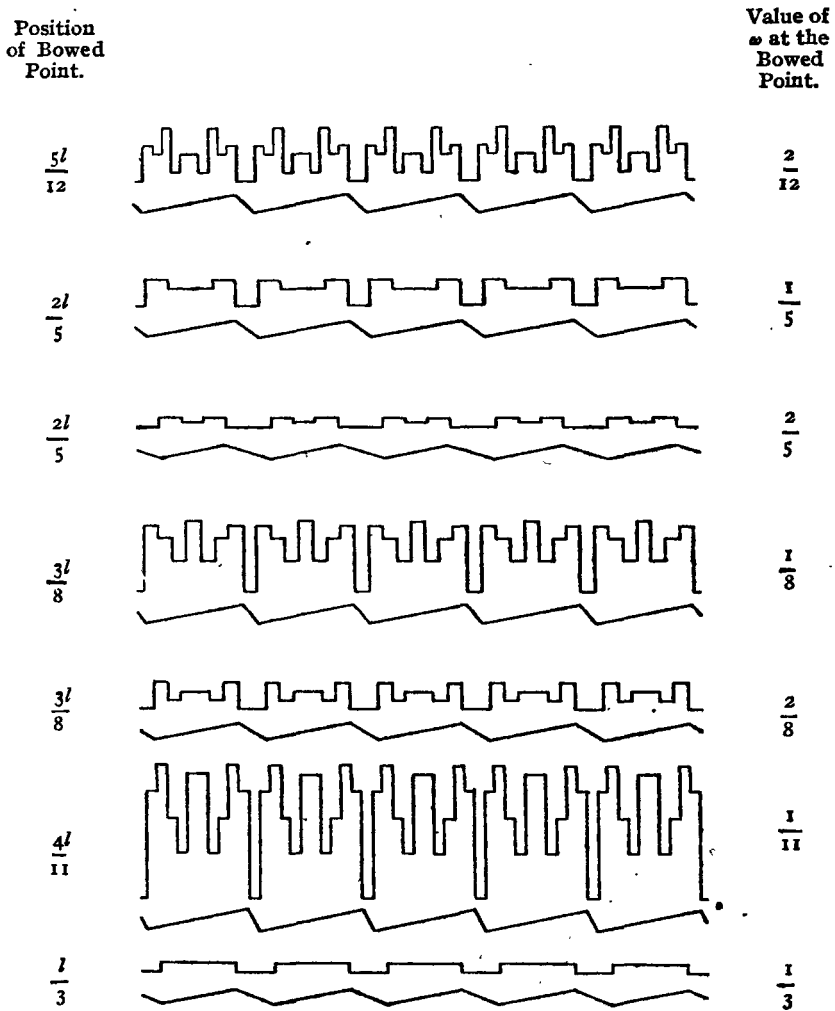


Fig. 17.—Frictional-Force Curves and Motion at the Bowed Point.

cases in which the bow is applied at a point of rational division and the motion at this point is a two-step zig-zag, the value of ω for which has either 1 or 2 as its numerator. It will be seen that,

in all these cases, the frictional force has a minimum constant value during the epochs at which the bowed point slips past the

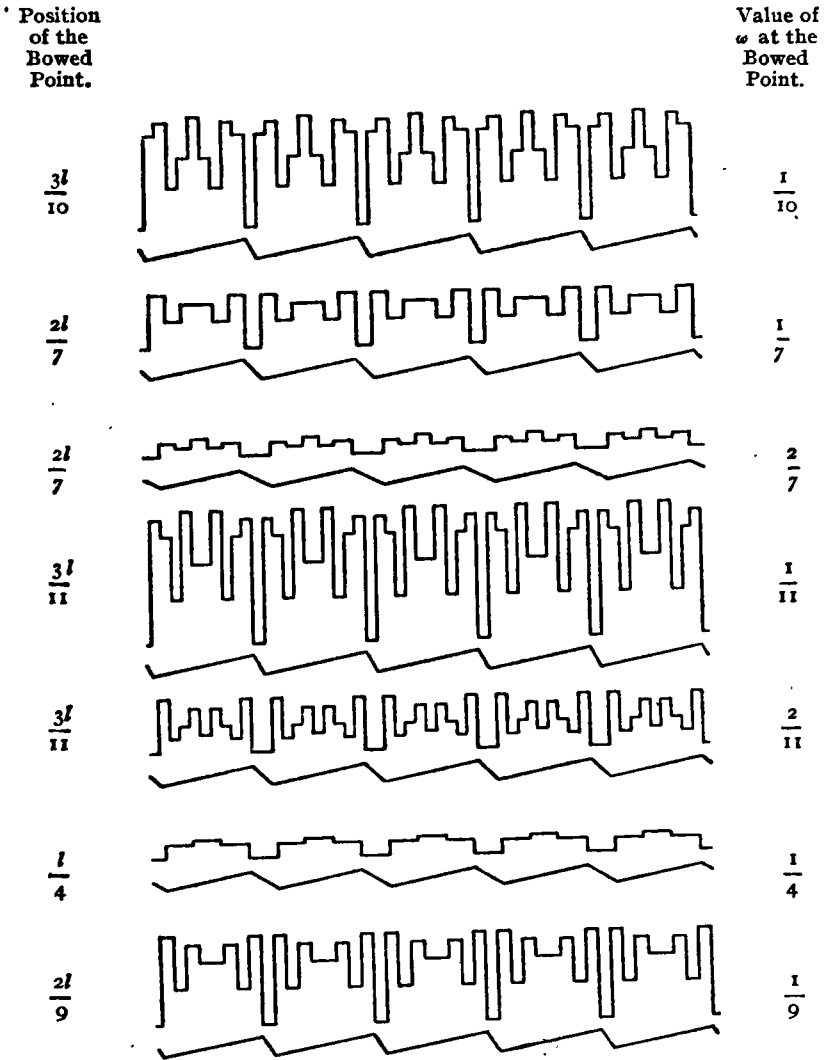


Fig. 18.—Frictional-Force Curves and Motion at the Bowed Point.

hairs of the bow. It is also seen that in some of these cases the frictional force has *the* maximum or *a* maximum value just before the

slipping begins and just after it is over. But this is by no means a general rule, for in 12 out of the 29 cases, the frictional force before and after this epoch is not a maximum at all. Further, in all the cases in which the bow is applied at a point of aliquot division, e.g., $l/2$, $l/3$, $l/4$, $l/5$ or $l/6$, etc., the friction is a maximum at the middle of the stage during which the bowed point is carried forward by the bow. The nine curves of this kind shown in the series all bear a strong family resemblance to one another. Similarly the frictional-force curves for the bowed points $\frac{2l}{5}$, $\frac{2l}{7}$, $\frac{2l}{9}$, $\frac{2l}{11}$, etc., are worthy of careful study and inter-comparison. When the value of ω for these cases is $\frac{1}{5}$, $\frac{1}{7}$, $\frac{1}{9}$, $\frac{1}{11}$, etc., respectively, the curves have a distinctive form in which the two chief harmonics having a node on either side of the bowed point are specially prominent. But when $\omega = \frac{2}{5}$, $\frac{2}{7}$, $\frac{2}{9}$, $\frac{2}{11}$, etc., respectively, the form of the curve is more closely analogous to those for aliquot points of division referred to above. This is evidently because the fundamental is more prominent when ω has the larger value in such cases.

Krigar-Menzel and Raps remark in their paper as follows:—
“It is clear from all that has been said that the idea of the mechanical action of the bow which we form is in all the cases the same as that which has already been described by Helmholtz. The bowed point adheres to the rosined hairs of the bow and is carried forward with a constant velocity equal to that of the bow. This situation accounts for the ascending line of moderate slope in the vibration-curve at the bowed point. Finally, through the increasing tension of the string, the adhering point breaks loose and glides downwards against the bow under strong friction with a constant maximum velocity till the cycle commences to repeat itself anew.” If Krigar-Menzel and Raps were quite correct in their explanation of the “breaking loose of the bowed point from the hairs of the bow” as due to the increasing tension of the string, we should have expected to find that the friction of the

bow is a maximum immediately before the release takes place. As we have just seen, this is by no means generally the case, and we are therefore forced to conclude that the pure kinematics of the

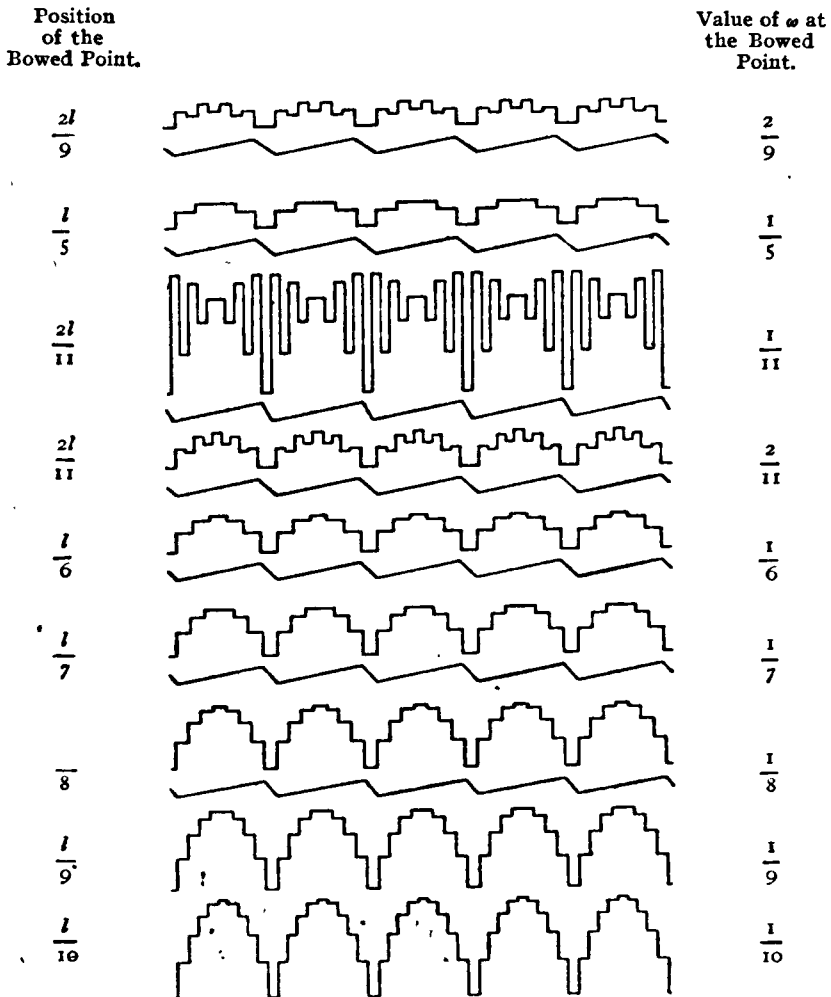
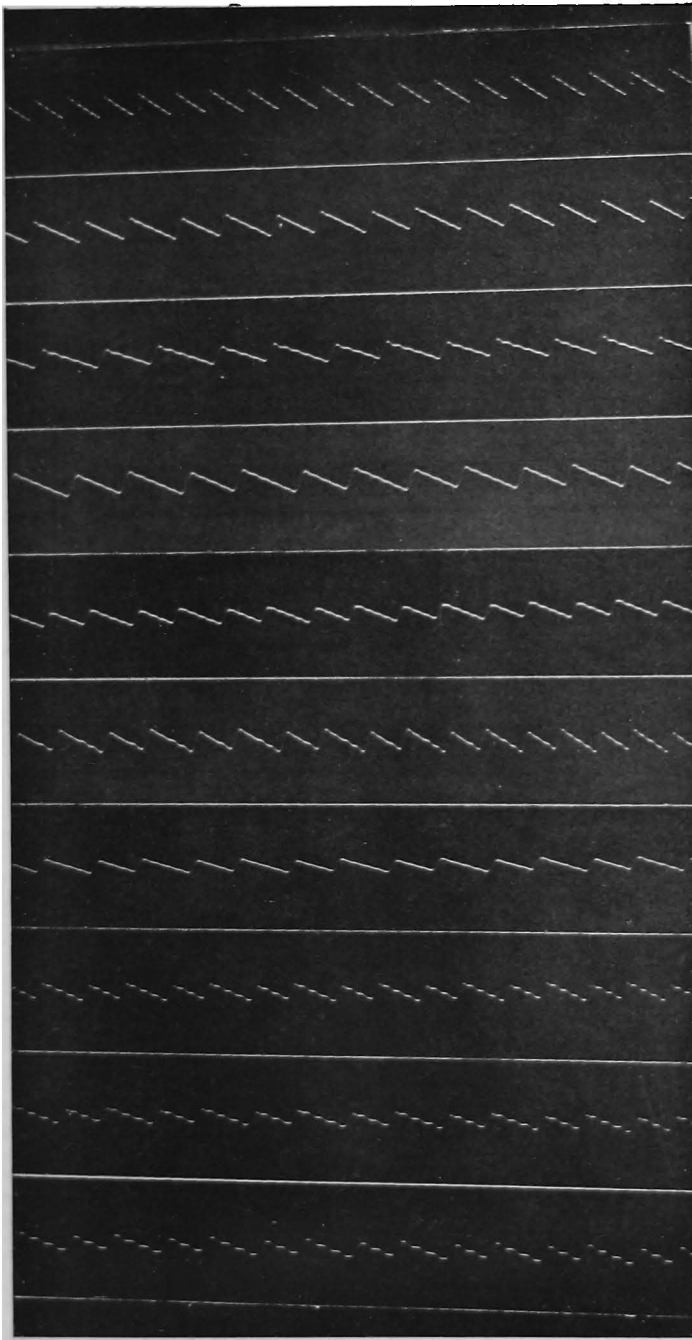


Fig. 19.—Frictional-Force Curves and Motion at the Bowed Point.

motion is also a factor in determining the release of the string by the bow. As we shall see presently, Krigar-Menzel and Raps were also wrong in taking the velocity of slipping against the hairs

PLATE XV.

Observed at L/15



Bowed at

L'2:11

L'2:16 or 6 L/13

L'2:19

L'2:20 or 5 L/11

L'2:23

L'2:24

L'2:25 or 4 L/9

L'2:29

L'2:30

L'2:35 or 3 L/7 nearly.

The second type of vibration : its rational and transitional modifications.

of the bow to be uniform. It is in general only approximately uniform or even largely non-uniform, and such variations of the velocity have an important significance and result.

Referring again to the curves shown in Figs. 16 to 19, it will be seen that in all cases, the harmonics which have a node near the bowed point are prominent in the frictional-force curve. This is what might be naturally expected from the form of the expression for the force.

Further, in all cases when ω is a small fraction, the frictional-force curves become very steep, that is, the friction becomes greater. If this friction exceeds the maximum statical value, the motion ceases to be possible. We thus see that if the value of ω is to be small, the pressure of the bow must be considerably increased. For instance, from the last five cases shown in Fig. 19 it is clear that the minimum pressure of the bow must be increased as the bowed point approaches one end of the string. Similar effects are also noticeable in the cases in which the bow closely approaches important nodes such as $l/2$, $2l/5$, $l/3$ or $l/4$.

For any given position of the bowed point, the larger value of ω means smaller friction and therefore a reduced minimum pressure. When the bow coincides exactly with an important node such as $l/2$ or $l/3$, the friction becomes extremely small and the pressure of bowing necessary is therefore very low indeed.

Passing on to the cases in which the motion at the bowed point is still assumed to be a two-step zig-zag, but the value of ω has 3 or some larger integer as its numerator, we see at once a remarkable difference (Fig. 20). *The frictional force has no longer a constant uniform value while slipping takes place. This is inconsistent with the assumption that the velocity of slipping is constant, and we are thus forced to conclude that the velocity of the bowed point during the slipping stage is necessarily non-uniform in a greater or less degree, when the pressure of bowing is such that the value of ω is greater than $2/r$, the r^{th} harmonic being the principal member of the missing series.*

We see, therefore, that for the particular set of damping

coefficients assumed, a strictly uniform velocity of slipping is only possible when the bow is applied with such pressure that the

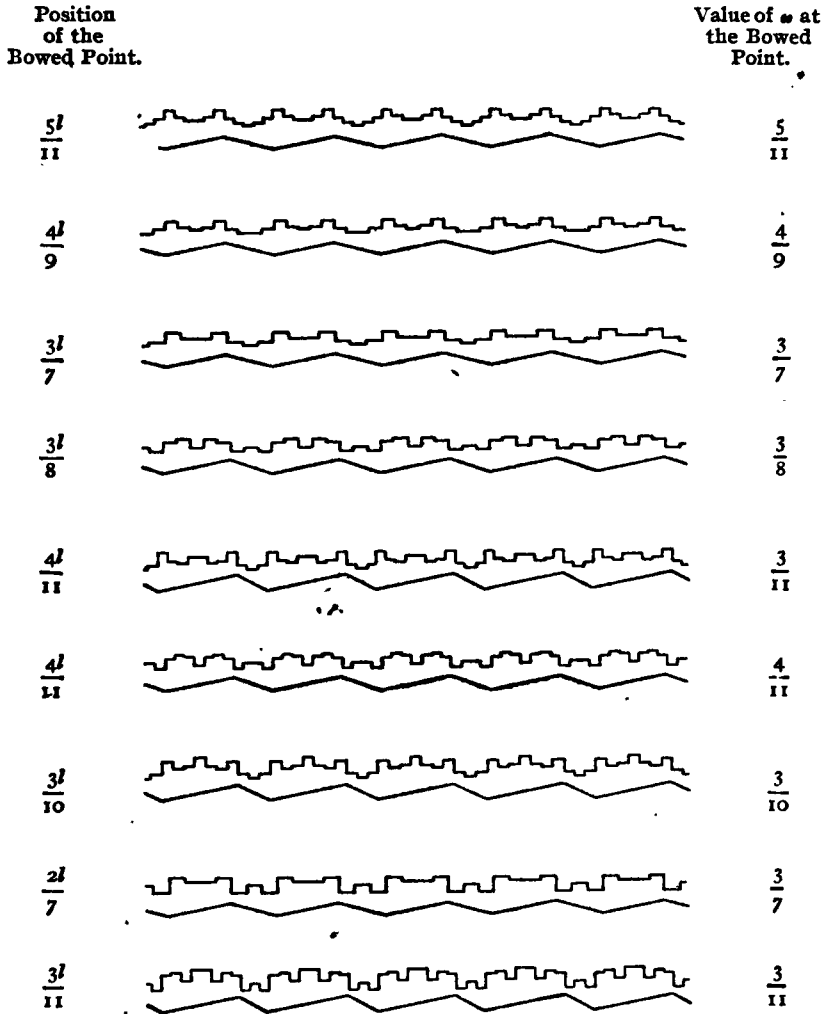


Fig. 20.- Frictional-Force Curves and Motion at the Bowed Point.
[Incompatible Cases.]

numerator of ω is either 1 or 2, and this may not be possible at all if the denominator τ is too large. For other laws of damping,

we would get an even more unfavourable result, that is, strict uniformity is never possible, though practical uniformity may be attained in a number of cases.

The foregoing results may, with advantage, be discussed a little more in detail. Take the case in which the bow is applied exactly at the point $l/3$. The value of ω is $\frac{1}{3}$ and the motion at the bowed point is practically a perfect two-step zig-zag. If now the bow be removed to a point a little on one side of the node, say to the point $16l/49$, we find on a reference to Fig. 14 (page 70), that if we exclude the cases in which the motion at the bowed point is a four-step or six-step zig-zag, etc., the only possible values of ω are $\frac{1}{49}$, $\frac{1}{7}$ and $\frac{1}{7}$. The value $\frac{1}{49}$ is evidently much too small to be easily elicited. The value $\frac{1}{7}$ is evidently of importance as it corresponds to the first principal mode of vibration of a bowed string. A very small pressure of bowing is obviously sufficient to elicit this type. But from what has already been said, it is evident that for this value of ω we cannot have strictly uniform velocity of slipping of the bowed point in the backward motion, though in its forward motion, the velocity may be exactly equal to that of the bow. If the third, sixth and other harmonics of the missing series are actually restored in the motion in nearly their proper amplitudes (neither more nor less), then the velocity in the backward motion may be practically uniform, otherwise not. Thus we see that this non-uniformity of slipping and the restoration of the missing harmonics are closely connected with one another. If the bow is removed further still from the point of trisection and is applied at, say, $5l/16$, the possible values of ω for a two-step zig-zag motion at the bowed point would be $\frac{1}{16}$, $\frac{1}{8}$ and $\frac{1}{8}$. The value $\frac{1}{16}$ may be elicited if the pressure is sufficient. If the pressure is sufficiently reduced we may get the first principal type of vibration for which $\omega = \frac{1}{16}$, but this would be modified by the non-uniform slipping which inevitably occurs in this case.

Fig. 21 shows the frictional-force curves and the motion at the bowed point for six specially selected cases in which the latter is a four-step zig-zag, and one case in which it is a six-step zig-zag. In the four-step zig-zags, the velocity is assumed to be constant and the same in both stages during which slipping occurs, and the

frictional-force curves are seen to be entirely compatible with this, as the friction is constant and has the same value during both the stages. It must be understood that this result holds good only in the special cases considered and in some others, but not generally. In the case of the six-step zig-zag shown, the frictional-force curve

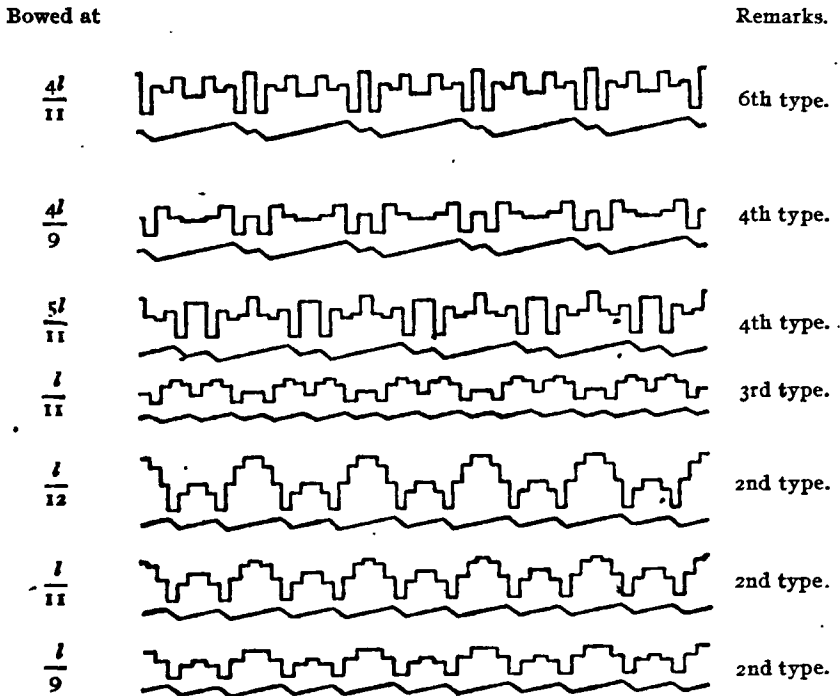


Fig. 21.—Frictional-Force Curves and Motion at the Bowed Point. (Four and six-step zig-zags).

is evidently incompatible with it, as the friction in one stage is less than in the two others.

The form of the frictional-force curves for other cases in which the motion at the bowed point is representable by a six-step or an eight-step zig-zag, etc., may be investigated by the method described above. In the great majority, if not all, of such cases, it would no doubt be found that the form of the frictional force is

incompatible with the perfect parallelism and straightness of the descending lines of the vibration-curve at the bowed point. In other words, the velocity of the bowed point would not be quite constant and uniform in all the stages in which it slips past the bow.

Transition from the Rational to the Irrational Modes of Vibration and vice versa.

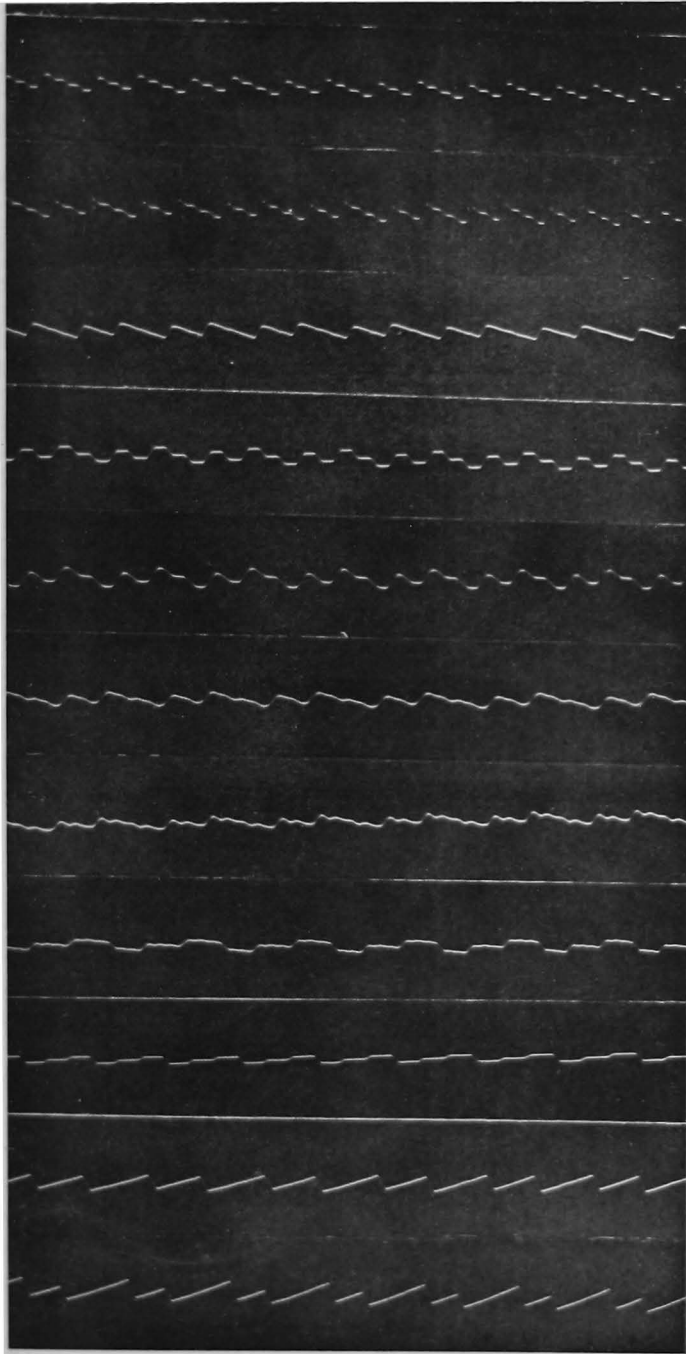
The preceding investigation of the form of the frictional-force curves has already enabled us to form a general idea of the conditions which under the kinematical theory outlined in Sections V to XII breaks down to an appreciable extent. We have seen that this departure from the comparatively simple vibration-forms so far investigated is due in the first instance to the velocity of slipping at the bowed point becoming non-uniform, and is closely connected with the progressive (as distinguished from the discontinuous) restoration of the missing harmonics which occurs when the bow is gradually moved away from some important nodal point. We are thus led to investigate the *transitional forms* of vibration, as they may be called, which are intermediate between the irrational types discussed in Sections V to IX and their rational modifications worked out in Section X. These transitional forms may be found, *a priori*, by a general method which will be best understood by considering some specific cases.

We may confine attention at first to the cases in which the motion at the bowed point is a two-step zig-zag or a close approximation thereto. Let the bow be applied at some point intermediate between, say, $l/5$ and $l/6$, with pressure and velocity approximately those necessary to elicit the first type of vibration (see Fig. 13). When the bow is applied exactly at $l/5$, the vibrational form of the string is defined by one large positive discontinuity in the velocity-diagram and four small negative discontinuities: these are so situated that the motion at the bowed point is a perfect two-step zig-zag and in the resulting motion, the 5th, 10th harmonics etc. are absent. Similarly when the bow is applied at $l/6$, we have one large discontinuous change of velocity and *five* small ones: the 6th, 12th harmonics etc. are absent. When the bow is gradually moved from $l/5$ to $l/6$, the 5th, 10th harmonics etc.

gradually reappear, and the 6th, 12th harmonics etc. become feebler and disappear. In these transitional stages, the forward motion of the bowed point must still take place with uniform velocity equal to that of the bow, but the velocity in the backward motion need not be strictly constant. We are thus naturally led to assume that the transitional modes should be capable of being deduced from a velocity-diagram with one large discontinuity and *five* small ones. On proceeding to find the relation that the positions and magnitudes of these discontinuities must satisfy in order that the bowed point may have a uniform velocity in the forward motion, it is found by trial that the velocity-diagram must be similar in certain respects to that for the case of bowing at $l/6$. The five small discontinuities should all be equal to one another, and their positions on the string with respect to the bowed point are perfectly determinate. If the motion of the string is assumed to be of the perfectly symmetrical type, that is involving only sine components, the position of the sixth (large) discontinuity is also uniquely determined. If, further, the inclination of the lines in the velocity-diagram and the velocity of the bow are assigned specific values, the magnitude of the discontinuities is known, and the vibration-form is completely fixed. In general, however, an asymmetrical vibration-form is possible, and it is found that when the velocity of the bow is given, the form of vibration has a possible variation determined by (a) the position assigned to the large discontinuity which must lie within certain limits and (b) the inclination of the lines of the velocity-diagram to the x -axis.

Except when the slope of the lines of the velocity-diagram is such that the five small discontinuities all vanish (in which case the transitional form becomes identical with the first irrational type of vibration), all the transitional forms referred to in the preceding paragraph have the common feature that the vibration-curve at the bowed point instead of being a perfect two-step zig-zag, consists of a zig-zag in which the steep descending line is not perfectly straight but consists of three (or in the extreme cases two) straight lines, all of which however are much steeper than the ascending line which is perfectly straight. Ten cases of transitional forms thus worked out, *a priori*, for bowed points lying between

Observed at L/15.



Bowed at

L/2:35 or 3 L/7

L/2:40

L/2:45

L/2:50 or 2 L/5

L/2:62

L/2:68 or 3 L/8

L/2:77

L/2:84

L/3:00

L/20

with

different

pressures.

The second type of vibration : its rational and transitional modifications.

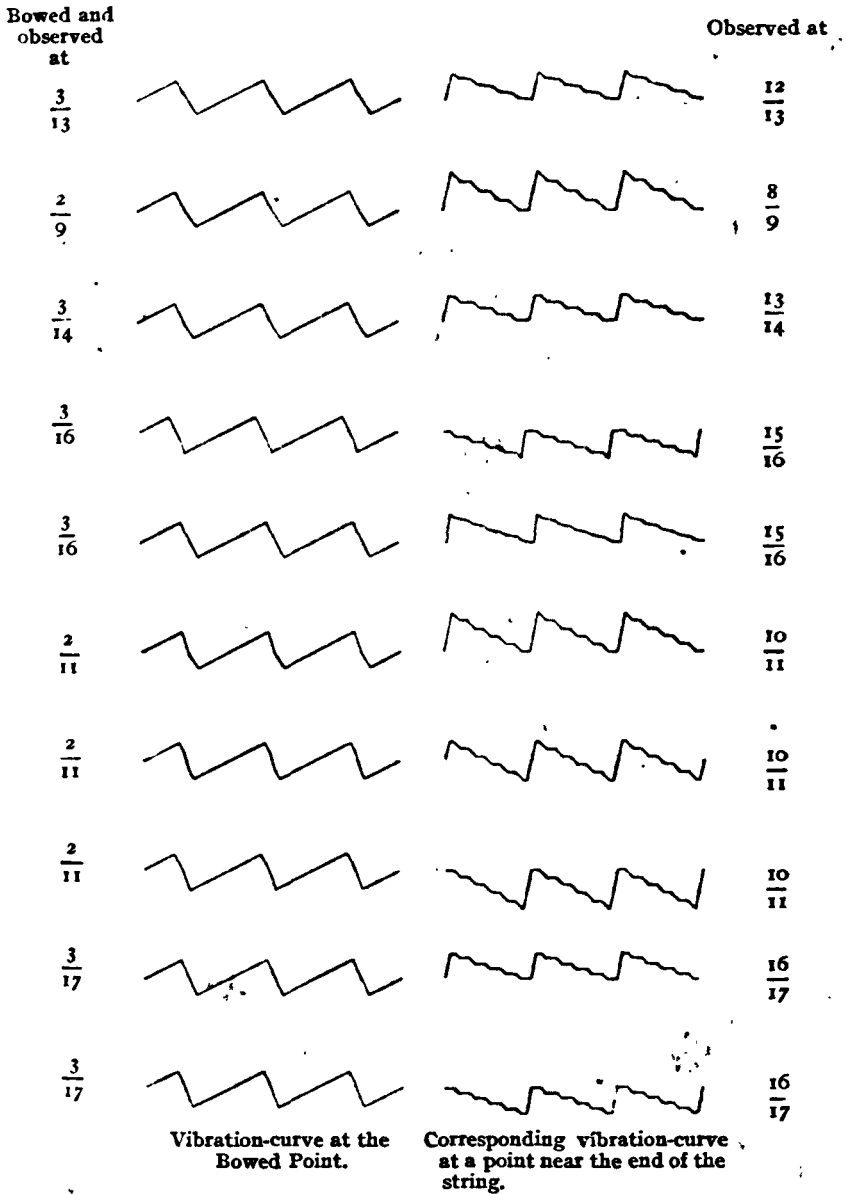


Fig. 22.—Transitional Forms of Vibration. (Modifications of the First Irrational Type.)

$l/4$ and $l/6$, are shown in Fig. 22, in which the corresponding vibration-curves calculated for points near the end of the string are also shown.

It will be seen that in all the ten curves, the vibration-curve at the bowed point closely approaches the simple two-step zig-zag form and in some cases (e.g., the curves for bowing at $3l/16$ and $3l/17$) is nearly indistinguishable from it. The vibration-curve for the point near the end of the string, however, shows the differences clearly enough.

Most of the curves on the right-hand side of Fig. 22 are seen to be asymmetrical; in other words, the appearance of the curves is not the same if the page were held upside down. The three curves for the case of bowing at $2l/11$ are particularly instructive. The first of these three curves (which is an extreme case) shows a sharp peak at the top and five horizontal steps, below. The second (which is the symmetrical case) shows six steps, of which the first and the last are shorter than the rest. The third curve (which is also an extreme case) shows five horizontal steps above, and one sharp point below.

As an example of the method of drawing these curves, we may take the case of bowing at $3l/16$. The velocity-diagram for the case is drawn in a manner similar to that for bowing at $l/6$, the positions of the discontinuities being as follows:— The first small discontinuity is initially at the end of the string ($x=0$). The point of bowing is at $3l/16$, and two other small discontinuities are therefore situate at $6l/16$. Another pair must be at $12l/16$. For, $6l/16 + 3l/16 = 12l/16 - 3l/16$. The inclination of the lines of the velocity-diagram and the position of the large discontinuity are arbitrary, though the latter must initially lie between the limits $14l/16$ and l . If the large discontinuity is initially at $14l/16$ and belongs to the positive wave, we have one extreme asymmetrical case in which the descending part of the vibration-curve at the bowed point consists of two straight lines only. [For, $(l - 14l/16) + (l - 3l/16) = (12l/16 + 3l/16)$]. If the large discontinuity is initially at the end l of the string, we have the symmetrical case in which the descending part of the vibration-curve at the bowed point consists of three straight lines. When the large discontinuity is initially at $14l/16$ and belongs to the negative wave, we have the other extreme asym-

metrical case: $[(14 l/16 + 3 l/16) = (l - 12 l/16) + (l - 3 l/16)]$. The slope of the lines of the velocity-diagram and the velocity of the bow determine the magnitudes of the discontinuities. If the lines were horizontal, the magnitudes of the discontinuities would be the same as if the string were bowed at $l/6$. Whatever the slope might be, and wherever the large discontinuity may lie initially within the limits referred to, the descending motion at the bowed point occupies exactly $3/16$ of the whole period of vibration. In other words, *the transitional form also obeys the kinematical law given in equation (17), i.e., $\omega = \frac{nx}{l}$, n being put equal to 1, as this is a*

modification of the first irrational type. The same kinematical law is satisfied for all the ten cases shown in Fig. 22, and is, in fact, true for all the transitional modifications of the first irrational type, ($n=1$).

In the preceding treatment, we have obviously neglected to take into account the existence of certain nodal points of minor importance lying between $l/5$ and $l/6$ or between $l/4$ and $l/5$. For instance, between $l/5$ and $l/6$, we have the nodal points $3 l/16$, $2 l/11$ and $3 l/17$. For a more complete theory, we have also to take into account the gradual dropping out and reappearance of the 16th, the 11th and the 17th harmonics and their trains of harmonics of high order, as the bow is gradually moved across from $l/5$ to $l/6$. As however these harmonics are of very small amplitudes, the correction may be neglected altogether if the bow be not applied exactly at any one of these nodal points. If it is applied exactly at such nodal point, the correction may be effected by the method described in Section X for rational points of bowing, and in any case, the correction so made would have no effect if some other node of the missing harmonic is chosen as the point of observation. When, however, the intervening nodal point is of importance, a more accurate method of correction is required. For example, when the bow is moved step by step from $l/2$ to $2l/5$, the gradual reappearance of the second harmonic and the gradual dropping out of the fifth harmonic have both to be taken into account. This may be done by drawing a velocity-diagram similar to that for bowing at $l/5$, that is, with one large and four small discontinuities, and readjusting the positions of these discontinuities so as to give

a uniform velocity in the forward motion at the bowed point. Fig. 23 (first three graphs in the left-hand column) shows three velocity-

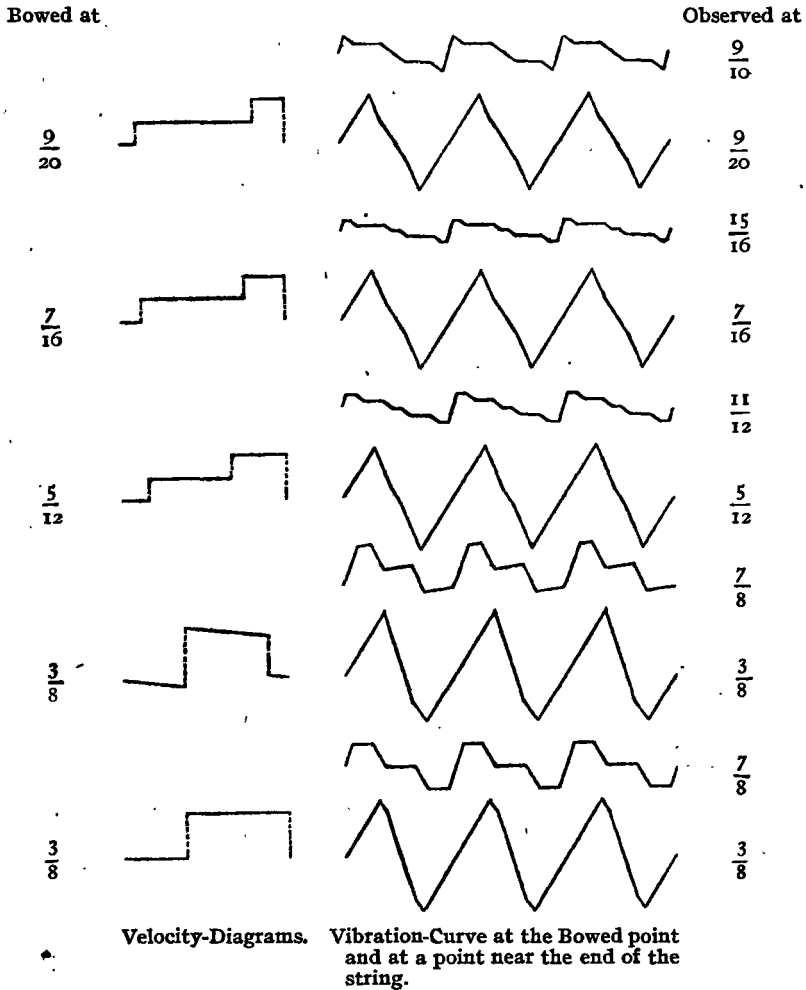


Fig. 23.—Transitional Forms of Vibration. (Modifications of the First Irrational Type.)

diagrams of this type, and against each of these diagrams is shown the corresponding motion at the bowed point and the vibration-

curve at a point near the end of the string. The gradual transition from the type corresponding to a string bowed at $l/2$ to one bowed at $2l/5$ is clearly seen.

The graphs in Fig. 23 for the case of bowing at $3l/8$ show the dropping out of the 3rd harmonic. One of the cases is of the symmetrical type and the other of the asymmetrical type. In the five vibration-curves at the bowed point shown on the right-hand side of Fig. 23, it will be seen that the ascent with the bow is made with a uniform velocity, but that the velocity of descent is not constant.

Similarly when the bow is applied at some point intermediate between $l/3$ and $2l/7$, the velocity-diagram of the transitional mode may be drawn in a manner similar to that for bowing at $l/7$, that is, with one large and six small discontinuities, the positions of these being readjusted in the manner requisite to give a uniform velocity in the forward motion at the bowed point. These vibration-forms would show the gradual dropping out of the seventh harmonic as the bow approaches the point $2l/7$. There is however an alternative set of transition-forms in which the velocity-diagram is similar to that for bowing at $l/4$, i.e. has one large and three small discontinuities, and these forms secure predominance as the bow is removed farther and farther from $l/3$ towards $l/4$. Since both types of transition-forms give a forward motion with uniform velocity at the bowed point for identically the same fraction of the period, they may be superposed in any desired proportion so as to secure the specified velocity at this point. In this way, the various modifications of the first irrational type of vibration obtained by bowing at points between $l/3$ and $l/4$ may be accurately drawn. Results approximating to the truth may however be obtained without utilizing the principle of superposition of transitional forms here suggested, by merely choosing the form with seven discontinuities for bowed points lying between $l/3$ and say $3l/10$, and the form with four discontinuities for bowed points lying between $3l/10$ and $l/4$. The curves thus drawn are shown in Fig. 24.

Of the five cases shown in Fig. 24, the second, third and fifth are of the asymmetrical type and the others are symmetrical forms.

In all these transitional forms, the descending motion at the

bowed point is not executed with a uniform velocity but consists of two or three stages in which the velocities are different. The

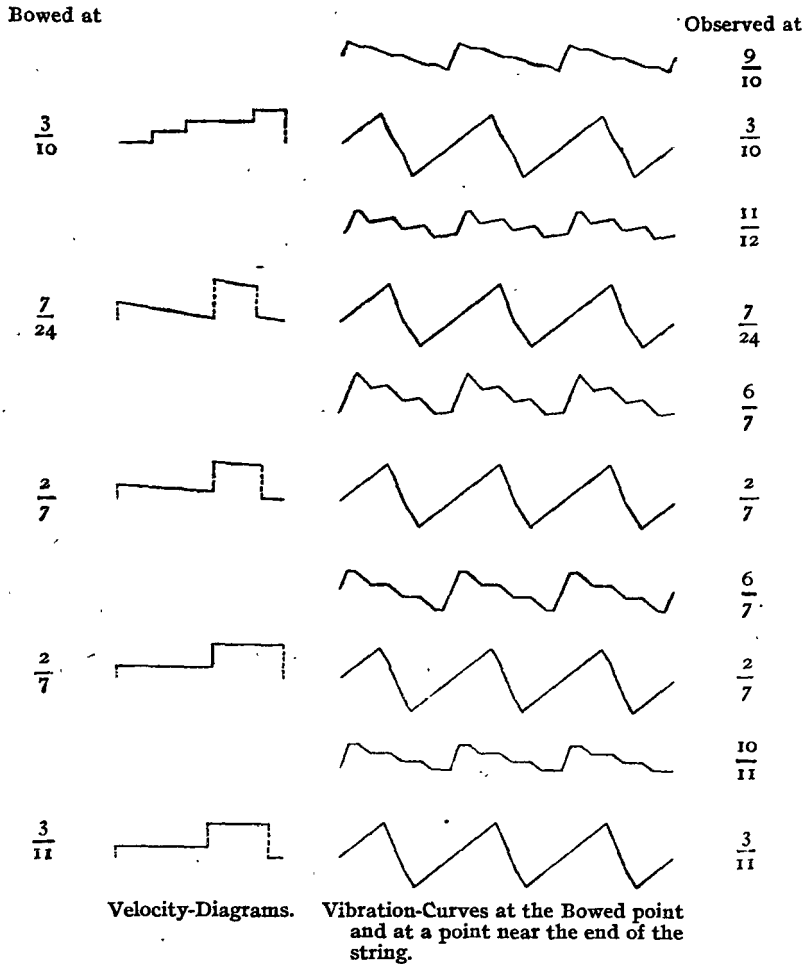
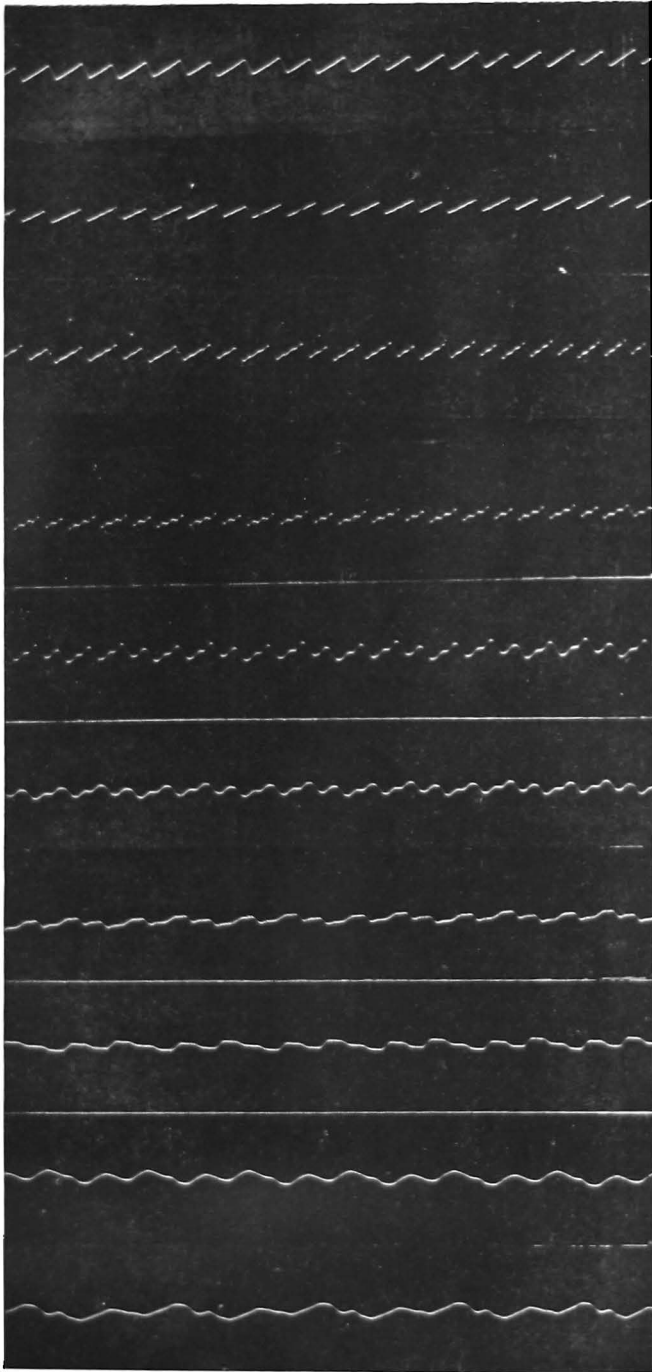


Fig. 24.—Transitional Forms of Vibration. (Modifications of the First Irrational Type.)

relative duration of these stages and the velocity of the bowed point during these intervals are capable of adjustment within a considerable range, and any such alteration involves important

Observed at L/15.



Bowed at

L/2:86

L/2:81

L/2:76 or 4 L/11

L/2:72

L/2:68 or 3 L/8

L/2:64

L/2:58

L/2:51 or 2 L/5 nearly.

L/2:40

L/2:35 or 3 L/7 nearly.

The third (negative) type of vibration : its rational and transitional modifications.

changes in the amplitudes and, for the asymmetrical types, also in the phases of the harmonics which have a node near the bowed point. There is thus, *prima facie*, reason to consider that these transitional forms should be capable of adjusting themselves in such manner as to secure the maintenance of the motion, and also its stability, over a considerable range of bowing pressures and velocities. A further mode of adjustment is provided by the principle of superposition of transitional forms referred to previously. The theory may be further elaborated by working out the form of the frictional-force curve in a representative set of transitional modes of vibration by the general method described in the preceding subsection, and proving its compatibility with the motion at the bowed point corresponding to each mode. This detailed investigation must be reserved for Part II of the monograph. For the present, however, it will be sufficient to point out some indications of theory. It is evident in the first place that any change either in the pressure or the velocity of bowing involves some change in the relative amplitudes of the harmonics in these transitional forms. For, the velocity of the bowed point being non-uniform when slipping past the hairs of the bow, equation (22) given on page 73 cannot, in general, continue to be satisfied at every instant by merely altering the non-periodic part P_0 of the frictional force when the pressure is changed, or by multiplying the periodic part on the right-hand side by a constant when the velocity of the bow is altered. Another result which is indicated by theory is that the position of the discontinuities in the velocity-diagram of the string would, in general, be compatible with the position of the discontinuities in the frictional-force curve, only if all of the former are, at some one epoch of the vibration, situated at points dividing the string into an integral number of equal parts, one of such points being that at which the bow itself is applied. This is evident from the method which was used for finding the form of the frictional-force curve.

The principle used for finding the form of the transitional modifications of the first irrational type may evidently be employed also for finding the transitional modifications of the second, third and higher irrational types. It is sufficient at first to confine attention to those cases in which the motion at the bowed point is

approximately a two-step zig-zag, though the method may also be extended to cover even more complicated cases.

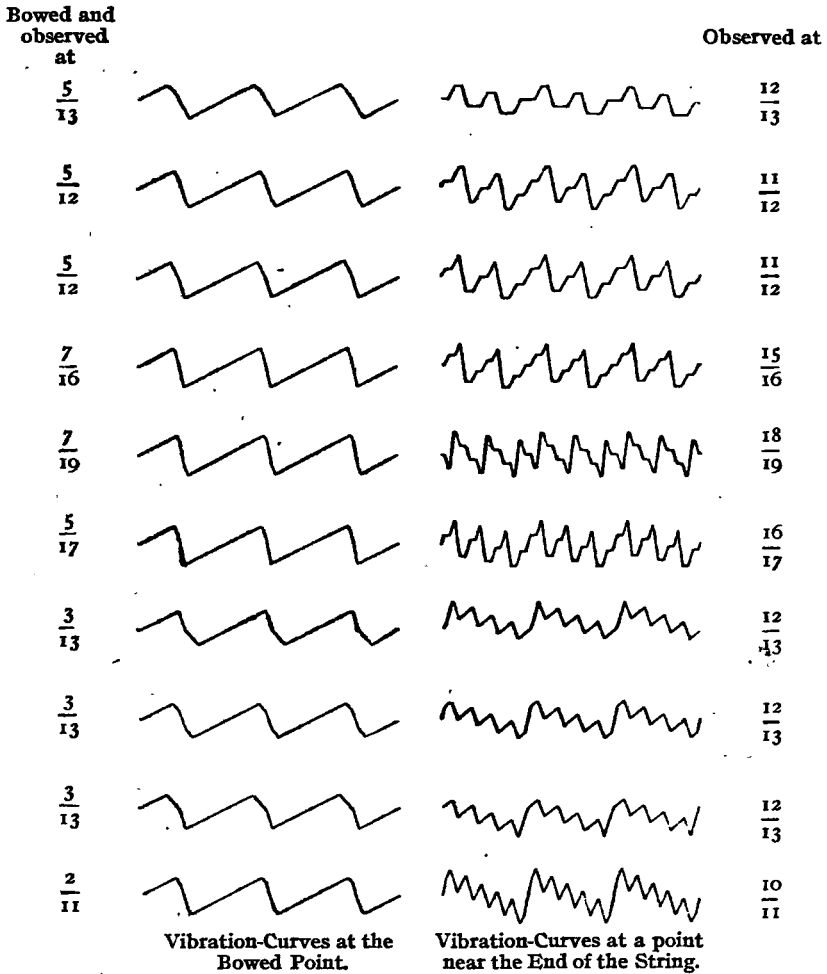


Fig. 25.—Transitional Modifications of the Second and Third Irrational Types, and the Transition from the First to the Fourth and Fifth Types.

The first four curves in each column on the two sides of Fig. 25 show the vibration-curves at the bowed point and at a point

near the end of the string respectively, for some transitional modifications of the second irrational type. In the first case the position of the bow is at the point $5l/13$ whose distance from the end of the string is less than $2l/5$. The curves may be drawn from a velocity-diagram with two large equal discontinuities and three smaller discontinuities also equal to one another; the magnitudes of the discontinuities being the same as for the case of bowing at $2l/5$, but their positions being different, in order that the point $5l/13$ might have a uniform velocity in the forward motion. It is seen that the curves are of the *asymmetrical* type, the two large discontinuities in the velocity-diagram not being coincident, when one of the three small discontinuities is at the end of the string and the other two are coincident. The next two pairs of curves in Fig. 25 show the transitional modifications, one symmetrical and the other asymmetrical, for the case of bowing at the point $5l/12$ which lies between $2l/5$ and $3l/7$. The velocity-diagram in these cases has two large and five small discontinuities. The bowed point for the fourth pair of curves in Fig 25 is $7l/16$ which lies between $3l/7$ and $4l/9$. The velocity-diagram for this case has two large and seven small discontinuities and is of an asymmetrical type.

The transitional forms of the second irrational type for bowed points lying between $4l/9$ and $5l/11$ or between $5l/11$ and $6l/13$ and so on, may be similarly drawn. When the bowed point lies further away from the centre of the string than the node $5l/13$, in other words is in the neighbourhood of the node $3l/8$, the eighth harmonic and its train would partially drop out, and the velocity-diagram would have two large and six small discontinuities, and the form of the vibration-curves may be easily deduced therefrom. For example, if the bow be applied at the node $8l/21$, the two large discontinuities would be initially at the same point, and the small discontinuities would be initially situated in pairs at the points $2l/21$, $14l/21$ and $18l/21$. If the bow be applied between $3l/8$ and $l/3$, the second irrational type would be modified by the dropping out of the eighth, eleventh and third harmonics and their respective trains. In all these transitional modifications of the second irrational type, the motion at the bowed point is approximately but not exactly a two-step zig-zag, and the fractional part

of the period of vibration taken up by the slipping motion is given rigorously by the usual kinematical law $\omega = \frac{n x_n}{l}$, n being given the integral value 2.

The fifth and sixth pairs of curves in Fig. 25 represent transitional modifications of the third irrational type, the bowed point in the two cases being situated on opposite sides of the point of trisection of the string. The bowed point $7/19$ is situated between the nodes $3/8$ and $4/11$, and the velocity-diagram for this type has therefore three large and eight small discontinuities. The bowed point $5/17$ is situated between the nodes $2/7$ and $3/10$, and the velocity-diagram which has therefore three large and seven small discontinuities is of the asymmetrical type, as is shown by the vibration-curves deduced from it. Further examples of the modifications of the third, fourth and higher irrational types may be readily worked out by analogous methods. In all such cases, the fraction of the period of vibration during which slipping occurs at the bowed point is given by the kinematical law $\omega = \frac{n x_n}{l}$, n being given the appropriate integral value 3, 4 or 5 etc.

Transition from one Irrational Type to another.

The theory given in the preceding sub-section may be extended so as to cover another important and interesting class of transitional vibration-forms, the nature of which will, as before, be best understood by considering a specific case. Let the bow be applied at some point intermediate between the nodes $1/4$ and $1/5$. We have already seen in the preceding sub-section that the transitional modifications of the first irrational type then obtained may be drawn from a velocity-diagram which has one large positive discontinuity and four small equal negative discontinuities. The magnitude of the large discontinuity bears to that of the small ones, a ratio depending on the inclination of the lines of the velocity-diagram to the x -axis. If this slope be at first zero and is gradually increased in the positive direction, a stage will be arrived at, when the four small discontinuities completely vanish, and the *mode of vibration becomes identical with the first irrational*

type. On further increasing the slope of the lines, the four small discontinuities re-appear, this time with a positive value, and when the inclination is such that all the five discontinuities have the same magnitude, *the mode of vibration becomes identical with the fifth irrational type*. On the other hand, if the slope of the lines is negative and is numerically increased, the four small discontinuities become larger and larger, and the fifth becomes smaller and smaller, till at a particular inclination, it vanishes altogether. *The mode of vibration then becomes identical with the fourth irrational type*. These transitional changes are obviously of great interest and importance, and it is very instructive to trace the corresponding changes in the motion at the bowed point by the method described in the preceding sub-section. Till the final stage in which the type becomes identical with either the fourth or fifth irrational type, the fraction of the period of vibration during which there is slipping at the bowed point continues to be given by the kinematical law $\omega = \frac{n x_n}{l}$ in which n is equal to unity. It then changes to the smaller value given by the same formula when n is put equal to 4 or 5, as the case may be. It is to be noticed, however, that before this final stage is reached, the motion at the bowed point undergoes an important modification. For instance, in the transition from the first to the fourth irrational type, as four of the discontinuous changes of velocity increase in magnitude and the fifth decreases, slipping at first occurs at the bowed point only when its velocity is in a direction opposite to that of the bow; when the fifth discontinuity is so small that it is equal to or less than the velocity of the bow, this is no longer true, and slipping also occurs during a part of the forward motion, and this ceases only when the fifth discontinuity finally vanishes. During the latter part of the transitional stages, the fraction of the period occupied by the backward motion is given by the ratio $n x_n / l$, in which n is put equal to 4, whereas the total fraction of the period during which slipping occurs is found by putting $n = 1$. Similarly in the transition from the first to the fifth irrational type, slipping is confined to the backward motion of the bowed point, only if the fifth discontinuity is greater than any one of the others plus the velocity of the bow. When it is equal to or less than this

sum, slipping occurs also during part of the forward motion, and the fraction of the period occupied by the backward motion is found by putting $n=5$ in the ratio nx_n/l , whereas the fraction during which slipping occurs is found by putting $n=1$.

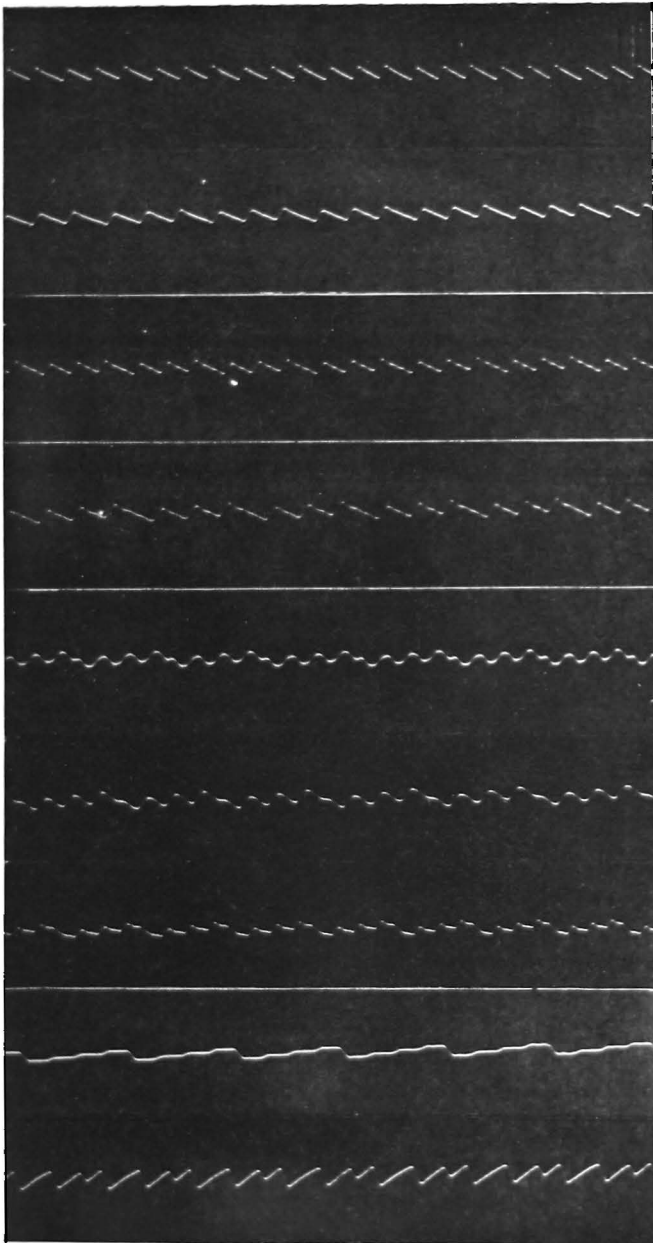
These transitional modes would be symmetrical or asymmetrical according as the position of the discontinuities in the velocity-diagram is symmetrical or otherwise. The three curves for the bowed point $3l/13$ and the observed point $12l/13$ shown in Fig. 25 represent the transition from the first to the fourth irrational type. Two out of the three pairs of curves are asymmetrical and the other is symmetrical. The last pair of curves in Fig. 25 shows the transition from the first to the fifth irrational type when the bow is applied between the nodes $l/5$ and $l/6$.

The theory indicated above may be extended to cover a very large number of cases in which there is a transition from one irrational type to another, the motion at the bowed point remaining approximately a two-step zig-zag. For example, as may be seen from Figs. 14 and 15, we may have transitions from the second irrational type to the fifth, seventh or ninth type, or transitions from the third type to the seventh or eighth type and so on.

Transitional forms involving complicated motions at the Bowed Point.

It has been shown in Section IX that if the number of discontinuities in an irrational type is not a prime integer, and the bowed point lies anywhere within certain ranges, its vibration-curve is necessarily of a more complicated form than a two-step zig-zag. We shall now consider some transitional forms in which the slipping velocity of the bowed point is not the same in all the stages of descent in such cases. For example, if the bow is applied near the centre of the string and the fourth type is elicited, the vibration-curve at the bowed point is a four-step zig-zag; if the sixth type is elicited, it is a six-step zig-zag, and so on. [See Fig. 5, (b), (c), (d) and (e), page 35.] In the transitional forms, all the discontinuities cannot be equal to one another as in the irrational types. On drawing the velocity-diagrams it is found, however, that when the motion at the bowed point is a four-step zig-zag, the first, third and other odd discontinuities, if any,

Observed at L/15.



Bowed at

L/3:15

L/3:26

L/3:33 or 3 L/10

L/3:44

L/3:54 or 2 L/7 nearly.

L/3:65

L/3:79

L/4:00

L/20

The third (positive) type of vibration : its rational and transitional modifications.

should be equal in magnitude, and similarly, the second, fourth and other even discontinuities, if any, should be equal in magnitude. If the motion at the bowed point is a six-step zig-zag, the discontinuities should be capable of being arranged in 3 sets of equal discontinuities, and so on. These relations are perfectly general, and the vibration-curve for a point near the end of the string calculated from a velocity-diagram of this kind shows some imme-

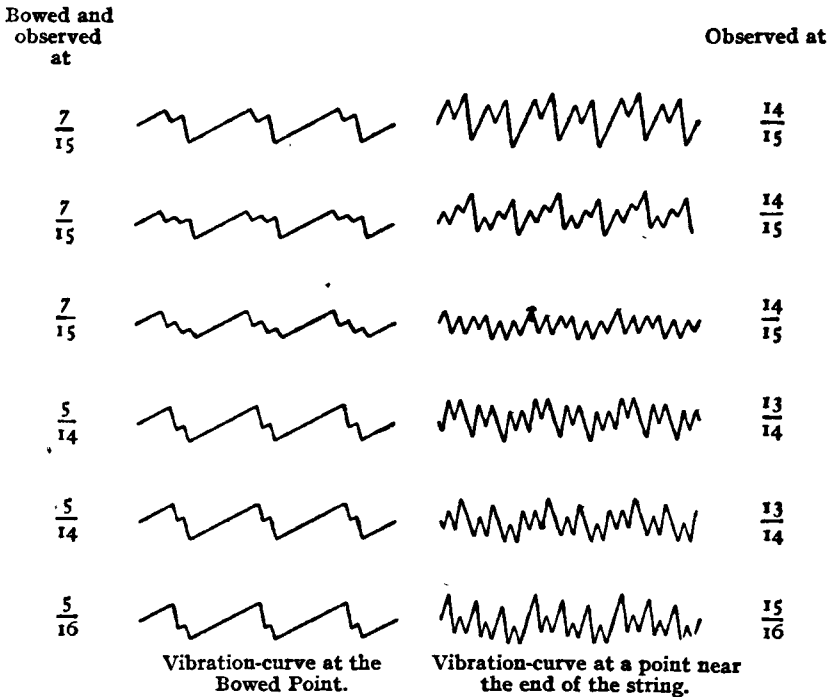


Fig. 26.—Transitional Modifications of the Fourth and Sixth Irrational Types.

diately recognisable characteristics, every alternate or every third ascent or descent being of the same steepness and length. This is clearly seen in the curves on the right-hand side column of Fig. 26.

The first pair of curves shows the fourth type and the next two pairs the sixth type, obtained by bowing the string near the centre. The two following pairs show the sixth type obtained by bowing on one side of the point of trisection, and the last pair

also show the sixth type obtained by bowing on the other side of the trisection-point of the string. The eighth type obtained by bowing near the point of quadrisection of the string may be similarly investigated. The curves are all necessarily asymmetrical.

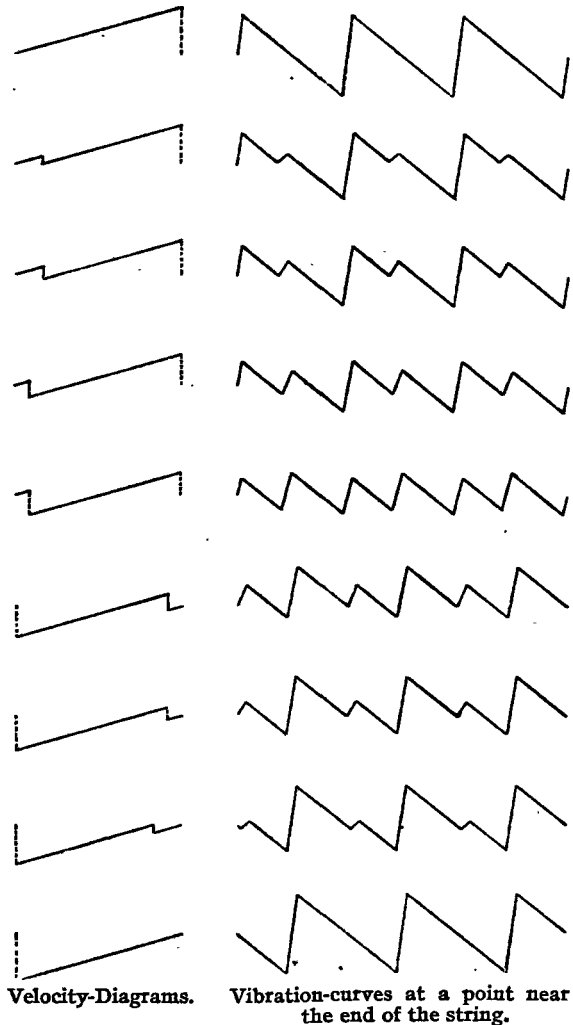


Fig. 27.—Transition from the First to the Second Irrational type and *vice versa* (also illustrating Cyclical change of Vibration-form at the wolf-note pitch).

The motion at the bowed point in all these cases obeys the kinematical law $\omega = \frac{nx_n}{l}$, n being given the appropriate integral value, and ω signifying the fractional part of the period during which slipping occurs at the bowed point.

The transition from a two-step to a four-step or a six-step motion at the bowed point, obtained by applying the bow close to the end of the string with smaller and smaller pressures, may be readily traced by drawing a velocity-diagram with unequal discontinuities, and deducing the vibration-curves in the manner explained above. The transition from a two-step to a four-step motion for bowed points close to the end of the string was observed by Helmholtz.¹

Limiting Form of Vibration for Very Small Pressures of Bowing.

In the discussion on the *modus operandi* of the bow and the subsequent detailed treatment of the modes of vibration maintained under various conditions, it has so far been assumed that the pressure of the bow is sufficient to ensure that there is no slipping at the bowed point during at least a part of each period of vibration. On this assumption, it has been found that when the pressure of the bow is gradually reduced, the mode of vibration passes through various stages which are either very close approximation to certain standard types or else form transitions between those types. There is little difficulty in finding which of the standard types of vibration is capable of being elicited when the bowing pressure is the minimum admissible. The exact method of ascertaining the critical pressure for any given type of vibra-

¹ "Sensations of Tone," English Translation by Ellis, page 85. Fig. 26 of Helmholtz's work representing this transition is not quite correct. For, when the two discontinuities are unequal, the two steeper lines in the vibration-curve of a point near the end of the string would not be quite parallel, except in the limit when the point observed is infinitely near the end of the string. The shorter descent would be less steep than the longer one. Further, Helmholtz shows only the symmetrical transition forms in which the break first appears in the middle of the ascending line of small slope. In general, the actual transition forms are asymmetrical. See Fig. 27 of this Bulletin.

tion has already been indicated. Generally speaking, the type which involves slipping at the bowed point for the largest fraction of the period has the smallest critical pressure. From Fig. 15, on page 71, it is seen that when the bow is applied at any point in the range $l/2$ to $l/3$, the fraction of the period during which there is slipping at the bowed point is largest for the first irrational type in which the fundamental is dominant. Within this range therefore, the smallest pressure of bowing for which the theory given is valid would elicit the first type of vibration, or rather a transitional modification of it in which harmonics having nodes near the bowed point are absent or relatively deficient. If the pressure of bowing be further reduced, the motion at the bowed point necessarily suffers further modification. Under the conditions postulated, the fundamental is dominant, and the higher harmonics, especially those whose nodes are nearest the bowed point, require proportionately much larger maintaining forces than the fundamental. The pressure of the bow being small, the forces exerted by it are insufficient to maintain the higher harmonics which accordingly tend to fall out, leaving the fundamental practically by itself. The limiting form of vibration of the string for small pressures of bowing within the range $l/2$ to $l/3$ is thus a simple oscillation. On reducing the pressure of bowing to the smallest possible values, even the fundamental ceases to be vigorously maintained, and the amplitude of the vibration tends to zero. The effect of an increase in the velocity of the bow on the form of the maintained vibration is of course analogous to that of a diminution of its pressure.

Practically similar results would be obtained by applying the bow with a small pressure-velocity ratio at points lying between $l/3$ and $l/4$. For, within this range, the second irrational type of vibration is that which requires the smallest pressure to elicit, and when the harmonics which have nodes at $l/3$, $2l/7$ and $l/4$ drop out, it leaves little besides the fundamental and a feeble octave. The case is however very different if the bow be applied in the range between 0 and $l/4$. The first type of vibration in which the fundamental is dominant then has a fairly high critical pressure, and when the pressure of the bow is less than this value, the mode of vibration alters into one in which the motion at the bowed

point is representable by a four-step or a six-step zig-zag or even a more complicated curve. In other words, the fundamental and harmonics of low order have then a tendency to fall out, leaving the higher harmonics in possession of the field. The string may even divide up into segments and vibrate with twice, thrice or four times its usual frequency.

Instability of Periodic Vibration under High Bowing Pressures.

The fundamental assumption on which the treatment given so far rests is that the bow maintains the string in a periodic vibration. If the yielding at the ends of the string be negligible, the period of this vibration is the same as that of its free oscillations, the phase of each harmonic component in the force exerted by the bow being in advance of the phase of the corresponding component in the maintained motion by 90° (see Figs. 16 to 19 and explanation on pages 80 to 90). The question arises whether a periodic motion is always possible under the action of the bow. This is best discussed by considering a specific case. Assume that the bow is applied exactly at the node $l/3$. A very small pressure is then sufficient to maintain the usual periodic motion. (See the last pair of curves in Fig. 17 on page 87). It is obvious that in this case, any increase in the pressure of the bow over the minimum necessary to establish the usual type of vibration can have no effect at all, so long as the motion is periodic. But it does not follow from this that the pressure of the bow may be increased indefinitely without affecting the possibility of the steady vibration. That a maximum exists beyond which the pressure may not be increased if a regular vibration is to be possible is indicated by the following considerations. The string determines its own frequency of vibration under the action of the bow. But during the fraction of the period in which the bow and bowed point adhere, the frictional force is in a sense arbitrary as it may have any value smaller than the statical friction. If, therefore, the pressure of the bow be sufficiently large, the frictional force is capable of variation in an arbitrary manner between large limits, and therefore also of setting up a motion of the string having an arbitrary period and phase. The motion of the string thus tends to become irregular when the pressure of the bow is much in excess of that

required to maintain a regular vibration having the maximum critical pressure.

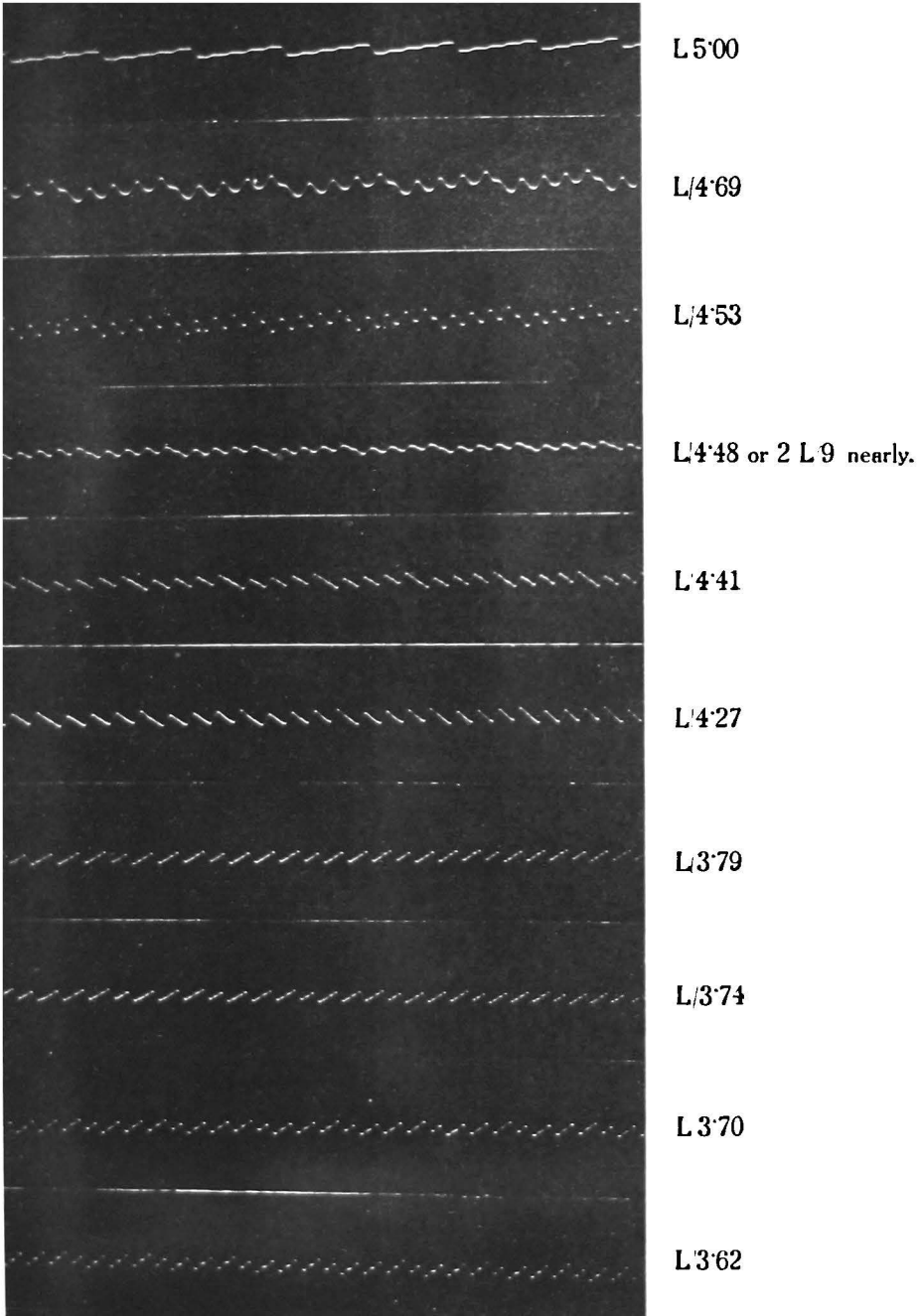
The maximum bowing pressure at which a steady vibration ceases to be possible evidently depends on the position of the bowed point, on the velocity of the bow, and to some extent also on the other conditions of bowing, *e.g.* the finite width of the bow. At important nodes such as $l/2$, $2l/5$, $l/3$ and $l/4$, the maximum admissible pressure is necessarily low, as the critical pressure necessary to maintain the usual steady vibration is small. But at nodes such as $5l/11$ or $5l/12$ or $5l/13$, a considerably larger pressure is admissible. In the general case in which the bow is applied at *any* point on the string, the factors that determine the possibility of the mode of vibration having the highest critical pressure, also determine the maximum pressure beyond which a steady vibration ceases to be possible.

Effect of the Finite Width of the Bow.

Except by way of passing reference (see pages 7, 65, 69 and the last para. of the previous sub-section), we have not so far considered in detail the effect of the finite width of the region of contact between the bow and the string. The necessary modifications in the equation of maintenance (22) given on page 73 may be made without difficulty. We may represent an element of the region of contact by dx , the pressure exerted on it by P_x and dx its velocity by v_{xt} . The frictional force acting on the element may be written as $F(P_x, v_{xt} - v_B)dx$. To find the expression for the maintained motion, we have to analyse the force acting on each element dx into its harmonic sine and cosine components, multiply each component by the corresponding factor $\sin \frac{n\pi x}{l}$ and then integrate over the region of contact. We thus obtain the two equations.

$$\int_{x_0}^{x_0'} \sin \frac{n\pi x}{l} dx \int_0^T F(P_x, v_{xt} - v_B) \sin \frac{2n\pi t}{T} dt$$

Observed at L'15.



The fourth type of vibration : its rational and transitional modifications.

$$\begin{aligned}
 &= \frac{k_n T B_n}{2} \cos (e_n + e_n') \\
 \int_{x_0}^{x_0'} \sin \frac{n\pi x}{l} dx &\int_0^T F(P_x, v_{xt} - v_B) \cos \frac{2n\pi t}{T} dt \\
 &= \frac{k_n T B_n}{2} \sin (e_n + e_n'),
 \end{aligned}$$

where k_n , B_n , e_n and e_n' have the same significance as in equation (22), and x_0 , x_0' are the limits of the region of contact.

Comparing the expressions now obtained with those for the ideal case of a string bowed at a mathematical point, it is evident that the theory for a finite region of bowing is considerably the more complicated of the two. It is important to realise clearly the essential point of difference between the two cases. When the pressure of the bow is regarded as applied at a single point on the string, the frictional force is expressible as a function of the relative velocity of that single point with respect to the bow, and may therefore have any arbitrary value (positive or negative) smaller than the statical friction when this relative velocity is absolutely zero. On the other hand, in the actual case of the finite region of contact, the relative velocity of every element of this region with respect to the bow enters in the expression for the system of forces acting on the string, and while *it is possible for a single point on the string to have absolutely the same velocity as the bow in every part of its forward motion*, kinematical theory shows that *it is not possible for every element on a finite region to have absolutely the same velocity as the bow in every part of its forward motion*. The frictional forces do not therefore have the same freedom of adjusting themselves to the conditions of the maintained motion as in the ideal case.

The only line of attack on the present problem open to us appears to be the tentative one of assuming that the maintained motion is one of the various types we have discussed in the preceding pages, and then finding in what manner its maintenance is affected by the finiteness of the region of contact. As the simplest case possible, let us assume that the bow is applied near the end of the string and that the maintained motion is of the first irra-

tional type (see Fig. 1 on page 25). The vibration-curve at every point on the region of contact is then a simple two-step zig-zag, but with different velocities of ascent and descent. The amplitude of vibration of the string then evidently depends on the position of the particular point whose velocity of ascent is the same as that of the bow; it is a maximum if the relative velocity in the ascending motion is zero at the extreme edge of the region of contact nearest the end of the string, and a minimum if it is zero at the edge farthest from the end. If the relative velocity be zero at some intermediate point, it is positive on one side of it and negative on the other. The frictional forces exerted by the bow on the region of contact on either side of this point are then in opposite directions, one set tending to increase the motion and the other to oppose it. The forces exerted by the bow thus tend mutually to cancel out their own effects, and only the difference left over, if any, is available for the maintenance of the motion. It must be remembered that, element for element, the forces acting on the string furthest from the end that tend to reduce its vibration are the more powerful, as most of the factors $\sin \frac{n\pi x}{l}$ are larger here than in the part nearer the end. The tendency of the vibrations to increase up to the maximum possible is thus strongly opposed. As the bow is applied nearer and nearer the end of the string, the point at which the relative velocity is zero tends to approach the boundary of the region of contact furthest from the end.

Conclusions similar to those stated above are also arrived at if we assume that the bow is applied with sufficient pressure, close to but not exactly at an important node such as $l/2$ or $l/3$, and that the corresponding irrational type of vibration (that is the 2nd type or the 3rd type) is elicited. It will be noticed that in every such case, the forces acting on the string furthest from the node tend to oppose the motion, while those acting nearer the node tend to support it, and the force available to maintain the motion is only the difference between the effects of the two sets. On the assumptions made, the force acting on each element of the string is perfectly determinate, and the integrals given above should therefore be capable of complete evaluation.

We may now pass on to consider the effect of the finiteness of the region of contact on the assumption that this region includes some fairly important node and that the vibration elicited is one of the rational types discussed in Section X. The velocity-diagram of the string then consists of horizontal lines parallel to the x -axis (that is, to the string) and separated by discontinuities. If the relative velocity is zero throughout the ascending motion at some one point in the region of contact, this would practically be the case also at immediately contiguous points; at points which are considerably removed from it, however, the relative velocity would be zero only during a succession of intervals making up a part of the ascending motion and would have a finite value during the other intervals, this value being positive in one part of the region of contact and negative in the other part. (For instance see Fig. 8 on page 52). During the intervals of the ascending motion in which the relative velocity is finite, the frictional forces would evidently act in opposite directions in the two parts of the region of contact, and would thus tend to cancel each other's effects. The more numerous the discontinuities are and the greater the width of the bow is in relation to the length of the string, the greater would be the reduction in the effective action of the bow produced by this opposition of forces. As the intervals in which the relative velocity is finite are distributed regularly over the period, the effect of the finite width may be regarded as approximately equivalent to a reduction of the pressure of the bow, though of course this is not an absolutely accurate statement. Since the number of discontinuities in the velocity-diagram is one of the factors determining the effective reduction in the pressure of bow produced by the finiteness of the region of contact, the tendency would be to elicit a mode of vibration having the fewest discontinuities. The particular point on the region of contact the motion of which approximates most closely to that for the ideal case of a bowed 'point' is, of course, a variable factor which enters into the equations determining the maintained vibration. Since this point would not in general actually coincide with the node falling within the region of contact, the mode of vibration would approximate to one of the transitional types discussed on pages 95 to 110 rather than to one of the standard types of vibra-

tion modified by the dropping out of a set of harmonics which we discussed in Section X.

Owing to the fact that the frictional forces in the cases considered in the preceding paragraph are partly determinate and partly indeterminate, a complete evaluation of the integrals and a rigorous detailed treatment do not appear practicable. A rough numerical estimate of the effect of the finite width of the bow on the critical pressure necessary to maintain any given type of vibration seems however within the range of possibility, if the necessary physical data are known or can be assumed. This complicated work must necessarily be reserved for a future occasion.

The Effect of the Yielding at the Bridge : General Discussion.

The yielding at the bridge and the consequent communication of energy from the vibrating string to the sound-box, and thence to the air, are essential features in the investigation of the mechanics of bowed strings. For simplicity, we have so far assumed that this yielding is very small, and that the bow maintains a strictly periodic vibration. When these assumptions are made, no special difficulty arises in discussing the mode of action of the bow; and it is found that the vibrations of the string are practically in the normal modes, and have the same frequency as that of the string with rigidly fixed ends. Cases may however arise in which either or both of the assumptions may not be justifiable *a priori*, and we have thus to enter into an examination of (a) the conditions, if any, under which a periodic vibration cannot be maintained by the bow, and (b) the possibility (or otherwise) of a periodic motion under the action of the bow, with a frequency differing from that of the string with rigidly fixed ends. For a full understanding of these problems, we have to enter into a discussion of the mechanics of the string and bridge much more detailed than that given in Section II. The discussion may conveniently be divided into four parts: (1) the free vibrations of the system if there be no dissipation of energy; (2) the free vibrations as modified by the dissipation of energy; (3) the vibrations forced by a periodic force of arbitrary period; and (4) the vibrations forced by the bow under various conditions. The discussion is

also valuable as enabling us to find methods for experimentally verifying the theory given in the preceding pages.

Alteration of Free Periods.

Taking first the free vibrations, we may, to avoid undue complications, consider only the motion at the bridge transverse to the string. This neglect of the longitudinal motion of the bridge would not seriously invalidate our conclusions, as the reaction of this component of the motion of the bridge would only tend to alter the tension of the string periodically, and would not directly tend to set up a transverse motion such as that with which we are now concerned. Further, it is sufficient if we consider the motion in the plane parallel to that of the vibrations of the string, the latter being assumed to be the same as that in which vibrations are forced by the bow in usual practice. In other words, the reaction of the bridge on the motion of the string may be sufficiently nearly represented by a system capable of movement in a single direction transverse to the string, and having one, two, three or such larger number of free periods of vibration as may be necessary to obtain a sufficiently close approximation to the truth. As a first step, we may assume that the bridge may be represented as a single mass controlled by a spring. Neglecting the dissipation of energy and using the notation of Section II, the free periods of vibration of the string and of the bridge may be found from the formula

$$\tan pl = \frac{-T_0 p}{f^2 - Mm^2}, \text{ where } \mu m^2 = T_0 p^2$$

The equation for pl may be completely solved by a graphical method. Writing the relation in the form

$$M T_0 p^2 / \mu - f^2 = T_0 p \cot pl,$$

the expressions on either side may be readily plotted as graphs with respect to pl . The left-hand side gives us a parabola with its vertex on the line $pl = 0$, on the negative side of the axis of pl . The right-hand side has a series of branches with the lines $pl = \pi$, $pl = 2\pi$, . . . $pl = n\pi$, etc., as their asymptotes. The particular point at which the parabola cuts the axis of pl determines the free period of vibration of the bridge, if the reaction

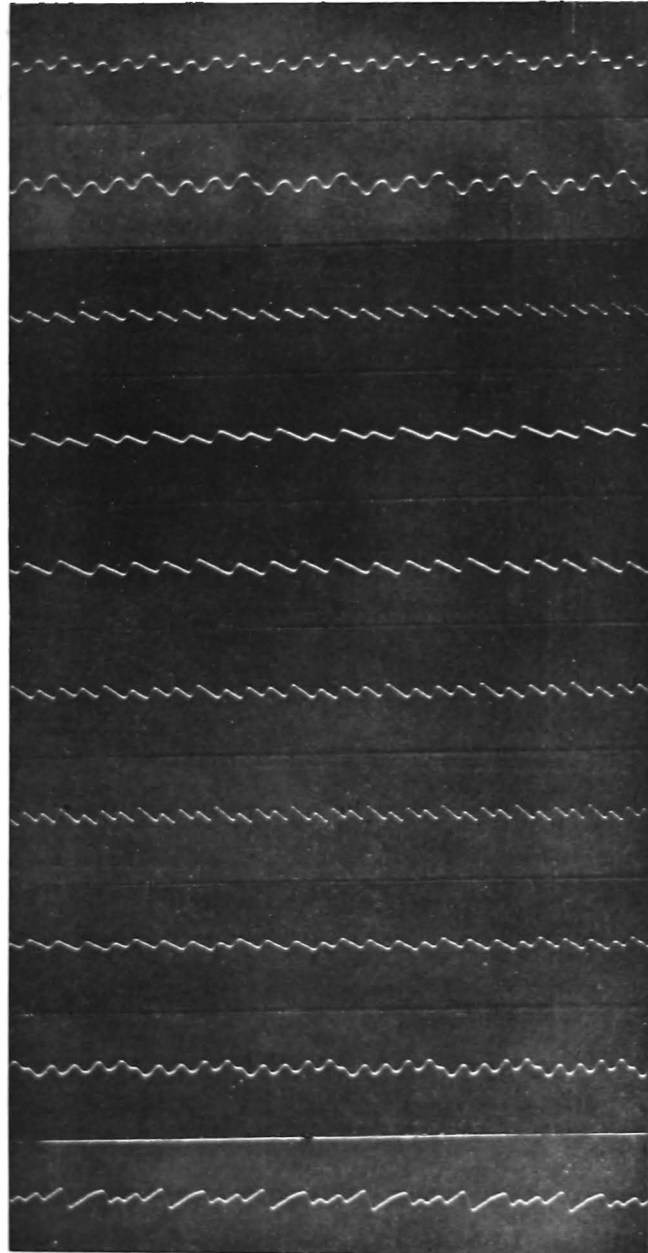
of the string be not taken into account. The curves representing $T_0 p \cot pl$ evidently cut the axis of pl at the points $pl = n\pi/2$; and if the parabola also cuts the axis at one of these points, the reaction of the string would have no effect on the free period of the bridge. In other cases, the free period of the bridge and the free periods of the string are both subject to modification. The graphs show that the natural frequencies of the string which are greater than that of the bridge, are further increased by the yielding of the latter, while those which are less are further decreased. The frequency of the bridge is increased or decreased according as it is greater or less than the nearest of the two natural frequencies of the string between which it lies. The most interesting results are obtained when the free period of the bridge, and one of the free periods of the string, nearly or actually coincide, that is, when the parabola in the graph cuts the axis of pl at or near one of the points $pl = \pi$ or 2π or 3π , etc. Taking, as an example, the case in which the bridge and the string have nearly the same frequency, the points where the parabola cuts the two branches having the common asymptote $pl = \pi$, determine the two free periods of the system as modified by the mutual action of its parts. When the parabola cuts the axis of pl at a point for which $pl < \pi$, the intersection of the parabola with the inner branch determines the modified period of the bridge, and the intersection with the outer branch determines the modified period of the string. The state of matters is reversed when the parabola cuts the axis of pl at a point for which $pl > \pi$. When the parabola passes exactly through the point $pl = \pi$, it is no longer possible to define which of the two free periods of the system is distinctively that of the string and which of the bridge.

From the preceding discussion it is clear that the yielding of the bridge modifies the free periods of the string lying near its own period to a greater extent than it does those further off, and that when the string and bridge taken separately have the same free period in any case, their mutual action results in the system having two different periods which, when the free oscillations are excited, would produce "beats" somewhat similar to those of two tuned electrical circuits coupled with each other. "Beats" would also occur when the free periods, taken separately, are nearly

Observed at L/15.

With a two-step zig-zag motion at the bowed point.

With a four-step zig-zag motion at the bowed point.



Bowed at
L 3:52 or 2 L 7

L 3:40

L 2:07
with
different
pressures.

L 2:13

L 2:14
with
different
pressures.

L 2:20 or 5 L 11

L 2:25 or 4 L 9

L 2:1

The fourth type of vibration : its rational and transitional modifications.

but not quite equal to each other ; but they would then be more rapid than in the case of perfect tuning. From the principle of conservation of energy, it is evident that in every such case, the vibration of the string would be a maximum when that of the bridge is a minimum, and *vice-versâ*.

Effect of Thickness of String on Free Periods.

An approximate formula for the numerical calculation of the alteration in the frequencies of the string is readily found. The unaltered frequencies are given by $m/2\pi$ where $m = (T_0/\mu)^{\frac{1}{2}} p$ and $pl = n\pi$, n being any positive integer. Putting $pl = n\pi + p'l$ as the result of the yielding of the bridge, $p'l$ being small, $\tan pl = \tan p'l = p'l$ (nearly). The change in frequency is thus

$$\begin{aligned} m'/2\pi &= (T_0/\mu)^{\frac{1}{2}} p'/2\pi \\ &= T_0 m/2\pi l (Mm^2 - f^2). \end{aligned}$$

If $(Mm^2 - f^2)$ is sufficiently large and either positive or negative, the value of m corresponding to the undisturbed period may be substituted on the right-hand side without sensible error. For a given value of m , that is, for a given frequency, the alteration produced by the yielding of the bridge is proportional to T_0/l , in other words to the tension divided by the length. For a given vibrating length and frequency, the heavier or thicker a string is, the greater would be the tension necessary, and therefore also the alteration in frequency produced by the yielding at the bridge. Similarly, with a given string vibrating with a stated frequency, the ratio T_0/l may be increased by increasing the tension and the vibrating length, and the alteration of frequency produced by the yielding of the bridge also increases.

When $(Mm^2 - f^2)$ is not very large, the equation may be written in a slightly different form.

$$\begin{aligned} m' [M(m - m')^2 + 2Mm'(m - m') - f^2] \\ = T_0 m/l. \end{aligned}$$

Since $(m - m')$ is the unaltered frequency divided by 2π , the relation is evidently a quadratic in m' which may be readily solved. When the free periods of the bridge and the string con-

sidered are the same if the two are taken separately, we have to write $M(m - m')^2 = f^2$ and $m' = \pm [T_0/2 M l]^{\frac{1}{2}}$.

The formula shows that in this case the system has *two* free periods instead of one, and that the influence of the density of the string, or of its tension and vibration-length for a given frequency in determining the effect of the yielding of the bridge, is relatively not so great as at other frequencies.

Yielding of a Bridge which has more than one Free Period.

If the bridge has two or more free periods of vibration, the effect of its yielding on the free periods of the string may be readily found by the method of generalized co-ordinates. If ϕ_1, ϕ_2, ϕ_3 , etc., be the normal co-ordinates of the system of which the bridge forms a part, we may write

$$\text{Kinetic Energy of the System} = \frac{1}{2} a_1 \dot{\phi}_1^2 + \frac{1}{2} a_2 \dot{\phi}_2^2 + \frac{1}{2} a_3 \dot{\phi}_3^2 + \text{etc.},$$

$$\text{Transverse Yielding of Bridge} = r_1 \phi_1 + r_2 \phi_2 + r_3 \phi_3 + \text{etc.}$$

From this, we find

$$\tan pl = -T_0 p \left[\frac{r_1^2/a_1}{n_1^2 - m^2} + \frac{r_2^2/a_2}{n_2^2 - m^2} + \frac{r_3^2/a_3}{n_3^2 - m^2} + \text{etc.} \right]$$

where $n_1/2\pi, n_2/2\pi, n_3/2\pi$, etc., are the natural frequencies of the bridge. When the particular free period of the string under consideration nearly coincides with the one of the free periods of the bridge, the results obtained in respect of it from this general formula, would not differ seriously from those obtained, if only the co-ordinate of the bridge having nearly the same free period is retained, and the others are neglected. Generally, however, two or more of the co-ordinates in the motion of the bridge require to be taken into account, and the alterations in a free period of the string produced by two co-ordinates in the motion of the bridge may be of opposite sign, and may thus tend to cancel each other out.

Decrement of Free Vibrations of String.

We may now pass on to consider the effect of dissipation of energy on the free vibrations of the system. For this purpose, we may, at first, confine our attention to the case in which the motion of the bridge is expressed by a single co-ordinate, and use

the same notation as in Section II. Since $y = 0$ when $x = 0$, we find by assuming the free oscillations of the string to be given by the expression

$$Y = F_1 e^{(i p_1 + q_1)(x + at)} + F_2 e^{(i p_2 + q_2)(x - at)},$$

that $p_1 = -p_2$, $q_1 = -q_2$ and $F_1 = -F_2$. We may therefore write

$$Y = F \left[e^{(i p + q)(x + at)} - e^{-(i p + q)(x - at)} \right].$$

At the point $x = l$, we have the relation

$$M \frac{d^2 y}{dt^2} = -T_0 \frac{dy}{dx} - f^2 y - g^2 \frac{dy}{dt}.$$

Substituting the assumed value of y , we find

$$\begin{aligned} & \left[M a^2 (i p + q)^2 + g^2 a (i p + q) + f^2 \right] \left[e^{(i p + q)l} - e^{-(i p + q)l} \right] \\ & = -T_0 (i p + q) \left[e^{(i p + q)l} + e^{-(i p + q)l} \right]. \end{aligned}$$

Since ql may be assumed to be small, a simplification may be effected by writing $(e^{ql} + e^{-ql}) = 2$ and $(e^{ql} - e^{-ql}) = 2 ql$. Then,

$$\begin{aligned} & [M a^2 (i p + q)^2 + g^2 a (i p + q) + f^2] [2ql \cos pl + 2i \sin pl] \\ & = -T_0 (i p + q) (2 \cos pl + 2iql \sin pl). \end{aligned}$$

Separating the real and imaginary parts and equating, we obtain

$$\tan pl = -\frac{T_0 p + Bql}{A - T_0 q^2 l} = \frac{Aql + T_0 q}{B + T_0 pql},$$

$$\text{where } A = [M a^2 (q^2 - p^2) + g^2 a q + f^2]$$

$$\text{and } B = [2M a^2 pq + g^2 ap].$$

Cross-multiplying and neglecting terms of the order q^3 , we find that

$$qa = -\frac{g^2 a^2 p^2 T_0}{[(f^2 - M a^2 p^2)ql + T_0^2 p^2 l] + [f^2 + M a^2 p^2]T_0}.$$

This gives us the rates of decay of the free vibrations of the system. The free periods as altered by the damping are given by the equation

$$\tan pl = -(T_0 p + Bql)/(A - T_0 q^2 l),$$

which may be solved graphically or numerically, after substitution of the approximate value of q .

We now proceed to discuss the results obtained in the preceding para.

Using the abbreviation $f^2 = Mm_1^2$, the expression for the rate of decay of the free vibrations may be written in the form

$$qa = -\frac{g^2}{p^2 l^2 (m_1^2/m^2 - 1) M^2/\mu l + M(m_1^2/m^2 + 1) + \mu l}$$

To obtain the rate of decay of the free vibrations of the bridge, we put $m = m_1$ and find $qa = -g^2 / (2M + \mu l)$, where μl is, of course, the mass of the string. It will also be seen that if the mass of the string be small compared with that of the bridge and associated parts of the instrument, the rates of decay of the free vibrations of the string would, in general, be small compared with the decrement of the free vibrations of the bridge. An exception should, however, be made in respect of the free modes, if any, the frequencies of which do not differ considerably from that of the bridge. The components whose frequencies are nearest to the frequency of free vibration of the bridge decay with time more rapidly than the rest, and in the particular case in which the free vibrations of the bridge and of the string in any particular mode are of nearly equal frequency, the rate of decay of the particular component is much larger and becomes comparable with that of the bridge.

Effect of Damping on Free Periods.

The effect of damping upon the free periods (as shown by the formula for $\tan pl$) is generally quite negligible. For, if we take the maximum value of qa , that is $-g^2/2M$, and substitute it in the formula $\tan pl = -(T_0 p + Bql) / (A - T_0 q^2 l)$, it is found that $Bql = 0$, and that $T_0 q^2 l$ is quite negligible. Except for certain terms containing q^2 appearing in A , the equation for determining the free periods is thus practically the same as if there were no dissipation of energy. The free period of the bridge (in the absence of the string) is increased by a quantity of the second order in consequence of the dissipation of energy, and the effect of this on the free periods of the string which do not lie near that of the bridge is of no consequence. Even in respect of those free periods of the string, if any, which are approximately coincident

with that of the bridge, the alterations produced by the mutual action of string and bridge would be nearly the same as in the absence of any dissipation of energy. But this statement may require modification, if the alteration of free periods by the mutual action of the string and the bridge be of the same order of quantities as the alteration of the free period of the bridge by damping, as would be the case if T_0/l were less than $g^2/2M$, that is, if the string were very thin, or if the damping of the bridge were considerable.

Coupled Vibrations of String and Bridge.

From what has been said above, it is clear that, ordinarily, if the free vibrations of the string be excited, the free vibrations of the bridge which are excited at the same time would die out more or less quickly; the beats due to the superposition of its free and forced oscillations would therefore vanish, leaving a steady vibration having the modified free period of the string which dies away rather slowly. The transient beats in the vibration of the bridge become slower and slower as the frequency of the string approaches that of the bridge, and the dissipation of the energy of the vibrating string becomes much more rapid. But the beats of the free vibrations of the bridge with those excited by the string do not vanish even when the adjustment of the frequencies of the string and bridge is most accurate. On the other hand, it is at this stage that they become most prominent in the motion of the bridge, and also appear in the vibration of the string, the modification of the free period of the string by the yielding of the bridge being then a maximum. The motion is however highly damped at this stage, and dissipates itself quickly. We cannot, therefore, as in the case of undamped vibration, expect to find the epochs of the maxima of the bridge-vibration coinciding *exactly* with those of the minima of the string-vibration, or *vice versa*. But as the free periods of the system are not considerably altered by damping, *approximate* coincidence of the maxima of the one with the minima of the other, and *vice versa*, may still be expected.

It is worthy of note that when m_1 is not nearly equal to m , the rate of decay of the free vibrations of the string depends not only on the frequency but also upon its length and density. For

a given frequency of vibration, the heavier of two strings of the same length is more strongly damped. Similarly, for a string of a given material, the damping may be increased by altering its length and tension in such a manner as to keep the frequency of vibration constant. Analogous effects have already been noted in respect of the alterations of the free period of the string produced by the yielding of the bridge. When the frequency of vibration is gradually altered so as to approach the point at which $m \equiv m_1$, the rate at which the damping of the free vibrations increases to the maximum possible, depends largely upon the density and length of the string. But in all cases, the maximum value is the same, this being attained when the string and bridge taken separately have *exactly* the same free period. That this is so in spite of the actual free periods of the system as modified by the mutual action of its parts being different in the various cases, is explained by the fact that the increased damping due to the greater density or length of the string is at this point completely set off by the decrease in the damping produced by the larger alteration of free period.

So far for the free vibrations in the case in which the motion of the bridge is expressible by a single co-ordinate. If the bridge has two or more free periods of vibration, the yielding at the end of the string may be expressed as a linear function of the values of the normal co-ordinates of the bridge-system. Similarly, the force exerted by the string on the bridge (which is of the damped harmonic type) may be resolved into its normal force-components which are also of the same type. On account of the dissipation of the energy, however, it is not generally possible in these cases to express the equations of motion in the simple form in which only a single co-ordinate is involved in each equation. By applying a general method analogous to that described by Lord Rayleigh (*Theory of Sound*, Vol. I, 2nd Ed., Art. 104), the yielding at the bridge and thence also the values for the free periods and the logarithmic decrements of the vibrations of the string may be determined. For those cases in which the free period of any component in the vibration of the string lies at or near one of the free periods of the bridge, the values thus obtained in respect of the particular component would not differ seriously from those obtained by neglecting all the co-ordinates in the motion of the

Bowed at

L5:47

L4:77

L4:66

2L5:19

2L5:14

2L4:90

2L4:82

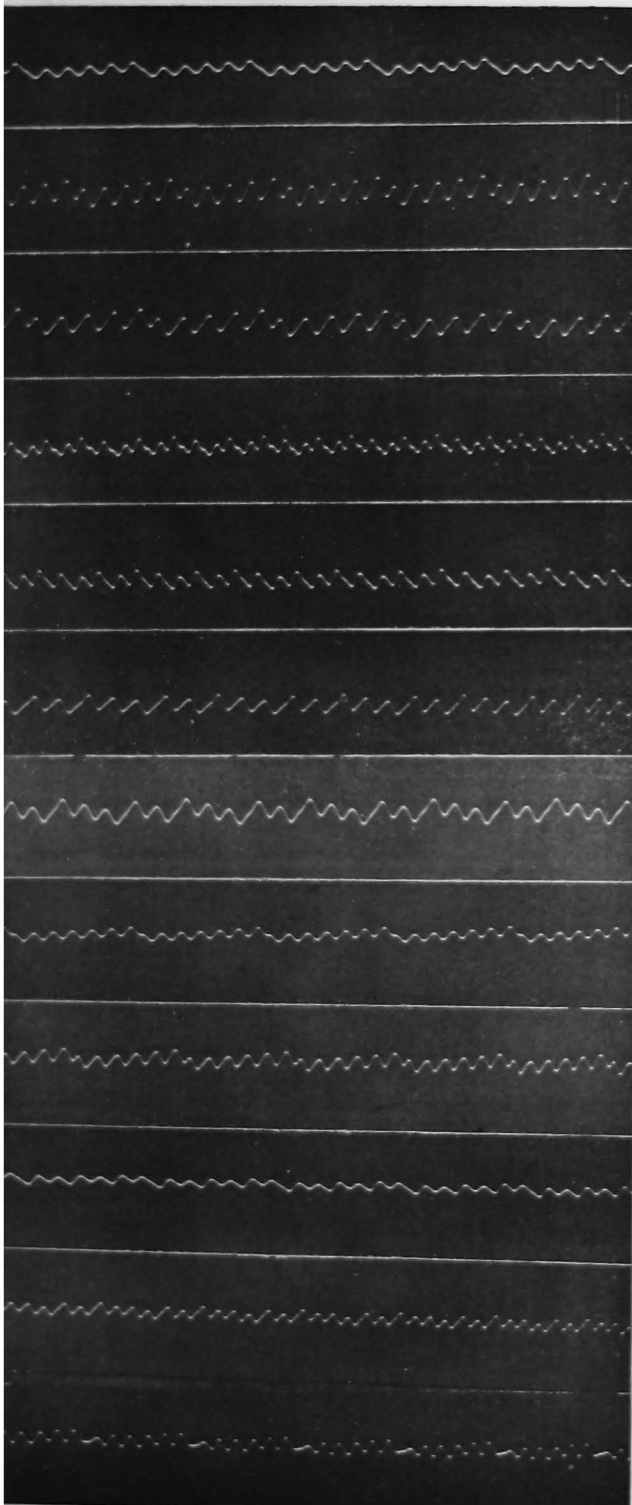
L6:55 or
nearly 2L13

L5:68

2L6:30

2L5:72

3L6:30



The fifth type and
its modifications.

nearly 5L13

nearly 5L12

The sixth type of vibration
with approximately two-
step zig-zag motion at
bowed point.

Ditto with a four-step
zig-zag motion at bowed
point.

Ditto with complicated
motion at bowed point.

bridge except that which becomes specially important in the circumstances.

Simple Harmonic Force of Arbitrary Period.

We may now pass on to discuss the vibrations maintained by a periodic force of arbitrary frequency applied at some specified point on the string. In Section II, we have already found the formulæ necessary for this purpose, on the assumption that the motion of the bridge is expressible by a single co-ordinate. It now remains to scrutinize the results in some detail, and to extend them to the case in which the bridge has two, three or a larger number of free periods of vibration.

One important consequence of the formulæ given on page 5 is as regards the phase of the motion of the bridge. When the period of the maintained vibration is much greater than that of the bridge, $(f^2 - Mm^2)$ is positive and large in comparison with $g^2 m$. The string and the bridge are then in the same phase of vibration. On the other hand, when the period is less than that of the bridge, $(f^2 - Mm^2)$ is negative, and the two vibrations are in opposite phases. When $f^2 = Mm^2$, the vibrations differ in phase by exactly a quarter of an oscillation. The results hold good, irrespectively of whether the frequency of the applied force is, or is not, exactly the same as the frequency of the free vibrations of the string, so long as the latter are of sufficient amplitude in comparison with the motion of the bridge.¹

The results given in Section II may be generalised for the case in which the bridge has two, three or a larger number of free periods, by using the method given in Lord Rayleigh's *Theory of Sound* Vol. I, Art. 104, to find the forced oscillation of the bridge in terms of that of the string. The relations thus found would be precisely analogous to equations (9) and (10) on page 5 except that instead of $(f^2 - Mm^2)$ and $g^2 m$, we would have two other constants depending in a rather complicated manner upon the masses, free periods and damping coefficients of the bridge-system, upon the position of the point on the bridge over which the string passes, and also upon the assumed period of the applied force. The for-

¹ Compare with the results described in the paper on the "Small Motion at the Nodes of a Vibrating String", Bulletin No. 6 of this Association.

mulæ for the forced oscillation of the string may then be deduced precisely as in Section II. The quantity $(F_2^2 + G_2^2)^{\frac{1}{2}}$ may be regarded as expressing the forced vibration of the string, so long as the motion of the bridge does not become comparable with the motion of the string in its amplitude.

It is given by the relation

$$(F_2^2 + G_2^2)^{\frac{1}{2}} = \frac{E \cos \psi \sin \rho x_0}{\rho T_0 [\sin^2(\rho l + \psi) + \delta^2 \cos^2 \rho l \cos^2 \psi]^{\frac{1}{2}}} \\ = E \sin \rho x_0 / k \quad ,$$

where k is a quantity independent of the position of the bowed point which expresses the relation between the applied force and the maintained vibration. In the denominator of the expression for $(F_2^2 + G_2^2)^{\frac{1}{2}}$, the quantity $\sin^2(\rho l + \psi)$ is approximately independent of the dissipation factor, provided two or more of the free periods of the system composed of the string and bridge do not lie near each other. On the other hand, the quantity $\delta^2 \cos^2 \rho l \cos^2 \psi$ is dependent entirely on the friction. Except in special cases of the kind mentioned, the amplitude of the maintained vibration would practically be a maximum when $\sin^2(\rho l + \psi)$ is zero, that is, when the period of the impressed force is the same as one of the free periods of the string as modified by the yielding of the bridge. When this is the case, k is proportional to δ , and is therefore entirely dependent on the rate of dissipation of energy. On the other hand, if the period of the impressed force is the same as one of the free periods of the string with the ends rigidly fixed, $\sin \rho l = n\pi$, and k is proportional to $[\tan^2 \psi + \delta^2]^{\frac{1}{2}}$, and depends both on the dissipation of energy and on the alteration of free period produced by the yielding of the bridge. The magnitude and phase of the force required to maintain the vibration thus depend, in general, both on the difference between the free and forced periods, and on the rate of dissipation of energy.

Forced Vibrations of Coupled Systems of nearly equal periods.

The special cases in which two or more of the free periods of the system composed of the string, bridge and associated masses lie near each other require however to be separately considered, as the value of ψ cannot then be regarded as independent of the

dissipation of energy. The simplest of these cases is that in which one of the free periods of the string approximately coincides with one of the free periods of the bridge, and also with the period of the applied force. As one of the co-ordinates in the motion of the bridge then becomes large in comparison with the others, we may neglect all the rest, and the formulæ given in Section II may therefore be used without serious error. Under the conditions assumed, the motion of the bridge is not negligibly small, and the motion of the string on either side of the point of application of the force cannot be quite accurately represented by the same expression; in other words, the string does not quite conform to the natural types of vibration. This is sufficiently evident from the formulæ on page 5 if $(f^2 - Mm^2)$ be put nearly equal to zero. As an approximate result, however, we may still regard $(F_1^2 + G_1^2)^{\frac{1}{2}}$ as expressing the amplitude of the maintained vibration of the string, while $(D_1^2 + E_1^2)^{\frac{1}{2}}$ represents that of the bridge. To find $(F_1^2 + G_1^2)^{\frac{1}{2}}$ for various periods of the applied force lying in the neighbourhood of the free periods of the string and the bridge, we have to consider the values of ψ and δ in such cases. Thus, $\tan \psi = \tan \theta (1 - \sin^2 \phi)$ and $\delta = \tan \theta \sin \phi \cos \phi$, where $\tan \theta = T_0 p / (f^2 - Mm^2)$, and $\tan \phi = g^2 m / (f^2 - Mm^2)$. By substitution, $\delta = T_0 p \sin^2 \phi / g^2 m$, and is thus always positive. Generally speaking, δ is small and approximately equal to $T_0 p g^2 m / (f^2 - Mm^2)^2$, being thus directly proportional to the damping coefficient g^2 of the bridge. But when f^2 approaches Mm^2 (as in the cases now being considered), δ increases rather sharply to a considerably larger maximum value $T_0 p / g^2 m$ which is *inversely* proportional to the damping coefficient of the bridge. So long as $(f^2 - Mm^2)$ is not small, ψ is practically equal to θ , being positive when $f^2 > Mm^2$, and negative when $f^2 < Mm^2$. But when f^2 approaches the value Mm^2 , ψ becomes numerically less than θ and, in fact, vanishes when $f^2 = Mm^2$, whereas θ increases to either of the values $\pm \pi/2$ at this point. The free period of the string is given by the relation $pl = n\pi$, if its ends be supposed rigidly fixed, and by the relation $pl + \theta = n\pi$, if the yielding of the bridge be taken into account. Thus, if the string and bridge (taken separately) have the same free period, and the applied force is also of the same period, $f^2 = Mm^2$, and $pl = n\pi$. $\sin^2(pl + \psi)$ is then zero, and

$G_2 = 0$. The amplitude of vibration of the string $(F_2^2 + G_2^2)^{\frac{1}{2}}$ is then equal to $\pm F_2$ and may be written as $E \sin \phi x_0 / \rho T_0 \delta$ which is equal to $E g^2 m \sin \phi x_0 / \rho^2 T_0^2$.

In other words, the force required to maintain a vibration of a given amplitude is then *inversely* proportional to the damping coefficient g^2 of the bridge. This apparently paradoxical result is easily explained*. For, the motion of the bridge is then $E_2 \cos mt$, where $E_2 = E \sin \phi x_0 / \rho T_0$, and the rate of dissipation of energy which is $\frac{1}{2} g^2 m^2 E_2^2$ may be written as $\frac{1}{2} F_2^2 T_0^2 \rho^2 / g^2$, and is thus also inversely proportional to the damping coefficient g^2 . By writing the rate of dissipation of energy in the form $\frac{1}{2} F_2 E m \sin \phi x_0$, it is seen that the force required to maintain the string in a vibration of a given amplitude is directly proportional to the rate of dissipation of energy. It is also proportional to the corresponding motion at the bridge, as may be seen by writing the expression for the applied force in the form $\frac{1}{2} F_2 E_2 T_0 \rho m$.

If the free periods of the string and the bridge (taken separately) and the period of the applied force are not all exactly equal to one another, but only approximately equal, the expression for the amplitude of the forced vibration of the string cannot reduce to such simple forms as those given in the preceding para. We may however trace the manner in which the amplitude of the maintained vibration varies with the period of the applied force, assuming *either* that (1) the latter is the same as the free period of the string with rigidly fixed ends, but differs from the period of the bridge (taken by itself), *or* (2) that the free periods of the string and of the bridge (taken separately) are equal, but differ from the period of the applied force. In the first set of cases, the expression $[\sin^2 (\phi l + \psi) + \delta^2 \cos^2 \psi \cos^2 \phi l]^{\frac{1}{2}} / \cos \psi$ to which the amplitude of maintained vibration is inversely proportional, reduces to $[\tan^2 \psi + \delta^2]^{\frac{1}{2}}$, ϕl being equal to π . As the period of the applied force approaches the free period of the bridge, δ^2 increases continuously and becomes a maximum when $f^2 = Mm^2$. On the other hand, the value of $\tan^2 \psi$ first increases, and after attaining a maximum when f^2 is $>$ or $<$ than Mm^2 , becomes zero when $f^2 = Mm^2$.

* Compare with the observations of Lord Rayleigh on the reaction of a dependent system, *Theory of Sound*, Vol. I, Art. 117.

But $(\tan^2 \psi + \delta^2)^{\frac{1}{2}}$ has only one *maximum* which is attained when $f^2 = Mm^2$. For, $\tan \psi$ may be written as $T_0 \rho \sin \phi \cos \phi / g^2 m$, and $(\tan^2 \psi + \delta^2)$ is therefore equal to $(T_0 \rho \sin \phi / g^2 m)^2$ which is a maximum when $\phi = \pi/2$. From this, it is seen that in the first set of cases, practically the *maximum* force is required to maintain a vibration of a given amplitude, when its period is the same as the free period of the bridge. In the second set of cases, it is necessary to trace the values of the expression $[\sin^2 (\phi l + \psi) / \cos^2 \psi + \delta^2 \cos^2 \phi l]^{\frac{1}{2}}$. This may be written in the form $[\sin^2 \phi l + \sin^2 \phi l \tan^2 \psi + \cos^2 \phi l (\tan^2 \psi + \delta^2)]^{\frac{1}{2}}$. $\sin^2 \phi l$ is a minimum when $\phi l = \pi$ and $f^2 = Mm^2$, and increases continuously when f^2 is $>$ or $<$ Mm^2 . We have already seen that $\cos^2 \phi l (\tan^2 \psi + \delta^2)$ is a maximum when $f^2 = Mm^2$. $\sin 2\phi l \tan \psi$ is zero when $f^2 = Mm^2$, and is very small when f^2 is appreciably greater or less than Mm^2 , but intermediately, it has finite *negative* values. To find whether the sum of these expressions is a minimum or a maximum when $\phi l = \pi$ and $f^2 = Mm^2$, we may differentiate $[\sin^2 (\phi l + \psi) / \cos^2 \psi + \delta^2 \cos^2 \phi l]$ twice with respect to ϕ , and then put $\phi l = \pi$ and $\psi = 0$. The result found is that the expression is then a maximum or a minimum according as

$$4 \left(\frac{T_0 M}{g^2 l} \right)^2 + 4 \frac{T_0 M}{g^2 l} (1 + \mu l / 4M) > \text{or} < 1.$$

If we neglect $\mu l / 4M$ which is one-fourth of the ratio of the mass of the string to the mass of the bridge, etc. this condition may be simply written as

$$T_0 / l > \text{or} < \frac{g^4}{2M} (\sqrt{2} - 1),$$

or to a closer approximation, in the form

$$T_0 / l > \text{or} < (\sqrt{2} - 1) \frac{g^4}{2M} (1 - \mu l / 4\sqrt{2}M).$$

As the term on the right-hand side is proportional to the square of the damping coefficient of the bridge, we should expect in practice to find it smaller than the one on the left, unless, of course, the string be very thin or the damping of the bridge be unusually large. The force required to maintain the vibration would thus, *in general*, be a *maximum* when its period is the same

as the free period of the string and the bridge, and when this is the case, the force required would be a *minimum* for two other periods, one of which lies on each side of the aforesaid maximum. These two periods for which the *minimum* maintaining force is required would, except in extreme cases, be more or less the same as the two free periods of the coupled system composed of the string and bridge. When, however, the string is very thin, or the damping of the bridge is unusually large, the two minima do not exist, the force required being a *minimum* and not a *maximum* at the period given by $f^2 = Mm^2$.

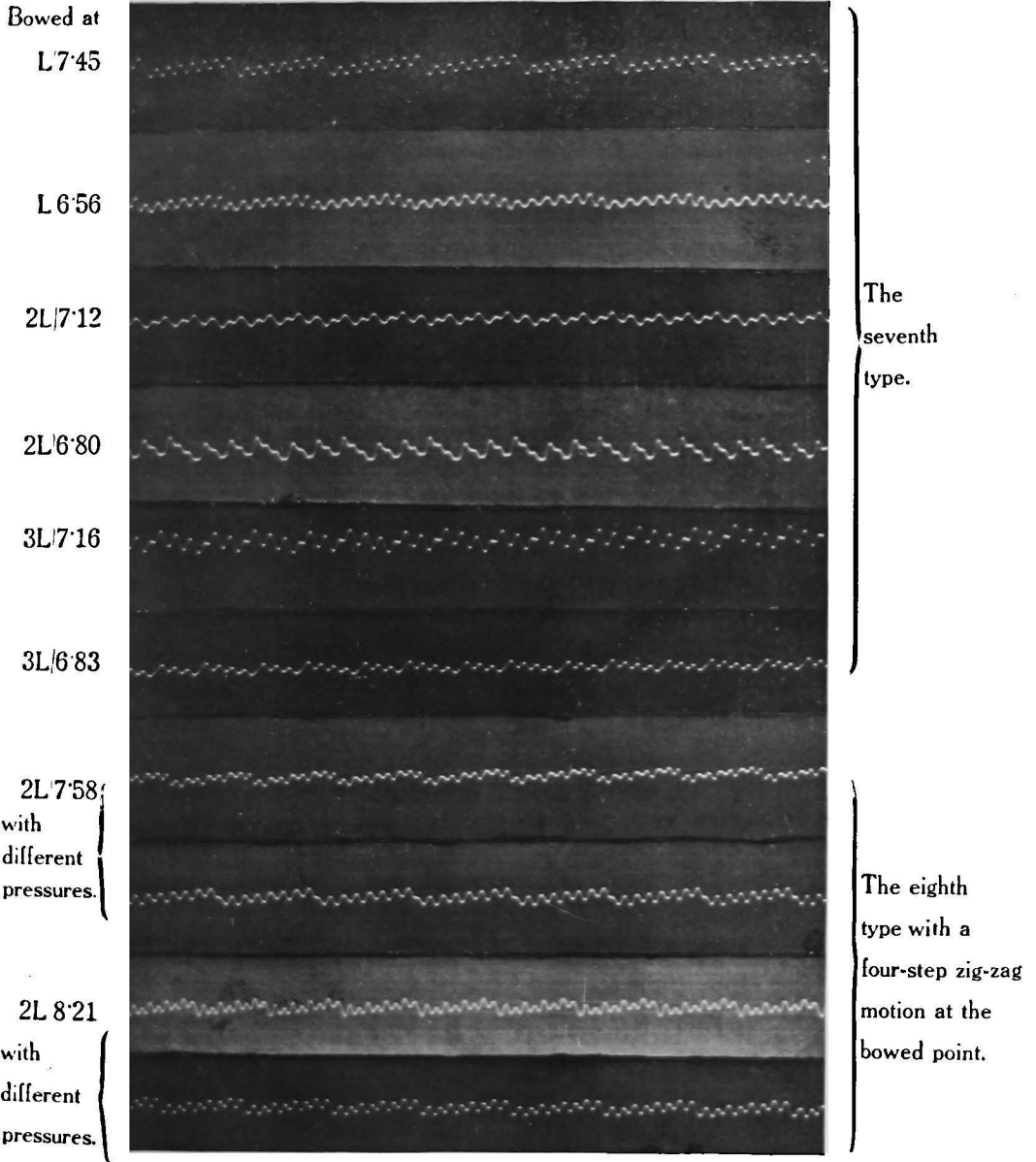
When the free periods of the string and of the bridge (taken separately) are nearly but not quite equal to one another, and are assigned specific values, and only the period of the applied force is regarded as a variable, it is easy to see from the discussion in the preceding para. that, subject to similar restrictions regarding the relative magnitudes of the quantities involved, the force required to maintain the string in vibration of given amplitude would, likewise, be a minimum for two periods, f^2 being greater than Mm^2 in one case and less than Mm^2 in the other. The two minima of the force necessary would however be unequal. These two periods would correspond more or less closely to the two free periods of the system, and from the discussion of the free vibrations already given, it is clear that the difference of these two periods would be a minimum when the free periods of the string and bridge taken separately are equal, and would not therefore change very rapidly when they are made slightly different.

Effect of Motion of the Bridge on Periodic Vibrations forced by the Bow.

When the applied force, instead of being simple in character, comprises a series of harmonics, and its period does not differ considerably from the free period of the string with rigidly fixed ends, the forced vibration may still, as an *approximation*, be expressed in terms of the amplitudes B_n and phases e_n of the normal types of vibration.

The force required to maintain the vibration may be written in the form

Observed at L/15.



The seventh and eighth types : their rational and transitional modifications.

$$\sum_{n=1}^{\infty} \frac{k_n B_n \sin\left(\frac{2n\pi t}{T} + e_n + e'_n\right)}{\sin \frac{n\pi x_0}{l}}$$

where k_n, e'_n are quantities which are approximately independent of the position of the bowed point, and are determined by the differences between the free and forced periods of the components in the motion, and the logarithmic decrements of the respective free modes. If the difference of periods is zero or negligible in respect of any component or components, the corresponding constants k_n are merely the logarithmic decrements of the free vibrations multiplied by the factor $\pi n^2 T_0/l$, and should thus be readily capable of experimental determination. If the difference of periods is not negligible, the experimental determination of k_n is not such a simple matter, as it would be necessary to determine the logarithmic decrement of the free vibrations, and also to make an accurate comparison of the period of the applied force and the period of the component free vibration as modified by the yielding of the bridge. [The free periods may, of course, be calculated theoretically if the constants of the string and the actual components of the yielding of the bridge are known]. In the particular cases in which the difference of the free and forced periods or the logarithmic decrement of any component is large, the corresponding constant k_n becomes large. This might, for instance, happen on account of a particular component being nearly or exactly in resonance with one of the free modes of vibration of the bridge, in which case, as we have already seen, the component would be thrown out of harmonic relation with the rest, or would be highly damped.

The preceding theory is evidently applicable in considering the motion under the action of the bow, if we assume that this motion is a periodic vibration. It is clear that the bow should be capable of forcing a strictly regular vibration even if the yielding of the bridge be not negligible, provided, of course, the pressure and speed of the bow are in suitable relation to the position of the bowed point and other factors involved. For, the expression given above for the force requisite to maintain such a motion is

exactly of the same form as that given at foot of page 73, the only difference (to a first approximation) made by the alteration of free periods due to such yielding being in the actual numerical values of the series of constants k_n and e'_n . In other words, assuming that the motion is periodic, the theory is substantially on the same lines as that already discussed. Various special points however come up for consideration. For instance, what is the period of the vibration forced by the bow when the yielding of the bridge is not negligible? In attempting to find an answer to this question, we should recollect that the series of "constants" k_n , and e'_n are not independent of the period of the forced vibration. A complete theory seems at first sight wholly impracticable in the circumstances. It is obvious, however, that in most cases of practical interest, where the yielding of the bridge is sufficiently large to enter into the theory, the alterations of the free periods of the various components in the motion produced by it, would not all be in the same direction. We may therefore infer that when the pressure of the bow is just sufficient to elicit a steady vibration including the usual retinue of upper partials, the period would not ordinarily differ to an appreciable extent from that of the free vibrations of the string with rigidly fixed ends. [The amplitude of vibration is, of course, assumed to be small, or at any rate of the same order of quantities in both cases]. Even when the yielding of the bridge results in a large alteration of the free period of some fairly important harmonic, e.g., of the fundamental or the octave, the same result might be expected. It might be shown that if in such a case, the pressure be sufficient only to excite the said component with the frequency as altered by the yielding of the bridge, and not with the normal frequency, a steady vibration would not be possible. For, when the bow is laid on, the bridge has *initially* no motion, and one of two things would happen. Either the component in question would altogether fail to be excited, or as we shall see later on, it would tend to be excited in a cyclic manner, that is, with alternately increasing and decreasing amplitude. Only the pressure sufficient to excite all the components in their normal frequencies would be capable of maintaining a regular periodic vibration of the usual kind.

Cases in which the Bow maintains a Periodic Vibration with Altered Frequency.

The preceding discussion makes it clear that in practically all cases in which the pressure of the bow is *just* sufficient to maintain a steady vibration, the period would not differ appreciably from that of the free vibration of the string with rigidly fixed ends. But when the pressure is much in excess of the minimum necessary, we might expect different results. For, as already remarked on page 113, when we have a very large maintaining force at our disposal, we are no longer restricted to a consideration of those types of motion which require the smallest forces to elicit. In order that a motion of a period different from the normal be possible, at least two factors are necessary—(a) we should have sufficient maintaining forces at our disposal, and (b) there should be a factor tending to alter the frequencies of all the components of free vibration in the same direction, that is, to increase all of them or to decrease all. By sufficiently increasing the pressure of the bow, factor (a) may be secured. We have already seen that the yielding of the bridge would not, in general, enable us to secure the result stated in (b). *The sliding friction of the bow might however lower the frequencies of all the component vibrations*, in much the same way as in the dynamics of a particle, the viscous resistance is found to result in an increase of the period of vibration. In other words, it is quite possible that when the pressure of the bow is sufficiently large, it might tend to lower the frequency of vibration in addition to maintaining the motion*. As, however, the friction exerted by the bow is not entirely determinate, we cannot ordinarily expect a regular vibration of the string under such circumstances. But under special conditions, as for instance in the region of frequencies within which the resonance of the instrument is considerable, we may expect to meet with cases in which a high bowing pressure elicits a *regular* vibration with a frequency appreciably or even considerably less than the normal. The greater the pressure of the bow, the larger would be the possible lowering of

* With reference to the possibility of a maintained vibration in such cases having a period different from that of free vibration, see Lord Rayleigh's *Theory of Sound*, Vol. I, Arts. 64 and 68(a).

frequency. For the reasons explained on pages 113 and 114, the phenomenon would be most prominent when the bow is applied at points exactly coinciding with important nodes, such as $1/3$ or $1/4$ or $1/5$, and would be inappreciable if the bow be applied near an end of the string, or at points close to, but not coincident with, important nodes.

Various other important questions arise in regard to the theory of the periodic vibrations of a uniform string forced by the bow. Has the construction of the instrument on which the string is mounted any effect in determining the possibility or otherwise of any stated form of vibration? What is the effect on the motion of the string of muting the bridge or otherwise loading the mobile parts of the instrument? How do the thickness, length and tension of the string influence the character of its motion under the action of the bow? What is the relation between bowing pressure and velocity? What happens when the amplitude of the maintained vibration is too large for the theory of "small" oscillations to be strictly applicable? These are extremely important questions for which it is essential to find an answer in order to arrive at a proper understanding of our subject. We now proceed to consider the various points raised, one after another, in considerable detail.

Influence of the Instrument on the Form of Vibration of Bowed Strings.

Upon the construction of the instrument depends the motion of the points of attachment of the string forced by its vibrations, and therefore also the reaction of the instrument on the vibrations of the string. This influence may be expressed mathematically in terms of the masses, free periods and damping coefficients of the bridge, and the associated mobile parts of the instrument, and in terms of the tension, length and free periods of the string, and the position of the point on the bridge over which it passes; we have already discussed the formulæ necessary for this purpose in some detail. It now remains to consider in what manner, if any, the motion forced by the bow depends on the actual numerical values of the various quantities involved. From the discussion given in Sections III, V, X, and pages 63 to 72, it would appear that the

sequence of the phenomena obtained by bowing at any given point on the string with varying degrees of pressure or velocity, is to a large extent capable of being found from kinematical considerations depending upon the position of the bowed point, its contiguity or coincidence with some important node-point and the like, taken in conjunction with broad dynamical principles common to all cases likely to arise in practice. But the subsequent mathematical treatment (pages 73 to 110) showed that the actual magnitudes of the constants k_1, k_2, k_3 etc., e'_1, e'_2, e'_3 etc., expressing the relation between the maintaining forces and the maintained motion, are of no small importance. In order to get a connected idea of the theory, we considered on pages 79 to 94 a special class of cases in which all the constants e'_n were put equal to $\pi/2$, and the constants k_n were put equal to nk ; this supposition enabled us to effect an analytical summation of the expression for the maintaining force in all such cases. We shall now see in what manner, if any, the conclusions thus arrived at have to be modified when the constants k_n and e'_n have values determined by the actual constants of the instrument on which the string is mounted.

The general equation giving k_n in terms of the constants of the instrument is

$$k_n = 2n\pi T_0 [\sin^2(2n\pi l/aT + \psi_n) + \delta_n^2 \cos^2 2n\pi l/aT \cdot \cos^2 \psi_n]^{\frac{1}{2}} / aT \cos \psi_n.$$

If the period of the motion is assumed to be the same as that of the string with rigidly fixed ends, this reduces to the form $k_n = n\pi T_0/l \cdot [\tan^2 \psi_n + \delta_n^2]^{\frac{1}{2}}$, where ψ_n usually depends only on the difference between the free and forced periods of the n th component and δ_n depends on the dissipation of energy. The magnitudes of ψ_n and δ_n for any component in the motion depend mainly on those normal modes of vibration of the instrument which have frequencies nearest to it. As any actual instrument would have numerous free periods of its own forming an ascending scale of frequencies, it is not a violent supposition in trying to take a general view of the phenomena to assume that $[\tan^2 \psi_n + \delta_n^2]^{\frac{1}{2}}$ is of the same order of quantities for all values of n . We would then have $k_n = n f(n)k$, where $f(n)$ varies in an irregular (not progressive) manner as n is increased, and k is a constant. If we put $f(n)$ equal to unity, and make the further supposition that e'_n is

equal to $\pi/2$ for all values of n , we have precisely the same conditions as those assumed in calculating the form of the frictional force curves on pages 80 to 94. The general value of e'_n is

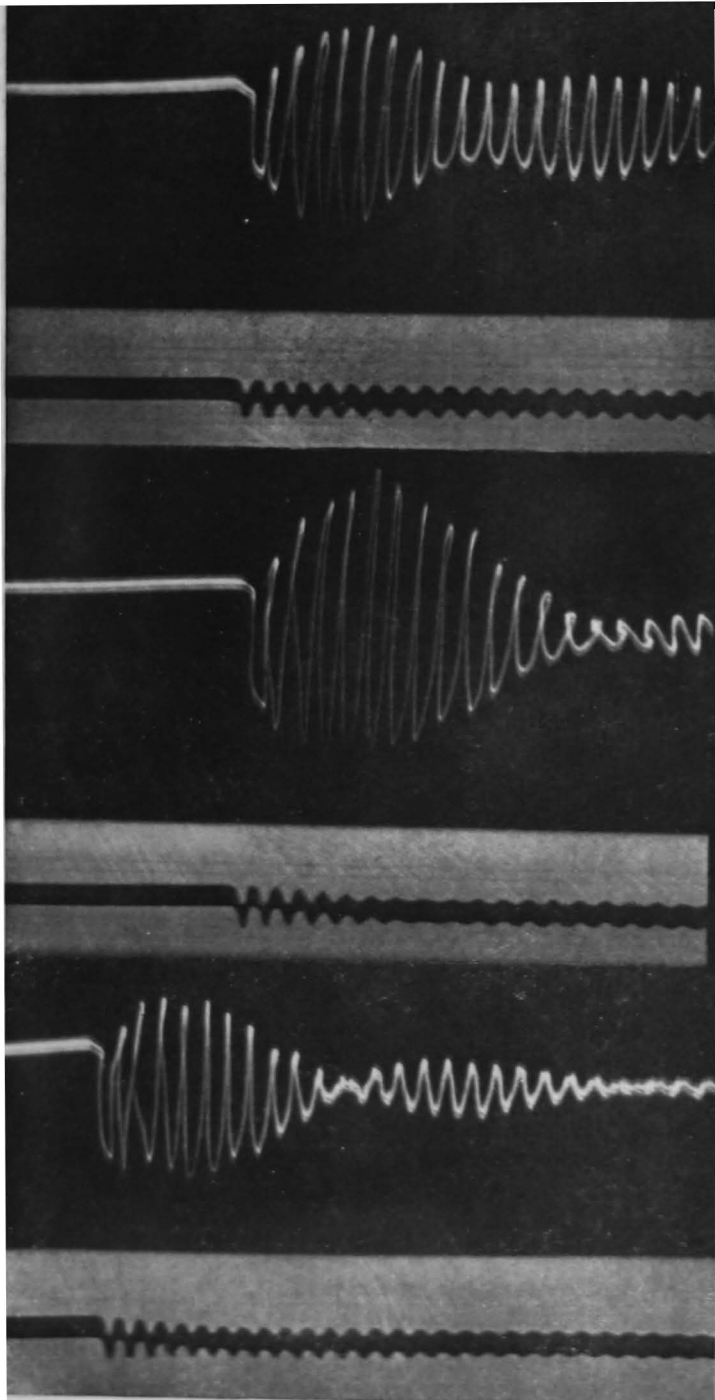
$$\pi/2 - \tan^{-1} [-\sin(2n\pi l/a T + \psi_n) / \delta_n \cos \psi_n \cos 2n\pi l/a T].$$

When the period of forced vibration is the same as that of the string with rigidly fixed ends, this reduces to the form

$$e'_n = \pi/2 - \tan^{-1} (-\tan \psi_n / \delta_n).$$

From this, it is seen that when the dissipation of energy is the principal factor and not the difference, if any, between the free and forced periods, e'_n is practically equal to $\pi/2$.

Though, as we have seen, the assumptions that $e'_n = \pi/2$ and $k_n = nk$ serve as a broad basis for discussion, the values of k_n and e'_n in individual cases, especially for the first eleven or twelve harmonics which are of importance, may indeed stand to each other in very different relations. As an illustration of this, we may consider a few examples. The first is that in which the gravest mode of free vibration of the instrument is far higher in frequency than the gravest mode of vibration of the string, and has, say, exactly ten times its frequency. So far as the first ten harmonics are concerned, we may altogether neglect the influence of the modes of free vibration of the instrument higher in frequency than the gravest. The values of $\tan \psi_n$ for the first nine harmonics increase in proportion to the ratio $n/(100 - n^2)$, and for the tenth is zero. The value of δ_n similarly increases with n in the ratio $n^2/(100 - n^2)^2$ if $n < 10$, and when $n = 10$, becomes very large. Since $k_n = n \pi T_0/l [\tan^2 \psi_n + \delta_n^2]^{1/2}$, it is seen that it would increase at a vastly greater rate than in proportion to n , as we move up from $n = 1$ to $n = 10$. In the curves for the maintaining force calculated on this basis for any assumed type of motion and position of the bowed point, the first three or four harmonic components would be far less pronounced in comparison with the rest than in the curves found when k_n is simply proportional to n . One obvious consequence of this would be that the critical pressure required for eliciting types of vibration in which the fundamental or octave is dominant, would be smaller than usual, and for those in which the higher harmonics are dominant, would be increased; so far from making it difficult to excite vibrations of the latter



Slightly below
'Wolf-note'
pitch.

At the
'Wolf-note'
pitch, showing
alteration of
free periods.

Slightly above
'Wolf-note'
pitch.

Simultaneous vibration-curves of the Bridge and G-String of a
'Cello, (plucked).

kind, this might, for some positions of the bowed point, actually make the production of such types of motion easier by increasing the difference between the critical pressures of alternative modes possible in any given case. An exception should however be made in respect of the extreme case of a type in which the tenth harmonic is dominant, as owing to the resonance of the instrument, this would require an unusually large force to elicit, and might thus actually be incapable of being realised in experiment.

As another example, we shall consider the case in which the gravest period of free vibration of the instrument is graver than the fundamental period of the string, and the other periods are assumed to be so small that their influence on the first eleven or twelve harmonics is negligible. As an extreme case, we may take the period of the instrument to be infinitely long, that is, regard the bridge as having inertia subject to damping but without spring. The values of $\tan \psi_n$ and δ_n would then vary as $1/n$ and $1/n^2$ respectively. The value of k_n would therefore actually decrease as n is increased. Since the amplitudes of the harmonics in the vibration are of the order $1/n^2$, the magnitude of the higher components in the maintaining force would be negligibly small, the first three or four terms of the series being pre-eminent. The prominence of the first component would be even more marked, if instead of taking the free period of the instrument as infinitely long, we take it as only a little greater than, or actually equal to, the fundamental period of the string. For example, let the period of the instrument be $\frac{11}{10}$ times the fundamental period of the string. The values of ψ_n and δ_n would then vary as $n/(100 - 121n^2)$ and $n^2/(100 - 121n^2)^2$ respectively. It is obvious that k_1 would then be much greater than k_2 , k_3 , etc. This preponderance of the first component in the maintaining force would have an important influence on the possibility of certain types of motion under the action of the bow. For example, we may consider the case of a string bowed near one end. If the pressure of the bow be sufficient, we should get the first type of vibration in which the principal component is dominant, the motion at the bowed point being of the simple two-step zig-zag form. When the pressure is reduced below the limit necessary for this type of vibration, the general

theory leads us to expect that the motion would alter to the second type of vibration in which the motion at the bowed point is of the four-step zig-zag form (see pages 66 to 67), or to one of the transitional forms intermediate between the first and the second types (see pages 108 to 111). But in the present case, the fact that k_1 is large leads to a difficulty. In order that a four-step zig-zag type of motion be possible at the bowed point, it is necessary that the frictional force should be equal, or nearly equal in the two stages at which slipping occurs. This, in its turn, is only possible when the *second* component (not the *first*) is prominent in the maintaining force. (This remark will be clearly understood on a reference to the last three pairs of curves in Fig 21 on page 94). We see that under the conditions assumed, the only steady modes of vibration ordinarily possible would be those in which the first harmonic is either dominant or entirely absent. This remark is of importance, as will appear later when we consider the theory of cyclic vibrations.

Other examples may also be furnished of the manner in which the values of the individual constants k_1, k_2 , etc., may affect the sequence of the phenomena obtained by bowing at any given point on the string with varying pressures or velocities. For instance if k_1 is very large, it would require a considerable pressure to elicit the first type of vibration in which the fundamental is dominant, even when the bow is applied at a point far removed from the end of the string, e.g., between $l/2$ and $l/3$. We may then find, as an exception to the general rule stated on page 112, that this is not the type which requires the smallest pressure to elicit within the range referred to. Similarly, a large k_2 would result in the octave being very prominent in the curves for the maintaining force, and we might find the sequences indicated for the range $l/2$ to $l/3$ in Fig 15 on page 71 entirely altered in such a case, especially in regard to modes of vibration involving complicated motions at the bowed point.

Relation of Bowing Pressure to the Tension, Linear Density and Length of String.

From a musical point of view, the thickness of the string is a factor of great importance. Leaving aside the complications due

to possible non-uniformity or imperfect flexibility of the string (which may be considered separately), the thickness of the string is principally of importance as it determines the linear density and therefore also the tension necessary for any given frequency of vibration. For purposes of comparison of the bowing pressures necessary, we may assume the length of the string and the frequency of vibration to be the same in all cases. For a given velocity of bowing, the amplitude of vibration would also be constant. The n^{th} harmonic component of the maintaining force is proportional to k_n , that is $n\pi T_0/l [\tan^2 \psi_n + \delta_n^2]^{\frac{1}{2}}$. Since T_0 is the tension of the string, and since $\tan \psi_n$ and δ_n are also proportional to T_0 , the maintaining forces necessary are proportional to the square of the tension, that is, also to the square of the linear density of the string. This becomes intelligible when we remember that the rate of emission of energy from the instrument is also proportional to the square of the tension or of the linear density. The use of heavy strings is thus indispensable for obtaining a powerful tone, and if we assume that the frictional coefficients are the same, the minimum bowing pressure required for any given type of vibration is also proportional to the square of the linear density. With strings of the same material, the linear density is proportional to the square of the diameter, and the bowing pressure necessary increases as the fourth power of the diameter. It is worthy of notice that the maximum possible area of contact between the bow and the string increases at a much smaller rate than the bowing pressure necessary, as the thickness of the string is increased. Further, as a thin string requires a much smaller bowing pressure than a thick one, a greater variety of vibration-forms would, in general, be possible with the former, within a given range of bowing pressures, than with the latter.

Comparison may also be made of the bowing pressures necessary when the tension and length of the string are simultaneously varied in such a manner as to retain the frequency of vibration unaltered. It is easily seen that under the conditions assumed, the amplitude of vibration remains constant, provided the velocity of the bow and the relative position of the point at which it is applied, are the same in all cases. The frequency being constant, the tension necessary varies as the square of the length of the

string, and the bowing pressure necessary is also proportional to the square of the length of the string.

The manner in which the bowing pressure necessary for the maintenance of the motion varies when the frequency of vibration is altered by changing the tension or length of the string, cannot however be expressed in such a simple manner as in the preceding cases. Taking, for instance, the case in which the frequency is altered by varying the tension of a string of constant length, the expression for the bowing pressure is seen to consist of two factors, one of which increases continuously with the tension, and the other fluctuates between a series of maxima and minima. As the frequency increases, the amplitude of vibration for a given velocity of bowing falls off, being inversely proportional to the square root of the tension; but the values of constants k_1, k_2 , etc., contain a factor proportional to the square of the tension. The bowing pressure therefore contains a factor proportional to $T_0^{\frac{3}{2}}$ which increases continuously as T_0 is increased. The other factor depends on the relation between the frequencies of the impressed vibration and the natural frequencies of resonance of the instrument. For example, if the instrument has only one free period of vibration, one of the factors which determines the bowing pressure has a series of maxima corresponding to the cases in which the first, second, third or higher harmonic has the same frequency as the free vibration of the instrument. The bowing pressure necessary, if plotted as a function of the frequency of vibration, should then show a series of maxima and minima, the highest value being reached when the frequency of the principal component in the forced vibration of the string is the same as that of the free vibration of the instrument. If the instrument has more than one free period of vibration, the variation of bowing pressure with frequency would be determined by the relation of the impressed frequencies of vibration to the frequencies of all the free periods of vibration of the instrument. In general, we should expect the pressure-frequency curve to show a series of maxima and minima, the most important maxima corresponding to the frequencies of resonance of the instrument to the dominant harmonic in the vibration. Superposed on these maxima and minima, we should expect to find a tendency of the bowing pressure necessary to increase continuously as the tension is in-

creased. Similar results should be obtained when the frequency of vibration is altered by decreasing the length of the string, both the tension and the ratio in which the bowed point divides the string being retained constant.

Effect of Muting on the Minimum Bowing Pressure.

The next question to be dealt with is the effect of muting or otherwise loading the mobile parts of the instrument upon the periodic vibrations elicited by the bow. The addition of mass represented by the mute results, of course, in an alteration of the constants of the instrument relevant to our present investigation. The free periods of the instrument are all increased. It is obvious that this would profoundly influence the character of the forced vibration of the body of the instrument and therefore also its reaction on the string. We have also to consider the alteration in the modes of vibration of the various parts of the instrument produced by the load. The point at which the mute or other load is added tends to become a node, or point of rest, so far as the modes of higher frequencies are concerned; on the other hand, the point loaded would tend to become a point of maximum vibration for the gravest mode or modes. The contiguity or otherwise of the load and of the point on the bridge over which the string passes, is thus a matter of some importance. Considering the bridge, belly and the air enclosed in the instrument as a single dynamical system, we may use the Lagrangian equations of motion to investigate the alteration in its forced vibrations produced by the load.

Let ϕ_1, ϕ_2, ϕ_3 , etc., be the normal co-ordinates of the system, and Φ_1, Φ_2 , etc., be the normal force-components corresponding to a particular harmonic in the force exerted on the bridge by the vibrating string. As the result of the addition of the load, ϕ_1, ϕ_2 , etc., are no longer the normal co-ordinates, and we may write the kinetic and potential energies of the system in the form*

* Cf. Routh's *Advanced Rigid Dynamics*, Sixth Edition, Secs. 76 to 78, and Lord Rayleigh's *Theory of Sound*, Second Edition, Art. 92(a), where the effects of addition of inertia or constraints on the free vibrations of a system are discussed. Strictly speaking, since the kinetic energy of a particle of mass m is $\frac{1}{2} m (\dot{x}^2 + \dot{y}^2 + \dot{z}^2)$, the addition to the kinetic energy of the system should be represented by three terms thus:

$$T = \frac{1}{2} a_1 \dot{\phi}_1^2 + \frac{1}{2} a_2 \dot{\phi}_2^2 + \dots + \frac{1}{2} a (f_1 \dot{\phi}_1 + f_2 \dot{\phi}_2 + \dots)^2$$

$$V = \frac{1}{2} c_1 \phi_1^2 + \frac{1}{2} c_2 \phi_2^2 + \dots$$

The Lagrangian equations for the forced vibration are

$$(a_1 \lambda^2 + c_1) \phi_1 + f_1 a \lambda^2 (f_1 \phi_1 + f_2 \phi_2 + \dots) = \Phi_1$$

$$(a_2 \lambda^2 + c_2) \phi_2 + f_2 a \lambda^2 (f_1 \phi_1 + f_2 \phi_2 + \dots) = \Phi_2$$

etc. etc.

Multiplying the first equation by $f_1/(a_1 \lambda^2 + c_1)$, the second equation by $f_2/(a_2 \lambda^2 + c_2)$ and so on, and then adding the results, we find

$$(f_1 \phi_1 + f_2 \phi_2 + \text{etc.}) = \frac{\Sigma f \Phi / (a \lambda^2 + c)}{1 + a \lambda^2 \Sigma f^2 / (a \lambda^2 + c)}$$

Since $\frac{1}{2} a (f_1 \dot{\phi}_1 + f_2 \dot{\phi}_2 + \text{etc.})^2$ is the kinetic energy of the load, a being its mass, its forced vibration is given by $(f_1 \phi_1 + f_2 \phi_2 + \text{etc.})$. Writing $\lambda^2 = -m^2$ and dividing out by the product $a_1 a_2 a_3$, etc., the preceding expression reduces to

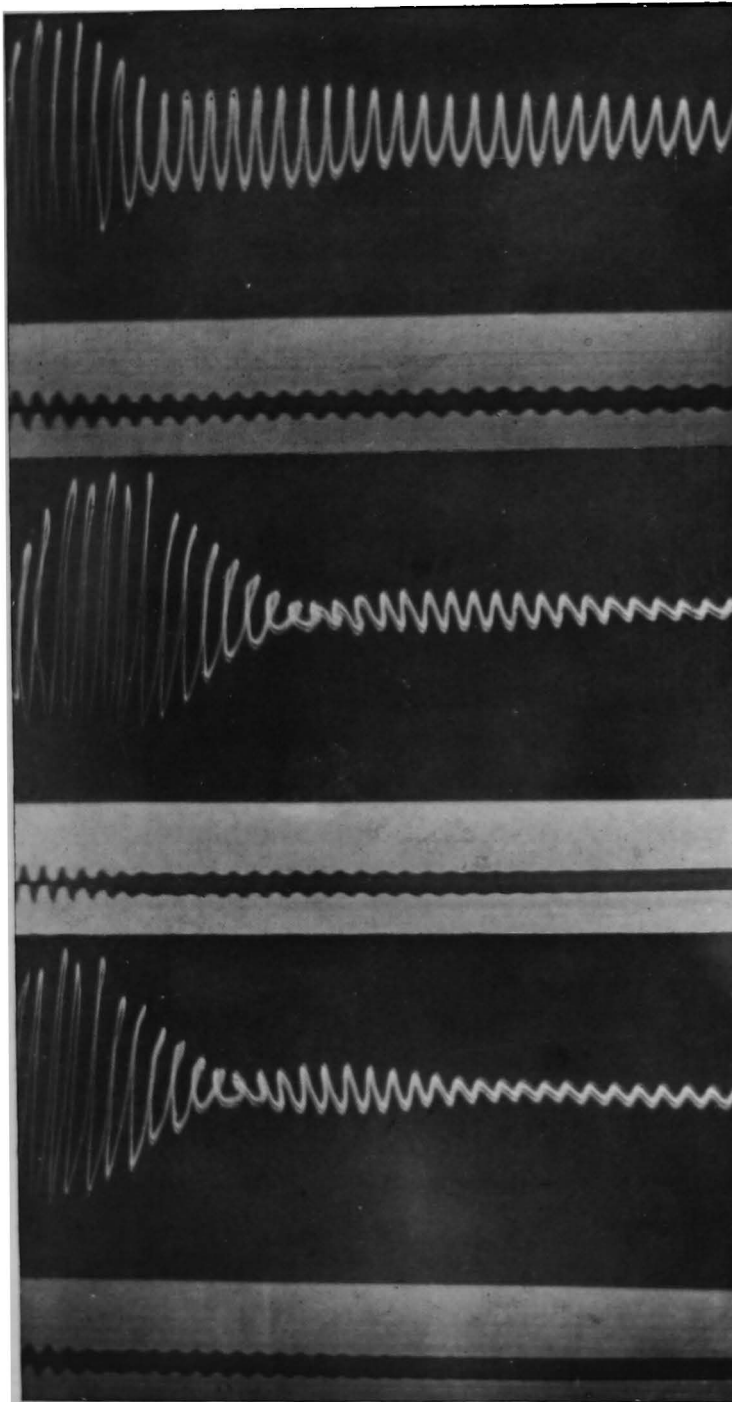
$$\frac{\Phi_1 f_1 / a_1 \cdot (n_2^2 - m^2)(n_3^2 - m^2), \text{ etc.} + \text{similar terms}}{(n_1^2 - m^2)(n_2^2 - m^2), \text{ etc.} - a m^2 [f_1^2 / a_1 (n_2^2 - m^2)(n_3^2 - m^2), \text{ etc.} + \dots]}$$

where $n_1/2\pi$, $n_2/2\pi$, $n_3/2\pi$, etc., are the natural frequencies of the system in ascending order of magnitude before the addition of the load. The forced vibration for any given frequency of the impressed force is thus inversely proportional to the magnitude of the expression $(n_1^2 - m^2)(n_2^2 - m^2), \text{ etc.} - a m^2 [f_1^2 / a_1 (n_2^2 - m^2)(n_3^2 - m^2), \text{ etc.} + \dots]$ which when put equal to zero gives also the equation for the free periods of the system as altered by the load. We may readily trace the effect of increasing the mass a of the mute from zero to

$$T = \frac{1}{2} a_1 \dot{\phi}_1^2 + \frac{1}{2} a_2 \dot{\phi}_2^2 + \dots + \frac{1}{2} a (f_1 \dot{\phi}_1 + f_2 \dot{\phi}_2 + \dots)^2$$

$$+ \frac{1}{2} a (g_1 \phi_1 + g_2 \phi_2 + \dots)^2 + \frac{1}{2} a (h_1 \phi_1 + h_2 \phi_2 + \dots)^2$$

However, for the sake of simplicity in interpreting the results, we assume (following Routh) that the addition to the kinetic energy consists of only one term of this type. This would be quite correct if the displacement of the particle due to variations of the co-ordinates ϕ_1 , ϕ_2 , etc., were all in the same straight line, and in any case may be regarded as sufficient for our present purpose. Lord Rayleigh has discussed the general theory for the free vibrations when the addition to the kinetic energy consists of any number of terms less than the number of degrees of freedom of the system. *It may be remarked here that the effect of the sound-post of the violin could probably be regarded as equivalent to that of a geometrical constraint imposed on the vibrations of the sides of the sound-box, and if this is the case, the effect could be discussed mathematically in a simple manner.*



Slightly below
'Wolf-note'
pitch.

At the 'Wolf-note'
pitch, showing the
rapid dissipation of
energy.

Ditto, and the beats
in the motion of the
bridge.

The simultaneous vibration-curves of the Bridge and G-String of a
'Cello, (plucked.)

any desired value, upon the value of this expression (say Δ), and therefore also upon the amplitude of the forced vibration. Taking first a case in which the frequency of the impressed force is smaller than the smallest natural frequency of the system ($m < n_1$), it is seen that both terms in Δ are positive, and their difference must therefore gradually diminish as a is increased, till for a particular value of a , it vanishes altogether. With subsequent increases of a , Δ changes sign, its numerical value becoming larger and larger. The effect of the load is thus, at first, to *increase* the forced vibration, till a stage is reached at which the latter becomes very large. This occurs when the frequency of the impressed force is the same as the lowest natural frequency of the system as altered by the load.* With a further increase in the load, the forced vibration diminishes, finally vanishing when the load is very large.

We may next consider a case in which the frequency of the impressed force lies between two of the natural frequencies of the system. The result of the load is to decrease the natural frequencies of the system, and it is a well-known result (which is easily deduced from the equation for free periods) that, whatever be the magnitude of the load, the altered frequencies form a series *separating* the original frequencies of the system. Thus, if

$$N_1 \Big|_{2\pi}, N_2 \Big|_{2\pi}, N_3 \Big|_{2\pi}, \text{ etc.},$$

be the natural frequencies of the system as altered by the load (assumed to be very great), the quantities

$$N_1, n_1, N_2, n_2, N_3, n_3, \text{ etc.},$$

form an ascending scale of magnitudes. (N_1 is practically zero if the load be very large). The sequence of changes in the forced vibration due to a gradual increase in the load is sufficiently illustrated by considering a case in which $n_1 < m < n_2$. This has to be sub-divided into two categories (a) [$n_1 < m < N_1$] and (b) [$N_2 < m < n_2$]. In the category (a), the determinant Δ is negative throughout, and increases numerically as the mass a of the load is increased. The effect of the load is thus to *diminish* the

* Of course, in such a case, the equations would have to be modified so as to take the dissipation of energy into account.

forced vibration throughout. In the category (b), Δ is negative when a is zero, and decreases numerically as a is increased, becoming zero for a particular value of the latter. For larger values of a , Δ is positive. The effect of the load in the second category of cases is thus to *increase* the forced vibration up to a certain stage at which it becomes very large, subsequent additions of load *decreasing* the forced vibration, till it finally vanishes in the limit when the load is large. The difference between the two categories is that in the former, the frequency of the impressed force does not, for any load, coincide with a natural frequency of the system.

So far, we have only considered the forced vibration of the system at the particular point at which the load is fixed. For our present purpose, it is necessary to know also the effect of the load on the forced vibration of the other parts of the system, particularly the point at which the string passes over the bridge. [This, of course, need not be the same point as that at which the load is fixed]. The motion of the system is fully defined by the co-ordinates ϕ_1, ϕ_2 , etc., though these are not the normal co-ordinates when the load is attached to the system. The values of ϕ_1, ϕ_2 etc., may be found by eliminating ($f_1\phi_1 + f_2\phi_2 + \dots$) from the Lagrangian equations of motion.*

* In the particular case in which the impressed force acts on the system at the point at which the load is fixed, the effect of the latter on the forced vibration may be readily found from elementary considerations without the use of the Lagrangian equations, provided it is assumed that this point is capable of movement only in a single direction. (It might, for instance, be supposed that the load is fixed on a string, bar, membrane or plate, capable only of transverse vibration at the point of application of the force). If the forced vibration at this point is $h E \cos mt$ when the component of the impressed force resolved in the same direction is $E \cos mt$ and there is no load, we may write the forced vibration as $k' E \cos mt$ when a load of mass a is attached to it. The alteration in the forced vibration is simply due to the reaction of the load, and we find at once that $k' = h/(1 - kam^2)$. If h be negative, that is, if the forced vibration in the absence of any load at the driving point be in a phase opposite to that of the impressed force, the effect of the load is to *decrease the forced vibration in the ratio* $1 : (1 - kam^2)$ *which is the same at every point of the system.* On the other hand, if h be positive, that is, if the vibration and the force at the driving point be in the same phase when there is no load, the effect of the load is, in the first instance, to *increase the forced vibration of every part of the system in the ratio* $1 : (1 - kam^2)$. When the load is such that $kam^2 = 1$, the forced vibration is very large, showing that at this stage the frequency of the impressed force coincides with a natural frequency of the system as altered by the load. Subsequent additions of load result in a continuous decrease of the

We obtain as the result,

$$\begin{aligned} \Delta \phi_1 &= \Phi_1/a_1 \cdot (n_2^2 - m^2) (n_3^2 - m^2), \text{ etc.,} \\ &+ am^2/a_1 \cdot [f_2/a_2(f_1\Phi_2 - \Phi_1f_2) (n_3^2 - m^2) (n_4^2 - m^2), \text{ etc.,} \\ &+ f_2/a_2(f_1\Phi_3 - \Phi_1f_3) (n_2^2 - m^2) (n_4^2 - m^2), \text{ etc.,} \\ &+ \dots], \end{aligned}$$

and analogous expressions for $\Delta \phi_2$, etc. Writing the transverse yielding of the string at the bridge in the form $(r_1\phi_1 + r_2\phi_2 + \text{etc.})$, we find $\Phi_1 = r_1 E \cos mt$, $\Phi_2 = r_2 E \cos mt$, and so on, where $E \cos mt$ is the periodic transverse force exerted by the vibrating string. If the point at which the load is fixed coincides with that over which the string passes, $f_1/r_1 = f_2/r_2 = f_3/r_3 = \dots$, and we have $(f_1\Phi_2 - \Phi_1f_2) = (f_1\Phi_3 - \Phi_1f_3) = \dots = 0$. From this it follows

$$\begin{aligned} \Delta \phi_1 &= \Phi_1/a_1 \cdot (n_2^2 - m^2) (n_3^2 - m^2), \text{ etc.,} \\ \Delta \phi_2 &= \Phi_2/a_2 \cdot (n_1^2 - m^2) (n_3^2 - m^2), \text{ etc.,} \end{aligned}$$

and so on.

In other words, each co-ordinate of the system is determined exclusively by the corresponding generalized component of force, and as the load is altered, *the motion of every point on the system is affected in the same way*, increasing or decreasing in inverse proportion with the determinant Δ , and vanishing when the load is increased indefinitely. A similar result would be obtained even if the point of attachment of the load is not the same as that over which the string passes, provided the ratios of the displacements at the two points due to variations of the co-ordinates are all identical, that is if $f_1/r_1 = f_2/r_2 = \dots$. In general, however, if the two points are not coincident, these quantities would not be identical, and an addition of load would not alter the forced vibration at different points of the system in the same proportion. The

forced vibration at every point of the system which finally vanishes for a very large load. These results are exactly the same as those deduced from the general Lagrangian equations, and clearly show from elementary dynamical considerations that the addition of a load at a given point of a system cannot lower the natural frequencies in such manner that more than one of them falls from above to below any assigned frequency. This is practically Routh's theorem regarding the separation of the roots of Lagrange's determinant as altered by the addition of inertia to any part of a dynamical system, and affords a clearer view of the fundamental nature of this theorem.

forced vibration would not also vanish when the load is increased indefinitely; for α (the mass of the load) appears in the numerator as well as in the denominator of the expression for each of the co-ordinates. In such cases, the forced vibration as altered by the load may be considered as consisting of two parts. The first part alters with increasing load in inverse proportion to the value of Δ , (the determinant for free periods), and vanishes when the load is indefinitely increased. The second part alters with increasing load in the ratio α/Δ , and its changes would thus be somewhat similar to that of the first part, except that when α is very large, it does not vanish but reaches a finite limiting value.

It is instructive to trace the effect of successive small changes in the load on the frequencies and modes of free vibration of the system and upon its forced oscillations. To a first approximation, the alteration in the free period of a normal mode produced by a small load is unaffected by the change of type which accompanies it,* and may be readily calculated from the modified equations of motion by putting all the other co-ordinates equal to zero. For instance, with the preceding notation, the frequencies as altered by a small load α are given by the equations

$$m_1^2 = c_1/(a_1 + \alpha f_1^2), \quad m_2^2 = c_2/(a_2 + \alpha f_2^2)$$

and so on.

The alteration of free period is in each case determined by the increase in the kinetic energy of the system due to the addition of load. *This furnishes us with a simple quantitative method for exploring the motion of the system*, and determining the ratio of the amplitudes of its vibration at different points in each of the normal modes. With larger loads, the alteration in the types of free vibration have an influence on the free periods which cannot be neglected. This is obvious at once on comparing the approximate values of the frequencies found as above (all of which become infinitely small when α is increased indefinitely), with those given by the equation $\Delta = 0$, the roots of which, according to the well-known theorem due to Routh, all remain finite (except the smallest), when the load is increased indefinitely. It is possible to find the normal co-ordinates of the loaded system by the general method

* Lord Rayleigh's *Theory of Sound*, Vol. I, Art. 88.

of transformation. (See, for example, Routh's *Advanced Rigid Dynamics*, Section 56). But a more instructive method is that used by Lord Rayleigh (*Theory of Sound*, Vol. I, Art. 90). The normal vibrations of the system in the absence of any load correspond to a variation of but one of the co-ordinates ϕ_1, ϕ_2, ϕ_3 , etc., at a time. The alteration of any one of these types produced by the addition of a small load may be expressed by superposing small synchronous variations of the other co-ordinates upon that of the principal co-ordinates involved. For example, the principal vibration given by the co-ordinate ϕ_1 as modified by a small load a would involve also small variations in the co-ordinates ϕ_2, ϕ_3 , etc., the magnitudes of which are given by the ratios

$$\phi_2/\phi_1 = n_1^2/(n_2^2 - n_1^2) \times af_1f_2/a_2$$

$$\phi_3/\phi_1 = n_1^2/(n_3^2 - n_1^2) \times af_1f_3/a_3$$

and so on.

The modification of the natural types produced by the load may become very important in some cases. For instance, if the vibration corresponding to the co-ordinate ϕ_2 involves large displacements at the point of attachment of the load, and its frequency does not differ much from that of the vibration ϕ_1 , the latter as modified by the load would involve also large synchronous variations of ϕ_2 . When the load is large enough to depress the pitch of the normal vibration in ϕ_2 sufficiently, the two principal vibrations may even completely interchange their characters. Examples of this will be referred to later. In fact, when the load is sufficiently great, the gravest modes of vibration are those involving large displacements of the point at which it is attached, and similarly the higher modes are those which involve little or no displacement of this point. This is a feature which is of importance in reference to our present investigation.

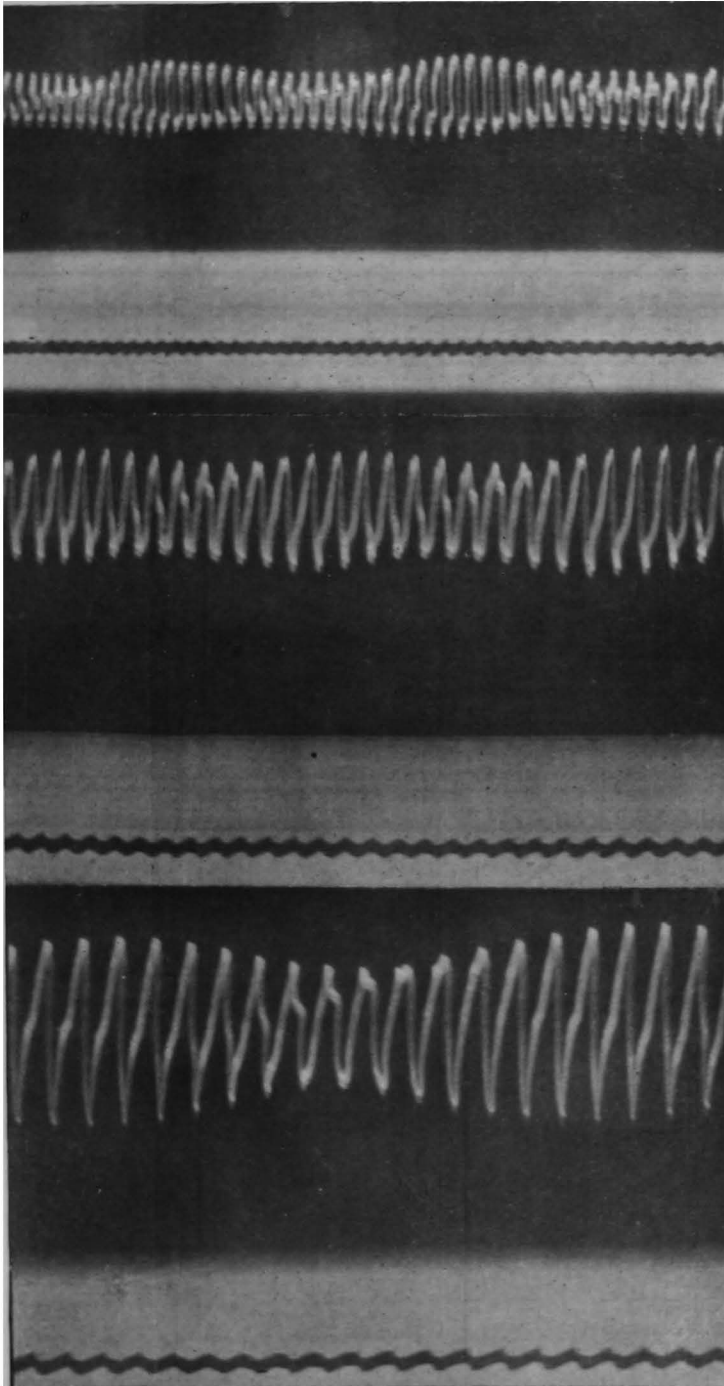
It has been stated above that the effect of the load on the forced vibration is in some cases to increase it, and in other cases to decrease it, and that in the particular case in which the load is very large and it is fixed to the system at the point of application of the force, the forced vibration vanishes. It may now be shown that, in general, the effect of a *moderate* load is to *increase* the forced vibrations of graver pitch, and to *diminish* those of higher

pitch. This is a consequence of the fact that a dynamical system such as that with which we are now concerned has a number of free periods which form a series, and that a moderate load fixed at any given point is sufficient to make the pitch of the higher modes of vibration approximate to their limiting values, or at any rate pass the first stage in which the effect of the load is to *increase* the forced vibration. This may be proved in the following manner. The kinetic energy of the system in the absence of any load may be written in the form

$$\frac{1}{2}a_1\dot{\phi}_1^2 + \frac{1}{2}a_2\dot{\phi}_2^2 + \frac{1}{2}a_3\dot{\phi}_3^2 + \text{etc.}$$

For any actual system (such as a violin) composed of bars and elastic plates, the quantities a_1, a_2, a_3 , etc., are all of the same order of magnitudes. From this fact and the approximate formula given previously, it follows that a given *small* load would lower the frequency of one of the higher modes by roughly about the same *interval* as it would in the case of one of the graver modes. The *absolute* lowering of the frequency would thus be much greater in the former case. By Routh's theorem, the maximum permissible lowering is equal to the difference of the frequencies of the given mode and that of the one next below it. If, as is generally the case with the higher modes, this difference is not large, a small load would be sufficient to make the frequency approximate to its limiting value, or at any rate pass the stage up to which the forced vibration is *increased* in amplitude.

From what has been said above, it is clear that the effect of a mute is to *increase* the yielding of the bridge and the dissipation of energy for vibrations of low pitch, and to *decrease* them for vibrations of high pitch. When the string is excited by bowing, the effect of the harmonic components of the force exerted by it on the bridge, would be variously influenced by the mute, according to the frequency of each. If the pitch of the fundamental vibration of the string is sufficiently high, the mute would decrease the forced vibration of the instrument, and the bowing pressure necessary for exciting the string would be reduced. On the other hand, if the pitch of the fundamental is sufficiently low, the effect of the principal components of force would be increased by the mute, and the bowing pressure necessary would be increased.



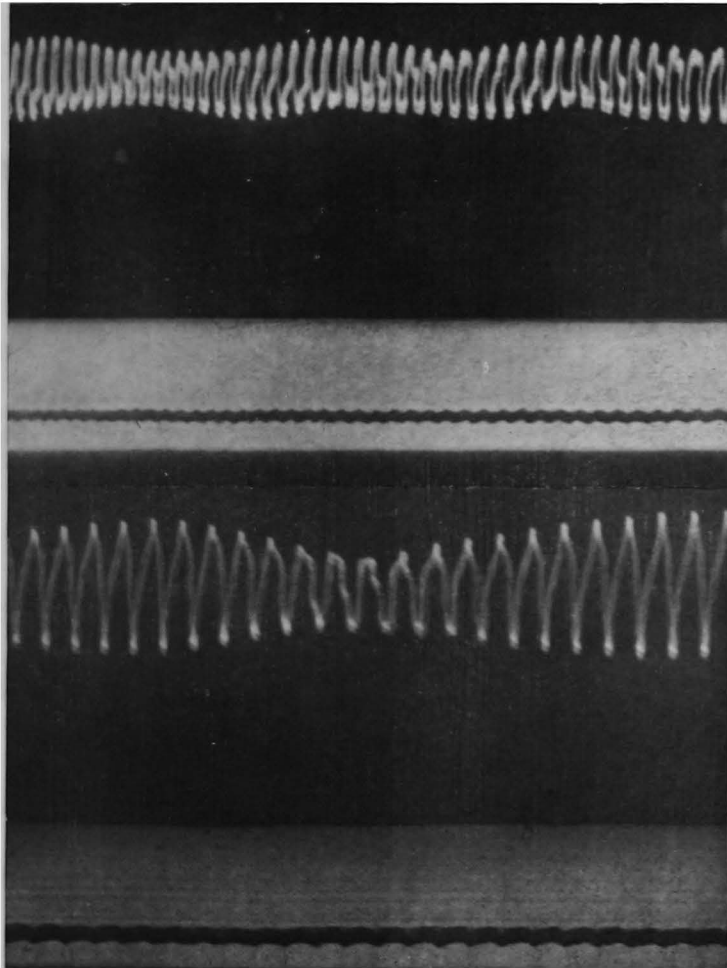
Frequency
148 vibrations
per sec.
Very small
lag.

156 vibrations
per sec.
Lag one-sixth
of a cycle.

162 vibrations
per sec.
Lag one-fifth
of a cycle.

Cyclical vibrations of G-String and Bridge of Cello near
'Wolf-note' pitch, showing the differences in lag.

PLATE XXVI.



Frequency
157 vibrations
per second.
Bowed near
one end.

Frequency
165 vibrations
per second.
Bowed at distance of
two-fifths
of length from
one end.

Cyclical vibrations of G-String and Bridge of 'Cello near the
'Wolf-note' pitch.

The constants k_1, k_2, k_3 , etc., expressing the relation between the periodic forces exerted by the bow and the vibration of the string maintained by it, would be profoundly modified by the action of the mute, and the possible influence of this on the modes of vibration of the string excited by the bow may be discussed as in the preceding pages.

Relation between Bowing Pressure and Speed.

From equations (22) and (25) given on pages 73 and 75 respectively, it is easy to see the relation between the amplitude of vibration of the string (as determined by the speed of the bow) and the minimum bowing pressure necessary for eliciting any given type of vibration. When the speed of the bow increases, the amplitudes of the harmonic components of the vibration in the given mode increase in proportion. From (22) and (25), we find accordingly that

$$P \propto S \cdot v_B / (\mu - \mu_A)$$

where P is the pressure required to excite the given type of vibration, S is a constant depending upon the type and the point of application of the bow, v_B is the velocity of the bow, and $(\mu - \mu_A)$ is the difference between the statical and dynamical coefficients of friction. If $(\mu - \mu_A)$ be independent both of the pressure and the speed of bowing, the minimum bowing pressure necessary is proportional to the speed of the bow. If, however, $(\mu - \mu_A)$ depends on the velocity of slip, this result does not hold good, and in the particular case in which the difference between the statical and dynamical coefficients of friction is proportional to the velocity of slip at which the latter is measured, the minimum bowing pressure is actually independent of the velocity of the bow. In practice, it may be expected, the truth lies between the two extremes. As remarked on pages 9 and 74, the property of an efficient generator such as rosined horse-hair is that the friction diminishes with increasing velocity, at first rapidly, and later more slowly. This may be represented graphically as in Fig. 28(a), the friction reaching a limiting value for large relative velocities. If we assume that the frictional force is proportional to the pressure, in

other words that the frictional coefficient depends only on the relative velocity, the graphical relation of the type shown in the figure may be approximated to by an analytical expression of the form

$$(\mu - \mu_A) = \mu_0 (1 - e^{-v/v_1})$$

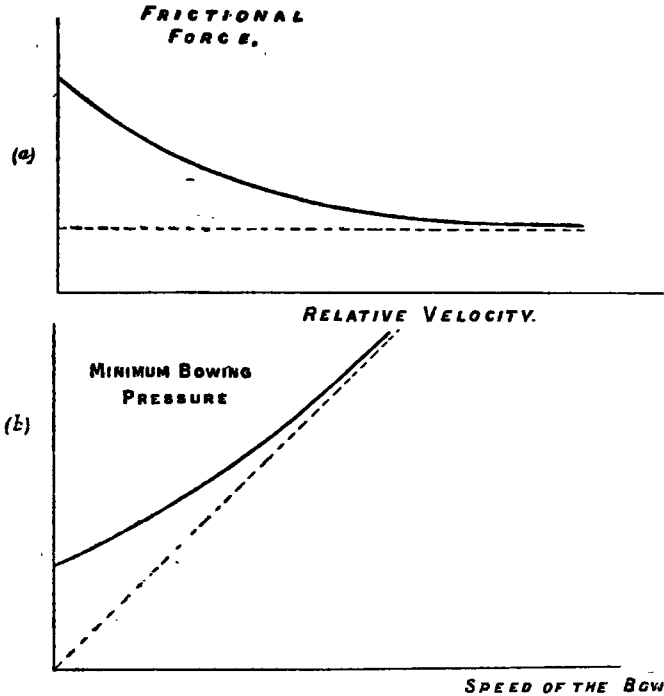


FIG. 28.

where μ_0 and v_1 are constants, and v is the relative velocity. For any given type of vibration, the relative velocity during the stages of slipping at the bowed point is proportional to the speed of the bow. Writing $v = r v_B$, where r is a number, the minimum bowing pressure is given by the formula

$$P = S/\mu_0 \cdot \frac{v_B}{1 - e^{-v_B \cdot r/v_1}}$$

This is shown graphically in Fig. 28 (b). For large bowing speeds, the bowing pressure necessary practically varies as the speed; but

for smaller speeds, the pressure required is greater than in proportion to the speed of the bow or the amplitude of the maintained vibration. For very small speeds, the pressure required would, as seen from the graph, converge upon a finite limiting value. This limit is easily shown to be given by

$$P = S/\mu_0 \cdot v_1/\tau$$

and is very small if the 'decay' of the friction from the statical to the limiting dynamical value be sufficiently rapid.

$$\frac{dP}{dv_B} = S/\mu_0 \cdot \frac{1 - e^{-v_B \cdot \tau/v_1} (1 - v_B \cdot \tau/v_1)}{(1 - e^{-v_B \cdot \tau/v_1})^2}.$$

From this, it follows that

$$\lim_{v_B=0} \left(\frac{dP}{dv_B} \right) = S/2\mu_0 \quad \text{and}$$

$$\lim_{v_B=\infty} \left(\frac{dP}{dv_B} \right) = S/\mu_0.$$

The preceding discussion is based on the assumption that the speed of the bow is not so large that the resulting vibration exceeds the limit for which the theory of "small" oscillations is applicable. We now proceed to consider the effect of increasing the amplitude of vibration beyond this limit.

Effect of Large Amplitudes.

The question arises whether a finite amplitude of vibration has any effect on the frequency of a bowed string, and in what manner, if any, the finiteness of the motion influences the mode of vibration of the string and of the instrument. This may be considered in the following way. Assuming the motion under the action of the bow to be periodic and of the form

$$y = \sum B_n \sin \frac{n\pi x}{l} \sin \left(\frac{2n\pi t}{T} + \epsilon_n \right),$$

the finiteness of the coefficients $B_1, B_2,$ etc., necessitates our considering certain terms of the second order in the forces acting

upon each element of the string and upon its point of attachment to the bridge. The length of the string at any instant from $x=0$ to $x=l$, is given by

$$\begin{aligned} & \int_0^l [\tau + (dy/dx)^2]^{\frac{1}{2}} dx \\ &= l + \int_0^l \frac{1}{2} (dy/dx)^2 dx, \text{ (appx.)} \\ &= l + \pi^2/8l \cdot \Sigma n^2 B_n^2 - \pi^2/8l \Sigma n^2 B_n^2 \cos \left(\frac{4n\pi t}{T} + 2e_n \right). \end{aligned}$$

If the ends of the string have no longitudinal motion, the alterations in the length due to the finite amplitude of vibration would result in corresponding alterations of the tension. These may be of considerable importance if (as is generally the case) the modulus of extension of the string be a large quantity in relation to its tension when at rest. It is seen that there is a non-periodic increase of tension proportional to $\Sigma n^2 B_n^2$, and there are also periodic changes of tension. The influence of these alterations of tension upon the forced vibrations is readily found by analogy with the case of a simple vibrator executing forced oscillations of large amplitude. The equation of motion of a symmetrical vibrator under periodic forcing is

$$\ddot{u} + k\dot{u} + (n_1^2 + \beta u^2) u = E \cos mt.$$

If we write the solution of this in the form

$$u = A_1 \sin mt + B_1 \cos mt + A_3 \sin 3mt + B_3 \cos 3mt + \text{etc.},$$

it is found on substitution that to a first approximation

$$\begin{aligned} (n_1^2 - m^2 + F) A_1 - km B_1 &= 0 \\ (n_1^2 - m^2 + F) B_1 + km A_1 &= E \end{aligned}$$

where

$$F = \frac{3\beta}{4} (A_1^2 + B_1^2)$$

and is thus proportional to the square of the amplitude of vibration. It is evident from this that the effect of the term βu^2 in the expression for the restitutive coefficient is equivalent to an alteration in the natural frequency of the vibrator; instead of n_1^2 we have to write simply

$$n_1^2 + \frac{3\beta}{4}(A_1^2 + B_1^2).$$

It should be remarked that the restitutorial coefficient $(n_1^2 + \beta u^2)$ may be expanded and written in the form

$$n_1^2 + \frac{\beta}{2} \cdot (A_1^2 + B_1^2) - \frac{\beta}{2} \cdot (A_1^2 + B_1^2) \cos 2(pt + \epsilon)$$

where $\tan^{-1} A_1/B_1$.

It follows that the effect of the *periodic* variation in spring of double frequency

$$\left[-\frac{\beta}{2} (A_1^2 + B_1^2) \cos 2(pt + \epsilon) \right]$$

is equivalent to a *permanent* increase in spring of half the amount

$$\left[\frac{\beta}{4} (A_1^2 + B_1^2) \right],$$

in respect of the principal oscillation. Returning now to the case of the bowed string, it is obvious that the non-periodic increase of tension which is

$$\frac{\text{Young's Modulus}}{\text{Tension}} \times \frac{\pi^2}{8l^2} \sum n^2 B_n^2$$

raises the natural frequencies of all the component vibrations and does not disturb their harmonic relation. The periodic part of the variation of tension is

$$-\frac{\text{Young's Modulus}}{\text{Tension}} \times \frac{\pi^2}{8l^2} \sum n^2 B_n^2 \cos \left(\frac{4n\pi t}{T} + 2\epsilon_n \right).$$

Each harmonic component of this periodic variation is equivalent to a further increase, namely,

$$\frac{\text{Young's Modulus}}{\text{Tension}} \times \frac{\pi^2}{8l^2} \cdot \frac{n^2 B_n^2}{2}$$

in the tension of the string, but this increase, unlike the first, is effective only in respect of the particular (n^{th}) harmonic component of the vibration having half the frequency of the variation of spring, and not to all alike. This is readily seen on substituting the variable tension in the normal equation for free vibrations. Since, in the case of the bowed string, the amplitudes B_n vary

generally as $1/n^2$, $\frac{n^2 B_n^2}{2}$ also varies as $1/n^2$, and the harmonic relation of the natural frequencies is thus disturbed. The frequencies of all the natural vibrations are raised, but those of the higher components to a lesser extent in proportion than in the case of the graver components. In practice, this would be probably set off to some extent by the effect of stiffness which raises the pitch of the higher components to a relatively greater extent. The general result however remains that the effect of a finite amplitude of vibration is to raise the pitch of the bowed string, and also, to some extent, to throw the *natural* frequencies of the higher components out of the harmonic relation and thus to *increase* the forces required to be exerted by the bow for the maintenance of the motion beyond what would otherwise be necessary.

That the vibration of a bowed string, *if of large amplitude*, cannot remain as a free oscillation in the absence of the bow can be shown directly from geometrical considerations. Taking, for instance, the simplest type of vibration (Fig. 1 on page 25) in which the configuration of the string at any instant consists of two straight lines, the point of intersection of which travels on two parabolic arcs, it is obvious that the length of the string and therefore also the tension would be a maximum when the two straight lines intersect at the vertex of either parabola, and would be a minimum when the string passes through its position of equilibrium. The velocity of travel of the wave along the string cannot, in the circumstances, be uniform. This is inconsistent with the assumed type of free vibration.

The periodic variations of tension in the string produced by a large amplitude may have an effect on the forced vibrations of the instrument. This will now be considered.

Effect of the Longitudinal Motion of the Bridge.

The periodic forces exerted by the vibrating string on the bridge at the point over which it passes may be resolved into two sets of components, one set transverse to the string and the other set parallel to the string. The magnitude of these forces and their generalized components may readily be calculated. T_0 being the stationary value of the tension of the string, the tension at any

given instant may be written in the form $T_0 + \delta T_0$. If the string at the bridge makes an angle θ with its position of equilibrium, the force exerted by it may be resolved into two components $(T_0 + \delta T_0) \cos \theta$ and $(T_0 + \delta T_0) \sin \theta$ respectively parallel and transverse to the string. The transverse force may to a sufficient approximation be written simply as $T_0 \theta$ and is thus of the first order of small quantities. The longitudinal component is

$$(T_0 + \delta T_0) (1 - \theta^2/2)$$

and may be written as

$$T_0 + \delta T_0 - T_0 \theta^2/2.$$

If Y be the modulus of extension of the string, l_0 its unstrained length, and Δl_0 the extension necessary to give it a tension T_0 , the length of the string in the position of equilibrium is

$$l_0 + \Delta l_0 = l, \text{ (say).}$$

If $l + \delta l$ be the actual length of the string at the given epoch during the vibration, we may write

$$\text{Longitudinal force} = Y(\Delta l_0/l_0 + \delta l/l_0 - \theta^2 \Delta l_0/2l_0).$$

Of the three terms within the brackets, only the second and the third include periodic quantities. The deflection of the string from its position of equilibrium produces an increase of length, and in the preceding sub-section, δl has already been calculated on the assumption that the bridge has no motion parallel to the string. It is of the order $\theta^2 l_0$, and $\delta l/l_0$ is thus of the order θ^4 . The third term $\theta^2 \Delta l_0/2l_0$ is therefore of a smaller order of quantities than even the second term which is itself proportional to the square of the amplitude of vibration of the string. It is thus seen that the only part of the periodic longitudinal force which is sensible is that due to the fluctuation of the effective length of the string when in vibration. If η be the longitudinal motion of the bridge, we may write

$$\delta l = \eta + \pi^2/8l \cdot \sum_n n^2 B_n^2 \left(1 - \cos \frac{4n\pi t}{T} + 2\epsilon_n \right)$$

and the longitudinal force = $Y \cdot \delta l/l$.

In finding the generalized components of force corresponding to the normal modes of vibration of the instrument, and the transverse periodic components of the tension, we are only con-

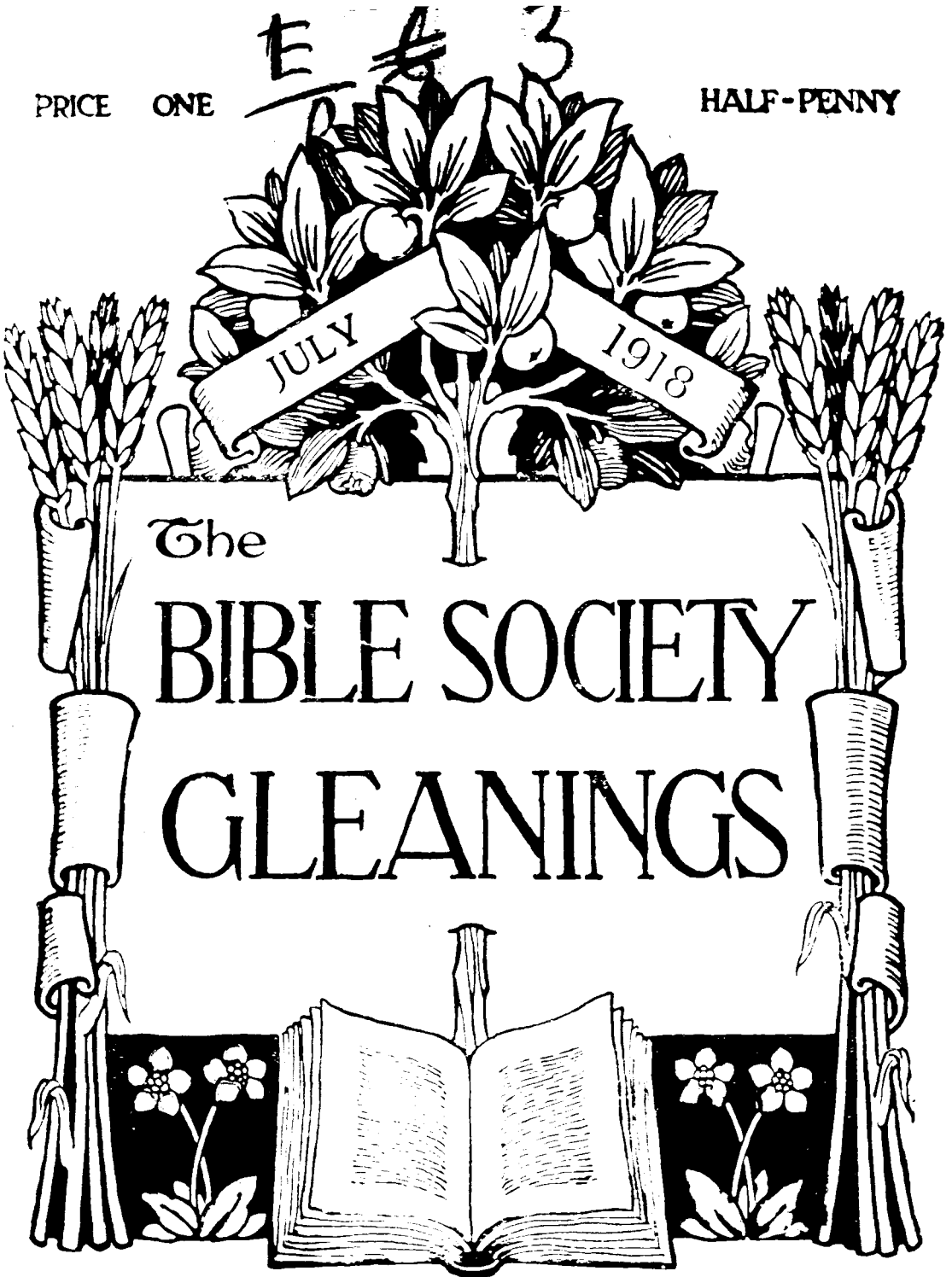
cerned with the motion of the bridge transverse to the string. Similarly in finding the generalized components of the longitudinal forces, we are only concerned with the longitudinal motion of the bridge. If the principal normal modes of vibration of the body of the instrument do not involve any longitudinal motion of the bridge, the effect of the longitudinal components of force may be ignored. In any case, these components are of the second order of smallness in magnitude and can be ignored if the amplitude of vibration of the string be sufficiently small. In special circumstances, however, they may attain some importance. The periodic part of the longitudinal force depending on the vibration of the string is of double its frequency, and if one of the frequencies of resonance of the instrument is of suitable value, the string may succeed in forcing an appreciable vibration of double its own frequency. As remarked in the preceding sub-section, the periodic variations of tension in the string vibrating with finite amplitude may also appreciably influence the frequency of its excitation by the bow and the magnitude of the force required to maintain the motion.

(To be continued.)

PRICE ONE

E # 3

HALF-PENNY



JULY 1918

The

BIBLE SOCIETY

GLEANINGS

THE BRITISH AND FOREIGN BIBLE SOCIETY.

146, QUEEN VICTORIA STREET, LONDON, E.C. 4

THE CONTENTS OF THIS ISSUE ARE COPYRIGHT.

Registered at the G.P.O., London, for transmission by Canadian Magazine Post.

The Postage of this Number is 1d.

'MELANYL' MARKING INK.

The Original, Requiring No Heat.

WARRANTED INDELIBLE & HARMLESS.

Its superiority over all others proved
by **25 years'** use all over the world.

6d. & 1s. Bottles.

*Nickel Linen Stretcher given away
with each 1s. Bottle.*

Of all Stationers, Chemists, and Stores, or post free
from the Inventors and Makers—

**COOPER, DENNISON & WALKDEN, LTD.,
LONDON.**

**"THE HEALTH
ACCUMULATOR"**

Fry's PURE
BREAKFAST
COCOA

Contains every requisite
for bodily nourishment

**A LIQUID FOOD
OF SOLID
VALUE**

OXFORD EDITIONS OF THE HOLY BIBLE

A New Wide Margin Reference Bible

Printed on New Oxford India Paper.
Specially Prepared for Pen and Ink Notes.

Pearl 32mo Reference, Clarendon Type.
In Seal-grain, Persian, and Levant Morocco.
In Limp and Yapp Bindings.

★ ★ ★ ★ ★

The Palestine Pictorial Bible

Authorised Version. With 96 Engravings and Coloured Pictures
and 15 Maps. On White Paper, and on Oxford India Paper, in
numerous editions and bindings. Also with 32 Coloured Illus-
trations and Maps, or with 32 Engravings, on White Paper.

London: Humphrey Milford
Oxford University Press, Amen Corner, E.C.4

Contents

July 1918

A MAN WHO CHOSE TO BE POOR, HAROLD B. HUNTING, 73—ABOUT OURSELVES, 75—GIUSEPPE: Part II. MISS STUART, 76—TRIALS OF TRANSLATORS: VII. T. H. D., 79—A PENNY LOAF, 80—WITH OUR COLPORTEURS LAST YEAR, 81—IN AUSTRALIA, 82—OUR LETTER BOX, 83—MONTHLY COMPETITIONS, 84—DAILY SCRIPTURE PORTIONS, 84—OUR STAMP CORNER, i—"SEARCH TEXTS" ACKNOWLEDGMENTS, iii—REMITTANCES FROM YOUNG PEOPLE'S ASSOCIATIONS, iii.

Our Stamp Corner

A stamped envelope must accompany all inquiries and orders, and they should be addressed to the Editor of "Gleanings," 146, Queen Victoria Street, London, E.C.4. Envelopes should be marked "Stamp Corner." Remittances must be enclosed with orders for stamps. Please order from this list, as all packets not included here are out of stock.

- (14) Containing 3 Persia, 1 Mauritius, 1 Malay, and 1 South African Republic. Price 14d. (L) 7 different Japan. Price 1d.
 (15) China Packet: 3 Empire, 1 Provisional, and 1 Republic. (M) 7 different unused Cuba (1870-79). Price 4d. Price 1d.

We gratefully acknowledge some stamps received from "Colporteur."

The
Correct
Feeding of
Infants

The Allenburys' Foods.

The true safeguard of Baby's Health

THE milk of a healthy mother confers a degree of immunity to infection to the young infant. Many mothers, however, though willing, cannot nurse their babies for various reasons. In such cases the greatest care should be taken in selecting a proper substitute. Ordinary cow's milk cannot be regarded as a safe food for infants; it is acid, contains indigestible curd, and is almost invariably contaminated with harmful germs. By using the "ALLENBURYS' FOODS, which are free from all dangerous organisms, and effectually replace human milk, security for baby is ensured, and vigorous growth and health are promoted.

Milk Food No. 1. From birth to 3 months. <i>In tins at 2s. 3d. and 4s. 6d.</i>	Milk Food No. 2. From 3 to 6 months. <i>In tins at 2s. 3d. and 4s. 6d.</i>	Malted Food No. 3. From 6 months upwards. <i>In tins at 1s. 3d. and 2s. 6d.</i>
---	---	--

ALLEN & HANBURYS LTD., 37, Lombard Street, LONDON, E.C.3.

Cleaves' Devonshire Cream Chocolate

More beautiful flavour and richer than any Milk Chocolate.
 Sold in 1d., 3d., 6d. & 1s.
 Tablets. 6d. & 1s.
 Croquettes.

Cleaves' Vanilla Lunch Chocolate.

Exquisite flavour. Extremely smooth to the palate, nutritious and sustaining.

JOHN GLEAVE & SON, Ltd.,
 Devonshire Cream Chocolate Works, CREDITON.

DELICIOUS FRENCH COFFEE.

RED WHITE & BLUE

For Breakfast & after Dinner.

"If we don't come back"

WHEN a party of soldiers was leaving for the Front, someone promised that we at home would look after the Wives and Bairns. "We don't say much," replied one of the men, "but it is a great comfort to think they will be all right if we don't come back."

The NATIONAL CHILDREN'S HOME is striving with might and main to keep that promise. It has already received

More than 350 Children

whose fathers, alas! have not "come back," and whose mothers also are either dead, sick, or overburdened.

The Home is now extending its accommodation to receive, if need be, no less than 600 more.

The State allowance covers little more than one-half the cost of maintenance. £10 pays the balance for a year. Life in one of the 20 Branches of the National Children's Home has many of the advantages of life in a great public school: it is simple, free, and joyous.

We beg you to remember these children of our Dead Heroes. By sending a donation you will be doing your part in fulfilment of a

Sacred Obligation.

Address: The Principal (Rev. W. Hodson Smith),
The National Children's Home and Orphanage, (Founded by Dr. Stephenson)
 104-122, CITY ROAD, LONDON, E.C.1.
N.B.—It is important that you should please mention this Magazine.
 Treasurers: J. R. Barlow, Esq., J.P.; Sir Charles C. Wakefield, Bart.

ADVERTISEMENT



Our Sailors are giving
ALL for us : What can
we do for them ?

The Missions to Seamen is the greatest agency ministering to the
spiritual and social needs of our

BRITISH SEAMEN

In all the **PRINCIPAL PORTS** at **HOME & ABROAD**



Torpedoed Men in Boat waiting to be picked up.

ADMIRAL SIR ROBERT LOWRY, K.C.B., after visiting the great Commercial
Ports in England and Ireland, said :

**“The work which The Missions to Seamen is doing exceeds
the work of all the other societies put together.”**

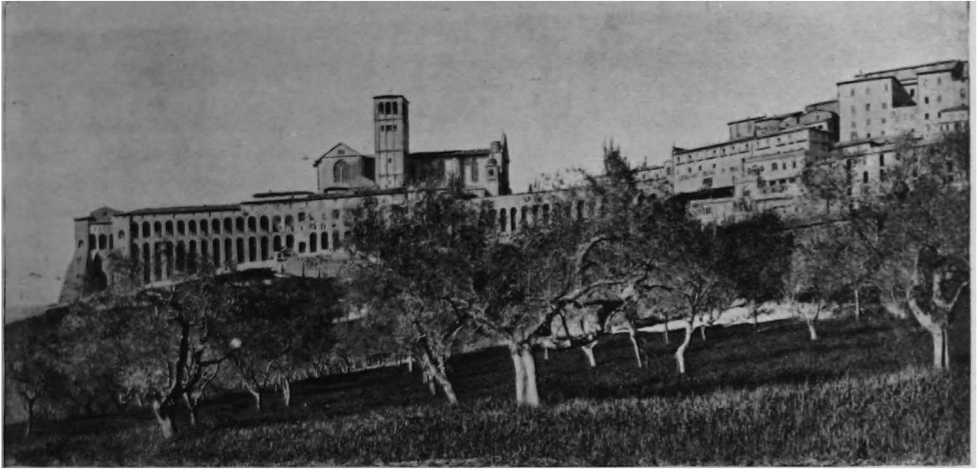
Numerous Torpedoed Crews are being cared for every week by our
Chaplains at various Ports in the British Islands and Abroad.

£5,000 is URGENTLY NEEDED for HUTS,
for Recreation and Divine Worship, at Naval Bases.

*Please send a Gift as a Thank-offering for your Food,
brought to you by Sailors in spite of Submarines & Mines.*

STUART C. KNOX, M.A., Secretary, **THE MISSIONS TO SEAMEN,**
11 BUCKINGHAM STREET, STRAND, LONDON, W.C.2.

Gleanings



THE CHURCH AND MONASTERY AT ASSISI, BUILT IN MEMORY OF ST. FRANCIS.

A man who Chose to be Poor

LIFE in Italy seven hundred years ago was not very different from life in England to-day. Though they had none of our wonderful inventions, yet the people themselves were much the same. There was selfishness everywhere. Kings and dukes were constantly making war on each other, and each war meant pain and sorrow and death to thousands. Even in times of peace there was more trouble than there should have been. In every town there were a few rich men who had more money than they needed, while hundreds of poor people wondered where to look for their daily bread.

There was also much sickness, and very little was done to care for the sick. One disease especially was very common, and was terrible beyond what we can imagine; this was leprosy—the same leprosy of which we read in the Bible. Poor suffering lepers could be seen almost every day, begging in the streets of the cities and villages, but few ever seemed to pity them. The people were all so busy with their own selfish aims—trying to have a good time, or to get rich,

or to hurt their enemies. In the Church itself people were selfish. Many of the priests were rich and cared more for money than for Christ's work. Even the monks, who were supposed to be especially holy, were only trying to save their own souls. And some of them were not even thinking of that, but were enjoying themselves in their monasteries.

Just such a selfish place was the little city of Assisi in Northern Italy, in the year A.D. 1200. But in that city at that time there lived one man who really loved everybody, and whom nearly everybody loved. His name was Francis. He is known in history as St. Francis of Assisi. Of all the great men of Italy, none has done more to bless and help the world.

His father was a rich cloth-merchant named Pietro Bernardone. Francis grew up a selfish lad like all his friends in Assisi, caring only for fun and frolics. Yet he sometimes tired of living only for pleasure, when so many were suffering for the lack of what he wasted—and especially when he read in the Gospels of the life and teaching of Jesus.

A man who Chose to be Poor

One day Francis was out riding on horseback, when he met a leper, whose face and body were horribly eaten away by the disease. In his disgust Francis turned his horse and rode in the opposite direction. Then he thought how loving Jesus had been to lepers, and he was ashamed of his own selfish cowardice. Going back to the man he sprang from his horse, and with gentle words gave him all the money he had.

From henceforth Francis began to live a different life. He used his money to help the poor, and instead of idling his days away as a rich man's son, he worked for his daily bread at whatever he could find to do. Much of his time he spent in hospitals for lepers, bathing their sores and helping to make them more comfortable. His father Pietro was very angry at what seemed to him the crazy notions of his son; and once he caught him, dragged him home, and kept him bound for a number of days.

A little while after that, Francis heard read in church the great words of Jesus: "Wherever ye go, preach, saying, the kingdom of heaven is at hand. Heal the sick; cleanse the lepers; cast out devils. Freely ye have received, freely give." "O," thought Francis, "that is what I want to do!" Those words pierced his heart: so he gave away all his possessions, and went about from place to place trying to persuade people to forsake their selfishness and love one another, and to follow the love of Jesus.

Very soon other men were deeply stirred by Francis' loving words and his enthusiasm, and they wanted to go with him. So there came to be a band of them, like the first disciples of Jesus. They gave all their money to the needy and went from place to place, helping the poor and sick, rebuking the rich and powerful, and teaching every one Jesus' way of love.

Wherever they went, Francis and his followers tried to show by example what Jesus meant by the law of love. They gave up their own property and chose to be poor. When people did not give them food in return for their sermons, they worked for their bread; they would gather wood, or

sweep floors, or carry water, or wash dishes. Often they were persecuted. Often they could find no place to sleep except in the cold, hard porches of churches or houses. But often, too, they found what Francis promised them, that is, "men full of faith, gentleness, and goodness, who will receive you and your words with joy."

Many stories are told showing the wonderful love which Francis showed toward all living creatures. He loved animals, and called the birds his "little sisters." There is a story that he even gathered the birds about him and preached to them. He loved children. Once, when he and some of his followers were going on a journey by sea, the boat was too small, and some of them would have to stay at home. So Francis called a little boy who was playing near by, and asked him to point to the men who should stay—just as boys and girls in their games nowadays "count out" with rhymes, such as "Eeny, meeny, miny, mo."

Those were the days of the Crusades, when all Europe was at war against the Muhammadans, trying to win back the Holy Land. Francis was more interested in a better kind of Crusade, which would conquer the hearts of the Greeks and Arabs and win them to the love of Jesus. He sent his followers to Syria and also to Spain; Francis himself went to Egypt to visit the Sultan and tell him about Jesus Christ.

In the later years of his life Francis and his followers were organized by the Pope into an order or society of monks. But as long as they were true to the spirit of Francis, they were quite different from most other monks of that age. Instead of spending so much of their time in fasts and prayers, to make sure that they themselves would go to heaven after they died, these Franciscans, as they were called, went about, like Jesus, doing good.

The influence of Francis lives on. We love to read about him, because he was so much like Jesus Christ—perhaps more like Him than any one else who has ever lived. And his example of fearless love is still helping to conquer selfishness and to establish in all the world Christ's new kingdom.

This sketch, by Harold B. Hunting, is reprinted, somewhat shortened, from "Every-land," by the Editor's kind permission.

About Ourselves

PRESIDENT WOODROW WILSON has become a member of the Pocket Testament League. According to the *Indian Witness*, on Sept. 19th last year he signed the membership card, "making it the rule of my life to read at least one chapter of the Bible each day, and to carry a Testament or Bible with me wherever I go."

❑ ❑ ❑

From the Bible House a stream of Red Cross Testaments, Gospels, and Psalters still flows out steadily to hundreds of hospitals, to be given away among the sick and wounded soldiers and sailors who are being nursed there. To give only one instance among many—during the last week in May a fresh grant of 4,000 books was sent free to a Christian worker who regularly visits several large military hospitals in Yorkshire.

❑ ❑

Here are a very few among many fresh testimonies to the power and preciousness of Scripture. A wounded Italian soldier wrote: "The Gospel is for me the only consolation. In certain sad moments I open the golden booklet and set myself to read some of the words—gracious, sublime, full of the Holy Spirit. The Gospel has given peace to my heart. I was weak as a reed, and it has made me strong like a tower."

A French soldier on leave, who was offered a Gospel, told our colporteur that he had one already: "Many a time under shell-fire it has braced my courage. I have read it again and again, and I never grow weary of the reading."

❑ ❑ ❑

In Korea a Canadian missionary tells us that about twelve months ago he went to a village away among the mountains, where so far as he knew there were no Christians. Yet in most of the houses he discovered our Society's cheap little Testaments or Gospels in Korean. He held services for the villagers. At his first service an old

man, more than seventy years of age, came and said that he was a Christian, and that he had read the New Testament all through several times. He showed his copy to the missionary; who saw that its pages were thumbbed from St. Matthew to the Revelation, and nearly every verse was marked with pencil. Without any Christian teacher, merely by reading the Book of books, this old man had found his Saviour. He had never been into a church and he knew nothing about Christian customs: when he went to that service which the missionary conducted, he pulled out his great long pipe and began to smoke during the sermon.



HOME ON LEAVE FROM THE FRONT.

Giuseppe

By Miss Stuart

In Three Parts—II

GIUSEPPE, the adopted son of the San Petunio Brotherhood was fifteen years of age.

The old Superior who had watched over his childhood was dead, and a new Prior reigned, who was very proud of the boy, and pushed him forward whenever the credit of the monastery was at stake. Perhaps this was not very judicious treatment; but Giuseppe had turned out amazingly clever, and was an example of both piety and learning as Brother Bruno had predicted.

Once when the Archbishop attended a festival at the monastery, the "adopted son" was permitted to recite in Greek and Latin before the guests, and not only his scholarship but his unusual demeanour made him a remarkable figure among the Brothers.

They were a countrified community, and the boy with his quick intelligence and high-bred air stood out "like an eagle among a flock of crows," as the Archbishop whispered to his chaplain.

"We must do something for the lad, and keep our eye upon him," he said aloud to the gratified Superior. "Such talents will be worth dedicating to the service of our Holy Church."

And when the great man left San Petunio he held out his hand, with the magnificent church ring on the thumb, for the boy to kiss: "We must have you at the Seminary," he said graciously, "Reverend Father will arrange it."

Truly Giuseppe had learnt all the country monastery could teach him. The old Prior had taught him Latin, and the new Prior had started him in Greek; he soon surpassed them, and craved for further instruction.

Some of the Brothers had a smattering of modern languages, and a certain blind Irish Brother, Patrick, who had drifted to San Petunio as a lay-assistant, taught him what both fondly believed to be English, with a strong Dublin brogue. Thus equipped with several languages and all the blessings of San Petunio, he started for the Archbishop's celebrated Seminary, for had not

his Excellency said, "such talents must be devoted to the service of our Holy Church"?

His heart beat high as he made this first venture into the world, beyond the monastery walls. At a turn of the road he could still see the branches of the cherry-tree, loaded with ripe cherries; like the tree he had been sheltered by those walls; he must try and repay the dear Brothers by bringing forth a harvest of fruit such as the cherry-tree yielded in due season.



The Seminary is a wonderful place, the glory of a grand old Italian town; and from its learned halls have sprung many famous men, as well as eminent ecclesiastics of the Roman Catholic Church. Because this is a true story, and Giuseppe a real person, I had better not say exactly where the great school is situated, for I might inadvertently make some mistake in describing it.

There are splendid grounds round the college, for the students' recreation, and a world-famous library for study and research. Most of the scholars loved the gardens better than the library, because from the terraced walks they could look down upon the town and the blue waters of the harbour, where the ships of all nations came and went. Even though they might not visit the town unattended, the harbour was an unfailing source of interest to the boys, and soon Giuseppe learnt to distinguish the ships and their ensigns. Truly this was a wider, more exciting life than San Petunio had afforded him, and he could not help thinking that if he had not been educated for a Preaching Friar, he would love to be a sailor, to see new countries and find out all the wonders of the world that lay beyond the blue harbour!

It is necessary for this story to tell how at this point of his career Giuseppe got into mischief—mischief none the less real, though it was undiscovered at the time.

One day the Seminary was keeping holiday; it was suddenly hot spring weather, and the boys had been allowed to exchange their sober cloth habits for lighter wear.

Giuseppe

Giuseppe found himself close to the postern gate of the kitchen premises, while a market-cart of vegetables was being unloaded, and the old porter, Gian Battista, supposed to be checking the baskets, drowsed in the sunshine. The temptation was as sudden as it was overwhelming. Giuseppe had darted through the gate into the road and had run some distance before he realized what he had done. He had never visited the town, nor indeed had he ever been anywhere by himself before, in his life; but once the die was cast, all duty to the Seminary was forgotten in the excitement of freedom as he sped down the hill.

Off came his student's tell-tale cassock and cap, which he rolled into a bundle and tucked away under the gnarled roots of an old sycamore tree overhanging the road. Now the trim young scholar was a shirt-sleeved, rough-headed boy, loafing down to the harbour, with his hands in his pockets and his black eyes dancing with delight. Even if the Prior of San Petunio had met him, he would scarcely have recognized such a daring young ragamuffin for the sedate Giuseppe of the class-room and the chapel.

The harbour was full of shipping and sailors of all nations were bustling about; two English Jack-tars were bargaining for oranges with an old woman, who screamed like a parrot

and grimaced like a monkey, while her puzzled customers tried to complete their purchase.

Here was Giuseppe's opportunity—had not Brother Patrick taught him English "as she is spoke" in Dublin?—so, with a smile and a little bow that were wholly Italian, he plunged into the bargaining in a brogue that would have done credit to the Liffey.

"Sure the English gintlemin could not ate them oranges, 'tis for preserving they are, and a rare ould pain they would be having if they attmpted ut." The sailors were in fits of laughter to hear this explanation in a well-known, home-tongue from the lips of an unmistakable native, and while the old woman groped in her baskets for sweet oranges, they overwhelmed "Paddy" with questions as to how he came "to sling their lingo" in this particular fashion? "The name of me master was Mister Patrick after the great Irish Saint," Giuseppe explained, and the Englishmen clapped him on the back, called him a brave boy, and gave him half a dozen oranges for himself. After consulting him as to the values of the money in their pockets, the sailors paid the old woman her exorbitant charge, and went off, still chuckling at the encounter.

"All mad, the English," muttered the old fruit-woman, but Giuseppe thought they were very kindly lunatics. He was glad he had thought of saying "Mister" instead of "Brother" Patrick, but he wondered why they

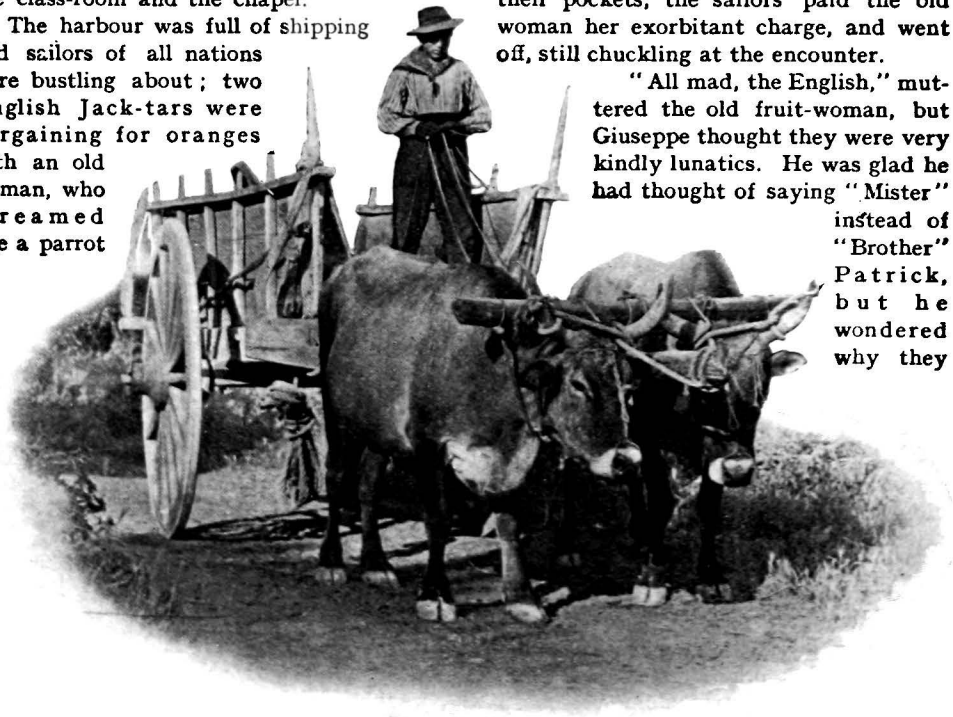


Photo by

AN ITALIAN BULLOCK-CART.

Donald McLeish.

Giuseppe

had laughed so when he spoke; perhaps because he had saved them from much pain if they had eaten the bitter oranges.

And what had they meant when they said: "Never mind, nipper—English, or Irish, or even Eyetalian, they are all free men upon a British man o' war!" He did not know what a nipper was, but "all free men upon a British man o' war," had a splendid sound, and he kept repeating it to himself long after the sailors had rolled out of sight.

If—if by any possibility he were not to be a Preaching Friar and a credit to San Petunio and the Seminary, he thought he would like to be an English sailor, with baggy serge trousers and a pocket full of silver money, and laugh and eat oranges as "a free man upon a British man o' war"!

Another happening of that wonderful afternoon printed itself deeply upon the boy's memory, and was destined to have far-reaching results upon his after life, though at the time its significance did not reach his intelligence.

At a corner of the principal square, where a little patch of shade made a pleasant resting place, a travelling book-merchant had opened his pack and had spread a few small volumes on a seat beside him. The passers-by stopped and received a cheerful greeting. Some of them fingered the books and perhaps stood reading for a minute, turning the pages with curious interest; others, attracted at first, dropped the books in dismay and made the Italian's favourite gesture with the forefinger of the right hand to avert evil! In vain the old book-merchant called out cheerily: "Have no fear—there is nothing there to harm any one!" People still remained oddly divided; some interested, others repelled by the inconspicuous little volumes which were all the old man's stock in trade. After watching this small comedy for some time, Giuseppe made up his mind to go nearer and investigate the mystery for himself.

"What are your books, Signor?" he asked politely. "May I be permitted to look at one of them?"

"Surely, my son, look as long as you like." Attracted by a bright red leather binding, Giuseppe picked up a slim volume and began to read at the first place that opened;

it was a New Testament, and the story of the feeding of the five thousand with the miraculous loaves and fishes caught his attention; he read on intently with the wrapt concentration of the born scholar, the old colporteur watching him the while and forming his own conclusions.

"This seems a very holy book," Giuseppe said at last, lifting his fascinated eyes from the page and turning eagerly to the book-seller.

"It is; it is the Holiest Book in the world," answered the old man, smiling. "It is the life of the Son of God when He dwelt on earth, a pattern for all men."

"He did miracles like the holy saints," continued Giuseppe wondering; "We have lives of the saints at—in my school, but this book seems more real than they, and it is new to me, while I have read and heard the others a hundred times. Pray, Sir, are your books very costly, for I should much like to buy one of these, and—"

"Put it down! put it down! it is a temptation of the devil, and he will come and carry thee away into the black pit, if thou meddle with his magic!" exclaimed an old woman who had come up unperceived, as she snatched the red volume from Giuseppe's hand, and flung it in the face of the book-merchant: "Run, run, lest the evil one catch thee! if I mistake not thy cut, thou art one of the Seminary lads, and ought to know better than to finger such witchcraft!" Then she spat violently in the direction of the old Colporteur to show that she, at least, had no traffic with him or his wares!

Giuseppe was terrified. Though he was fifteen years of age, he had never been out by himself before; and the woman's violence, her mention of the evil one and the black pit, but, above all, her hint of recognition, sent him racing up a back street and by devious ways to the point, beneath the Seminary wall, where he had left his clothes hidden under the sycamore. He crept back by the kitchen postern unperceived and, marvellous to relate, his afternoon escapade was never discovered.

In the years that followed the memory of some of it faded from his mind, which was growing apace; but he never entirely forgot either the English sailors or the little red book.

Trials of Translators—VII

LET us look this month at the way in which a living translator has wrestled with one particular language. If you were to sail up the great River Niger from the sea for about 500 miles, you would find living along both banks of the stream a race of black men who call themselves the Nupe people. They are at home on the river and are expert canoe-men, and they supply crews for all the government and trading steamers on the Niger. A Canadian missionary, the Rev. A. W. Banfield, went and lived among these people for a dozen years, and he mastered their speech so thoroughly that they used to call him "the white Nupe." He has translated the New Testament into the Nupe language, and two years ago it was published by our Society. Here are some of his experiences of the difficulties which he had to conquer in carrying out this task.

Nupe is a very rich language, with a copious vocabulary. Mr. Banfield compiled a Nupe dictionary with over 11,000 words. He discovered great numbers of terms which mean nearly the same thing. Thus, he found more than 100 words meaning "large," and about 60 words meaning "small." In English we use the same word when we speak of thin soup, or of a thin man, or of a thin string; but the Nupe use a different adjective in all such cases. They have 50 or 60 different words meaning "short."

Some of their idioms are curious and picturesque. The phrase they use for fasting means literally "to thrash yourself with hunger"; the phrase for happiness means "to be sweet inside"; the word for to thank is "to prostrate yourself on the ground"; while the word for to repent means "to change your character."

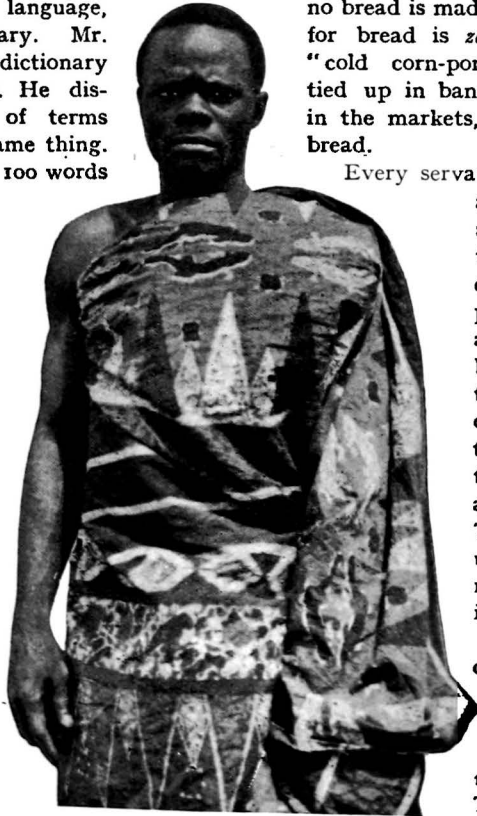
The Nupe possess no name for "bachelor"; but they have a word which literally means "red-eye," and this is used to denote a young man who is sad because he would like to marry and have some one to cook his food, but he has not enough money to buy a wife.

In Northern Nigeria kings and queens do not wear crowns, nor do they sit on thrones. The king sits on a mud platform, raised about four inches high; so "throne" had to be translated by "the sitting-place of the king." The idea of placing a crown on the king's head has never crossed the mind of the Nupe people; but a turban is wound round the head of a king or chief as a sign of authority. Hence, in the Nupe New Testament we read: "They took thorns and made a turban and put it on His head."

As no wheat is grown in the country, no bread is made; so the word used for bread is *zambu*, which means "cold corn-porridge." This food, tied up in banana leaves and sold in the markets, takes the place of bread.

Every servant is called a slave, and in fact "God's slave" is the Nupe term used for a disciple. To the Nupe people God is known as *Soko*. They all believe that *Soko* is the maker and ruler of the universe. But they have no word in their speech for atheist or infidel. They simply do not understand how any man can disbelieve in the reality of God.

After many years of study Mr. Banfield could find no better equivalent for soul than *nyagban* (bosom). The word *eko* means the heart as a bodily



THE SKIPPER OF A STEAMER ON THE NIGER.

Trials of Translators



Photo by J. Flint, C.M.G., NUPE MINSTRELS AT LOKOJA, ON THE UPPER NIGER. of the Niger Co., Ltd.

organ, but not as the seat of affection; that is expressed by *gbako* (stomach) or *nyagban* (bosom). A Nupe who wishes to speak of his heart being at rest or pacified will say: "My bosom is lying down." "Soul" and "mind" and "conscience" are all included in this comprehensive term *nyagban*.

In translating the New Testament Mr. Banfield adopted a word for "holy" which literally means "clean." For "pacified" he used a word meaning a "heart which has lain down." There was no proper word for "believe," so he had to make one by combining two which mean "accept" and "word." The Nupe word for "to give

alms" means "to give to God." They have never seen snow, so he translated "as white as snow" by "as white as cotton." For "lily" he used "white flower," as they have a little white flower in the fields. "Synagogue" is rendered as "school." He has had to coin a word for the Church, which he expressed as "the holy company"; but the building in which Christians worship is called the "house of God."

Mr. Banfield tells us that the Nupe themselves have often said to him: "You take our words and so change them that we hardly recognize them again." . . . "We never thought that you could say such pure things with our language."

A Penny Loaf

By John Bunyan

THE great author of the *Pilgrim's Progress* loved little people, and said many things which they should know and remember. Among his other works he wrote *A Book for Boys and Girls; or, Temporal Things Spiritualized*. His plan was to make common things speak to us of the higher wisdom of the heart. The following quaint verses on "A Penny Loaf" come home to us now that we are rationed.

"My price one penny is in time of plenty;
In famine doubled 'tis from one to twenty;
Yea, no man knows what price on thee to set,
When there is but one penny loaf to get.

"This loaf's an emblem of the Word of God—
A thing of low esteem before the rod
Of famine smites the soul with fear of death,
But then it is our all, our life, our breath."

With our Colporteurs last year

IN countries which are being ravaged and wrecked by war, the work of colportage must needs be crippled. The marvel is that among our Bible-sellers the great majority have been able to carry on their calling with so little interruption and with so much success. They plod their way patiently—these humble, devoted men—across the rice-fields of Bengal, and over the snowy passes of Peru, and through the rubber-plantations of Selangor. They sell the Scriptures to settlers on the Canadian prairie, to pilgrims at Buddhist shrines in Japan, to students from the great Moslem university at Cairo, to pleasure-seekers at crowded fairs in Spain. Everywhere they carry the Gospel of God's love to the poor.

Their duty is no holiday task. We heard last year of colporteurs arrested as spies in France, and cast into prison in Sicily, and pelted in remote Paraguay. On the nitrate pampa of Chile Colporteur Diaz is a well-known figure along the railway line from Antofagasta, early and late about his Master's business; at the end of one hard weary day he said quite simply to his companion, "Often I think how tired Jesus Christ must have been."

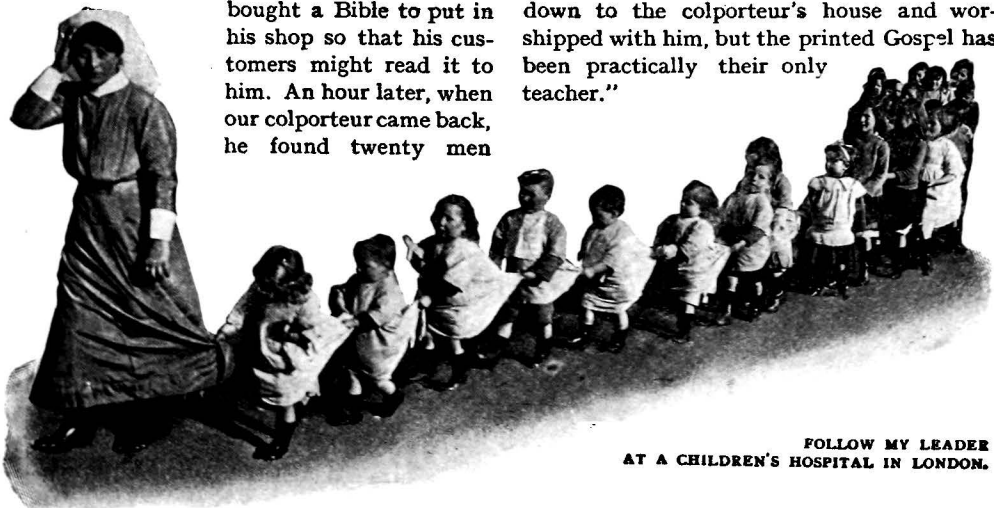
We have only space for two or three snapshots of these men at their task. At a village in the Nile Delta the barber was a Copt, who could not read; but he bought a Bible to put in his shop so that his customers might read it to him. An hour later, when our colporteur came back, he found twenty men

sitting in that shop, listening to a small boy who was reading the Bible aloud.

At a railway-station in Ontario, where some men were loading timber, their spokesman declared that "the boss wanted them to get their work done, and not to look at Bibles." The colporteur promptly undertook to do his job, while he came and inspected the books. So they changed places; and before many minutes two Bibles, a Testament, and three Russian Gospels were sold.

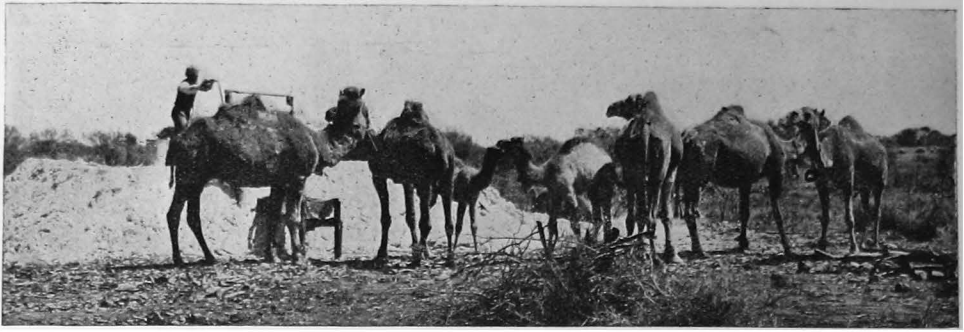
At Port Said a Greek who had purchased the New Testament complained because it had no sign of the Cross on the cover. "Read it carefully," replied the colporteur, "and you will find inside how our Lord suffered on the Cross for you and me."

In heathenlands the colporteur habitually acts as a pioneer evangelist. A missionary sends this witness from Korea: "Yesterday I went to the town where one of your Korean colporteurs is living, and a man and his wife came to me for baptism from a tiny village up among the mountains, eight or nine miles away. Six months ago this colporteur had visited their village, where he took time to "speak a good word for Jesus Christ," and then sold a couple of Gospels. Ever since they have been keeping Sunday alone up there, reading the books and worshipping as best they could our risen Lord. Once or twice they have walked down to the colporteur's house and worshipped with him, but the printed Gospel has been practically their only teacher."



FOLLOW MY LEADER
AT A CHILDREN'S HOSPITAL IN LONDON.

In Australia



CAMELS AT A WELL, IN WEST AUSTRALIA.



BULLOCKS DRAWING TIMBER IN QUEENSLAND.



SHEEP YARDS IN AUSTRALIA.

Photo by J. C. Remiss.

Our Letter Box

MY DEAR YOUNG PEOPLE,

Notwithstanding the war, our GLEANINGS Stamp Corner continues its good work. We owe a deep debt of gratitude to Miss Oliver, of the Bible House, London, who with her helpers continues to manage the Stamp Corner at no small expenditure of pains and patience. Although we have received fewer gifts of stamps, and communications from overseas have become more difficult, yet the net profit earned for the Society by the Stamp Corner during the year which ended on March 31st last amounted to £20 16s. 5d—as compared with £23 8s. in the previous year. By means of this money our Stamp Corner just manages to support two colporteurs in the East. One of them, is a Chinese Christian, named Mr. Tsi, who does good service in the district round the city of Liangchow, which stands on the northern edge of China, close to the Mongolian desert. Last year Mr. Tsi sold twenty-two New Testaments and 3,723 smaller portions of Scripture, most of them Gospels. Mr. Kao, our former Stamp Corner colporteur at Liangchow—about whom I wrote to you in the GLEANINGS Letter-Box last July—has grown feeble with age; but this good old man, though he has retired from active service, is still able to go about the streets of the city and sell a few Gospels. Last year he succeeded in putting eleven Testaments and 748 portions into the hands of his fellow-countrymen. Thus altogether more than 4,500 copies of the Scriptures were sold last year in this distant part of China as one result of our Stamp Corner.

We also support another colporteur who works in Burma. I hope later on to give you some particulars about him. Meanwhile ask your friends in foreign countries to save up any strange stamps and send them to the "Stamp Corner," Bible House, London.

Here is another way of helping our Society. In south-east London, a "Boys' Bible Band" was founded at Forest Hill two years and a half ago by Mrs. Waring, who holds a monthly meeting in her own house for the members. In November 1916 they gave a public entertainment and realized about £7 for the Bible Society. Since then the Band has grown in numbers, and last April they held a most successful exhibition, with a sale of work and ingenious competitions. The proceeds, with the boys'



PLOUGHING IN CHINA.

monthly collections, amounted to £14 5s. Of this sum £12 will go to support a special colporteur in Burma.

At Wadhurst, Sussex, our devoted friend, Miss E. Sheppard-Walwyn, recently organized a most successful sale of work. Interest among the young people there had been quickened by her story *Bobbie's Bible Box*, which appeared in the April number of GLEANINGS. So generously did every one work and give and buy, that the net proceeds realized £37 7s. for our Emergency Fund.

Our first letter this month comes from Lilian, who is a "girl guide," and is trying hard to win a "Search Texts" prize.

I go to school at Ipswich. It was really "The High School, Felixstowe," before the war began, but the house was commandeered and so the school was moved to Ipswich. There are nineteen girls at my school, and twelve of us are Girl Guides. We are working up for our second-class badge, and on Saturdays sometimes we go to the meeting; we collect sacks of waste paper for the Government. On Friday afternoon we had a glorious game of hockey; the worst of it was we did not win! I hope that I shall get a prize for my "Search Texts" this year. I am trying hard. My sisters and brother used to do them when they were little.—Lilian Odell, Ipswich.

Phyllis gives an account of a "rally" which will interest all our readers who belong to the scouts.

At our scouts and cubs rally in the recreation ground there were: 1st, 2nd, and 3rd Woking, Christ Church, St. Mary's Church, Horsell Church, and other companies. The Congregational Church scouts, and cubs are 1st Woking, Baptist 2nd, and Wesleyan 3rd Woking. One of the inspectors, was a naval man, and four other men in scouts' uniform. After the inspection the scouts drilled. Our scouts did dumb-bell drill. The cubs tied three knots. Two of our cubs were in the front. They were to tie the knot in a certain time; when they had tied it they moved on a step. Four scouts in each company had a race. Christ Church company did some gymnastics. They stood upon one another's backs, and shoulders, and on their heads. The last item was ambulance by the scouts. One scout out of every company lay down, and pretended to have either a broken leg, broken arm, broken collar-bone, broken jaw, crushed hand, to be nearly drowned, or to have broken a finger. Then two boys out of every company bandaged them up. It was very interesting. The rally commenced at three o'clock, and finished at half-past five.—Phyllis Brown-ing, Woking.

Our Monthly Prize Competitions

NOTE—Your postcards will now require a Penny Stamp.

Read the Rules in January or May "Gleanings"

Anagrams of Bible Mothers and a Mother-in-law

For readers not over 13 on July 1st

- | | | |
|-----------------|--------------------|---------------------|
| 1. Vee (Gen.) | 4. Rodebah (Judg.) | 7. Buzaha (1 Kings) |
| 2. Ahrsa (Gen.) | 5. Oimehths (Lev.) | 8. Nabnah (1 Sam.) |
| 3. Ayrn (Matt.) | 6. Aleh (Gen.) | 9. Monia (Ruth) |

These look very unlike names of people mentioned in the Bible as mothers, yet most of them are quite familiar. Here the letters are placed out of their proper order, but when the letters of each curious-looking word are properly arranged they spell the names correctly. All you have to do is to find out the names by rearranging the letters, and then write them on a postcard, numbered as above. The books containing the names are given for reference only and are not required in the answers. Your full name, age, and address must be added, the competition rules observed, and your answer posted in time to reach the Editor of GLEANINGS by July 31st.

Prophets and Patriarchs

For readers not over 16 on July 1st

- In which prophet's time was Naaman cleansed of leprosy? (Luke.)
- Who uttered the prophecy fulfilled in rebuilding Jericho? (Joshua)
- Who doubted news from Egypt he thought too good to be true? (Genesis.)

- Which is the "crowning city" described by a prophet? (Isaiah.)
- Who of the patriarchs is called the "Friend of God"? (James.)
- Which prophet did Ahab call his enemy? (1 Kings.)

Write the six names on a postcard, and send it off in time to reach the Editor of GLEANINGS by July 31st. References are not required in answers to this competition.

A Military Acrostic

For readers not over 18 on July 1st

- I am complete, behead me and I am open.
- I shun you, behead me and I am vacant.
- I am in the garden, behead me, add h in place, and I swim.
- I am in the Transvaal, behead me and I am a conjunction.
- I am angry, behead me and I scold or chide.
- I am a stone, behead me and I am a companion.
- I tear asunder, behead me and I come to a finish.

The acrostic is formed of seven words: their initial letters read downwards spell a word used to describe a military man which is used three times in the Bible—1 Kings, 2 Chronicles, and Isaiah. Each word is required *complete*, but you are also told what each word stands for when its first letter is taken away, so that you may more easily solve this acrostic.

Write the seven words, in the order indicated, on a postcard, and send it off in time to reach the Editor of GLEANINGS by July 31st.

Prize Competitions May—Results

Prize-winners should send word in which European language they wish to have their Prize Bible or Testament

Anagrams of Churches

- | | | |
|---------------|--------------|-------------------|
| 1. Antioch. | 5. Babylon. | 9. Thyatira. |
| 2. Cenchrea. | 6. Ephesus. | 10. Sardis. |
| 3. Galatia. | 7. Smyrna. | 11. Philadelphia. |
| 4. Macedonia. | 8. Pergamos. | 12. Laodicea. |

This is the most popular of our May competitions, and with few exceptions the rules have been observed. Prize Bibles are awarded to Lily Cotton (age 12), 36, Lutwyche Road, Catford, S.E.6, and Gweneth Barnes Hughes (11), Linden Croft, London Road, Deal. A prize New Testament is awarded to Dorothy Ashton (8), 64, Severalls Avenue, Chesham, Bucks. These awards are for exceptionally neat and correct answers.

The following list contains the names of competitors who deserve Honourable Mention—their answers are correct and they have observed the rules: D. K. Dix, O. C. Allison, H. B. Weinberger, D. Grant, L. M. Shearing, W. Hawker, P. Grieve, E. Jackman, H. P. Rowe, D. E. Bass, B. Blew, H. MacLagan, V. Cutler, M. Ramwell, G. P. Nicholson, D. Parr, F. O'Connor, H. F. Wiold, A. M. Abbott, W. E. Philip, W. K. Periam, H. Smith, E. Abraham, J. Keigwin, A. M. Hard, J. M. Spriggs, G. Hamner, P. W. Brook, M. Jordan, G. Gamble, F. A. Crooke, D. Talbot, and G. E. Cook.

Modern Warfare in Palestine

TRENCH-WARFARE.

1 Sam. xvii. 20 and xxvi. 5, 7, Luke xix. 43.

This takes a poor second place in the competitions for May but some competitors have done exceptionally well. Prize Bibles are awarded to Geoffrey Gamble (age 12), 16, Burton

Road, Ashby-de-la-Zouch, Leicestershire, and Grace Bessie Blanche Millgate (15), Canterbury House, Castle Road, Newport, Isle of Wight. A prize New Testament has been won by Ella M. Hillman (13), 2, Woodcote Villas, West Norwood, S.E.27. Six competitors deserve Honourable Mention for sending in correct answers and also observing the rules: H. F. Wiold, E. Heasman, M. Willis, J. Watson, I. C. Bass, and R. G. Beloe.

A Whitsun Acrostic

- | | |
|------------|-----------|
| P rick. | C harm. |
| E spy. | O ration. |
| N umber. | S tar. |
| T act. | T oil. |
| E strange. | |

Very few answers were received to this competition—all from girls! A prize Bible is, however, awarded to Alice Hybert Freeman (age 16), "Glenholme," Nightingale Road, Rickmansworth, for the nearest correct solution. Eileen Rowan deserves Honourable Mention.

Letter-writing Competition

We want letters so that more prizes may be awarded. Write with ink and as neatly as possible not more than 250 words, and on one side only of the paper.

Write about whatever you think will interest the Editor and his readers most, and do it all yourself—without any help. Give your full name, age, and address. Readers abroad may compete.

Write the words *For Competition* at the top of your letter, and address it to the Editor of GLEANINGS, 146, Queen Victoria Street, London, E.C. 4. The postage will be 1½d.

Daily Scripture Portions for July

JULY.			John.			John.			John.			John.			AUGUST.		
John.			7 S	3.	1-13	13 |	4.	43 54	19 |	6.	28-40	23 |	8.	12-30	John.		
1	1.	1-14	8 |	3.	14-24	14 S	5	1-18	20 |	6.	41-58	26 |	8.	31-47	1	10.	19-30
2	1.	15-28	9 |	3.	25-36	15 |	5.	19-29	21 S	6.	59-71	27 |	8.	48-59		10.	31-42
3	1.	29-39	10 |	4.	1-14	16 |	5.	30-47	22 S	9	1-12	28 S	9	1-12	3	11.	1-16
4	1.	40-51	11 |	4.	15-30	17 |	6.	1-14	23 |	7.	1-18	29 |	9.	13-25	4 S	11	17-31
5	2.	1-12	12 |	4.	31-42	18 |	6.	15-27	24 |	7.	19-36	30 |	9.	26-41	5 |	11.	32-46
6	2.	13-25							25 |	7.	37-53	31 |	10.	1-18	6 |	11.	47-57

April 1918 Correct and Complete "Search Texts" Lists (and List from Abroad) received up to May 31st, 1918

Please Remember.—If you put your "Search Texts" list in an envelope (not fastened), or in a wrapper, and *without any letter*, the postage is $\frac{1}{4}d.$ for 1 oz. or $1d.$ for 2 ozs. But your list will now cost $1\frac{1}{4}d.$ by post when you *fasten the envelope* or *enclose a letter*. Recently some lists from Birmingham, Cheswardine and Eltham were posted to the Editor underpaid.

Abbott, N. Abraham, E. Adams, P. C. Adams, T. R. Allsopp, W. Andrews, A. Andrews, F. M. Ashby, K. F. Atkinson, E. K. Akinson, W. Attrill, L. E. Baddeley, J. Bailey, C. Bailey, E. T. Bailey, J. Bailey, N. Baker, D. N. Baker, G. M. Baker, H. E. Baldry, I. Ball, G. I. Ball, S. V. Ballinger, F. T. Banning, D. M. Banning, F. M. Barnes, I. W. Barnes, W. Bartholomew, D. L. Baxter, E. H. Baxter, H. M. Beavington, D. Bedford, A. Beer, E. G. Bell, A. Bellamy, E. Bennett, H. M. Betterson, L. M. Blakeman, M. A. Blew, M. Bollington, L. Boundy, V. M. Bourner, R. Bowsher, F. M. Boyes, G. I. Brimble, N. Brind, E. G. Bromby, E. M. Brown, V. M.	Buckingham, B. E. Buckland, G. Bullock, H. W. burdett, B. Burgess, J. Burgess, M. Burt, D. M. Butcher, E. Butterworth, E. B. Caddy, H. Calfyn, O. E. Caldecourt, D. M. Carr, V. E. Chadwick, N. Chambers, R. J. Cheney, C. R. Cherry, D. I. Cherry, R. A. Chew, G. H. Chew, N. L. Chorley, O. Christmas, W. M. Clark, W. A. Clayton, G. Clements, N. Clifford, E. M. Coates, P. K. Cook, G. M. Cooke, I. A. Cooke, I. H. Cooper, J. H. Cooper, R. E. Cubitt, A. B. Cutler, N. Cutler, V. Davy, I. Dean, E. J. Deveson, E. Dicks, G. T. Dobson, D. Doubleday, S. D. Down, I. L. Dredge, D. H. E. Edmondson, N. Elthott, C. A. Falkner, E. A. Fallows, F. E. Fawkes, J. H.	Francis, K. L. P. G. A. Franklin, I. Fyson, C. M. Game, A. M. Garmston, E. Garnham, H. A. Gater, E. Geradi, F. Gibb, E. R. Glasse, D. Glover, M. E. Gorton, I. D. Goulding, J. Greaves, K. J. Green, W. L. Groombridge, G. V. Hallam, P. Halls, G. Halsey, J. H. Hamilton, M. Harrison, J. H. Hart, W. D. Hassall, E. Hastings, M. Hawker, W. V. Herbert, V. M. Herridge, K. M. Hickford, E. Highton, N. Hill, J. Hoar, D. F. Hockly, L. J. Hodge, C. E. Hogbin, D. Hogbin, M. Hollands, K. Holmes, L. M. Horsfall, J. Horton, G. E. Horton, H. Hughes, G. B. Huime, P. Hunt, G. E. Jackson, G. Jenkins, N. Johnson, B. M. Jones, A. A.	Jones, N. Jordan, A. Jordan, E. Jordan, L. Keats, L. King, B. A. King, D. King, F. King, M. King, M. I. King, P. A. Kirkby, E. M. Kirkpatrick, A. Kitchin, W. Knight, G. E. Knights, B. E. Knocker, J. H. L. Lambourne, A. Lambourne, C. Laird, W. Lancaster, D. Lancaster, L. Leach, D. M. Leal, H. L. Lee, B. Leslie, A. W. Leveridge, E. Lewington, D. Lindley, F. C. Long, E. H. Lowday, A. E. Lucas, V. Major, P. G. Malkinson, F. Mann, G. R. Martin, E. G. Martin, F. E. Martin, G. T. Martin, K. W. Medhurst, A. Medley, E. A. Medley, W. M. Millard, P. Millgate, G. B. B. Milnes, K. J. Milnes, M. R. Mitchell, J. Mockford, H. I. Moffatt, T. H. Monro, J. T.	Moody, D. Morgan, C. M. Morran, E. Morphew, L. C. Morrey, E. Morse, Ena. Morse, Ernest. Mosley, B. Muscott, A. J. Nation, W. D. Nawson, G. Nelson, A. Nibbett, T. G. Nicholson, G. P. Noble, E. Nott, A. O'Connor, F. C. Odell, A. L. Odell, C. S. Oram, A. B. Oram, M. A. Page, E. C. Page, R. M. Palley, J. Palmer, V. B. Pannell, H. H. Park, A. Park, G. Parker, J. B. Pearce, E. W. Penney, L. Periam, W. K. Perrett, L. P. Perrett, R. W. Phillips, C. M. Phillips, F. H. Phillips, M. E. Phipps, M. Polkinhorn, D. M. Powell, A. Preedy, M. H. Pritchard, A. Pugh, G. Radford, M. J. Randall, G. Reynolds, V. Reynoldson, E. W. Rowe, H. P.	Rymer, F. W. Sales, S. Saunders, G. Schofield, F. M. Scott, S. W. Sharman, C. B. Shearing, E. A. Shearing, L. M. Shearing, M. A. Sheldrake, I. Sheppard, T. G. Short, H. M. Simister, G. Simmonds, E. Skinner, G. P. Skyrme, John. Skyrme, Joy. Odell, A. L. Odell, C. S. Oram, A. B. Oram, M. A. Page, E. C. Page, R. M. Palley, J. Palmer, V. B. Pannell, H. H. Park, A. Park, G. Parker, J. B. Pearce, E. W. Penney, L. Periam, W. K. Perrett, L. P. Perrett, R. W. Phillips, C. M. Phillips, F. H. Phillips, M. E. Phipps, M. Polkinhorn, D. M. Powell, A. Preedy, M. H. Pritchard, A. Pugh, G. Radford, M. J. Randall, G. Reynolds, V. Reynoldson, E. W. Rowe, H. P.	Tooley, I. Toop, R. Torkington, J. M. Trevan, H. M. Tuckwell, F. Tugwood, E. A. Turner, D. L. J. Turner, E. L. Vanscolina, D. Vanscolina, M. Vincent, D. Vincent, N. Vobe, D. Waite, R. E. Waller, D. Waller, M. Walley, M. A. Walton, I. Walton, L. Wannon, M. R. Ward, I. Waterhouse, F. E. Watts, P. B. Webb, T. S. Webster, H. V. Wells, W. White, H. Whitfield, F. C. Whitfield, G. Whitfield, R. G. Whitfield, R. G. Whiting, D. Wield, N. K. Wilkes, W. J. Wilkins, I. K. Wilkinson, A. Willis, M. Winn, C. M. Winn, E. G. Winterton, E. M. Winterton, L. C. Woolley, A. Young, A. W. Young, B. E. Young, E. M.
---	---	---	---	--	---	--

From Abroad
March
Romer, M. E.

Received from Young People's Associations during March 1918

The list of remittances for April is—for lack of space—held over until next month.

	£	s.	d.		£	s.	d.
Bucks: Aylesbury: Cong. Ch. S.S.	0	0	0	Lincs: S. S. for war work	0	12	3
Cornwall: Helston: Children's Service	1	11	10	Lincs: Skegness: Orient College	1	0	0
Cumb: Workington: St. John's: Children's Service	0	10	0	Spilsby: Bryant School	4	1	6
Derby: Buxton: Grammar School	2	12	7	Middlesex: Bow and Bromley: Bruce Rd. Cong. Ch.: Boys' Brigade	0	10	0
Devon: Bideford: Grammar School Boys	2	10	0	Ealing: Hanwell: Central London District School	1	1	4
Dorset: Blandford: Kingstons Cong S.S.	1	3	3	Islington: North London Y.P. Br.: Home and Colonial Schools	0	4	8
Hants: Southampton: Box by Irene and Kathleen Dibben	0	10	0	South Kensington: Logan School	0	10	0
Isle of Wight: Newport: Y.P. Asson.	4	13	9	St. Pauey Meeting S.S.	1	1	0
Kent: Blackheath and Lee: Y.P. Asson. for Colp.	6	6	5	Tottenham: Emslea Sch.	1	12	0
Deptford: Deptford Ragged Sch: Teachers and Scholars	4	17	11	Notts: Newark: Magnus Grammar School	8	14	5
Maidstone: Y.P. Asson.	12	16	2	Som.: Bristol: Y.P. Asson.	3	13	2
Woolwich and Plumstead: St. James' Ch. S.S.	3	10	0	Staffs: Wolstanton: Y.P. Asson.	5	4	4
Lancs: St. Helens: Arthur St. Mission and Ragged School	1	10	0	Surrey: Kingston, etc., Norbiton: Children's Service	0	18	11
				Purley: St. James' Ch. S.S.	0	18	7
				Richmond: Duke St. Bapt. S.S.	2	5	2
				Walton, Hershham, etc., Y.P. Asson.	6	6	4
				Yorks: York: Y.P. Asson.	16	6	11
				Cottingham: East Holme College	6	9	0
				Wales			
				Anglesey: Menai Bridge: C.M. S.S.	2	1	5
				Carm: Llandilo: County School	2	11	3
				Carm: Dolwyddelan: Y.P. Asson.	4	14	3
				Llandudno: Y.P. Asson.	4	2	0
				Denbigh: Coedpoeth, Adwy, etc.: S.S.	3	15	9
				Flints: Conna's Quay: Man-cott: Presb. Ch. Children	1	13	7
				Flynngroew: Y.P. Asson., for Scs. for troops	2	3	8
				Glam.: Merthyr Tydvil: Heolgerriog: Y.P. Asson.	4	8	2
				Swansea: Henrietta Y.P. Asson.	2	5	2
				Saundersfoot: Y.P. Asson.	5	3	6
				Emergency Fund			
				Essex: Romford: Barkingside: Dr. Barnardo's Homes, Children's Ch.	1	10	9

HUDSON'S

GRANNY loves to tell, with a smile, how the folks in the old village sighed and shook their heads. "The Belle of the Village," they said, "could never make a good housewife." But she did. The work never became irksome, because Hudson's Soap took all the drudgery out of it.

The young housewife to-day has still the help in the house that her Grandmother had. Hudson's Soap stands unequalled for all home cleaning, for washing-up after meals.

**IN PACKETS
EVERYWHERE.**

R. S. HUDSON LIMITED,
Liverpool, West Bromwich and London.

EH 104-28



Search Texts.

JULY 1918.

This List must reach the Editor by Aug. 31st, 1918—unless you live abroad. You must not use a Concordance. Write with ink. This month's text from the Psalms is in the latter half of the book. Write to the Editor after the end of the year if a prize is due, and name the language chosen. Rules are in May "Gleanings."

Read the Rules before you begin to find the texts.

Text:	Chap.	Book.	Verse.
1 Do those things that are pleasing in his sight.....		1	Job
2 Teach me to do thy will; for thou art my God.....			Psalms
3 Learn to do well.....			Isaiah
4 Do that which is good, and thou shalt have praise of the same.....			Romans
5 The seventh day is the sabbath of the Lord thy God.....			Deut.
6 Thou shalt not follow a multitude to do evil.....			Exodus
7 <i>Lord, what will thou have me to do?</i>			Acts
8 Eschew evil, and do good.....		1	Peter
9 I do always those things that please him.....			John
10 As ye would that men should do to you, do ye also to them likewise.....			Luke
11 Cease to do evil.....			Isaiah
12 When I would do good, evil is present with me.....			Romans
13 Hear the word of God, and do it.....			Luke
14 <i>These are the things that ye shall do.....</i>			Zachariah
15 Six days thou shalt do thy work.....			Exodus
16 The Lord our God will we serve, and his voice will we obey.....			Joshua
17 A nation that obeyeth not the voice of the Lord their God.....			Jeremiah
18 Saul said unto Samuel, Yea, I have obeyed the voice of the Lord.....		1	Samuel
19 The remnant of the people, obeyed the voice of the Lord their God.....			Haggai
20 We will obey the voice of the Lord our God.....			Jeremiah
21 <i>To obey is better than sacrifice.....</i>		1	Samuel
22 If ye be willing and obedient, ye shall eat the good of the land.....			Isaiah
23 Who is the Lord, that I should obey his voice to let Israel go?.....			Exodus
24 So shall ye perish; because ye would not be obedient.....			Deut.
25 Your obedience is come abroad unto all men.....			Romans
26 Obey my voice, and I will be your God, and ye shall be my people.....			Jeremiah
27 What good thing shall I do, that I may have eternal life?.....			Matthew
28 <i>The works that I do shall he do also.....</i>			John
29 Let us do good unto all men.....			Galatians
30 Without me ye can do nothing.....			John
31 Whatsoever ye do, do all to the glory of God.....		1	Cor.

THIS MUST BE SIGNED

Books People are Reading

The Achievements of Christianity

By the Rev. J. H. Moberly, D.D., D.C.L., and Dean of Lambeth Palace, London. 2s. 6d. net.

The Life of the World to Come

Six Addresses given by the Rev. E. H. BARTLEY SWETE, D.D., D.C.L., D.D., London. 2s. 6d. net.

Fellowship with God in Prayer

By the Rev. J. J. H. MOORE, M.A., London. 2s. 6d. net.

The Minor Prophets Unfolded:

I. Hosea. II. Joel and Amos
By the Rev. A. J. VAN WILLEM, D.D., Hon. Canon of the Cathedral, Exeter. 2s. 6d. net.

The Evangelistic Work of the Church

Being the Report of the Archdiocesan Triennial Committee of Inquiry. 2s. 6d. net.

Administrative Reform of the Church

Being the Report of the Archbishops' Fourteenth Committee of Inquiry. 2s. 6d. net.

The Missionary Work of the Church

Being the Report of the Synod Committee appointed by the Central Board of Missions. 2s. 6d. net.

Society for Promoting Christian Knowledge

LONDON: 68, HAYMARKET, S.W.1

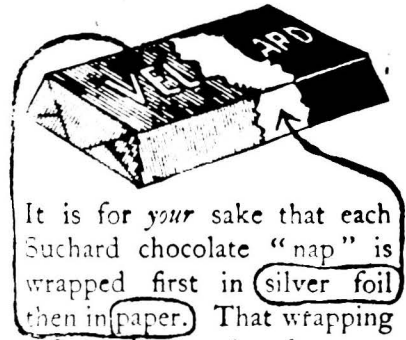
And of all Booksellers. Inquiries respectfully invited.

FOR THE WOUNDED

BRAND'S
ESSENCE
of **BEEF**
IS INDISPENSABLE

SOLD EVERYWHERE

ANEMIA
No. 2
Iron
Jelloids



It is for *your* sake that each Suchard chocolate "nap" is wrapped first in silver foil then in paper. That wrapping safeguards the chocolate you eat against dust and handling

The winning charm of

Velma

is the distinctive flavour, discovered after years of study in blend and make. Velma enjoys an enormous vogue and remains the greatest achievement in chocolate yet.

In the red packet with the gold corner

Milka

is the Queen of milk chocolates: note its delicious creaminess, mark the full chocolate flavour, then its exquisite taste and velvety smoothness.

In the mauve packet with the gold corner

Elite Maker

Suchard

89 years reputation

For Advertising Space in this Magazine apply to HART'S ADVERTISING OFFICES, 6, Arundel Street, Strand, W.6.2.

THE SACRED BOOKS OF THE HINDUS

Translated by Various Sanskrit Scholars

EDITED BY
MAJOR B. D. BASU, I.M.S., (RETIRED)

EXTRA VOLUME
A CATECHISM OF HINDU DHARMA

[SECOND EDITION—REVISED AND ENLARGED]

RAI BAHADUR ŚRĪŚA CHANDRA VIDYĀRŪVA

PUBLISHED BY
SUDHĪNDRA NĀTHA VASU
THE PĀṆINI OFFICE, BHUVANEŚWARI ĀSRAMA, BAHADURGANJ,
ALLAHABAD.

PRINTED BY APURVA KRISHNA BOSE AT THE INDIAN PRESS
1919

PREFACE.

Twenty years ago when this book first made its appearance, it created great excitement in a certain section of the Indian Community. But, on the other hand, it was greatly appreciated by educated and liberal-minded Indians, The Administration Report of the N.-W. P. and Oudh for 1899-1900, noticed this book as follows:

“ Among the smaller books on Hinduism the only one which need be specially mentioned is *A Hindu Catechism*, by Babu Srish Chandra Bose, B.A., a member of the Judicial Service in these Provinces. This is an attempt to state in plain language and in a brief form the leading teachings of that religion, both dogmatic and practical; but its chief claim to notice consists in the evidence it affords of a growing tendency to liberal and broad interpretation of the texts and to the need which is becoming felt in certain classes of educated Hindu Society for greater freedom, both of thought and practice.”

The first edition was soon exhausted but the author found little time to bring out another edition in his life-time. However, he revised the work and left it almost complete for the press.

It is hoped that this revised edition of the book will be found useful by those who are interested in the study of Hinduism.

—The Editor, S. B. H.



A Catechism of Hindu Dharma.

CHAPTER I.

1. Q.—*Who is a Hindu?*

A.—He who accepts the Vedas, the Smṛitis, the Purāṇas, and the Tantras as the basis of religion, and the rule of conduct, and believes in one Supreme God (Brahm), in the law of Retributive Justice (Karma), and in Re-incarnation (punar-janma).

2. Q.—*What is Dharma or Religion?*

धारणाद्धर्ममित्याहुर्धर्मे धारयति प्रजाः ।

A.—“That which supports, that which holds together the peoples (of the universe), that is Dharma.” *Mahābhārata*, Kārṇa Parva, lxix, 59.

3. Q.—*What are the sources of the Dharma of a Hindu?*

A.—Four. The Śruti or Revelation, the Smṛiti or Tradition, the Sadāchāra or Custom and Ātma-Priyam or Self-imposed vows &c.

4. Q.—*What is a Śruti?*

A.—Śruti literally means ‘heard.’ Technically it means Revelation—that which an inspired sage *hears* in his entranced super-normal condition. It is the Voice (Vāk) of God *heard* in the conscience of the Holy sage.

5. Q.—*How many kinds of Śrutis are there?*

A.—Two. The Vaidiki and the Tāntriki.

धृतिश्च द्विविधा वैदिकी तान्त्रिकी च (Hārita as quoted by Kulluka on Manu II. 1).

6. Q.—*What is Vaidiki Śruti?*

A.—The Veda of the Hindus constitutes the Vaidiki Śruti. It was the Revelation given to the first Āryan race. It is the foundation of the exoteric Hindu Religion.

7. Q.—*What is the Tāntrikī Śruti?*

A.—The Revelation of the Eternal as found in the Tantra, of the esoteric bases of Hindu religion. The present catechism is mainly based on such Tāntrikī Śruti.

8. Q.—*What are the six schools of Indian Philosophy.*

A.—1. Nyāya, 2. Vaiśeṣika, 3. Sāṅkhya, 4. Yoga. 5. Mīmāṃsā and 6. Vedānta.

9. Q.—*What is the main object of all these six Darśanas?*

A.—To remove human suffering by the removal of ignorance, the cause of bondage.

10. Q.—*Can a person not born of Hindu parents become a Hindu?*

A.—Yes, according to the Śāstras he can.

In ancient India non-Āryans were raised to the rank of Āryans by the performance of Vrātya-Stoma. The Vrātyas were non-Āryans, aborigines and foreigners and included also the degraded Āryans. The description of it is to be found in the Tāṇḍya Brāhmaṇa of the Sāma Veda, Ch. XVII. In later times, Vaiṣṇavas admitted into their sect Mahomedanā, as Haridāsa, the Mahomedan disciple of Sri-Chaitanya. Thus in Śrīmad-Bhāgavata we find :—

किरातहृष्यान्ध पुलिन्दपुक्कसा आवीरकंका यवनाः खसादयः ।

येन्ये च पापायदपाश्रयाश्रयाः शुध्यन्ति तस्मै प्रभविष्यवे नमः ॥

“Reverence be to that All-pervading by taking refuge in whom the Kirātas, the Hūṇas, the Andhras, the Pulindas, the Pukkasas, the Āviras, the Kaṅkas, the Yavanas, the Khasas, and other sinful races are purified.” (*Bhāgavata*).

This shows that persons belonging to foreign nations and countries other than India, could become Hindus. A Mahomedan convert to Hinduism, named Darāb Khān, composed a hymn addressed to the Ganges, and that hymn is daily chanted by the Brāhmaṇas of India without scruple at the time of bathing in that river.

So also we find in the Mahānirvāṇatantra :

अहो पुण्यतमाः कौलाः तीर्थरूपाः स्वयं प्रिये ।

ये पुनन्त्यात्मसम्बन्धान् म्लेच्छश्वपचपामरान् ॥

“Oh! how holy are the followers of Universal Brotherhood (Kaula) because they make others holy, like the sacred waters of holy places, for by coming in contact with them, the sinners, the out-castes and the foreigners become purified.”

Thus it was a glory of the Saivas that they could raise up others to their rank.

गंगायां पतिताम्भांसि यान्ति गांगेयतां यथा ।
 कुलाचारे विशन्तोऽपि सर्वे गच्छन्ति कौलताम् ॥
 यथार्णवगतं वारि न पृथग्भावमाप्नुयात् ।
 तथा कुलाम्बुधो मग्ना न भवेयुर्जनाः पृथक् ॥
 विप्राद्यंत्यजपर्यन्ता द्विपदा येऽत्र भूतले ।
 ते सर्वेऽस्मिन् कुलाचारे भवेयुरधिकारिणः ॥
 प्रार्थयन्ति कुलाचारः ये केचिदपि मानवाः ।
 तान् षञ्चयन् कुलीनोऽपि रौरवं नरकं व्रजेत् ॥
 चाण्डालं यवनं नीचं मत्वा स्त्रियमवह्नया ।
 कौलं न कुर्यात् यः कौलः सोऽधमो यात्यधोगतिम् ॥
 शताभिवेकात् यत् पुण्यं पुरश्चर्याशतैरपि ।
 तस्मात् कोटियुगं पुण्यमेकस्मिन् कौलिके कृते ॥

“As the waters of rivers flowing into the Ganges become sacred as the Ganges; so all persons entering into this religion become holy.”

“As rivers running into oceans do not retain their separate nature, so all persons entering into the ocean of this religion, retain not their separateness.”

“From the most learned Brahmin down to the low born out-caste, verily all human beings on this earth, are entitled to the privilege of this Brotherhood.”

“A Hindu (Kaula) who refuseth to initiate another who is solicitous of entering this religion, goes to the howling darkness. That Hindu who does not make another a Hindu, despising the latter because he is a chândâla or a foreigner or a degraded one or because she is a woman, goes on the down-ward path.”

“A merit which one acquires by hundreds of prayers or ceremonial performances is acquired a thousand-fold by him who makes one person a Hindu.” (Mahânirvâṇa, XIV. 181-188.)

11. Q.—What are the Vedas?

A.—The truths revealed to mankind by a Higher Being, are called Vedas. They are not confined to any particular country or people. The Vedas of the Hindus, however, are collected in four books :—Rik, Yajus Sâman, and Atharvan.

12. Q.—How many Vedas are there?

A.—The Veda, like caste, was originally one. Vyâsa divided it

into four parts : Rik, Yajus, Sâman and Atharvan for facility of reference and study.

वेदमेकं स बहुधा कुरुते हितकाम्यया

(Devî Bhâgavat, I. iii. 19.)

13. Q.—*What are the two divisions of the Vedas?*

A.—The Mantra portion or the hymns and the Brâhmaṇa portion. वेदोहि मन्त्रब्राह्मण-भेदेन द्विविधः (Vidyâranya, Taittiriya Vârtika, p. 87 Ānandâśrama Series).

14. Q.—*What do the Brâhmaṇa-portions of the Vedas treat of?*

A.—They treat of history (itihâsa), mythology (cosmology, purâna &c.), the occult sciences (vidyâ), transcendental philosophy (upaniṣad), metrical compositions (śloka), proverbs and aphoristic sayings (sûtras), explanations of those aphorisms, anu-vyâkhyânas and commentaries on such explanations (Vyâkhyâna).

इतिहासः पुराणं विद्याउपनिषदः श्लोकाः सूत्राण्यनुव्याख्यानानि व्याख्यानानि (Ibid. p. 87).

15. Q.—*Name the principal Brâhmaṇas?*

A.—Aittareya Br., Taittareya Br., Talavakâra Br., Śatapatha Br., Tândya Br.

16. Q.—*Name the principal Upaniṣads?*

A.—ईश-केन-कठ-प्रश्न-मुण्डक-माण्डूक्य-तित्तिरिः ।

पेतरेयञ्च छान्दोग्यं बृहदास्पयकं तथा ॥

1. Īśāvāsya, 2. Kena or Talavakâra, 3. Katha, 4. Praśna, 5. Muṇḍaka, 6. Māṇḍukya, 7. Taittiriya, 8. Aitareya, 9. Chhândogya and 10. Brihadâranyaka, are the ten principal Upaniṣads. Besides these, Kauṣitaki, Maitrâyan and Śvetaśvatara are also among the important ones.

17. Q.—*Into how many schools or Śâkhâs are the four Vedas divided?*

A.—The Rig-Veda has 21 Śâkhâs, the Yajur-Veda has 109 Śâkhâs, the Sâma-veda has 1,000 Śâkhâs, and the Atharva-Veda has 50 Śâkhâs.

ऋग्वेदस्य तु शाखास्स्युरेकविंशतिसंख्यकाः ।

नवाधिकशतं शाखा यजुषो मास्तात्मज ॥

सहस्रसंख्यया जाताश्शाखास्साम्नः परन्तपः ।

अथर्वणस्य शाखास्स्युः पञ्चाशद्धेदतो हरैः ॥

Theoretically every one of these Śâkhâs has a particular Upaniṣad

of its own. (Mukti. Up. 12, 13). But 108 Upaniṣads are generally found.

18. Q.—*What are the Smṛitis ?*

A.—Smṛitis are traditional or memorial laws, civil and religious, delivered by human authors. It literally means what is remembered as opposed to *Śruti* what is heard, (Revelation).

19. Q.—*How many principal Smṛitis are there ?*

A.—20, namely :—

मन्त्रत्रिविष्णुहारीतयाज्ञवल्क्योशनोऽङ्गिराः ।

यमापस्तम्बसम्बर्त्ताः कात्यायनवृहस्पती ॥

पराशरव्यासशङ्खलिखिता दक्षगौतमौ ।

शातातपो वसिष्ठश्च धर्मशास्त्रप्रयोजकाः ॥

“Manu, Atri, Viṣṇu, Hārīta, Yājñavalkya, Uśanās, Ṃgīras, Yama, Āpastamba, Sambarta, Kātyāyana, Vṛihaspati, Parāśara, Vyāsa, Śāṅkha, Likhita, Dakṣa, Gautama, Śātātapa and Vasiṣṭha, are the compilers of the *Dharma-Śāstras* or Codes of Law.” (*Yājñavalkya* I. 4-5).

21. Q.—*What is a Purāṇa ?*

Q. सर्गश्च प्रतिसर्गश्च वंशो मन्वंतराणि च ।

वंशानुचरितं चैव पुराणं पंचलक्षणम् ॥

“Purāṇas have five characteristics, namely, they treat of the creation, the secondary creation, the dynasties (of gods, sages, and kings,) the ages of the world, as well as the career of the dynasties.” (*Viṣṇu P.* III. 6. 25.)

20. Q.—*How many principal Purāṇas are there ?*

A.—18, namely :—

अष्टादशपुराणानि पुराणज्ञाः प्रचक्षते ।

ब्रह्मं पाशं वैष्णवञ्च शैवं भागवतं तथा ॥

अथान्यं नारदीयञ्च मार्कण्डेयञ्च सप्तमम् ।

आग्नेयम् अष्टमञ्चैव भविष्यं नवमं तथा ॥

दशमं ब्रह्मवैवर्त्तं लैङ्गमेकादशं स्मृतम् ।

वाराहं द्वादशञ्चैव स्कान्दञ्चात्र त्रयोदशम् ॥

चतुर्दशं धामनञ्च कौर्मं पञ्चदशं स्मृतम् ।

मात्स्यञ्च गारुडञ्चैव ब्रह्माण्डञ्च ततः परम् ॥

“Eighteen Purāṇas are enumerated by those versed in the Purāṇas:—1. the Brahma, 2. the Padma, 3. the Viṣṇu, 4. the Śiva, 5. the Bhāgavata, 6. the Nārada, 7. the Mārkaṇḍeya, 8. the Agni, 9. the Bhaviṣya, 10. the Brahmavaivarta, 11. the Liṅga, 12. the Varāha, 13. the Skanda, 14. the Vāmana, 15. the Kūrma, 16. the Matsya, 17. the Garuḍa and 18. the Brahmāṇḍa.” (*Viṣṇu P. III. 6. 21-24.*) The Bhāgavata mentioned above is the Devi Bhāgavata. The Viṣṇu Bhāgavata is an upa-Purāṇa.

22. Q.—*What are the Tantras ?*

A.—Tantras are Śrutis like the Vedas but more arcane and cosmopolitan. It comes from the root तन् “to spread or to expand.” The following is its description.

सर्गश्च प्रतिसर्गश्च मन्त्रनिर्णय एव च ।

देवतानाञ्च संस्थानं तीर्थानाञ्चैव वर्णनम् ॥

तथैवाध्रमधर्मश्च विप्रसंस्थानमेव च ।

संस्थानञ्चैव भूतानां मन्त्राणाञ्चैव निर्णयः ॥

उत्पत्तिर्विबुधानाञ्च तरुणां कल्पसंहितम् ।

संस्थानं ज्योतिषाञ्चैव पुराणाख्यानमेव च ॥

कोषस्य कथनञ्चैव व्रतानां परिभाषणम् ।

शौचा शौचस्य चाख्यानं नरकाणाञ्च वर्णनम् ॥

हरचक्रस्य चाख्यानं स्त्रीपुंसाश्चैव लक्षणम् ।

राजधर्मो दानधर्मो युगधर्मस्तथैव च ॥

कथ्यते व्यवहारश्च तथा चाध्यात्मवर्णनम् ।

इत्यादिलक्षणैर्युक्तं तन्त्रमित्यभिधीयते ॥

“Tantras are books which treat of creation, minor creation, mystic mantras, and their determination, the description of the Devas and their temples, the description of sacred pilgrimages, the duties of various Āśramas or stages of life, the characteristics of the Brahmīns and of various elements, the rise of various learned men, the birth of Gods, trees &c., the description of celestial bodies, narration of various stories, description of treasures and determination of religious vows and services, narration of purity and impurity, description of various kinds of hells, the hints about secret assemblies, the characteristics of men and women, the duties of kings

and the duties fit for various yugas and civil law as well as transcendental philosophy." (*Vāchaspatyam.*)

23. Q.—*How many principal Tantras are there?*

A.—*Mahānirvāṇa, Nārada Pancharātra and Kulārṇava.*

24. Q.—*What do the Śāstras say in reference to Brahm?*

A.—**यतो विश्वं समुद्भूतं येन जातञ्च तिष्ठति ।**

यस्मिन् सर्वाणि लीयन्ते ज्ञेयं तद्ब्रह्म लक्ष्यैः ॥

"From which the whole Universe has come out, (at the beginning of a kalpa) by which the creation is sustained, (during a kalpa) in which all are absorbed (at the time of Pralaya), know that to be the Brahm." This is as He is described by Śiva to Pārvati :—

स एक एव सदरूपः सत्योऽद्वैतः परात्परः ।

स्वप्रकाशः सदापूर्णः सच्चिदानन्दलक्षणः ॥

"He is one alone, mere Existence, True, One without a second, supreme, self-effulgent, always full, whose definition is *Sachchidānanda* (existence, knowledge and bliss)."

निर्विकारो निराधारो निर्विशेषो निराकुलः ।

गुणातीतः सर्वसाक्षी सर्वात्मा सर्वदृग्विभुः ॥

"He is immutable, without any support, without difference, and ever-full. He is beyond all attributes, witness of all, soul of all, and spread in all quarters."

गूढः सर्वेषु भूतेषु सर्वव्यापी सनातनः ।

सर्वेन्द्रियगुणाभासः सर्वेन्द्रियविवर्जितः ॥

"He is hidden in all beings, is all-pervading, and ancient. He is the light of all the senses and their respective objects, but He is devoid of all senses."

लोकातीतो लोकहेतुरवाङ्मनसगोचरः ।

स वेत्ति विश्वं सर्वशस्तं न जानाति कश्चन ॥

"He is beyond all worlds. He is the cause of all worlds. He cannot be comprehended by speech or intellect. He knows the Universe. He is omniscient, but no one knows Him."

तदधीनं जगत् सर्वं त्रैलोक्यं सचराचरम् ।

तदात्मन्नतस्तिष्ठेदवितर्क्यमिदं जगत् ॥

"All this universe and the three worlds, movable and immovable, are under His control ; this world exists supported by Him inscrutable and mysterious." (*Mahānirvāṇa* II. 34 &c.).

25. Q.—How then is it that many gods are worshipped by the Hindus ?

कारणं सर्वभूतानां स एकः परमेश्वरः ।

लोकेषु सृष्टिकरणात् स्रष्टा ब्रह्मेति गीयते ॥

विष्णुः पालयिता देवि संहर्त्ताहं तदिच्छया ।

A.—“As the cause of all the creatures, that Great Lord is one: (but in His many aspects He is worshipped under different names). Thus through His will, Brahmâ is known as the Creator among men, Viṣṇu as the Portector, and I as the Destroyer.” (*Ibid.*)

26. Q.—Whom do you mean by “I” ?

A.—Here Śiva is speaking, and even he speaks of himself as an aspect of Brahm and not himself as Brahm.

27. Q.—Are the minor Devas like Indra &c. under His control ?

A.—Yes :

इन्द्रादयो लोकपालाः सर्वे तद्वशवर्त्तिनः ॥

स्वे स्वेऽधिकारे निरतास्ते शासति तदाज्ञया ।

त्वं परा प्रकृतिस्तस्य पूज्यासि भुवनत्रये ॥

“Indra and other Loka-pâlas (rulers of spheres or planetary spirits) exist but through his will.”

“All these rule over their respective dominions, appointed and controlled by His order. Thou art His great Prakṛiti (Nature) and art so worshipped in the three worlds.” (*Ibid* II. 42).

28. Q.—Who is referred to here by the word ‘Thou’ ?

A.—Pârvatî, the consort of Śiva: She represents Śakti or Primordial energy, the material and efficient cause of this Universe.

29. Q.—Are the forces of Nature independent workers or under the control of the supreme God ?

A.—Brahm is immanent in all Nature. Therefore He is called Antaryâmin or the Inner Ruler.

तेनान्तर्यामिरूपेण तत्तद्विषययोजिताः ।

स्वस्वकर्म प्रकुर्वन्ति न स्वतन्त्राः कदाचन ॥

“He being the Inner spirit of all, guides them all to their proper functions. They do their works never independent of Him.”

यद्भयाद्वाति वातोऽपि सूर्यस्तपति यद्भयात् ।

वर्षन्ति तोयदाः काले पुष्यन्ति तरवो वने ॥

काले कालयते कालो मृत्योर्मृत्युर्भियो भयम् ।

वेदान्तवेद्यो भगवान् यत्तच्छब्दोपलक्षितः ॥

“Through fear of Him blows the wind, through fear of Him the sun gives light and heat, the clouds rain in their due season, and the flowers bloom in the forests.”

“He puts out Time at the time of the great Pralaya, He is the Death of death even and the Fear of fear ; He is the Supreme Deity declared by the Vedānta and the Vedas by the words *Yat-Tat* (He That).” (*Ibid.* II. 43-45.)

30. Q.—*What is the philosophy of the Hindus in worshipping various Gods and Goddesses ?*

A.—The Hindus worship various Gods and Goddesses, because they consider these as parts of that Supreme.

सर्वे देवाश्च देव्यश्च तन्मया सुरवन्दिते ।

आब्रह्मस्तम्भपर्यन्तं तन्मयं सकलं जगत् ॥

“Oh Devi! all Devas and spirits are from Him, as well as the whole Universe from a tuft of grass up to Brahmā.” (*Ibid.* II. 46.)

31. Q.—*Is it necessary to worship all these Devas to satisfy Him ?*

A.—No. He who worships the Supreme need not—nay should not—worship any minor deity. For him it is superfluous, and therefore, sinful to do so.

तस्मिंस्तुष्टे जगत् तुष्टं प्रीणिते प्रीणितं जगत् ।

तदाराधनतो देवि सर्वेषां प्रीणनं भवेत् ॥

तरोर्मूलाभिषेकेण यथा तद्भुजपल्लवाः ।

तृप्यन्ति तदनुष्ठानात् तथा सर्वेऽमरादयः ॥

यथा गच्छन्ति सरितोवशेनापि सरित्पतिम् ।

तथार्चादीनि कर्माणि तदुद्दिश्यानि पाव्वति ॥

“He being pleased, the whole creation is pleased, He being satisfied, the creation is satisfied. By worshipping Him, all others (Devas &c.) are satisfied.”

“As by pouring water at the root of a tree, its branches and leaves are all satisfied, so by devotion to Him, all Immortals are satisfied.”

“As all the rivers, through necessity, fall into the ocean, so all prayers and sacrifices (to lesser deities) reach Him.” (*Ibid.* II. 47-50.)

32. Q.—*Who should worship these minor deities ?*

A.—Persons mentally incapable of grasping the abstract idea of the Supreme.

33. Q.—*Who are such persons called?*

A.—Kaniṣṭha Adhikâris or younger souls. As in a school there are boys of various grades of advancement, so in this world there are souls of various degrees of development. For the youngest of these are the external symbols and images, like the toy-alphabets of the infants.

34. Q.—*How many grades of worshippers are there according to their mental evolution?*

A.—Four:

उत्तमो ब्रह्मसद्भावो, ध्यानभावस्तु मध्यमः ।

स्तुतिर्जपोऽधमो भावो, बहिः पूजाधमाऽधमा ॥

“The realisation of the Supreme in all is the highest form of worship, the meditation of Him in the form of a *mental* image is the middling state; prayers to and praises of Him with the silent repetition of His name is the lowest, and the external adoration is lower than the lowest.” (*Ibid.* XIV. 122.)

35. Q.—*Does higher Hinduism encourage image worship?*

A.—No. On the contrary it deprecates it in the strongest language.

बालक्रीडनवत् सर्वं, रूपनामादिकल्पनम् ।

विहाय ब्रह्मनिष्ठो यः, स मुक्तो नात्र संशयः ॥

मनसा कल्पिता मूर्तिः, नृणां चेन् मोक्षसाधनी ।

स्वप्नलब्धेन राज्येन, राजानो मानवास्तदा ॥

मृच्छिलाधातुदार्वीदि, मूर्त्तवीश्वरबुद्धयः ।

विलश्यन्तस्तपसा ज्ञानं विना मोक्षं न यान्ति ते ॥

“He who is devoted to the Supreme God, and has abandoned all imagined forms and names as so many play-things for children, attains salvation without doubt.”

“If mentally imagined forms could give salvation to mankind, then verily all dreamers would become kings in fact, because they in their dreams had obtained a kingdom.”

“Those who think that God has a form made of clay, stone, metal or wood merely trouble themselves by fruitless austerities, for without right knowledge they shall never attain to emancipation.” (*Ibid.* XIV. 117-119).

Thus not only *physical* idolatory is denounced but *mental* imagery as well,

36. Q.—*How many principal manifestations are there of Brahm?*

A.—Three : Brahmâ the Creator, Viṣṇu the Preserver, and Śiva the Regenerator or Destroyer.

37. Q.—*How many minor manifestations are there of Brahm?*

A.—Innumerable: but chief amongst them are, thirty-three, viz., the eight Vasus, the eleven Rudras, the twelve Âdityas, and Indra and Prajâpati. (Bṛihadâraṇyaka III. 9. 2-10.)

38. Q.—*Who are the Vasus?*

A.—Fire (Agni), the earth (Pṛithivi), the air (Vâyu), the welkin (Antarikṣa), the sun (Âditya), the sky (Dyu), the moon (Chandramas), and the stars (Nakṣatras). They are called Vasus, because in them all dwell (*vas* 'to dwell').

39. Q.—*Who are the Rudras?*

A.—The ten organs of sense (jñaneadriyas) and motion (karmendriyas) in the living soul, together with the common sensory (manas) which is the eleventh organ. When they depart from this mortal body, they make us cry (rodayantî) and because they make us cry, they are called Rudras.

40. Q.—*Who are the Âdityas?*

A.—The twelve months of the year and they are Âdityas, because they move along (yanti), taking up everything (âdadânâḥ), the life of men and fruits of their work.

41. Q.—*Who is Indra?*

A.—Indra is thunder or king of gods.

42. Q.—*Who is Prajâpati?*

A.—Prajâpati is the sacrifice by which the universe was manifested.

43. Q.—*What is the chief idea expressed by these Devâs, and what was the later development?*

A.—The chief idea running through them is that of Power. The next development was in the Upaniṣad period, when Chaitanyam or intelligence or wisdom of the Divinity was more dwelt upon than His Power. The third period represents God as Ânanda-Maya or All-Love. The Purâṇas are the chief repositories of the Love-worship of God. Thus the Supreme God—the Almighty (सर्व) All-wise (चित्) and All-love (आनन्द)—has always been worshipped by the Hindus, in all periods of their history, though with varying

intensity—some emphasising His power, others His wisdom, and some His love.

44. Q.—*What has contributed to the permanency of the Hindus through the manifold revolutions convulsing India for a thousand years and more?*

- A.—1. Their inoffensive and pure religion as contained in the Vedânta.
2. Their social and domestic economy as manifested by sympathizing with one another.
 3. The peculiarity of landed tenure securing a permanent interest in the land for all classes of the people according to their respective capacities.
 4. The most minute and detailed provisions made in the Hindu Scriptures for all classes of people, all ages and stations of life are sufficient to keep the people happy and contented.*

* I found this question and its answer in one of the papers of my father,

CHAPTER II.

On Worship.

45. Q.—*Does modern Hinduism enjoin congregational worship?*

A.—No: except in the Tāntrika secret assemblies. The Hindu worship is essentially individualistic. Hence it makes the Hindu really religious in his private character, so that his religion is not for the purpose of public show or manifestation but for private practice.

46. Q.—*Describe the method of worshipping Brahm?*

A.—The most sacred formula for worshipping Brahm is the mantra ओं सच्चिदेकं ब्रह्म ॥ After performing his daily ablutions, the Hindu should sit in a sacred place, in an easy posture, on a seat of non-conducting materials as described in the Gītâ. (VI. 11.)

शुचौ देशे प्रतिष्ठाप्य स्थिरमासनमात्मनः ।

नात्युच्छ्रितं नातिनीचं चैलाजिनकुशोत्तरम् ॥

1. In a pure place, established on a fixed seat of his own, neither very much raised nor very low, made of a silk, a black antelope skin and kuśa grass, one over the other, 2. Then after performing āchamana or sipping of water, he should magnetise himself by repeating the above mantra, on the various centres of the body. 3. Next he should perform the Prāṇâyâma.

47. Q.—*What is the method of Prāṇâyâma?*

प्राणायामं ततः कुर्यान्मूलेन प्रणवेन वा ।

मध्यमानामिकाभ्याञ्च दक्षहस्तस्य पार्वति ॥

वामनासापुटं धृत्वा दक्षनासापुटेन च ।

पूरयेत् पवनं मन्त्री मूलमष्टमितं जपन् ॥

अङ्गुष्ठेन दक्षनासां धृत्वा कुम्भकयोगतः ।

जपेद्द्वात्रिंशतावृत्त्या ततो दक्षिणनासया ॥

शनैः शनैस्त्यजेद्वायुं जपन् षोडशधा मनुम् ।

वामनासापुटेऽप्येवं पूरकुम्भकरेचकम् ॥

पुनर्दक्षिणतः कुर्यात् पूर्ववत् सुरपूजिते ।

प्राणायामविधिः प्रोक्तो ब्रह्ममन्त्रस्य साधने ॥

“Then let him perform Prāṇâyâma (restraint of the breath) with the whole mantra or with the syllable Om only, in the following way.”

“He should close the left nostril with the middle and the ring-fingers of the right hand, and inspire air slowly through the right nostril, repeating eight times the Mûla Mantra (the root Mantra, *i.e.*, Om Sach Chid Ekam Brahma).”

“Then let him close the right nostril with the thumb, and practise Kumbhak Yoga (retention of air), so long as he can repeat the above Mantra thirty-two times.”

“Then let him slowly expire the air through the right nostril, repeating the mantra sixteen times. Similarly let him practise Pârak (Inspiration), Kumbhak (Retention), and Rechak (Expiration) with the left nostril.”

“Let him then do so with regard to the right nostril again and so on as before. This is the method of Prânâyâma, by which success in the Brahm Mantra is obtained.” (*Mahânirvâna* III. 44-48.)

48. Q.—*What should be done after Prânâyâma?*

A.—He should then meditate on Brahm as seated in his heart thus:—

हृदयकमलमध्ये निर्विशेषं निरीहं
हरि-हर-विधिवेद्यं योगिभिर्चर्यानगम्यम् ।
जननमरणभीतिभ्रंशि सच्चित् स्वरूपं
सकलभुवनबीजं ब्रह्म चैतन्यमीडे ॥

“I contemplate on that Brahma Chaitanyam (the Supreme Intelligence), situated in the lotus of the heart; Who is without differences, without desires, Whose manifestations are Brahmâ, Viṣṇu and Śiva, Who is approached by the Yogis in their contemplation, Who destroys the fear of birth and death, Whose form is existence and knowledge, and Who is the seed of the whole Universe.” (*Ibid.* III. 50.)

49. Q.—*What form is one to meditate upon in Brahm Dhyâna?*

A.—The Brahman has no *form*: but for the purposes of upâsanâ, He is meditated upon as Light — a steady, glowing diffused Light in the Heart. While meditating, the worshipper should concentrate his mind on this Light.

50. Q.—*What should he do next?*

A.—After such meditation or Dhyâna, he should offer the Deity mental Pûjâ thus:—

गन्धं दद्यान्महीतत्त्वं पुष्पमाकाशमेव च ।

धूपं दद्याद्वायुतत्त्वं दीपं तेजः समर्पयेत् ।

नैवेद्यं तोयतत्त्वेन प्रदद्यात् परमात्मने ॥

“ Let the Prithivi tatwa (subtle earth) be offered as scent, let the Ākâśa tatwa (subtle ether) be offered as flower, let the Vāyu tatwa (subtle air) be offered as incense, and the Agni tatwa (subtle fire) as candle light, and the Jala tatwa (subtle water) as food-offering to the Supreme Self (*Ibid.* III 52.)

51. Q.—*What should he do then ?*

A.—Then he should perform external pûjâ by dedicating material offerings to the Deity with the following mantra :—

ब्रह्मार्पणं ब्रह्मदृविर्ब्रह्माशौ ब्रह्मणा हुतम् ।

ब्रह्मैव तेन गन्तव्यं ब्रह्मकर्म समाधिना ॥

“ Brahm the oblation, Brahm the clarified butter, are offered to Brahm the fire, by Brahm ; unto Brahm verily shall he go who in his action meditateth wholly upon Brahm.” (*Ibid.* III. 56.) This mantra is the Grand Purifier. All food, drink etc. prepared by a Hindu or a non-Hindu when purified by this mantra by reciting seven times over it, become sanctified, and may be eaten by every Hindu. In dining with non-Hindus in India and outside of India, a Hindu reciting this Mantra can never commit any breach of his religious rules.

52. Q.—*Of what does this external offering generally, consist when worshipping minor deities with symbolic representations ?*

A.—Sixteen ingredients or ṣoḍaśa-upachâra.

पाद्यार्थाचमनीयञ्च स्नानं वसनभूषणे ।

गन्धपुष्पे धूपदीपौ नैवेद्याचमनं ततः ॥

ताम्बूलमर्चना स्तोत्रं तर्पणं च नमस्क्रियाम् ।

प्रयोजयेदर्चनायाम् उपचारांस्तु षोडशः ॥

The sixteen homages should be paid to a Deity while worshipping 1. Pâdya, water for washing the feet, 2. Arghya, offering (water, milk, kuśa, curd, ghee, rice, barley, &c.), 3. Āchamana-water for sipping, 4. Bath ingredients, 5. Dress, 6. Ornaments, 7. Scents, 8. Flowers, 9. Incense, 10. Candle-lights, 11. Food, 12. Water for washing the mouth, 13. Betel, 14. Prayers, 15. Praises, and 16. Tarpaṇa.

आसनं स्वांगतं पाद्यं, अर्घ्यमाचमनीयकम् ।

मधुपर्कस्तथाचम्यं स्नानीयं वस्त्रभूषणे ॥

गन्धपुष्पे धूपदीपौ नैवेद्यं चन्दनं तथा (Ibid. XIII. 203.)

According to others it consists of 1. seat, 2. welcome address, 3. pādya, 4. arghya, 5. and 6. āchamanīyas, 7. madhuparka, 8 to 15 as 4 to 11 above, and lastly, 16. salutations.

53. Q.—What should he do after this?

A.—He should perform japa or silent repetition of the mantra, Om Sach Chid Ekam Brahma, at least 108 times, meditating upon the Deity.

54. Q.—What should he do after japa?

A.—He should recite the following Brahm stotra or Universal prayer:—

ओं नमस्ते सते सर्वलोकाश्रयाय,
 नमस्ते चित्ते विश्वरूपात्मकाय ।
 नमोऽद्वैततत्त्वाय मुक्तिप्रदाय,
 नमो ब्रह्मणे व्यापिने निर्गुणाय ॥
 त्वमेकं शरण्यं त्वमेकं वरेण्यं,
 त्वमेकं जगत्कारणं विश्वरूपम् ।
 त्वमेकं जगत् कर्तृ पातृ प्रहर्तृ,
 त्वमेकं परं निश्चलं निर्विकल्पम् ॥
 भयानां भयं भीषणं भीषणानां,
 गतिः प्राणिनां पावनं पावनानाम् ।
 महोच्चैपदानां नियन्तृत्वमेकं,
 परेषां परं रक्षकं रक्षकाणाम् ॥
 परेश प्रभो सर्वरूपाविनाशिन,
 अनिर्देश्य सर्वेन्द्रियागम्य सत्य ।
 अचिन्त्याक्षर व्यापकाव्यक्ततत्त्व,
 जगद्भासकाधीश पायादपायात् ॥
 तदेकं स्मरामस्तदेकं जपामः
 तदेकं जगत्साक्षिरूपं नमामः
 सदेकं निधानं निरालम्बमीशं
 भवाम्भोधिपोतं शरण्यं ब्रजामः ॥

“Thou art real existence, Thou art the refuge of all worlds, salutation to Thee. Thou art intelligence, Thou art the Self of Uni-

versal forms, salutation to Thee, salutation to Thee. Thou art one without a second, Thou art the giver of salutation, salutation to Thee. Thou art the great One, the all-pervading and free from all attributes, salutation to Thee."

"Thou art the one great guide, Thou art the one great object of worship, Thou art the only cause of the world, and the Universal form art Thou. Thou art the one creator of all, the protector, the destroyer. Thou art One, the highest, the unshaken, the immovable and free from all modifications."

"Thou art the Fear of fear itself, Terror of terror itself, Thou art the goal of all living beings, Thou art the purifier of all that purifies, Thou alone art the appointer of all those who rule on high places, Thou art greatest of the great, and the protector of the protectors."

"Oh Thou great God! Oh Lord! Thou art in every form, Thou art indestructible and inscrutable. Oh Truthful one! Thou canst not be reached by any of our senses, our mind cannot comprehend Thee, Oh Thou, undecayable one! All-pervading and unmanifested is Thy nature. Thou art the manifestor of all the Universe and ruler thereof, protect us from all evils, Oh Lord!"

"Thee one alone do we constantly remember. Thy one name, do we constantly recite. Thee, Oh witness of the Universe! we humbly adore. Thou art the Supreme and the Absolute Lord, the ship in this ocean of the Universe, we take shelter under Thee." (*Ibid.* III 59-63).

55. Q.—*What should he do next?*

A.—He should then repeat the following (Kavacha) to protect himself from all evil influences:—

परमात्मा शिरः पातु हृदयं परमेश्वरः ।

कण्ठं पातु जगत्पाता वदनं सर्वदृग्विभुः ॥

करौ मे पातु विश्वात्मा पादौ रक्षतु त्विन्मयः ।

सर्वाङ्गं सर्वदा पातु परब्रह्म सनातनम् ॥

"Let the Supreme Self protect my head, and the Almighty God, my heart, let the Protector of the world protect my throat and my mouth, the all-seeing God."

"Let the All-soul protect my hand, let the All-intelligence protect my feet, and the Highest and the Ancient Brahm always protect every part of my body." (*Ibid.* III. 67-68.)

56. *What should be done next ?*

A.—He should then finish the pûjâ by performing pranâm or salutation with the following mantra :

ओं नमस्ते परमं ब्रह्म नमस्ते परमात्मने ।

निर्गुणाय नमस्तुभ्यं सद्रूपाय नमो नमः ॥

“Om salutation to the Supreme God, salutation to the Supreme Self, salutation to Thee, who art above the three-fold attributes of matter, salutation to Thee, again, and again, Oh Thou the Real Existence.” (*Ibid.* III. 74.)

57. Q.—*What should he do next ?*

A.—Then he should distribute the food offering to his family members and other friends, and partake himself of the same.

58. Q.—*What is this offering-called ?*

A.—Prasâda.

59. Q.—*What are the restrictions about Brahm Worship ?*

A. No restrictions except mental purity :

पूजने परमेशस्य नावाहन-विसर्जने ।

सर्वत्र सर्वकालेषु साधयेद् ब्रह्मसाधनम् ॥

“In this worship of the Supreme God, there is no necessity of performing any ceremony of Âvâhana (invoking or welcoming) or Visarjana (bidding farewell to a Deity) at the end of the pûjâ. This Brahm worship may be performed everywhere and at all times.” (*Ibid.* III. 77.)

60. Q.—*Is a man who is prevented from bathing before worship to abstain from it ?*

A.—No.

अस्नातो वा कृतस्नानो भुक्तो वापि बुभुक्षितः ।

पूजयेत् परमात्मानं सदा निर्मलमानसः ॥

“Whether a man has bathed or has not bathed, has taken his food or is with empty stomach, he may worship the Supreme Self always with a pure heart.” (*Ibid.* III. 78.)

61. Q.—*Is there any restriction as to the food offering dedicated to God, or any conditions of auspicious times for His worship ?*

A.—No.

भक्ष्याभक्ष्यविचारोऽत्र त्याज्यं ग्राह्यं न विद्यते ।

न कालशुद्धिनियमो न वा स्थाननिरूपणम् ॥

“In this Brahm worship there is no distinction of the eatable or non-eatable food, nor of what is to be accepted or what is to be

rejected, there is no restriction as to proper astrological times nor of place." (*Ibid.* III. 116.)

62. Q.—*What is the only condition in this worship?*

A.—Purity of Heart.

संकल्पेऽस्मिन् महामन्त्र मानसः परिकीर्तितः ।

साधने ब्रह्ममन्त्रस्य भावशुद्धिर्विधीयते ॥

"The only condition in this practice is that he should possess a pure heart, and the only resolution that he should form is a mental resolution or thought control." (*Ibid.* III. 120.)

63. Q.—*The mantras being spiritual, forces are said to produce contrary effect, if wrongly pronounced &c. Is there the same danger in Brahm mantra ?*

A.—All other mantras have generally some selfish object in view, and therefore danger lurks in them. But not so the Brahm-mantra which is pure self surrender.

सर्वं ब्रह्ममयं देवि भावयेद् ब्रह्मसाधकः ।

न चास्य प्रत्यवायोऽस्ति नाङ्गवैगुण्यमेव च ॥

"Let the Brahm worshipper consider everything as if full of divinity. In this worship the devotee incurs no risk, even if in repeating the mantra he commits mistakes." (*Ibid.* III. 121.)

64. Q.—*Are there any restrictions about Prasāda.*

A.—No.

अनेन ब्रह्ममन्त्रेण भक्षयेयादिकं च यत् ।

क्षीयते परमेशाय तदेव पावनं महत् ॥

पक्वं वापि न पक्वं वा मन्त्रेणानेन मन्त्रितम् ।

साधको ब्रह्मसात्कृत्वा भुञ्जीयात् स्वजनैः सह ॥

नात्र वर्णविचारोऽस्ति नोच्छिष्टादिविवेचनम् ।

न कालनियमोऽप्यत्र शौचाशौचं तथैव च ॥

यथाकाले यथादेशे यथायोगेन लभ्यते ।

ब्रह्मसात्कृतनैवेद्यमश्नीयाद्विचारयन् ॥

"Whatever food or drink has been offered to the Supreme God by reciting the Brahm mantra that even becomes the great purifier itself."

"Whether it be cooked food or uncooked, having purified it with this mantra, let the worshipper eat it with his friends and kinsmen."

"There is no distinction of castes here, no scruples about its being stale ; no restrictions about time or purity and impurity."

“ In whatever time, in whatever place, by whatever means obtained, let the food, sanctified by the Brahm mantra, be eaten without hesitation.” (*Ibid.* III. 79-83.)

65. Q.—*Should the Prasâd brought by a person of a lower caste be eaten by one of the higher caste ?*

A.—Yes.

आनीतं श्वपचेनापि श्वमुखादपि निःसृतम् ।
 तदन्नं पावनं देवि देवानामपि दुर्लभम् ॥
 यदि स्यान्नीचजातीयमन्नं ब्रह्मणि भावितम् ।
 तदन्नं ब्राह्मणैर्ग्राह्यमपि वेदान्तपारगैः ॥
 जातिभेदे न कर्त्तव्यः प्रसादे परमात्मनः ।
 योऽशुद्धबुद्धिं कुरुते स महापातकी भवेत् ॥

“ Whether it be brought by a Chândâla or fallen from the mouth of a dog, this food is sacred and dear to the Devas even.”

“ Let the food belong to a man of the lowest caste, it is pure if it is offered to God, and it must be eaten by the holiest Brahmins versed in all Vedantic lore.”

“ In this food sanctified by offering to the great God, one should not make petty caste distinctions, he who through perversity of intellect considers it impure, becomes a great sinner.” (*Ibid.* III. 84, 91, 92.)

66. Q.—*Where is this practically illustrated ?*

A.—In Puri or Jaggannath in Orissa, and among the secret societies of the Tântrikas.

67. Q.—*Who are entitled to this Brahm-initiation ?*

A.—All, the five sects of Hindus as well as all non-Hindus.

शाक्ताः शैवा वैष्णवाश्च सौरा गाणपतास्तथा ।
 विप्रा विप्रेतराश्चैव सर्वेऽप्यत्राधिकारिणः ॥

“ The worshippers of 1. Sakti, 2. Śiva, 3. Viṣṇu, 4. Sūrya or 5. Gaṇapati, a Brâhmin or a non-Brahmin, yea, ALL are entitled to this religion. (*Ibid.* III. 142.)

CHAPTER III.

Ātmā or Soul.

68. Q.—*What is Soul or Jīvatmā ?*

A.—इच्छाद्वेषप्रयत्नसुखदुःखज्ञानानि आत्मनो लिङ्गानि ।

(Nyāya I. 1. 10) “The marks of soul are desire, aversion, conation, pleasure, pain and knowledge.” In other words, to use the language of modern philosophy, “That which feels, knows, and wills is soul.” Desire and aversion, with their correlative pleasure and pain constitute Feelings. Activity or Prayatna or conation is Willing or Volition. And knowledge or Jñāna is Intellection. Or Volition, Emotion and Intellection are the characteristics of Soul.

69. Q.—*Has Jīva (soul) any size ?*

A.—No. It changes its size, with the body that it temporarily occupies. Figuratively, however, it is sometimes spoken of as having the size of a thumb, and sometimes as very minute.

अंगुष्ठमात्रो रवितुल्यरूपः, संकल्पाहंकारसमन्वितो यः ।

बुद्धेर्गुणेनात्मगुणेन चैव, आराग्रमात्रोऽप्यपरोऽपि दृष्टः ॥

बालाग्रशतभागस्य शतधा कल्पितस्य च ।

भागो जीवः स विज्ञेयः, स चानन्त्याय कल्पते ॥

That lower one (Jīva) is not larger than a thumb, but brilliant like the sun ; it is endowed with personality and thoughts, with the quality of mind and the quality of body, and is seen small even like the point of a goad.

That Jīva is to be known as a hundredth part of the point of a hair, divided a hundred times, and yet it is to be infinite. (Śvetāśvatara V. 8, and 9.)

70. Q.—*Has Jīva (soul) any sex ?*

A.—The soul has no sex.

नैव स्त्री न पुमानेष न चैवास्यं नपुंसकः ।

यद् यच्छरीरमादत्ते तेन तेन स युज्यते ॥

It is not woman, it is not man, nor is it neuter ; whatever body it takes, with that it is joined. (Śvetāśvatara. V. 10).

71. Q.—*What are the three Guṇas or attributes of Soul ?*

A.—Sattva or purity, Rajas or activity, and Tamas or passivity. Intellect corresponds with Sattwa, Volition with Rajas and Emotion with Tamas.

सत्त्वं रजस्तम इति गुणाः प्रकृतिसम्भवाः ।
 निबध्नन्ति महाबाहो देहं देहिनमव्ययम् ॥
 तत्र सत्त्वं निर्मलत्वात् प्रकाशकमनामयम् ।
 सुखसङ्गेन बध्नाति ज्ञानसङ्गेन चानघ ॥
 रजोरागात्मकं विद्धि तृष्णाऽऽसङ्गसमुद्भवम् ।
 तन्निबध्नाति कौन्तेय कर्मसङ्गेन देहिनम् ॥
 तमस्वज्ञानजं विद्धि मोहनं सर्वदेहिनाम् ।
 प्रमादालस्यनिद्राभिस्तन्निबध्नाति भारत ॥
 सत्त्वं सुखे संजयति रजः कर्मणि भारत ।
 ज्ञानमावृत्य तु तमः प्रमादे संजयत्युत ॥

Gitâ XIV. 5-8.

“Sattva, Rajas, Tamas, such are the Gunas; Prakṛiti-born they bind fast in the body, O great armed one, the indestructible dweller in the body.”

“Of these Sattva, from its stainlessness luminous and healthy, bindeth by the attachment to bliss and the attachment to wisdom, O sinless one.”

“Rajas, having the nature of passion, know thou, is the source of the attachment to the thirst for life, O Kaunteya, that bindeth the dweller in the body by the attachment to action.”

“But Tamas, know-thou, born of unwisdom, deludeth all dwellers in the body; that bindeth by negligence, indolence and sloth, Oh Bhârata.”

“Sattva attacheth to bliss, Rajas to action, O Bhârata. Tamas, verily having shrouded wisdom, attacheth on the contrary to negligence.”

72.—Q.—*What is the principal characteristic of the Soul?*

A.—Consciousness or संविद्.

73. Q.—*What is the name given to Soul with regard to consciousness?*

A.—द्रष्टा or Seer, प्रत्यगात्मा or Subject. It is the name for the possessor of mental experience.

74. Q.—*What is the chief feature of this mental experience?*

A.—Its continuity or co-herence. It is one and indivisible, it can never be broken.

मासाब्दयुगकल्पेषु गताऽगम्येष्वनेकधा ।
 नोदेति नास्तमेत्येका संविदेषा स्वयंप्रभा ॥

"Throughout all months, years, æons and kalpas, throughout all past, present and future—(through all diversities of time), the consciousness remains one and self-luminous; (it neither has a beginning nor an end), it neither rises nor sets." (Pañchadaśī I. 7.)

75. Q.—*Is not the continuity of consciousness broken in dreamless sleep?*

A.—No. In *suṣupti* also one is conscious of *ānanda* or bliss. See *Bṛihadāraṇyaka* IV. 3. 23 to 30.

यद्वै तन्न विजानाति विजानन्वै तन्न विजानाति न हि विज्ञातुंविज्ञाते-
र्विपरिलोपो विद्यतेऽविनाशित्वान्न तु तद्विद्वितीयमस्ति ततोऽन्यद्विभक्तं यद्विजानीयात् ॥

"And when (it is said that) there (in the *suṣupti*) he does not know, yet he is knowing, though he does not know. For knowing is inseparable from the knower, because it cannot perish. But there is then no second, nothing else different from him that he could know."

76. Q.—*What are the various states of consciousness?*

A.—Four: *Jāgrata* or waking, *Svapna* or dreaming, *suṣupti* or dreamless sleep and *Turiya* or transcendental.

77. Q.—*Describe the waking state?*

A.—जागरितस्थानो बहिःप्रज्ञः सप्ताङ्ग एकौनविंशतिमुखः स्थूलभुग्वैश्वानरः
प्रथमः पादः ॥

"The first quarter is the soul in the waking state, externally cognitive, with seven members, with nineteen inlets, with fruition of the sensible, the spirit of waking souls, *Vaiśvānara*."

In this state the consciousness deals with objects called external.

78. Q.—*What are the seven members here referred to?*

A.—The head, eye, breath, body, bladder, feet and mouth, on the analogy in *Chhândogya Upaniṣad* V. 18. 2.

79. Q.—*What are the nineteen inlets?*

A.—They are the five organs of sense—hearing, touch, sight, taste and smell: the five organs of motion—speech, handling, locomotion, excretion, and generation: the five vital airs—respiration (*prāṇa*) descending (*apāna*), permeating (*vyāna*), ascending, (*udāna*), and assimilative (*sāmāna*) vital airs, the common sensory *manas*, the intellect, *buddhi*, the self-assertive, *ahaṅkāra*, and the memorial faculties, *Chitta*.

80. Q.—*What are the names of individual and universal souls in this state?*

A.—The individual embodied soul is called *Viśva* and the Soul presiding over the sum of embodied souls, *Vaiśvānara*.

81. Q.—*Why is God called Vaiṣvānara in His physical aspect?*

A.—He is so called, because He in this aspect awards the fruits of action, in the shape of pleasure and pain, to all human beings, according to their good and bad deeds. He is also called Virāṭ in this aspect.

विश्वान्नरान् भोक्तृत्वेन व्यवस्थितान् प्रत्यनेकधा धर्माधर्मकर्मानुसारेण सुखदुःखादिप्रापणादयं कर्मफल दाता वैश्वानरशब्दितो भवति ॥ (Anandagiri on Māndūkya I. 3.)

For a fuller description of Virāṭ-rūpa, see the Gītā Chapter XI.

82. Q.—*Describe the dream-consciousness?*

स्वप्नस्थानोऽन्तःप्रज्ञः सप्ताङ्ग एकोनविंशतिमुखः प्रविविक्तभुक् तैजसो द्वितीयः पादः ॥

“The second quarter is the soul in the dreaming state, with seven members, with nineteen inlets, with fruition of the ideal,—the dreaming spirit.”

83. Q.—*What are the names of individual and universal souls in dreaming state?*

The individual sleeping soul is styled Taijasa, the Soul presiding over the sum of sleeping souls in their invisible bodies is Hiranyagarbha.

84. Q.—*Why is soul called Taijasa in its subtle state?*

A.—Because in this state, its body is luminous and bright (teja), like lightning.

इयं विद्युत् सर्वेषां भूतानां मध्वस्यै विद्युतः सर्वाणि भूतानि मधु, यश्चायमस्यां विद्युति तेजो मयोऽमृतमयः पुरुषो यश्चायमध्यात्मं तैजसस्तेजो मयोऽमृतमयः पुरुषोऽयमेव स योऽयमात्मेदममृतमिदं ब्रह्मेदं सर्वम् ॥

“This lightning is the honey of all beings, and all beings are the honey of this lightning. Likewise this bright, immortal person in this lightning, and that bright, immortal person existing as light in the body (both are Madhu). He indeed is the same as that Self, that Immortal, that Brahm, that All.” (Bṛihadaranyaka. II. 5. 8.)”

85. Q.—*Describe the dreamless consciousness?*

A.—यत्र सुप्तो न कञ्चन कामं कामयते न कञ्चन स्वप्नं पश्यति तत्सुषुप्तम् ॥ सुषुप्तस्थान एकीभूतः प्रज्ञानघन एवानन्दमयो ह्यानन्दभुक् चेतोमुखः प्राज्ञस्तृतीयः पादः ॥

“Dreamless sleep is that state in which the sleeper desires no desire and sees no dream. The third quarter is the soul in the

state of dreamless sleep, being one in itself, a mass of cognition, pre-eminent in bliss, with fruition of beatitude, having thought as its inlet, and of transcendent knowledge."

86. Q.—*What is the name given to the individual soul and the Universal soul in this state?*

A.—The individual soul is called *Prājña* and the Universal soul is called *Īśvara*, who is the lord of all, the eternal ruler, the source of all things; who is that out of which all things proceed and into which they shall pass back again.

87. Q.—*You have said that God or Īśvara is the totality of all consciousness. Is this totality, like that of an "army" which is the name given to the totality of certain men, but the "army" devoid of the men is nothing? Is God like that?*

A.—No. In that case God would be no Personality, but merely, an abstraction, a name and no substance. But He is the substance or *Sat*: and He is the Highest Person called *Puruṣottama* (the Supreme Man.)

88. Q.—*Will you illustrate this idea further by some simile?*

A.—Man is perhaps the best simile. He is called *Pinḍāṇḍa* or microcosm as opposed to *Brahmāṇḍa* or macrocosm, and this microcosm is a miniature universe. Human body, physiology tells us, is made up of innumerable small cells, each cell a living organism. Each cell of the human body (some of them as minute as $\frac{1}{300}$ of an inch) has a *jīva* or Soul, for it possesses the seven marks or characteristics of soul—it has desire (*ich-chhā*), aversion (*dveṣa*), volition (*prayatna*), pleasure (*sukhā*), pain (*duḥkha*) and knowledge (*jñāna*). Every cell in the human body has its own likings and dislikings, its sorrows and troubles; every cell exerts its own little will and has a dim consciousness. But all these myriads of *jīvas* or souls are under the control of the supreme soul or man. It is through man, that each cell exists, it is for man that each cell works, it is a portion that goes to make man. But though man is made up of these, yet human consciousness and soul is a distinct personality, infinitely higher than the personality of the cell. So is *Īśvara* or God. Every creature lives in Him and because of Him. He is the Inner Ruler or the *Antaryāmin* *Puruṣa* of all of us, and though He is the totality of us all, yet He is infinitely superior to us in Power, Wisdom, and Love.

89. Q.—*What lesson does it further teach?*

A.—That we must co-ordinate our Will to the Supreme Will. As the will of each cell works in harmony with the will of man, so must every man work in harmony with the will of God.

90. Q.—*What do we call when a cell acts contrary to the Human Will?*

A.—If any cell in any portion of the human body begins to act independently to the human will, that portion becomes diseased, and we say there is a disease in that portion.

91. Q.—*What is the fate of such a cell?*

A.—It is expelled out of human organism, if not cured of its perversity.

92. Q.—*What do we call a man who acts contrary to Divine Will?*

A.—A sinner.

93. Q.—*What is the fate of a confirmed sinner?*

A.—Expulsion from the body of God, and Soul-death.

94. Q.—*When a cell is diseased, man feels pain; does similarly God feel pain when a man sins?*

A.—Yes. *Īsvara* feels pain for us all when we sin: and because he loves us so well, that he feels for us more acutely than any one of us can ever feel.

95. Q.—*Describe the Pure consciousness?*

नान्तःप्रज्ञं न बहिःप्रज्ञमुभयतःप्रज्ञं न प्रज्ञानघनं न प्रज्ञं नाप्रज्ञम् ।
अदृष्टमव्यवहार्यमग्राह्यमलक्षणमचिन्त्यमव्यपदेश्यमेकात्म्यप्रत्ययसारे प्रपञ्चोपशमं
शान्तं शिवमद्वैतं चतुर्थं मन्यन्ते स आत्मा स विज्ञेयः ॥

“Neither internally cognitive nor externally cognitive, nor cognitive both without and within; not a mass of cognition, neither cognitive nor incognitive, invisible, intangible, characterless, unthinkable, unspeakable; to be reached only by insight into the oneness of all spirits; that into which the world passes away, changeless, blessed, above duality;—such do they hold the fourth to be. That is Self. That is to be known.” In this state one becomes, as if, one with Brahman the absolute.

96. Q.—*What are the distinguishing features of these four states of Consciousness?*

A.—The *Viśva* and the *Taijas* are manifested in the realms of cause and effect. The *Prājña* manifests itself in the realm of cause only, while the *Turiya* is above cause and effect.

कार्यकारणबद्धौ ताविश्येते विश्वतैजसौ ।

प्राज्ञः कारणबद्धस्तु द्वौ तौ तुर्ये न सिध्यतः ॥ (Gauḍapāda K.)

The Viśva and the Taijas are said to be bound by cause and effect, the Prājña is bound by cause only, but both these cause and effect do not affect the Fourth—Turiya.

97. Q.—*What is the difference between the Prājña and the Turiya consciousness?*

A.—Both have this common characteristic, that there is unity of consciousness in both of them, no duality is perceived: but Prājña has latent in it the seed of lower states and is drawn back to those states. But not so the Turiya.

द्वैतस्याग्रहणं तुल्यमुभयोः प्राज्ञतुर्ययोः ।

बीजनिद्रायुतः प्राज्ञः सा च तुर्ये न विद्यते ॥ (Ibid.)

98. Q.—*What are the two kinds of souls?*

A.—Daivi or angelic souls and āsuri or satanic souls.

99. Q.—*Describe Daivi attributes?*

अभयं सत्त्वसंशुद्धिर्ज्ञानयोगव्यवस्थितिः ।

दानं दमश्च यज्ञश्च स्वाध्यायस्तप आर्जवम् ॥

अहिंसा सत्यमक्रोधस्त्यागः शान्तिरपैशुनम् ।

दया भूतेष्वलोलुप्त्वं मार्दवं ह्रीरचापलम् ॥

तेजः क्षमा धृतिः शौचमद्रोहो नातिमानिता ।

भवन्ति सम्पदं दैवीमभिजातस्य भारत ॥ The Gītā XVI. 1-3.

Fearlessness, purity of heart, steadfastness in the yoga of wisdom, alms-giving, self-restraint and sacrifice and study of the śāstras, austerity and straight-forwardness.

Harmlessness, truth, absence of wrath, renunciation, peacefulness, absence of calumny, compassion to living beings, uncovetousness, mildness, modesty, absence of fickleness.

Boldness, forgiveness, fortitude, uprightness, amity, absence of pride—these become his who is born with the divine properties, O Bhārata.

100. Q.—*Describe the āsuri sampat?*

A.—दम्भो दर्पोऽभिमानश्च क्रोधः पारुष्यमेव च ।

अज्ञानं चाभिजातस्य पार्थ सम्पदमासुरीम् ॥

प्रवृत्तिं च निवृत्तिं च जना न विदुरासुराः ।

न शौचं नापि चाचारो न सत्यं तेषु विद्यते ॥

असत्यमप्रतिष्ठन्ते जगदाङ्कुरनीश्वरम् ।
 अपरस्परसम्भूतं किमन्यत् कामहैतुकम् ॥
 एतां दृष्टिमवष्टभ्य नष्टात्मानोऽल्पबुद्धयः ।
 प्रभवन्तु उग्रकर्माणाः क्षयाय जगतोऽहिताः ॥
 काममाश्रित्य दुष्पूरं दम्भमानमदान्विताः ।
 मोहाद्गृहीत्वाऽसद्ग्राहान् प्रवर्त्तन्तेऽशुचिवताः ॥
 चिन्तामपरिमेयां च प्रलयान्तामुपाश्रिताः ।
 कामोपभोगपरमा एतावदितिनिश्चिताः ॥
 आशापाशशतैर्बद्धाः कामक्रोधपरायणाः ।
 ईदृन्ते कामभोगार्थमन्यायेनार्थसंचयाम् ॥
 इदमद्य मया लब्धमिदं प्राप्स्ये मनोरथम् ।
 इदमस्तीदमपि मे भविष्यति पुनर्थनम् ॥
 असौ मया हतः शत्रुर्हनिष्ये चापरानपि ।
 ईश्वरोऽहमहं भोगी सिद्धोऽहं बलवान् सुखी ॥
 आढ्योऽभिजनवानस्मिं कोऽन्योऽस्ति सदृशो मया ।
 यक्ष्ये दास्यामि मोदिष्ये इत्यज्ञानविमोहिताः ॥
 अनेकचित्तविभ्रान्ता मोहजालसमावृताः ।
 प्रसक्ताः कामभोगेषु पतन्ति नरकेऽशुचौ ॥
 आत्मसम्भाविताः स्तब्धा घनमानमदान्विताः ।
 यजन्ते नामयज्ञैस्ते दम्भेनाविधिपूर्वकम् ॥
 अहङ्कारं बलं दर्पं कामं क्रोधं च संश्रिताः ।

मामात्मपरदेहेषु प्रद्विषन्तोऽभ्यसूयकाः ॥ The Gītā XVI. 4-18.

Hypocrisy, arrogance and conceit, wrath and also harshness and unwisdom are his who is born, O Pârtha, with âsuric properties.

Âsuric men know not either action or inaction (religious action or inaction); nor purity (of body), nor even purity of conduct, nor truth is in them.

“The universe is without truth, without (moral) basis,” they say “without a God, brought about by mutual union and caused by lust and nothing else.”

Seeing thus, these uncurbed ruined men, of small intelligence, of fierce deeds, come forth as enemies for the destruction of the world.

Surrendering themselves to insatiable desires, possessed with hypocrisy, conceit and arrogance, holding evil ideas through delusion, (they) engage in action with impure resolves.

Giving themselves over to numberless plans, whose end is death, regarding as the highest the gratification of lusts, feeling sure that, that is all.

Held in bondage by a hundred ties of expectation, given over to lust and anger, they strive to obtain by unlawful means hoards of wealth for sensual enjoyments.

"This to-day by me hath been gained, that desire I shall obtain, this wealth is mine already, and also this shall be thine in future."

"I have slain this enemy, and others also I shall slay. I am a lord, I am the enjoyer, I am successful, I am powerful, happy."

"I am wealthy, well-born; what other is there that is like unto me? I will sacrifice, I will give (alms), I will rejoice." Thus deluded by unwise wisdom,

Bewildered by numerous thoughts, enmeshed in the web of delusion, attached by the gratification of desire, they fall downwards into a foul hell.

Self-conceited, obstinate, filled with pride and the intoxication of wealth, they perform lip-sacrifices with hypocrisy, contrary to scriptural ordinance.

Given over to egoism, power, insolence, lust and wrath these malicious ones hate Me in the bodies of others and in their own.

101. Q.—*What are the other names of Devas and Asuras?*

A.—Wise and unwise souls.

102. Q.—*Describe them?*

आत्मानं रथिनं विद्धि शरीरं रथमेव तु ।
 बुद्धिन्तु सारथिं विद्धि मनः प्रग्रहमेव च ॥
 इन्द्रियाणि ह्यानाहुर्विषयांस्तेषु गोचरान् ।
 आत्मेन्द्रियमनोयुक्तं भोक्तव्याहुर्मनीषिणः ॥
 यस्तु विज्ञानवान् भवति युक्तेन मनसा सदा ।
 तस्येन्द्रियाणि वक्ष्यामि सदश्वा इव सारथेः ॥
 यस्त्वविज्ञानवान् भवत्यमनस्कः सदाऽशुचिः ।
 न स तत्पदमाप्नोति संसारञ्चाधिगच्छति ॥
 यस्तु विज्ञानवान् भवति समनस्कः सदा शुचिः ।
 स तु तत्पदमाप्नोति यस्माद् भूयो न जायते ॥
 विज्ञानसारथिर्यस्तु मनः प्रग्रहवाज्ररः ।
 सोऽश्वनः पारमाप्नोति तद्विष्णोः परमं पदम् ॥

यस्वविज्ञानवान् भवत्ययुक्तेन मनसा सदा ।

तस्येन्द्रियाण्यवश्यानि दुष्टाश्वा इव सारथे ॥ Kāṭha I. 3. 3-9.

Know the self to be sitting in the chariot, the body to be the chariot, the intellect (buddhi) the charioteer, and the mind the reins.

The senses they call the horses, the objects of the senses their roads. When he (the Highest Self) is in union with the body, the senses, and the mind then wise people call him the Enjoyer.

He who has no understanding and whose mind (the reins) is never firmly held, his senses (horses) are unmanageable, like vicious horses of a charioteer.

But he who has understanding and whose mind is always firmly held, his senses are under control, like good horses of a charioteer.

He who has no understanding, who is unmindful and always impure, never reaches that place but enters into the round of births.

But he who has understanding who is mindful and always pure, reaches indeed that place, from whence he is not born again.

But he who has understanding for his charioteer, and who holds the reins of the mind, he reaches the end of his journey and that is the highest place of Viṣṇu.

103. Q.—Does soul survive death ?

A.—Yes, it is immortal.

अविनाशि तु तद्विद्धि येन सर्वमिदं ततम् ।

विनाशमव्ययस्यास्य न कश्चित् कर्तुमर्हति ॥

अन्तवन्त इमे देहा नित्यस्थोक्ताः शरीरिणः ।

अनाशिनोऽप्रमेयस्य तस्माद् युष्यस्व भारत ।

न जायते म्रियते वा कदाचिन्नायं भूत्वा भविता वा न भूयः ।

अजो नित्यः शाश्वतोऽयं पुराणो न हन्यते हन्यमाने शरीरे ॥

वासांसि जीर्णानि यथा विहाय नवानि गृह्णाति नरोऽपराणि ।

तथा शरीराणि विहाय जीर्णान्यन्यानि संयाति नवानि देही ॥

नैनं छिन्दन्ति शस्त्राणि नैनं दहति पावकः ।

न चैनं क्लेदयन्त्यापो न शोषयति मारुतः ॥

अच्छेद्योऽयमदाहोऽयमक्लेद्योऽशोष्य एव च ।

नित्यः सर्वगतः स्थाणुरचलोऽयं सनातनः ॥

अव्यक्तोऽयमचिन्त्योऽयमविकार्योऽयमुच्यते ।

तस्मादेवं विदित्वैनं नानुशोचितुमर्हसि ॥ Gīta II. 17—25.

KNOW THAT to be indestructible by whom all this is pervaded. Nor can any work the destruction of that imperishable One.

These bodies of the embodied One, which is eternal, indestructible, and boundless, are known as finite. Therefore fight, O Bhârata.

It is not born, nor doth it die, nor having been, ceaseth it any more to be: unborn, perpetual, eternal and ancient, it is not slain when the body is slaughtered.

As a man, casting off worn out garments, taketh new ones, so the dweller in the body, casting off worn-out bodies, entereth into others that are new.

Weapons cleave it not, nor fire burneth it, nor waters wet it, nor wind drieth it away.

Uncleavable it, incombustible it, and indeed neither to be wetted nor dried away; perpetual, all pervasive, stable, immovable, ancient.

Unmanifest, unthinkable, immutable, it is called; therefore knowing it as such, thou shouldst not grieve.

104. Q.—*What are the vehicles through which the soul manifests itself in its different states of consciousness?*

A.—In its pure consciousness it has no vehicle or Śarīra. In its Suṣupti state, the vehicle is the Kāraṇa Śarīra or the causal body: in Svapna the vehicle is the Sukṣma Śarīra or the subtle body plus the causal body, and in its waking state, the vehicle is the Sthūla Śarīra or physical body plus the other two.

105. Q.—*What are the five Sheaths or koṣas?*

A.—They are the following: 1. Annamaya koṣa, or nutrititious *involutum* or the sheath of food. 2. Prāṇamaya koṣa or tenuous *involutum* or the sheath of vital airs. 3. Manomaya koṣa or the sheath of mind. 4. Vijñānamaya koṣa or cognitional *involutum* or the sheath of intellect. 5. Ānandamaya koṣa or beatific *involutum* or the sheath of bliss.

106. Q.—*What is Annamaya koṣa?*

A.—This physical body is called the Annamaya koṣa or the sheath of food.

अन्नकार्याणां कोशानां समूहोऽन्नमयः कोशः (Śarvasāra Up.)

स्यात् पञ्चीकृतभूतोत्थो देहः स्थूलोऽन्नसंज्ञकः ॥ (Panchadasi I. 34.)

The collection of materials that constitute the element of food

is called food Sheath. Or the dense body, formed of the five gross elements is called Annamaya koṣa.

107. Q.—*What is Prāṇamaya koṣa ?*

A.—Prāṇamaya koṣa is the Sheath of vital airs as acting in the dense body.

प्राणादि चतुर्दशवायुभेदा अन्नमयकोशे यदा वर्तन्ते तदा प्राणमयः कोशः ॥ (Sarva.)

जिह्वे तु राजसैः प्राणैः प्राणः कर्मेन्द्रियैः सह ॥ (Panch. I. 34.)

When the fourteen sorts of Vāyus into which Prāṇa is divided dwell in the Annamaya koṣa, then it constitutes the Prāṇamaya koṣa.

The Prāṇamaya koṣa is the aggregate of the five vital airs and of the five organs of action as existing in the Linga-deha (subtle-body): consisting of the *rājasic* portion of the five elements.

108. Q.—*What is the Manomaya koṣa ?*

A.—The sheath of manas or sensations and desires is called Manomaya koṣa.

एतत्कोशद्वयसंसक्तं मन आदि चतुर्दशकरणैरात्मा शब्दादिविषयसंस्पर्शादीन्धर्मान् यदा करोति तदा मनोमयः कोशः ॥ (Sarva.)

सात्त्विकैर्धीन्द्रियैः साकं विमर्शात्मा मनोमयः ॥ (Panch. I. 35.)

When this soul dwelling in the two above vestures and using the fourteen instruments (manas, buddhi, chitta, Ahaṅkāra, five jñānendriyas, five karmendriyas) perceives sounds &c., has doubts and desires, then it is said to work in Manomaya koṣa.

The Manomaya koṣa consists of the *Sātvic* portions of the five elements together with the five organs of sense, and has the quality of doubting.

109. Q.—*What is Vijñānamaya koṣa ?*

A.—It is the sheath encased in which the soul discriminates and reasons upon the materials supplied by the Manomaya koṣa.

एतत्कोशत्रयसंसक्तं तद्गतविशेषयो यदा भासते तदा विज्ञानमयः कोशः ॥ (Sarva.)

तैरेव साकं विज्ञानमयो धीर् निश्चयात्मिका ॥ (Panch. I. 35.)

When the soul, in contact with the above three sheaths illuminates all, by its special discrimination, it is said to work in Vijñānamaya koṣa.

The Vijñānamaya koṣa has the same constituent elements as the Manomaya koṣa, but its quality is that of determining.

110. Q.—*What is Ānandmaya koṣa ?*

A.—It is the sheath of bliss or the causal body.

एतकोशचतुष्टयं संसक्तं स्वकारणाज्ञाने वटकणिकायामिव वृक्षो यदा वृत्तते तदानन्दमयः
कोशः ॥ (Sarva.)

कारणे सत्त्वमानन्दमयो मोदादिवृत्तिभिः ॥ (Panch. I. 36.)

When in contact with the above four koṣas and ignorant of its own cause, like a tree involved in its seed, the soul remains unconscious of duality, that state of the soul is called the Ānandamaya koṣa.

The Ānandamaya koṣa is the Satva-guṇa as existing in the Causal body, with its functions of joy, satisfaction &c. (Panchadaśī. I 34-36. See Taitt. Up. II. 1-5).

In the Liṅga-deha (subtle-body) there are two forces Jñāna śakti (faculty of cognition) and Kriyā-śakti (faculty of action). Prāṇamaya koṣa is the vehicle of Kriyā-śakti, while the Jñāna-śakti manifests itself through the other two (Vidyāranya).

111. Q.—*To what do these vestures correspond in modern psychology?*

A.—The food sheath corresponds to physical body, with the physical forces of heat, light, gravitation, and magnetism. It is the mineral kingdom of nature. The second corresponds to the Life plane, which is above the physical plane, and represents the vegetable kingdom : all active functions such as those of growth and reproduction of the physical body belong to this sheath. The third belongs to the animal plane or the plane of passion, doubt and desire, the chief characteristics of the animal nature. The fourth belongs to the plane of intellection or Man proper : it is this that differentiates man from lower animals. The fifth is the vesture of gods in the Heaven of bliss. This is the goal of human evolution. In other words, these five sheaths correspond to the five planes of existence :— 1. Mineral, 2. Vegetable, 3. Animal, 4. Human, 5. Angelic.

112. Q.—*Does not Prāṇa mean breath and do vegetables breathe that you say they have Prāṇamaya Sheath?*

A.—Yes, Prāṇa means in popular language breath, but it means also *life*. Vegetables also have Prāṇa or life-fluid : because they breathe in (prāṇa) carbonic acid gas, and *breathe out* oxygen gas (apāna), they have also got *sāmāna* by which the sap is circulated throughout their trunks and branches. They possess also rudiments of the five organs of action, namely (1) they reproduce themselves (*generation*) (2) some have *locomotion* also (3) they can *catch* flies &c. (4) they *excrete* gums &c.

113. Q.—*Does the soul always function in every one of these sheaths?*

A.—No. The souls of the majority of men work with the first three sheaths, which are well developed in all. The intellectual sheath is not fully developed in the majority. The great philosophers, artists and scientists constantly use it. While the last sheath is developed fully only by the ecstatic yogis and saints.

114. Q.—*Can these sheaths be separated one from the other?*

A.—Yes, but not completely. At death the physical vesture is completely thrown off. But the soul retains the other four sheaths.

115. Q.—*Are none of them shaken off by the soul after death?*

A.—These constitute the subtle and the causal body of the soul. The soul which has not developed highest purity and has not freed himself from the wheel of births and deaths, cannot voluntarily throw off these, till the end of kalpa. Then the subtle body of all souls is destroyed and the souls remain in their last vesture, with which they emerge again at the beginning of a new kalpa.

116. Q.—*What states of consciousness correspond with what sheath?*

A.—Roughly speaking, waking consciousness deals with all these sheaths, dreaming consciousness deals with the last three of them; for then the physical body and the Prânas are not under the guidance of the conscious self, and the dreamless sleep corresponds to the beatific sheath.

117. Q.—*Show in a tabular form these sheaths and their correspondences.*

(See the annexed table).

Sariras and Jiva&Isvara.	Kośas or Sheaths.	Gunas or qualities	Śakti or forces.	Lokas or Planes.	Tatwas or elements.	CONSTITUENTS.
Śhūdra Śārira Viśva & Vaiśvānara.	Annamaya or Dense body.	Tamas (Inertia or Passivity.)	Āvarana Śakti or Inertia force.	Bhū-loka or Physical plane.	Bhūta-tatwa or Gross elements.	<p>The Five Gross Elements : Subtle elements are Tanmātras :</p> <p>1. Earth made up of ... $\frac{1}{8}$ Subtle Earth + $\frac{1}{8}$ Subtle Fire + $\frac{1}{8}$ S. Ether. Subtle Air + $\frac{1}{8}$ Subtle Water + $\frac{1}{8}$ Subtle</p> <p>2. Air ... $\frac{1}{8}$ S. Air + $\frac{1}{8}$ S. Ether. $\frac{1}{8}$ Subtle Earth + $\frac{1}{8}$ Subtle Water + $\frac{1}{8}$ S. Fire + $\frac{1}{8}$ S. Ether.</p> <p>3. Water ... $\frac{1}{8}$ S. Water + $\frac{1}{8}$ S. Ether. $\frac{1}{8}$ S. Air + $\frac{1}{8}$ S. Fire + $\frac{1}{8}$ S. Ether.</p> <p>4. Fire ... $\frac{1}{8}$ S. Fire + $\frac{1}{8}$ S. Ether. $\frac{1}{8}$ S. Air + $\frac{1}{8}$ S. Water + $\frac{1}{8}$ S. Ether.</p> <p>5. Ether ... $\frac{1}{8}$ S. Ether + $\frac{1}{8}$ S. Ether. $\frac{1}{8}$ S. Air + $\frac{1}{8}$ S. Water + $\frac{1}{8}$ S. Fire.</p>
Sūkṣma Śārira : Taijasa and Hiranyagarbha.	Prāṇamaya or Force body.	Rajas (Energy or Activity.)	Kriyā Śakti or Motion force, Involuntary or sympathetic nervous action.	Bhuvan loka or Astral plane.	Prāṇa-Tatwa or Force element.	<p>Prāṇa or Up-breathing ... Respiration, Chest</p> <p>Apāna or Down-breathing ... Intestines, Excretion</p> <p>Vyāna or Back-breathing ... Vascular System; Circulation</p> <p>Udāna or Out-breathing ... Throat; Deglutition (Alimentation).</p> <p>Samāna or On-breathing ... Navel : Assimilation</p>
	Manomaya or Desire and Perception body.	Tamas & Satwa (Passive knowledge.)	Ichchhā or Kāraṇa Śakti or Desire force, Voluntary cerebro-spinal nervous action.	Svar loka or Devāchanic (Heaven) plane.	Kāraṇa tatwa organising element.	<p>Karma Indriyas or organs of actions ... 1. Voice, 2. Hands, 3. Feet, 4. Excreting, 5. Generation.</p> <p>Jñāna Indriyas or organs of Perception ... 1. Sight, 2. Hearing, 3. Taste, 4. Smell, 5. Touch.</p> <p>Antar Indriyas or organs of Ideation ... 1. Manaś or co-gitation, 2. Buddhi or Determination, 3. Chitta or Memory, 4. Ahaṅkāra or Egoity.</p>
Kāraṇa Śārira : Prāṇa & Isvara.	Vijñānamaya or Reason body.	Rajas and Satwa (Active or Self-initiated cognition.)	Jñāna or Karti Śakti or will or creative force cerebellar action.	Mahar loka or Buddhic plane.	Aham-tatwa or Individualising element.	<p>Subject—Consciousness or Abstract ideas. This is the Jivātmā of the Naiyāyikas, and the Ahamtatva of the Sāṅkhyās.</p>
	Anandamaya or Intuition body.	Satwa (Transcendental knowledge.)	Bhoga Śakti or Enjoyment.	Janah Loka or Atmic plane 6 & 7, Tapas and Satya are unknown planes.	Bhoga-Tatwa or Transcendental element.	<p>The Sat-chid-ānanda ātma or the Self free from all upādhis or determining limitation. It is, according to some, no body but Brahman Itself. See Vedānta Sūtras 1. 1. 12.</p>

CHAPTER IV.

Karma and Re-birth.

118. Q.—*What is Karma?*

A.—The literal meaning of the word is 'an action.' In technical language it means "any action voluntarily done, with a motive."

क्रियमाणेन्द्रियैः कर्माण्यहं करोमीत्यध्यात्मनिष्ठतयाकृतं कर्मैव कर्म ॥

119. Q.—*How many kinds of karmas are there?*

A.—Three, Nitya, Naimittika and Kāmya.

120. Q.—*What are the Nitya karmas?*

A.—They are obligatory (Nitya) duties, which every person must perform, the omission of which produces sin, though the doing of which does not produce merit (karma); such as the five daily sacrifices. नित्यानि अकरणे प्रत्यहायसाधनानि, संध्यावन्दादीनि ॥

121. Q.—*What are the five daily sacrifices?*

A.—बलि कर्म स्वधा होम स्वाध्यायातिथिसत्क्रियाम् ।

भूतपित्रमरब्रह्ममनुष्याणां महामखाः ॥ Yājñavalkya I. 102.

The five great sacrifices are, first, Bhûtayajña or duty towards all creatures, which is done by giving food, morning and evening to lower animals and degraded men; second, Pitri-yajña, or ancestor-worship, by offering oblations to the departed manes or Fathers; and remembering their great deeds; thirdly, Deva-yajña or sacrifice to the Devas by offering homa-oblations in fire; fourthly, Brahma-yajña or studying the Vedas; and lastly, Manuṣya-yajña or honoring and feeding the guest.

122. Q.—*What are the Naimittika karmas?*

A.—Duties which are obligatory under certain circumstances only; or an occasional duty; such as the ten saṁskāras or sacraments.

नैमित्तिकानि पुत्रजन्मादि-अनुबन्धीनि जात-इष्ट्यादीनि ॥

123. Q.—*What are the ten Sacraments?*

A.—गर्भाधानमृतौ पुंसः सवनं स्पन्दनात्पुरा ।

षष्ठेष्टमे वा सीमन्तोमास्येते जातकर्म च ॥

अहन्येकादशे नाम चतुर्थे मासि निष्कमः ।

षष्ठेऽन्नप्रदानं मासि चूडा कार्या यथाकुलम् ॥

एवमेतः शर्म याति बीजगर्भसमुद्भवम् ।

तूष्णीमेताः क्रियाः स्त्रीणां विवाहस्तु समन्वकः ॥

गर्भाष्टमेऽष्टमे वाग्ने ब्राह्मणस्योपनायनम् ।

राज्ञामेकादशे सैके विशामेके यथाकुलम् ॥

1. In season the garbhâdhâna (or the ceremony of conception), 2. before the quickening the puṁsavana ceremony (or the ceremony of having a male child), 3. in the sixth or the eighth month the simanta, (or parting of the hair of the head and to so arrange it as to indicate that the woman is *enciente*), 4. on delivery, the jâtakarma (or birth ceremony),

5. On the eleventh day the nâma ceremony (or naming the child), 6. on the fourth month the niṣkraman, (showing the child to the sun), 7. on the sixth month the annaprâśana (giving cooked food to the child), 8. chûḍâkarana (tonsure) is to be performed according to the family usage. By this the sin produced from the seed and the embryo is destroyed. These ceremonies in case of women are performed in silence, their marriage is with the mantra.

9. In the eighth year of conception or in the eighth (year of) birth, the upanayana ceremony of the Brâhmaṇa, of the Kṣatriyas in the eleventh, of the Vaiśyas in the twelfth. Some say according to the family custom. The tenth sacrament is marriage. Yâjñavalkya II. 11. 12. 13. 14.

124.* Q.—Describe the Saṁskâras more fully.

A.—Saṁskâra literally means perfectly made, completing, giving the finishing stroke. It also means the power of memory and faculty of recollection, hence convictions which when obtained without discrimination is like giving a decree before investigation. Hence Prejudice is कुसंस्कार. But the term असंस्कृत technically means one who has not received the purificatory rites observed. One who has been denied of such liturgical rites is a ब्राह्मणः who has not received the purificatory rites and is as such अस्वाध्यायो uneducated—निराकृतिः—deprived of rites.

षोडशवर्षपर्यन्तं अकृतसंस्कारो व्रतदानानर्हो One who has not been purified up to his 16th year is unfit for any observances and to receive any donations. He is also called a अष्टगायत्रीकः one who has lost the Gâyatri and being ignorant of the Vedas is as if ostracised. But the term संस्कार of the body or clothes consists in placing such

* This important paper on Saṁskaras is from the pen of that distinguished scholar, the recluse of Vindhyâchal,

fragrant herbs as are called *Pat-Purer* in the Parisian markets with which garments are treated. Amara says:—

चूर्णनिवासयोगः स्युः भावितं वासितं For garments such powders are perfumed and persons are purified, adorned—(toiletted) by गन्ध (perfumes) and माल्य garlands; certain hymns of the Rig Veda are said to purify (संस्कुर्वते) the soul.

Yājñavalkya says

ब्रह्मक्षत्रियविट्शूद्रा वर्णास्त्वाद्यास्त्रयो द्विजाः ।

निवेकादिदमशानान्तास्तेषां वै मन्वतः क्रियाः ॥

Of the Varnas, Brāhmaṇa, Kṣatriya, Vaiśya and Śūdra, the first three are called Dvija, twice-born, from birth till death all their acts are accompanied by hymns. निवेक literally means aspersion, infusion, impregnation and the ceremony connected with it. दमशान the place of the final disposal of the corpse.

These Saṁskāras have to be observed of the first three Varnas with chanting of Mantras.

Of the Varnas=colour-tint; from √वृ, to screen etc., the first three which are Twice-born (द्विज) from conception to the funeral ceremony, all observances must be accompanied with hymns.

The later authors such as Yājñavalkya have excluded the Śūdras from those of the Twice-born caste. But in the Mahābhārata which refers to earlier periods, a more liberal view of the Śūdra is taken. The term Śūdra has been in later grammars and lexicographies derived from √शुच= to purify, च being changed to द and the vowel emphasized. But in the Vedas we find (Chhândogya Upaniṣad) the term is derived from शुभ=grief; one who having heard of grief melts; one who is affected by small things and is ruffled by trifles. Saṅkara explains the passage and Ānandagiri corroborates by saying that

अन्यधनहरणानिच्छायां कारणोपेक्षायां शूद्रेति सम्बोधनम् । श्रुतिद्वारा विद्या-
धिकारो नास्तीति अयं शूद्राधिकरणे निर्द्धारिताशुगाविष्टत्वेन शुगाहेतुना आद्रवती ।

One who is desirous of misappropriation of other person's property is called a Śūdra. As also one who is denied the teaching by the Śruti, thus in the chapter of Śūdras it has been determined:—Suga is शोक one who melts by grief is a Śūdra.

In the vernaculars we have शोचना-शोच hence शोक, the first sympathetic or pathetic utterance of the Great Epic author वाल्मीकि.—

In the Mahābhārata Bhīṣma Pitāmaha takes a more liberal view of the caste; in the आनुशासनिक we find

रागो द्वेषश्च मोहश्च पारुष्यञ्च नृशंसता ।
 शास्त्रञ्च दीर्घवैरत्वमतिमानमनार्जवम् ।
 झमतञ्चातिवादश्च पैशुन्यमतिलोभता ।
 निकृतिश्चाप्यविज्ञानं जनने शूद्रमाविशत् ।
 दृष्ट्वा पितामहः शूद्रमभिभूतन्तु तामसैः ।
 द्विज-शुश्रूषणं धर्मं शूद्राणाञ्च प्रयुक्तवान् ।
 नश्यन्ति तामसा भावाः शूद्रस्य द्विजभक्तिः ।
 द्विजशुश्रूषया शूद्रः परं श्रेयोधिगच्छति ।

Anger, envy, illusion, cruelty, cheating, persistent enmity, immense vanity, non-rectitude, irrelevance, garrulity, wickedness, great acquisitiveness, rustication from the Vedas, ignorance : all these enter a Śūdra on his birth. Pitāmaha (Brahmā) observing the Śūdra obsessed by chaotic darkness with a view to alter his sentiments assigned the following of the Brāhmaṇas as loyal vassals: Śūdra by loyally following a Brāhmaṇa attains excellence by association.

Is it not said that "Tell me who are your friends and I will tell you who you are." For hawks with hawks and pigeons with pigeons fly.

(1) In support of this we have मनुः—

असूयकः पिशुनश्च कृतघ्नदीर्घरोपकः ।

चत्वारः कर्मचाण्डाला जन्मतश्चापि पञ्चमः ॥

The envious, the wicked, the ungrateful and one who retains vindictive motives for any length of time are four sorts of Chāṇḍālas, one born of Chāṇḍāla parents is the fifth Chāṇḍāla.

Vasiṣṭha reads it

असूयश्च कृतघ्नश्च ब्रह्महा चिरोपकः ।

चत्वारः कर्मचाण्डाला जन्मतश्चापि पञ्चमः ।

Vasiṣṭha substitutes the पिशुन by one who kills or injures a Brāhmaṇa.

Such vile affections as calumny, ingratitude, an infidel and one who retains his wrath for any length of time, thinking for revenge, are four Chāṇḍālas by their actions and the fifth Chāṇḍāla is one born of Chāṇḍāla parents. The whole thing hinges upon one's conduct and behaviour for it has been distinctly said that, 'By birth every one is a Śūdra which refers to the animality of the being as the Naiyaikas have defined man to be an animal, a biped, without tail and horns. पुच्छविशानविहीनद्विपदपशुः । The animality is connected with birth.

जन्मना जायते शूद्रः संस्काराद् द्विज उच्यते ।

वेदपाठे भवेत् विप्रः ब्रह्मज्ञाने तु ब्राह्मणः ।

Every man born is a Śūdra, he is called a Twice-born (द्विज) after purification (Sacerdotal rites). He is called a Vipra when he is educated in the Vedas and he is a Brāhmama who has acquired the knowledge of the Final Cause.

The passage of the Mahābhārata quoted above means (राग =) wrath, anger, (द्वेषः =) enmity, hate, (मोह =) loss of consciousness, (पारुष्यं =) scurrilousness, contumacious speech, (वृशंस =) malice (शाब्द =) villainy, (दीर्घवैर =) इङ्गपङ्गी in Hindi a deep-rooted family antipathy, a long cherished anger, (अतिमान =) high haughtiness, arrogance (अनाजं =) moral crookedness, (अमत्तुतिवाद =) approbious speech, (पैशुन्य =) espionage, depravity, (निकृति =) intense cupidity, (अवेज्ञान =) dishonesty, Ignorance. Stupidity when grows in a man, he becomes a Śūdra, in him Śūdratā grows or enters, he becomes one of the mob. Brahmā the Creator, having observed such obsession in some men, enveloped by darkness ordained them Śūdras to the service of the learned twice-born, a reformatory punishment by which the illiterate are enlightened, their folly minimised and they attain better manhood.

There is a Bengali saying which depicts the short-sightedness of the illiterate नका स्वर्णपूत्रौ पेषे हौन मति । शरिजा करिन चुरि एत नौच गति ।—He stops not to think, he is misled by the yellow colour of turmeric and commits the vile sin of theft (mistaking it for gold) without adequate gain. It leads us to the better and more substantial lasting happiness if we simply for a short time restrain our cupidity.

In the शान्तिपर्व we find that Śūdras are allowed such liberties as to utter स्वाहा etc., and with them let him observe the rites of the cooked sacrifice himself being the ritualist.

स्वाहाकार-नमस्कार-मन्त्रं शूद्रे विधीयते ।

ताभ्यां शूद्रः पाकयज्ञैर्यजेत ब्रह्मवान् स्वयम् ॥

“Let him observe with such Mantras as have स्वाहा etc. the पाकयज्ञ which consists in द्योतयन् including oblations to the विद्यदेवाः, to the पितृ, the daily obsequial rites and hospitality, sacrifice and distribution of food being necessary.”

In the Viṣṇu Purāṇa we have

दानञ्च दद्यात् शूद्रोपि पाकयज्ञैर्यजेत च ।

पित्रादिकञ्च वै सर्वं शूद्रः कुर्वीत तेन वा ।

A Śūdra may give doations and may adore the Manes with cooked rites or he may by donations substitute all the rites.

It need not be mentioned that there is much difference between a Śūdra = Mob and a *Chāṇḍāla*, the lowest caste; for we find

कपिलाक्षीरपानेन ब्राह्मणीगमनेन च ।

वेदाक्षरविचारेण शूद्रश्चाण्डालतामियात् ॥

The term Śūdra is confined to any caste, it sometimes stands for the million, other than those specified as the twice-born. For in the above passage, such of the million and nude persons as taste the milk of the Kapila Cow, or who go to a Brahmini (female) and who cavil the wordings of the Vedas become Chāṇḍālas. A Chāṇḍāla appears to be the lowest in the Aryan community. In the Bengali Vernacular a Chāṇḍāla styles himself as one who makes obiesance to (stoops), even to a śūdra (नमश्शूद्र is a Chāṇḍāl in Bengal.)

The Saṁskāras necessary for the Twice-born are ten in number. Saṁskāra does not create but it has to be taken in the sense as जीर्णोद्धार (repair) of a tank or building, conservation, clearing or cleansing out. They begin with conception which is no sexual enjoyment but is the most holy and sacred act of Procreation. As the sacrificial fire is kindled with certain observances of ritualistic ceremonies and hymns अग्न्याधान, the गर्भाधान is a similar ceremony. Âdhâna is the depositing or taking possessions of. The second is पुंसवन (पुं = a male, and सू = bear) a ceremony aimed for the bringing forth of male children only, a natural desire for every one who has the interest of the family, the race and the country at heart. Did not Shakespeare make Macbeth express such a desire in admiration of the heroic energy of his lady? As a matter of course it is observed after the vitality of the foetus is noticed and therefore after the suppressions of the menses for 2 or more months. It is a deep question of Biology how the foetus is affected by the mental condition of the mother. During conception and in child-bearing when a new life is generated in the womb, the constitution needs extra feeding for that which the mother partakes nourishes the foetus which is a limb of the mother. The third purificatory ceremony necessary amongst the Hindus is the सीमन्तोन्नयन which literally means the parting and combing of the hair of the female after conception so as to divide the hair over the two temples and making as it were a distinctive road, जीति

being separation of the hair, (the (सीमन्त) on each side so as to leave a distinct line the top of the head. - This ceremony is observed in the 4th, 6th or 8th month of pregnancy. These three ceremonies need not be repeated at every conception; once observed they purify the womb. Before conception the Hindu females are permitted to so comb their hair (as is known in Bengali *বাঁকা মৌড়া* the right-word combing of the hair) or to collect the end of the hair, all in a tuft, behind the skull.* But after conception such tying is forbidden. The *सीमन्तोन्नयन* distinguishes a female, a wife from a virgin and when one becomes a widow, she resorts to the prior method of tying her hair all in a knot coiffre at the back if she does not shave her head clean. Apparently *सीमन्तोन्नयन* is an Empiric Convention, a custom limited in each society, just as the tattooing *उत्की* of the arm or chest and forehead of a female is only observed after marriage. A tattoo distinguishes an unmarried female from a married one. In Bengal the vermilion mark on the *सीमन्त* distinguishes a wife from a widow and a virgin just as the hood, the veil the *घोमटा* the *घूंघट*, which however in the Non-Aryan Dravidians is dispensed with in cases of married females, it is only the widow who use the veiling hood: they argue that so long the female is a femme-covert her protection is assured by her consort, it is only after widowhood that she must use the veil (hood) to protect herself. The idols of goddesses are never veiled nor hooded, they need it not. But even in Vindhyaçal on the two Novenas, the autumnal and the vernal, the face of the idol in the shrine is screened from the 4th to the 9th day when the feet alone of the goddess is seen *चरणदर्शन*. A tãntric observance now much resorted to is the *कुमारीपूजा*, the adoration of virgin girls specially of the Brãhman caste and in doing this in Bengal, the vermilion mark is placed on the forehead of the girl but in these places they do not allow the vermilion on their head, it is placed on the feet. Girls-virgins, Kumãris are differently addressed in their worship according to their approximate age, the appellation *कुमारी* is given to a girl of eight years.

* An anecdote is recorded in the Vedas which in a manner explains authoritatively why the forehead of man is free from the growth of hair; a circumstance not to be observed in the quadrumania though the *Hylobates hoolock* may be seen to walk erect on its feet in a sailor style and has arms stretching much below its thighs *बाजागुलम्बितपाद*.

सीमन्त in the lexicographies and vocabularies means the dressing of the hair सीमन्तकेशवेशेषु—केशविन्यास सीमन्त-सीवन sewing-suture is also applied in the ligaments of the joints.

चतुर्दशैव सीमन्ताः कथिता मुनिपुङ्गवैः ।

संघाता सीविता यैस्तु सीमन्तास्ते प्रकीर्त्तिताः ॥

Anatomically there are 14 sutures mentioned by the learned Munis with which are ligamented and connected the limbs etc., of the human body and hence they are called ligaments.

Is it then the branding of the female with the mark of a wife—Mid-wife ; so like the warning which is chanted to the Bull let loose in वृषोत्सर्ग ceremony ?

- न खादेत् परशयानि नाक्रमेद् गर्भिणीञ्च गाम् ?

Browse not another's crops and attack not a pregnant cow.

The fourth purificatory essential संस्कार is जातकर्म—the festival of the nativity. When before the new-born is separated from the womb, i.e., before the Umbilical cord is cut through it is observed and the first rite is to make the baby lick in a gold spoon a small quantity of clarified butter. Matrons add pounded pepper and they say the phlegm slime which chokes the gullet of the new-born is extracted and respiration initiated, the baby then utters cries. The father has then to observe the Nandimukha Śrāddha but not with cooked rice. Until the navel cord is cut through, the birth of the baby is not legalised and therefore the couvade—the uncleanness—of the parents and of the other members of the family does not begin :—the new-born is until then technically speaking a limb of the mother, the same blood circulating through them both. The individuality of the baby begins after the incision of the chord. In the case of the death of a साम्प्रिक mere death does not effect a couvade, it begins after the corpse is cremated and the same is consumed on a pyre: the individuality is supposed to subsist in the corpse. This clearly explains the couplet in the opening lines of शान्तिपर्व so often misconstrued as an apology for observing 30 days couvade of the Kāyasthas of Bengal.

कृतोदकास्ते सुहृदां सर्वेषां पाण्डुनन्दनाः ।

× × × ×

शौचं निर्वर्त्तयिष्यन्तो मासमात्रं बहिः पुरात् ।

They having offered oblations to the manes of their kindreds, the Sons of Pandu purified, returned to the city after a month.

The thirty days of this अशौच were made up with 18 days of warfare and 12 days of अशौच couvade as ordained for Kṣatriyas whose deads were cremated after the conclusion of the war.

The naming of the new-born नामकरण is the fifth observance संस्कार.

But during pregnancy, specially the first, there is a custom amongst the Bengalis which is known as साधमद्य. Those who are well-to-do observe this rite on two occasions :—on the 5th month of pregnancy and on the 9th month, the first being known as कांचासाध and the last as पाकासाध. In the former the female, on an auspicious day well decorated and bejewelled, is made to dine with female relatives on dishes mostly consisting of parched, puffed, flaked, roasted, baked and fried articles. On the last the mature साध day cooked food of all possible kinds is served.

The third Saṃskâra सीमन्तोन्नयन with its appendage the कांचा and पाकासाध "the jointure" nature of the Saṃskâras purificatory ceremonies ceases. The remaining seven observances pertain to the male. A female on her first conception and until the birth of her first child partakes of the three ceremonies and once observed her womb is considered purified for ever, she escapes the period of accoucheuse though she plays an important part in sacrifices as a सहचर्मिणी—for cooked oblatory cakes and for helping in other sacrifices, she becomes a consort, a partner.

The remaining seven Saṃskâras pertain to the male—the 4th जातकर्म, the 5th नामकरण.

The sixth is निष्क्रमण. Until this the new-born is considered too delicate to be exposed. On an auspicious day the new-born is carried out to see the luminaries, the sun and the moon. The seventh is अन्नप्राशन which takes place about the time the baby is teething. Henceforth the ceremonies are restricted to the male baby the female baby does not according to the Sastras require any further rites until her marriage age. The birth of a girl has always been a source of anxiety to her parents.

पुत्रीति जाता महतीह चिन्ता कस्मै प्रदेयेति महान् वितर्कः ।

दत्ता सुखं प्राप्स्यति वा नवेति कन्यापितृत्वं खलु नाम कष्टम् ॥

A girl being born is a source of great anxiety ;—to whom to be given in marriage is a serious question, Given in marriage to a person, she might be happy or not ; to be father of a girl is really a misfortune.

Although there are such Vedic passages as recommend the better treatment of daughters, they suggest that there must have been such necessity

अश्र्वं हि भूरिदावत्तरावां विजामातुरुत्तवां धास्याजात् ।

अथासोमंस्युप्रयती युवभ्यामिन्द्राग्नीस्तोमं जनयामि नव्यम् ॥

Oh Indra and Agni, both of you are liberal donors of Wealth. Listen the unlearned bridegroom or of the brother of the bride who for the benefit of his sister so for you I offer fresh Soma-juice etc.

Sāyana interprets the above passage thus

लोके हि स्वदुहितुरत्यन्तप्रियविशिष्टो जामाता दौहित्ररूपावह्नीः । प्रजा प्रददाति स्यालक्ष स्वया दक्ष भगिनीस्नेहेन गृहधनरक्षणाय दासदासी रूपा बह्नीः प्रददाति । ताभ्यामपि वां भूरिदावोत्तरौ अतिशयेन बहु प्रजाप्रदौ युवामित्य-श्रुणुवम् etc.

Men in society regard their daughters with much affection as also their sons-in-law and their sons (the sons of daughters), they give wealth to their brothers-in-law to secure the happiness of their girls and sisters, give slaves etc.

In the Chhândogya Upaniṣad, the way to attain Brahmaloḳa is fully described. Having been educated in an university i.e., having completed his studies; आचार्यकुजात् वेदमधीत्य etc., and having after completing his studies अभिसमावृत्य etc., one should marry and, having provided for his family, कुटुम्बशुचौ देशे स्वाध्यायमधीयानां etc., attains Brahmaloḳa and not otherwise; as is now done without education and before marriage or neglecting families to take up asceticism. Manu derides those who neglecting relatives seek the comfort of the Atithi which is the ostensible object of the ascetics and hermits of the present age.

शक्तः परजने दाता स्वजने दुःखजीविनि ।

मध्वापातो विवास्वादः स्वधर्मप्रतिरूपकः

“(If an opulent man (is) liberal towards strangers, while his family lives in distress, that counterfeit virtue will first make him taste the sweets (of fame, but afterwards) make him swallow the poison (of punishment in hell. Manu xi. 9.”

The seventh is अन्नप्राशन when the teeth have appeared and when the new-born craves for solid food, when bits of ivory or wood with little bells are given to the child to masticate to harden his gums. This is directed not to be observed before 100 days.

The eighth is चूडा, = Tonsure, when the hair of the child is shaved for the first time.

The ninth is उपनयन, investiture of the sacramental thread, a badge of distinction but is also a bondage of duties as it is called in these provinces व्रतबन्धन .

The last is marriage which is an observation purificatory and is as essential as any of the above.

Such are the Saṁskāras enumerated in the Śāstras which every Hindu is bound to observe. One who has not observed these ceremonies is a व्रात्य and he is forbidden in parties becoming अपांक्त्य, unfit to be permitted in the same line of the table.

A व्रात literally means a multitude, the promiscuous million—one who sinks in the abyss of the millions losing his individuality becomes forgotten in the mob. A व्रात्य as stated above is an out-caste, one ostracised, an apostate unfit to be allowed a place in an assembly.

Local customs have modified some of the above observances. The earlier authors go far

यस्य पिता पितामहो वा सोमं न खिवेत् स व्रात्य इति श्रुतिः

Whose father or even the grandfather has not tasted the Soma juice is an out-caste.

In the Taittiriya Saṁhitâ we find quoted by Sâyaṇa

यस्य वेदश्च वेदीश्च विच्छिद्यन्ते त्रिपूरुषं । स वै दुर्ब्राह्मणो नाम यश्चैव वृषलीपतिः ॥

One who has lost the Vedas and the altars for 3 generations is a bad Brâhmana and is as low as a garlic eating sinner.

And Kâtyâyana has ruled

यस्य देशस्य यो धर्मः प्रवृत्तः सर्वकालिकः ।

श्रुतिस्मृत्यविरोधेन देशदृष्टं स उच्यते ॥

That is the usage and custom which is of his country and which has been current at all times and which is not opposed to the Śruti and the Smṛiti, that is verily देशदृष्ट.

This restricts the custom within legitimate jurisdictions. The caste restrictions as to intermarriage have been adopted by the more civilised nations of the west; for are there no such things as *connubium* which is the पांक्त्य and अपांक्त्य of the Hindus and the commensuality which were in force amongst the plebians and patricians of Rome and they are still observed amongst the great Germans and the Russians. The rules of Endogamy and Exogamy are current all over the world. That certain classes eat together is an universal custom, is a worldwide phenomenon and it is idle to impute superstition and ignorance to us Hindus only. In other countries, however, they are not fixed and immutable and they are not quite the same in successive generations. Caste everywhere depends on the sanction of public opinion and the

opinions as expressed in the current Sâstras seem to be stable but they tend to vary as to degree according to the clever exegesis of the times. The gradual growth of the Indian system and the gradual formation of the new sectarians with the gradual extension of such institutions, all trace up wrongly or rightly their descent from the same source. Geographical distinctions were not originally recognised so long as there was no substantial difference between the settlers of the valley of the Ganges and of the Hills. Limited education has gradually narrowed the jurisdiction but progress being the unchangeable mundane Law such nice distinctions as Uttara-râdhi, Dakṣiṇa Râdhi, Bârendra, Vaidika Śrotriya etc., like immature growths survive ephemerally. Liberal cosmopolitanism is what the Vedas and Upaniṣads teach us and every thing tends towards that Noble-path. But gradually as natural growth, they must not and cannot be forced and thrust without serious detriment to the welfare of the community at large.

When Buddha appeared Caste was in the making. There were four classes with undefined limitations. After the decline of Buddhism the Brâhmins successfully ousted the nobility. There was a gradual falling off in the Buddhist cannons. Aśoka attempted to rectify but he simply expedited the Decline. The Kulins of Bengal under the masterful control of Master Purandar Khan accepted rigid rules which they began to break through in the first century of this institution.

Manu therefore has ruled that unperturbed conscience is the only true guide

विद्वद्भिः सेवितः सद्भिर्नित्यमद्वेषरागिभिः ।

हृदयेनाभ्यनुज्ञातो यो धर्मस्तं निबोधत ॥

“Learn that Sacred law which is followed by men learned (in the Veda) and assented to in their hearts by the virtuous, who are ever exempt from hatred and inordinate affection.” Manu ii. 1.

and concludes by saying

येनास्य पितरो याता येन याताः पितामहाः ।

तेन यायात् सतां मार्गं तेन गच्छन्न रिष्यते ॥ iv. 178.

यत्कर्म कुर्वतोप्यस्य परितोषोन्तरात्मनः ।

तत्प्रयत्नेन कुर्वीत विपरीतन्तु वर्जयेत् ॥ iv. 161.

“Let him walk in that path of holymen which his fathers and grandfathers followed, while he walks in that he will not suffer harm.”

“When the performance of an act gladdens his heart, let him perform it with diligence, but let him avoid the opposite.”

He forbids such asceticism as

दुःखमित्येव यत्कर्म कायङ्केशभयात्त्यजेत् ।

आलस्योपहतैरङ्गैरकर्तृत्वमुपेयते ।

स कृत्वा राजसं त्यागं नैव त्यागफलं लभेत् ॥

Abandoning any act because of the physical inconveniences is no forsaking. That abdication is considered secondary. That is no abstinence and there is no merit in the same.

And such Sadhus have been called as political beggars.

126. Q.—*What is a kâmya karma (optional action) ?*

A.—An act performed for some particular object, and with a view to future fruition : as the Jyotiṣṭoma sacrifice made in order to get to heavenly regions &c. काम्यानि स्वर्गादि-इष्ट साधनानि ज्योतिष्टोमादीनि ॥

127. Q.—*What is the other meaning in which the word karma is generally used ?*

A.—It means also the universal law of action and re-action,—“a causation operating on the moral as well as on the physical and other planes : what a man sows that must he reap.”

128. Q.—*What are the various terms by which this Law is called ?*

A.—Fate, Destiny, Adṛiṣṭa, Apûrva, and Prârabdha.

129. Q.—*Of how many kinds are the fruits of Karma ?*

A.—Three : Sañchita, Prârabdha and Âgâmin.

130. Q.—*What are the Sañchita-Karma-Phalas ?*

A.—अनन्तकोटिजन्मनां बीजभूतं सत् यत् कर्मजातं पूर्वार्जितं तिष्ठति तत् संचितं ज्ञेयम् ॥

The aggregate of Karmas wrought previously, that exist as the seed (or potential cause) of an infinite millions of births is known as Sañchita. (Tatwabodha)

131. Q.—*What is Prârabdha ?*

इदम् शरीरमुत्पाद्य इहलोकं एवं सुखदुःखादिप्रदं यत् कर्म तत् प्रारब्धम्, भोगेन नष्टं भवति । प्रारब्धकर्मणा भोगादेवं क्षय इति ॥

The Karma that generating this body yields forth pleasure and pain &c., in this region is called Prârabdha : it comes to an end by enjoyment (i.e., fruition). For it is said 'the destruction of Prârabdha Karma comes through enjoyment alone'.

132. Q.—*What is Âgâmin ?*

ज्ञानोत्पत्त्यनन्तरं ज्ञानिदेहकृतं पुण्यपापरूपं कर्म यदस्ति तदागामीत्यभिधीयते ॥

That Karma is called Âgâmin, which appears as virtue and vice performed by the body of a sage, after the dawning of knowledge (on him).

133. Q.—*Does this law teach fatalism ?*

A.—No. As the pleasures and pains experienced in any life are the fruits of one's own actions, it follows as a logical consequence, that *fresh* and new actions can sometimes totally *destroy* and sometimes counteract, the effects of past actions and prevent their manifestation.

134. Q.—*How do you harmonise the law of Karma with the doctrine of Grace ?*

A.—The grace or प्रसाद of God is strictly in accordance with this law. The act of prayer and total dependence upon God is the highest Karma possible. It requires a great effort to bring the soul to this attitude, and as a result there is Grace.

135. Q.—*How is the love of God manifested in this world ?*

A.—The infinite patience and love of God is manifested by His willingness to work through organs—developing them through sons of labour: so that each ego or monad may become conscious of God's love and sympathy and become a co-worker with Him.

136. Q.—*What Karmās can be destroyed ?*

A.—The Sañchita Karmas can be so destroyed.

“अप्रवृत्ते फले एव पूर्वे जन्मान्तरसञ्चिते अस्मिन्नपि च जन्मान प्राक् ज्ञानोत्पत्तेः सञ्चिते सुकृतदुकृते ज्ञानाधिगमात् क्षीयेते”

“Former works, i.e., works whether good or evil, which have been accumulated (sañchita) in previous forms of existence as well as in the current form of existence before the origination of know-

ledge, are destroyed by the attainment of knowledge." (Vedānta-Sūtra IV. 1. 15 Śaṅkara).

137. Q.—*What cannot be destroyed?*

A.—The Prārabdha actions.

न तु आरब्धकार्ये सामिभुक्तफले याभ्यामेतत् ब्रह्मज्ञानायतनं जन्म निर्मितम् ।

“Those works, on the other hand, whose effects *have begun* (Prārabdha) and whose results have been half-enjoyed—i.e., those very works to which there is due the present state of existence in which the knowledge of Brahman arises—are not destroyed by that knowledge.” (*Ibid.*) Their effect must be either *suffered* or *counteracted*.

138. Q.—*How can the Sañchita Karmas be destroyed?*

A.—By the knowledge of Brahm, or by the proper discharge of Nitya duties. (*Ibid.* IV. 1. 16.)

139. Q.—*How can Agāmi Karma be destroyed?*

A.—By knowledge: like sañchita. However there is no connection of the knower with Agāmi:karma: like waters on the petals of a lotus. आगामि कर्म अपि ज्ञानेन नश्यति ॥ किञ्च आगामि कर्मणाम् नलिनीदलगत-जलवत् ज्ञानिनां संबन्धो नास्ति ॥ (Tatwabodha).

140. Q.—*What is the difference between the Nitya and Kāmya works in this respect?*

A.—The Nitya works subserve mediately final release, but not so the Kāmya (*Ibid.* IV. 1. 16-18.)

141. Q.—*Has not the belief in the doctrine of karma made Indians fatalists?*

A.—To a certain extent it has: but it is the result of misunderstanding this law, which has made ignorant people confound karma with kismet. Our wise men have always taught the contrary.

ह्यस्तनो दुष्ट आचार आचारेणाय चारुणा ।

यथाशु शुभतामेति प्राक्तनं कर्म तत् तथा ॥

पेहिकः प्राक्तनं हन्ति प्राक्तनोऽद्यतनं बलात् ।

सर्वदा पुरुषस्पन्दस्तत्रानुद्वेगवान् जयी ॥

द्वयोरद्यतनस्यैव प्रत्यक्षाद् बलिता भवेत् ।

दैवं जेतुं यतो यत्नैर्बालो यूनेव शक्यते ॥

Just as the effects of an evil work performed yesterday may be counteracted by a good work done to-day, so one can make amends for the works done in his previous lives.

Amongst the works of this life and those of the previous life, the works of this life have greater power generally, on account of their being visible ; just as a young man can easily conquer a boy, so the mature works of this life can conquer the weak works of the past.

Sometimes the works of this life destroy the works of the past life, sometimes on the contrary the past life overcomes the works of this life. The rule is that the stronger always conquers. Yogavâsiṣṭha Mumukṣa VI. 5, 18 and 19.

142. Q.—Do the karmas themselves produce their effect ?

A.—No. Īśvara or God ordains the fruits of action. He rewards and punishes all according to their merits and demerits, for actions themselves are unintelligent and cease as soon as done.

कर्मैव फलदं यद्वा कर्माबाधित ईश्वरः ।

अपूर्वावान्तरद्वारा कर्मणः फलदातृता ॥

अचेतनात् फलासूतेः शाल्नीयात् पूजितेश्वरात् ।

कालान्तरे फलोत्पत्तेर्नापूर्वपरिकल्पना ॥

एतद्येव साधु कर्म कारयति तं यमेभ्यो लोकेभ्य उन्निनीषते एष उ
पवासाधु कर्म कारयति तं यमथो निनीषते ॥

यो यो यां यां तनुं भक्तः श्रद्धयाऽर्चितुमिच्छति ।

तस्य तस्याचलां श्रद्धां तामेव विदधाम्यहम् ॥

स तथा श्रद्धया युक्तस्तस्याराधनमीहते ।

लभते च ततः कामान् मयैव विहितान् हितान् ॥

सर्ववेदान्तेषु चेश्वरहेतुकां एव सृष्टयो व्यपदिश्यन्ते । तदेव चेश्वरस्य
फलहेतुत्वं यत् स्वकर्मानुरूपाः प्रजाः सृजति, विचित्रकार्यानुपपत्त्यादयोऽपि दोषाः
कृतप्रयत्नापेक्षत्वादीश्वरस्य प्रसज्यन्ते ॥

Does Karma itself produce its fruit or God allots the rewards and punishments according to one's actions? (The followers of Jaimini hold) that Karma itself produces the fruit through an invisible power called Apūrva. The unintelligent Karma however has no such power to produce fruit. But the God—the adorable One allots the fruits of actions, and so there is no necessity of believing in an invisible entity called Apūrva.

He makes him whom He wishes to lead up from these worlds

do a good deed ; and the same makes him whom He wishes to lead down from these worlds do a bad deed. Kau. Up. III. 8.

Whosoever seeketh to worship with faith any such semblance; I verily bestow the unswerving faith of that man.

He, united to that faith, seeketh the worship of such a one, and he obtaineth these desires, I verily decreeing the benefits. The Gîtâ VII. 21—22.

All Vedânta-texts, moreover, declare that the Lord is the only cause of all creation. And His creating all creatures in forms and conditions corresponding to and retributive of their former deeds, is just what entitles us to call the Lord the cause of all fruits of actions. And as the Lord has regard to the merit and demerit of the souls, the objections raised above—as to one uniform cause being inadequate to the production of various effects, &c.—are without any foundation. Vedânta. Sankar. III. 2. 41.

143. Q.—*Is this Īśvara an extra-cosmic Deity?*

A.—No. He is in all : and dwells within the Human soul.

अग्निर्मूर्धा चक्षुषो चन्द्रसूर्यौ दिशः श्रोत्रे वाग्विवृताश्च वेदाः । वायुप्राणो हृदयं विश्वमस्य पद्भ्यां पृथिवी ह्येष सर्वभूतान्तरात्मा ॥ Mund. II. 1. 4.

Fire is His head, the sun and moon His eyes, the regions His ears, the open Vedas are His voice, the air is His vital breath, whole world is His heart, the earth springs from His feet, for this is the Inner soul of all living things.

प्राणो ह्येष यः सर्वभूतैर्विभाति विजानन् विद्वान् भवते नातिवादी । आत्मक्रीड आत्मरतिः क्रियावानेष ब्रह्मविदां वरिष्ठः ॥ Mund. Up. III. 1. 4.

This Īśvara is the living breath that variously manifests itself in all living things. Knowing him, the sage ceases to speak of many things ; his sport is in the Self, his joy is in the Self, his action is relative to the Self, and he is the best of those that know the Self.

144. Q.—*What is the result of karma?*

A.—Rebirth—Good karma leading to incarnation into higher spheres, bad karmas into lower.

धर्मण गमनमूर्ध्वं, गमनमधस्ताद्भवत्यधर्मण ।

ज्ञानेन चापवर्गो, विपर्ययादिष्यते बन्धः ॥

By virtue (is obtained) ascent to higher planes ; by vice, descent to the lower, from wisdom (results) beatitude ; and bondage from the reverse. (Sāṅkhyakārika 44.)

यावन्न क्षीयते कर्म शुभं वाशुभमेव वा ।
 तावन्न जायते मोक्षो नृणां कल्पशतैरपि ॥
 यथा लौहमयैः पाशैः पाशैः स्वर्णमयैरपि ।
 तथा बद्धो भवेज्जीवः कर्मभिश्चाशुभैः शुभैः ॥
 कुर्वाणः सततं कर्म कृत्वा कष्टशतान्यपि ।
 तावन्न लभते मोक्षं यावज् ज्ञानं न विन्दति ॥

So long as karmas, whether good or bad, are not exhausted, men do not attain Mokṣa or release even in hundreds of kalpas.

Both good and bad karmas bind tight the jīva in their chains ; one is a chain of gold, the other is that of iron.

A man may always do karmas suffering great pains, but release will not be got by him, so long as wisdom is not attained.

Mahānirvāṇatantra XIV. 109 to 111.

145. Q.—*How is this wisdom to be attained ?*

A.—By reflecting over the True or Brahm or by doing action without any desire of reward.

ज्ञानं तत्त्वविचारेण निष्कामेनापि कर्मणा ।
 जायते क्षीणतमसां विदुषां निर्मलात्मनाम् ॥

146. Q.—*How is emancipation attained ?*

A.—Through wisdom, devotion to God and His grace.

ईश्वरः सर्वभूतानां हृद्देशेऽर्जुन तिष्ठति ।
 भ्रामयन् सर्वभूतानि यन्त्रारूढानि मायया ॥
 तमेव शरणं गच्छ सर्वभावेन भारत ।
 तत् प्रसादात् परां शान्तिं स्थानं प्राप्स्यसि शाश्वतम् ॥
 मन्मना भव मद्भक्तो मद्याजी मां नमस्कुरु ।
 मामेवैष्यसि सत्यं ते प्रतिजाने प्रियोऽसि मे ॥
 सर्वधर्मान् परित्यज्य मामेकं शरणं व्रज ।
 अहं त्वां सर्वपापेभ्यो मोक्षयिष्यामि मा शुचः ॥

Īśvara dwelleth in the hearts of all beings, O Arjuna, by His Mâyâ (power) causing all beings to revolve, as though mounted on a potters' wheel. Flee unto Him for shelter with all thy being, O Bhârata ; by His grace thou shalt obtain supreme peace, the everlasting dwelling-place.

(Place) the Manas on Me, be My devotee, sacrifice to Me, prostrate thyself before Me, thou shalt come even to Me. I pledge thee My troth ; thou art dear to me.

Renouncing all Dharmas, come unto Me alone for shelter ; sorrow not, I will liberate thee from all sins. The Gîtâ XVIII. 61, 62 and 65, 66.

147. Q.—*Accompanied with what body does the soul migrate ?*

A.—With the astral body (Sûkṣma Śarīra or Liṅga Deha).

पूर्वोत्पन्नमसक्तं नियतम्महदादिसूक्ष्मपर्यन्तम् ।

संसरति निरुपभोगं भावैरधिवासितं लिङ्गम् ॥

The mergent, subtle (astral) body,—formed primevally, unconfined, permanent, composed of *Buddhi* and the rest down to the primary elements,—migrates, is without enjoyment, and is invested with dispositions. (S. Kârikâ 40.)

148. Q.—*What is the composition of this Liṅga Deha ?*

A.—Astral Body is composed of *Buddhi* and the rest, down to the primary elements. That is to say, it is an aggregate of *Buddhi Ahaṅkāra*, the eleven senses and the five primary elements, and as such it is specific, being endowed with the properties of calmness, restlessness and dulness.

149. Q.—*Can a Sûkṣma Śarīra remain without a specific body ?*

A.—No. As a shadow cannot subsist without a substance, so this Liṅga Deha.

चित्रं यथाश्रयमृते स्थाप्वादिश्यो विना यथाच्छया ।

तद्वद्विना विशेषेन तिष्ठति निराश्रयं लिङ्गम् ॥

As a painting stands not without a ground, nor a shadow without a stake, so neither does the *Liṅga* (*Buddhi* &c.) subsist supportless without a specific (body). (S. Kârikâ 41.)

150. Q.—*What is the nature of this specific body ?*

A.—When on earth, this specific body is of blood, bones, &c. called the dense or physical body ; after death this specific body consists of subtler physical elements (light, electricity—ether).

स्थूलानि सूक्ष्माणि बहूनि चैव रूपाणि देही स्वगुणैर्वृणोति ।

क्रियागुणैरात्मगुणैश्च तेषां संयोगहेतुरपरोऽपि दृष्टः ॥

The embodied soul invests a variety of bodies, supersensible and sensible, with the lasting influence of its works in earlier embodiments ; and, according to the nature of its works and the nature of its bodies, is united with some fresh body, and seems to be another. (Śvetâśvatara V. 12.)

151. Q.—*Can this Liṅga-Deha assume various shapes ?*

A.—Yes. It can be trained to assume various forms—sensible and supersensible.

पुरुषार्थहेतुकमिदं निमित्तनैमित्तिकप्रसङ्गेन ।

प्रकृतेर्विभुत्वयोगान्नटवद्यवतिष्ठते लिङ्गम् ॥

Formed for the sake of the spirit's purpose, the Astral Body plays its parts like a dramatic actor, on account of the connection of means and consequences, and by union with the predominant power of Nature.

That is to say, as a dramatic actor, occupying different stages, plays severally the parts of Paraśurâma, Yudhiṣṭhira, Vatsarâja, so does the astral body occupying various gross bodies, play the part of man, brute, or plant. Sâṅkhya Kârikâ 42.

152. Q.—*What forms may the Lînga-Deha of a holy person assume after death?*

A.—It may assume the form of a deva or a shining one.

तद्यथा पेशस्कारी पेशसा मात्रामुपादायान्यन्नवतरं कल्याणतरं रूपं तनुत
एवमेवायमात्मेदं शरीरं निहत्याऽविद्यां गमयित्वान्यन्नवतरं कल्याणतरं रूपं कुरुते
पिश्यं वा गान्धर्वं वा दैवं वा प्राजापत्यं वा ब्राह्मं वाऽन्येषां वा भूतानाम् ॥

And as a goldsmith, taking a piece of gold, turns it into another, newer and more beautiful shape, so does this self, after having thrown off this body and dispelled all ignorance, make unto himself another, newer and more beautiful shape, whether it be like the Fathers, or like the Gandharvas, or like the Devas, or like Prajâpati, or like Brahmâ or like other beings (Bṛihadâraṇyaka IV. 4).

153. Q.—*How many grades of Devas are there?*

A.—There are eight grades of Devas.

अष्टविकल्पो दैवस्तैर्यग्यो नश्च पञ्चधा भवति ।

मानुषश्चैकविधः, समासतो भौतिकः सर्गः ॥

The divine class has eight varieties, the lower animals, five, mankind is single in its class; thus briefly is the world of living beings.

The eight divine varieties are the Brâhma, the Prâjâpatya, the Aindra, the Paitra, the Gândharva, the Yâkṣa, the Râkṣasa, and the Paisâcha.

The five varieties of lower animals are quadrupeds (other than deer), deer, birds, creeping things, and the immovable trees &c.

Mankind is single—not containing sub-divisions.

154. Q.—*In what do the Devas differ?*

A.—In the amount of their bliss.

There is the following computation of beatitude: Let there be a youth, a good youth, versed in the Veda, an able teacher, hale and strong, and let the whole earth, full of wealth, belong to him. This is one human bliss. A hundred of these human beatitudes are the one bliss of the man that has become a Gandharva and also of a sage learned in the Veda and unstricken with desire. A hundred of these beatitudes of the man that has become a Gandharva, are the one bliss of the divine Gandharvas, and also of a sage learned in the Veda and unstricken with desire. A hundred of these beatitudes of the divine Gandharvas, are the one bliss of the Pitris and so on of Devas, Indras, Bṛihaspati, Prajāpati and Brahman. Tait. Up. II. 8.

155. Q.—*How many Higher planes are there to the physical?*

A.—Six, namely:—Bhuvah, Swah, Mahah, Janah, Tapas, Satya. Kārikā 44.

156. Q.—*What are the two Paths on which the souls of the good go after leaving the gross body at death?*

A.—Pitriyāna—the Path of the Fathers; and Deva-yāna—the Path of the Shining Ones.

अग्निर्ज्योतिरहः शुक्लः षण्मासा उत्तरायणम् ।

तत्र प्रयाता गच्छन्ति ब्रह्म ब्रह्मविदो जनाः ॥

धूमोरात्रिस्तथा कृष्णः षण्मासा दक्षिणायनम् ।

तत्र चान्द्रमसं ज्योतिर्योगी प्राप्य निवर्त्तते ॥

Fire, light, day-time, the bright fortnight, the six months of the northern path—then, going forth, they who know Brahman go to Brahman. Smoke, night-time, the dark fortnight also, the six months of the southern path—then the Yogi, obtaining the moonlight, returneth. (The Gītā. VIII. 24-25).

Those who know this and those who in the forest follow faith and austerities go to light, from light to day, from day to the light half of the moon, from the light half of the moon to the six months when the sun goes to the north, from the six months when the sun goes to the north to the year, from the year to the sun, from the sun to the moon, from the moon to the lightning. There is a person not human. He leads them to Brahman. This is the path of the Devas.

But they who living in a village practise sacrifices, works of public utility, and alms, they go to the smoke, from smoke to night, from night to the dark half of the moon, from the dark half of the moon to the six months when the sun goes to the south. But they do not reach the year.

From the months they go to the world of the fathers, from the world of the fathers to the ether, from the ether to the moon. That is soma, the king. Here they are loved by the Devas, yes, the Devas love them.

Chhândogya Up. V. 1 to 4.

157. Q.—*What is the fate of the soul when it has exhausted the good works in Heaven?*

A.—It returns again to this physical world.

तस्मिन्वावत्सम्पातमुषित्वाऽथैतमेवाध्वानं पुनर्निवर्त्तन्ते यथेतमाकाशमाकाशाद्वायुं वायुर्भूत्वा धूमो भवति धूमोऽभूत्वाऽग्निं भवति ॥

अग्निं भूत्वा मेघो भवति मेघो भूत्वा प्रवर्षति त इह ब्रह्मिहियवा-
ओषधिवनस्पतयस्तिलमाषा इति जायन्तेऽतो वै खलु दुर्निष्पतरं यो यो ह्यन्नमत्ति
यो रेतः सिञ्चति तद्भूय एव भवति ॥

Having dwelt there, till their (good) works are consumed, they return again that way as they came, to the ether, from the ether to the air. Then the sacrificer, having become air, becomes smoke, having become smoke, he becomes mist.

Having become mist, he becomes a cloud, having become a cloud, he rains down. Then he is born as rice and corn, herbs and trees, sesamum and beans. From thence the escape is beset with most difficulties. For whoever the person may be that eats the food, and begets offspring, he hence forth becomes like unto them.

Chhândogya Up. V. 10. 5 to 6.

तदेव सक्तः सह कर्मण्यैति लिङ्गं मनो यत्र निषक्तमस्य ॥ प्राप्यान्तं
कर्मणस्तस्य यत्किञ्चैह करोत्ययम् ॥ तस्माल्लोकात्पुनरेत्यस्मै लोकाय कर्मण्य
इति नु कामयमानः ॥

To whatever object a man's own mind is attached, to that he goes strenuously together with his deed; and having obtained the end (the last results) of whatever deed he does here on earth, he returns again from that world (which is the temporary reward of his deed) to this world of action.

158. Q.—*Does the soul exhaust all its past works before it descends for re-incarnation?*

A.—No. It descends with a remainder.

दृतात्ययेऽनुशयवान्दृष्टस्मृतिभ्यां यथेतमनेवञ्च ॥

On the passing away of the works (the soul descends) with a remainder, according to Scripture, and Smṛiti as it went (*i.e.*, passing through the same stations) and not thus (*i.e.*, in the inverse order): Ved. S. III. 1. 8.

159. Q.—*Souls go to heaven to obtain a complete requital of their works, how can they return with a remainder?*

A.—All works may be divided into two classes, works performed for the sake of the heavenly world; and works other than those. The fruits of the first set of works are enjoyed *completely* in heaven. The remaining other set of works, whose fruits are to be enjoyed in this world, constitute the so-called Anuśaya or remainder, with which the soul redescends.

आमुष्मिकफले कर्मजाते उपभोक्ते अवशिष्टमैहिकफलं कर्मन्तरजातं
अनुशयस्तद्वन्तोऽवरोहन्तीति ॥

160. Q.—*What is the nature of those works for the requital of which the soul returns to this world?*

A.—All our high aspirations and divine longings find their *complete* requital in heaven. The soul comes back to this earth for the requital of those works which were done with a worldly motive.

161. Q.—*Do all souls go to heaven?*

A.—No. The souls of those persons who never performed any act of Self-sacrifice, go to Samyamanam or the region of punishment.

162. Q.—*What is the mode of descent from heaven?*

A.—They return again the way they came &c. See above Q. 143.

163. Q.—*What is meant by the soul becoming ether &c.? Does it become identified with them.*

A.—No. It does not become identical with them, it only passes into a state of similarity to ether. When the body, consisting of Astral light which the soul had assumed in the sphere of the moon, or mental plane, for the purpose of enjoyment, dissolves at the time when that enjoyment comes to an end, then it becomes subtle like ether, passes thereupon into the power of the air, and then gets mixed with smoke &c. (Ved. S. III. 1. 22.)

164. Q.—*Whether the souls really pass over into plants &c. and enjoy their pleasures and pains?*

A.—No. They enter merely into a state of conjunction with the body of plants &c.

The souls to which a remainder attaches enter merely into conjunction with rice-plants, &c., which are already animated by other souls, and do not enjoy their pleasures and pains.

अन्यैर्जीवैरधिष्ठितेषु व्रीह्यादिषु संसर्गमात्रमनुशयिन प्रतिपद्यन्ते न तस्सुखदुःखभाजो भवन्ति पूर्ववत् । Vedānta Sūtra, III 1. 24.

165. Q.—*What becomes of the soul after this?*

A.—After that (there takes place) conjunction (of the Soul) with him who performs the act of generation.

166. Q.—*Can a man know, what was his past life and what would be his future life?*

A.—Sometimes he can, if he attends to his dreams.

This same self has two stations: any given present embodiment, and the embodiment that is next to follow. And there is a third place: the state intermediate between the two—the place of dreams. Standing in the place of dreams, it sees both these stations, this embodiment and the embodiment next to come. In the place of dreams it steps on to the path it has made itself to the next embodiment, and sees the pains and pleasures that have been in earlier lives and are to be in after-lives.

तस्य वा एतस्य पुरुषस्य द्वे एव स्थाने भवत इदञ्च परलोकस्थानञ्च ; सन्ध्यं तृतीयं स्वप्नस्थानम् ॥ तिस्रस्सन्ध्ये स्थाने तिष्ठन्नेते उभे स्थाने पश्यतीदञ्च परलोकस्थानञ्च ॥ अथ यथाक्रमोऽयं परलोकस्थाने भवति तमाक्रममाक्रम्यो भयान् पाप्मन आनन्दांश्च पश्यति ॥

Bṛi. Up. IV. 3. 9.

167. Q.—*Can the Human soul visit the higher spheres?*

A.—Yogis can voluntarily do so. Ordinary men do so occasionally in dreams. *Ibid*, IV. 3. 12,

CHAPTER V.

The Rules of Conduct.

163. Q.—*What are the various stages of life through which a Hindu passes from his birth to his death?*

A.—Four: namely, Student (Brahmacharjya), House-holder (Grihastha), Hermit (Vānaprastha) and Sannyāsa.

169. Q.—*Are all these four āśramas observed in this age?*

A.—In this age there are really only two āśramas:—householder and sannyāsa.

चत्वारः कथिता वर्णा आश्रमा अपि सुव्रते ।

आचाराश्चापि वर्णानाम् आश्रमाणां पृथक् पृथक् ॥

कृतादौ ; कलिकाले तु वर्णाः पंच प्रकीर्त्तिताः ।

ब्राह्मणः क्षत्रियो वैश्य द्रुद्रः सामान्य एव च ॥

ब्रह्मचर्याश्रमो नास्ति वानप्रस्थोऽपि न प्रिये ।

गार्हस्थ्यो भिक्षुकरचैव आश्रमौ द्वौ कलौ युगे ॥

Four castes as well as four āśramas were known in the first three Yugas, with their distinctive rules of Good Behaviour for each caste and stage: but in this Kaliyuga there are five castes, namely the Brāhmaṇa, the Kṣatriya, the Vaiśya, the Śūdra, and the Sāmānya or the common caste.

Of all these castes there are two Āśramas or stages of life.

In this age there is no Brahmacharya Āśrama nor any Vānaprastha Āśrama. In this Kali-age there are only two Āśramas, the Grihastha and the Bhikṣuka.

Mahānirvānatantra VIII. 4, 5 & 8.

170. Q.—*What are the duties of a house-holder in his different periods of life?*

विद्यामुपाज्जयेत् बाल्ये धनं दाराश्च यौवने ।

प्राङ्गे धर्म्याणि कर्माणि चतुर्थे प्रव्रजेत् सुधीः ॥

In his early age, he should acquire knowledge, in his youth, he should acquire wealth and marry, in his maturer age, he should perform religious duties, and in his fourth age he should wander forth as a Sannyāsi.

Ibid. VIII. 16.

171. Q.—*Can a person become a Sannyāsi in his youth?*

A.—No, generally not.

मातरं पितरं वृद्धं भार्याञ्चैव पतिव्रताम् ।

शिशूश्च तनयं हित्वा नावधूताश्रमं व्रजेत् ॥ *Ibid* VII. 17.

Abandoning an old father and mother or a devoted wife or a minor child, one should never enter the Sannyāsa stage.

मातृन् पितृन् शिशून् दारान् स्वजनान् बान्धवानपि ।

यः प्रव्रजेत हित्वैतान् स महापातकी भवेत् ॥ *Ibid*. VIII. 18.

He who becomes a Sannyāsi, abandoning father, mother, child, wife, kinsmen and relatives, becomes a great sinner.

172. Q.—What are the chief duties of a house-holder?

A.—

ब्रह्मनिष्ठो गृहस्थः स्यात् ब्रह्मज्ञानपरायणः ।

यद् यत् कर्म प्रकुर्वीत तद्ब्रह्मणि समर्पयेत् ॥ *Ibid*. VIII. 23.

The house-holder should be devoted to the Supreme God, and aspire for divine knowledge. Whatever action he should do, he should offer it to the Supreme Brahman.

न मिथ्याभाषणं कुर्यात् न च शास्त्रं समाचरेत् ।

देवतातिथिपूजासु गृहस्थो निरतो भवेत् ॥ *Ibid*. VIII. 24.

He should not tell falsehood nor deal in duplicity, he should be constantly engaged in worshipping gods, parents and the guests.

मातरं पितरञ्चैव साक्षात् प्रत्यक्षदेवताम् ।

मत्वा गृही निषेधेत् सदा सर्वप्रयत्नतः ॥ *Ibid*. VIII. 25.

The mother and the father, these are the visible manifest deities, thinking them as such, let the house-holder serve them always with due attention.

गृहस्थो गोपयेद्दारान् विद्यामभ्यासयेत् सुतान् ।

पोषयेत् स्वजनान् बन्धून् पञ्च धर्मः सनातनः ॥ *Ibid*. VIII. 35.

He should protect his wife, educate his sons, maintain his kinsmen and friends, this is the ancient religion.

जनन्या वर्द्धितो देहो जनकेन प्रयोजितः ।

स्वजनैः शिक्षितः प्रीत्या सोऽश्वमस्तान् परित्यजेत् ॥ *Ibid*. VIII.

36.

This body was nourished by the mother, produced by the father and trained by the kinsmen with great affection, therefore he who abandons them is a wretch.

ततः स्वधर्मनिरतान् एकग्रामनिवासिनः ।

अभ्यांगतानुदासीनान् गृहस्थः परिपालयेत् ॥ *Ibid.* VIII. 49.

Steadily he should maintain the persons belonging to his own religion, his co-villagers, the strangers and the ascetics.

निद्रालस्य देहयत्नं केशविन्यासमेव च ।

आसक्तिमशने वस्त्रे नातिरिक्तं समाचरेत् ॥ *Ibid.* VIII. 51.

He should not be addicted to sleep or laziness, nor to physical comforts and the embellishment of his body. He should not have too much attraction either for food or dress.

युक्ताहारो युक्तनिद्रो मितवाङ्मितमैथुनः ।

स्वच्छो नम्रः शुचिर्दक्षो युक्तः स्यात् सर्वकर्मसु ॥ *Ibid.* VIII.

52.

He should be moderate in his food, moderate in sleep, and in his speech, he should keep the passions under restraint, he should be simple and pure, modest, dextrous and energetic in every work.

शूरः शत्रौ विनीतः स्यात् बान्धवे गृहसन्निधौ ।

जुगुप्सितान् न मन्येत नावमन्येत मानिनः ॥ *Ibid.* VIII. 53.

He should be brave towards his enemies, and humble before his kinsmen and elders, he should not honor the wicked persons nor should he show disrespect to the honored ones.

स्वीयं यशः पौरुषञ्च गुप्तये कथितञ्च यत् ।

: कृतं यदुपकाराय धर्मज्ञो न प्रकाशयेत् ॥ *Ibid.* VIII. 56.

He should not divulge his own fame or prowess, or secrets, told to him, or what he has done for the benefit of another.

विद्याधनयशोधर्मान् यतमान उपाज्जेयेत् ।

व्यसनञ्चासतां संगं मिथ्याद्रोहं परित्यजेत् ॥ *Ibid.* VIII. 58.

He should abandon vain quarrels, the company of bad persons and indulgence of all sorts. He should acquire with great energy religious merit, fame, wealth, and learning.

सत्यं मृदु प्रियं धीरो वाक्यं हितकरं वदेत् ॥

आत्मौत्कर्षन्तथा निन्दां परेषां परिवर्जयेत् । *Ibid.* VIII. 62.

He should say what is beneficial to others, what is pleasant, what is sweet but always truth. He should not indulge in vain glory of his own self or utter slander about others.

173. Q.—*What are the duties of a son to his parents?*

A.—आसनं शयनं वस्त्रं पानभोजनमेव च ।

तत्तत्समयमाहाय मात्रे पित्रे नियोजयेत् ॥ *Ibid.* VIII. 28.

The son should give to his father and mother, seat, dresses, food and drink at the proper time, whenever they ask for these.

भावयेन्मृदुलां वाणीं सर्व्वदा प्रियमाचेरत्

पित्रोराञ्जानुसारी स्यात् सत् पुत्रः कुलपावनः ॥ *Ibid.* VIII. 29.

He should speak sweet words, always do what is pleasant to them, be obedient to his parents, for such a son is the glory of the family.

भौद्धत्यं परिहासञ्च तर्ज्जनं परिभाषणम् ।

पित्रोश्च न कुर्वीत यदीच्छेदात्मनो हितम् ॥ *Ibid.* VIII. 30.

He should not be haughty, or arrogant in their presence, nor laugh or rebuke any one; or abuse any body if he wants his own good. —

मातरं पितरं वीक्ष्य नत्वोत्तिष्ठेत् ससम्भ्रमः ।

विनाज्ञया नोपविशेत् संस्थितः पितृशासने ॥ *Ibid.* VIII. 31.

He should rise up respectfully, and bow to them whenever he sees his father or mother. He should not sit down without their permission; he should always remain under the command of his father.

मातरं पितरं पुत्रं दारानतिथिसोदारान् ।

हित्वा गृही न भुञ्जीयात् प्राणैः कण्ठगतैरपि ॥ *Ibid.* VIII. 33.

The householder should not eat under any circumstances without having first fed his father, mother, son, wife, brother and guests.

वञ्चयित्वा गुरुन् बन्धून् यो भुङ्क्ते सोदरम्भरः ।

इहैव लोके गह्र्योऽसौ परत्र नारकी भवेत् ॥ *Ibid.* VIII. 34.

He who takes his food without feeding his elders and friends, that selfish man becomes despised in this world and goes to hell in the next.

174. Q.—*How should a husband treat his wife?*

A.—

न भार्यान्ताडयेत् कापि मातृवत् पालयेत् सदा ।

न त्यजेत् घोरकष्टेऽपि यदि साध्वी पतिव्रता ॥ *Ibid.* VIII. 39.

He should never chastise his wife, but should always maintain her like a mother, even under greatest affliction he should never abandon a chaste and dutiful wife.

स्थितेषु स्वीयदारेषु स्त्रियमन्यां न संस्पृशेत् ।

दुष्टेन चेतसा विद्वान् अन्यथा नारकी भवेत् ॥ *Ibid.* VIII. 40.

The wise householder should not even think with evil mind of another's wife, for by so doing he incurs sin.

विरले शयनं वासं त्यजेत् प्राज्ञः परस्त्रिया ।

अयुक्तभाषणञ्चैव स्त्रियं शौच्यं न दर्शयेत् ॥ *Ibid.* VIII. 41.

He should not sit or dwell with another's wife in a solitary place, and should not speak harsh words to his wife nor treat her cruelly.

धनेन वाससा प्रेम्णा श्रद्धयामृतभाषणैः ।

सततं तोषयेत् दारान् नाप्रियं क्वचिदाचरेत् ॥ *Ibid.* VIII. 42

He should always satisfy his wife by giving her presents, dresses and money, and also by love, respect and pleasant words; but he should never behave unkindly towards her.

यस्मिन्नरे महेशानि तुष्टा भार्या पतिव्रता ।

सर्वो धर्मः कृतस्तेन भवति प्रिय एव सेः ॥ *Ibid.* VIII. 44.

O! Goddess! a man who is loved by his chaste wife, has acquired all merits and becomes thy beloved.

175. Q.—*What are the duties of a wife?*

A.—

न तीर्थसेवा नारीणां नेपवासादिकाः क्रियाः ।

नैव व्रतानां नियमो भर्तुः शुश्रूषणं विना ॥ *Ibid.* VIII. 100.

The truest duty of the wife is to serve the husband and not going to pilgrimages or keeping fast, or performing vows, unless with the husband's permission.

भर्तृव योषितां तीर्थं तपो दानं व्रतं गुरुः ।

तस्मात् सर्वात्मना नारी पतिसेवां समाचरेत् ॥ *Ibid.* VIII. 101.

The husband is to a woman her pilgrimage, her austerities, her alms giving, her vows and her preceptor. Therefore should a wife serve her husband with all her soul.

पत्युः प्रियं सदा कुर्यात् वचसा परिचर्यया ।

तदाज्ञानुचरी भूत्वा तोषयेत् पतिबान्धवान् ॥ *Ibid.* VIII. 102.

Let her always do what is pleasant to her husband, both by serving as well as by speech and, always remain obedient to his command and respect his kinsmen.

176. Q.—*How should a householder treat his sons?*

A.—चतुर्वर्षावधि सुतान् लालयेत् पालयेत् पिता ।

ततः षोडशपर्यन्तं गुणान् विद्याञ्च शिक्षयेत् ॥ *Ibid.* VIII. 45

The father should fondle and give indulgence to his sons upto their fourth year. Then up to their sixteenth year he should teach them science and arts.

विंशत्यब्दाधिकान् पुत्रान् प्रेरयेत् गृहकर्मसु ।

ततस्तास्तुल्यभावेन मत्वा स्नेहं प्रदर्शयेत् ॥ *Ibid.* VIII. 46.

Then up to their twentieth year, he should make the sons do household works and treat them with affection and equality.

177. Q.—*Should a daughter also be educated in the same way?*

A.—Yes, she also should be taught so as to fit her to be a good wife, and mother.

कन्याप्येवं पालनीया शिक्षणीयाति यत्नतः ।

देया धराय विदुषे धनरत्नसमन्विता ॥ *Ibid.* VIII. 47.

The daughter must be educated and brought up with great care just like the son, and she should be married to an educated husband, with riches and ornaments as dowry.

178. Q.—*What are the duties of a householder to the public?*

A.—जलाशयाञ्च वृक्षाञ्च विश्रामगृहमभ्वनि ।

सेतुः प्रतिष्ठितो येन तेन लोकत्रयं जितम् ॥ *Ibid.* VIII. 63.

The householder should dig tanks, plant trees, and erect rest-houses on the roads and make bridges over rivers, by such great works he can conquer the three worlds.

179. Q.—*Who are said to have won the three worlds?*

A.—सन्तुष्टौ पितरौ यस्मिन् अनुरक्ता सुहृद्गणाः ।

गायन्ति यद्यशो लोकस्तेन लोकत्रयं जितम् ॥ *Ibid.* VIII. 64.

He whose parents are satisfied, whose friends are attached to him, whose praise the people sing, he has conquered the three worlds.

सत्यमेव व्रतं यस्य दया दीनेषु सर्वथा ।

कामक्रोधौ बशे यस्य तेन लोकत्रयं जितम् ॥ *Ibid.* VIII. 65.

He whose vow is truth, who is always compassionate to the poor, whose passion and anger are under his control, he has conquered the three worlds.

विरक्तः परदारेषु निस्पृहः परवस्तुषु ।

दम्भमात्सर्यहीनो यस्तेन लोकत्रयं जितम् ॥

Ibid. VIII. 66.

He who feels no attraction for another's wife nor does he envy another's riches, he who is devoid of pride and haughtiness, by him are conquered the three worlds.

न विभेति रणाद्यो वै संग्रामेऽप्यपराङ्मुखः ।

धर्मयुद्धे मृतो वापि तेन लोकत्रयं जितम् ॥

Ibid. VIII. 67.

He who is not afraid to die in the battle, nor turns his back to his enemies, whose glory is to die in a just war, by him the three worlds are conquered.

असंशयात्मा सुश्रद्धः शास्त्रवाचारतत्परः ।

मञ्छासने हितो यश्च तेन लोकत्रयं जितम् ॥

Ibid. VIII. 68.

He who is free from unnecessary doubts, he who has faith and devoted to the duties of this religion, he who follows my commands, by him are conquered the three worlds.

ज्ञानिना लोकयात्रायै सर्वत्र समदृष्टिना ।

क्रियन्ते येन कर्माणि तेन लोकत्रयं जितम् ॥

Ibid. VIII. 69.

That wise one who performs all duties merely for the sake of carrying on the worldly activities, he who has equal regards for all, by him are conquered the three worlds.

180. Q.—How many sorts of purifications are there?

A.—Two, mental and physical.

शौचन्तु द्विविधं देवि बाह्याभ्यन्तरभेदतः ।

ब्रह्मण्यात्मार्पणं यत्तत् शौचमान्तरिकं स्मृतम् ॥

Ibid. VIII. 70.

The purifications are of two kinds, external and mental ; offering one's self to the will of the Supreme is mental purification.

अद्भिर्वा भस्मना वापि मलानामपकर्षणम् ।

‘देहशुद्धिर्भवेद्येन बहिःशौचं तदुच्यते ॥

Ibid. VIII. 71.

To purify the dusts and dirt of the body by water or ashes is external purification.

181. Q.—How many times should a householder pray every day?

A.—He should pray thrice, at the times of three sandhyās and perform pūjā of his tutelary deity.

182. Q.—What are the sacred days?

A.—मासवत्सरपक्षाणाम् आरम्भदिनमम्बिके ।

चतुर्दश्याष्टमी शुक्ला तथैकादशी कुहूः ॥

निजजन्मदिनञ्चैव पित्रोर्मरणवासरः ।

वैशोत्सवदिनञ्चैव पुण्यकालः प्रकीर्तितः ॥

Ibid. VIII. 96-97

The first day of the month, of the year, of the lunar fortnight, the fourteenth day of the moon, the eighth day and the eleventh day of the new moon, one's own birth day and the anniversary day of the deaths of father and mother, and the days of joyous festivals; are sacred days.—

183. Q.—*What are the sacred tīrthas ?*

गङ्गानदी महानद्यो गुरोः सदनमेव च ।

प्रसिद्धं देवताचेत्रं पुण्यतीर्थं प्रकीर्तितम् ॥

Ibid. VIII. 98.

The river Ganges, all great rivers, the house of the teacher, the famous shrines, are said to be the sacred Tīrthas or places of pilgrimage.

184. Q.—*But what duties are higher than going to Tīrthas ?*

A.—*एतन्ना स्वाध्ययनं पित्रो शुश्रुषां दाररक्षणम् ।*

नरकाय भवेत्तीर्थं तीर्थाय व्रजतां नृणाम् ॥

Ibid. VIII. 99.

A person should not go to Tīrthas by renouncing the study of scriptures or the nursing of his old parents or protecting his wife, for he who does so incurs sin instead of merit.

सत्यं तीर्थं क्षमा तीर्थं तीर्थमिन्द्रियनिग्रहः ।

सर्वभूत-दया तीर्थं सर्वत्रार्जवमेव च ॥

दानं तीर्थं दमस्तीर्थं सन्तोषस्तीर्थमुच्यते ।

ब्रह्मचर्यं परं तीर्थं तीर्थञ्च प्रियवादिता ॥

ज्ञानं तीर्थं धृतिस्तीर्थं पुण्यं तीर्थमुदाहृतम् ।

तीर्थानामपि तत्तीर्थं विशुद्धिर्मानसं परम् ॥

Truth is pilgrimage, forgiveness is pilgrimage, the restraint of senses is pilgrimage, kindness towards all living beings, straightforwardness of dealing, alms-giving, controlling the mind, contentment, chastity are the best of all pilgrimages: so also speaking kindly; knowledge, fortitude, doing virtuous deeds are all true pilgrimages—but the pilgrimage of all pilgrimages is the purity of heart.

185. Q.—*At what age should a girl be married ?*

A. After reaching years of discretion.

अज्ञातपतिमर्थ्यादाम् अज्ञातपतिसेवनाम् ।

नेहाहयेत् पिता बाबाम् अज्ञातधर्मशासनाम् ॥

Ibid. VIII. 107.

A girl who does not know to serve her husband, who does not know the honor due to him, such a child should not be married by the father nor until she knows the duties and precepts of religion.

186. Q.—*What meat is forbidden ?*

A.—नरमांसं न भुञ्जीयात् नराकृतिपशूंस्तथा ।

बहूपकारान् गाश्च मांसादान् रसवर्जितान् ॥ *Ibid.* VIII. 108.

One should not eat the flesh of man nor of animal having human structure, nor of cows, nor of carnivorous animals.

187. Q.—*Are any vegetables forbidden?*

A.—No.

फलानि ग्राम्यवन्यानि मूलानि विविधानि च ।

भूमिजातानि सर्वान्पि भोज्यानि स्वेच्छ्या शिवे ॥ *Ibid.* VIII. 109.

All vegetables wild as well as cultivated, all roots and every kind of vegetables that grows from the earth, may be eaten according to one's wish.

188. Q.—*What are the duties of a Brâhmana ?*

A.—अध्यापनं याजनञ्च विप्राणां व्रतमुत्तमम् ।

अशक्तौ चतुर्यविशां वृत्तेर्निर्वाहमाचरेत् ॥ *Ibid.* VIII. 110.

Teaching and sacrificing for others, are the highest duties of the Brâhmana, but if he is incapable of doing that, he may earn his livelihood by doing the duties of a Kṣatriya or a Vaiśya.

अद्वेषा निर्ममः शान्तः सत्यवादी जितेन्द्रियः ।

निर्ममत्सरो निष्कपटः स्ववृते ब्राह्मणो भवेत् ॥ *Ibid.* VIII. 114.

He should be free from envy and avarice, he should be calm, truthful, and leader of his senses, free from haughtiness and guile.

अध्यापयेत् पुत्रबुद्ध्या शिष्यान् सन्मार्गवर्तिनः ।

सर्वलोकहितैषी स्यात् पद्मपातविनिर्मुक्तः ॥ *Ibid.* VIII. 115

He should teach his pupils considering them as sons, he should be the well-wisher of all humanity and free from all partialities and prejudices.

मिथ्यालापमसूयाञ्च व्यसनाप्रियभाषणम् ।

नीचैः प्रसक्तिदम्भञ्च सर्वथा ब्राह्मणस्तजेत् ॥ *Ibid.* VIII. 116.

Useless talk, envy, gambling, harsh words, keeping the company of low persons and pride, should always be renounced by a Brâhmin.

189. Q.—*What are the duties of a Kṣatriya ?*

A.—शौर्यं तेजो क्षतिर्दाक्ष्यं युद्धे चाप्यपलायनम् ।

दानमीश्वरभावश्च चात्रं कर्म स्वभावजम् ॥ *The Gîtâ*

Bravery, energy, fortitude, dexterity and flying not in battle, gift and lordliness are the nature-born duty of the Kṣatriya.

युयुत्सा गर्हिता सन्धौ सम्मानैः सन्धिरुत्तमा ।

मृत्युर्जयो वा युद्धेषु राजन्यानां वरानने ॥ *Mahânirvâṇa* VIII 117.

The desire for war is heinous where an honorable peace can be made by a king; the duty of the warriors is either to win the battle or die in it : O Devi!

अलोभी स्यात् प्रत्रावित्ते गृहीयात् सम्मितं करम् ।

रक्षन्नीकृतं धर्मं पुत्रवत् पात्रयेत् प्रजाः ॥ *Ibid.* VIII. 118.

The king should not be avaricious of the wealth of his subjects, he should take moderate taxes, his duty being to protect, he should like a father nourish his subjects.

190. Q.—*Is a person Brâhmin by deeds or by birth?*

A.—A man is a Brâhmin by deeds and not by birth.

सत्यं दानं क्षमा शीलमनुशंस्यं तपो घृणा ।

दृश्यन्ते यत्र नागेन्द्र स ब्राह्मण इति स्मृतः ॥

शूद्रे तु यद्भवेद्दृश्यं, द्विजे तच्च न विद्यते ।

नैव शूद्रो भवेच्छूद्रो ब्राह्मणो न च ब्राह्मणः ॥

यत्रैतत् लक्षते सर्पं वृत्तं स ब्राह्मणः स्मृतः ।

यत्र नैतत् भवेत् सर्पं तं शूद्रमिति निर्दिशेत् ॥

Mahâbhârata, Vanaparva.

Truth, alms-giving, forgiveness, good conduct, want of cruelty, austerities, and mercy, wherever these are to be found, he is a Brâhmin, O king of the Nâgas, for this is the law.

If these attributes are seen in a (born) Sûdra and are not found in a (born) Brâhmin, then that Sûdra is not a Sûdra, nor is that Brâhmin a Brâhmin.

Oh Serpent! wherever these qualities are to be found, the law declares him to be a Brâhmin, and wherever these qualities are not found [in a Brahmin], he, O Serpent, should be regarded as a Sûdra.

191. Q.—*Can a Sûdra become a Brâhmin.*

A. Yes,

पभिस्तु कर्मभिर्देवि शुभैराचरितैस्तथा ।

शूद्रो ब्राह्मणतां याति वैश्यः क्षत्रियतां व्रजेत् ॥

By rightly performing these duties, O goddess, a Sûdra becomes a Brâhmin and a Vaisya becomes a Kshatriya.

पतैः कर्मकलैर्देवि न्यूनजातिकुलोद्भवः ।

शूद्रोऽप्यागमसम्पन्नाद् द्विजो भवति संस्कृतः ॥

By the good merits of these works a Śûdra, though born in a low caste family, becomes a twice-born sanctified person when he has studied the laws and the Vedas.

ब्राह्मणे वाप्यसद्वृत्तः सर्वसङ्करभोजनः ।

ब्राह्मण्यं समनुत्सृज्य शूद्रो भवति तादृशः ॥

And a Brâhmin who follows evil conduct and eats with low people, loses his Brâhmanity and becomes a Śûdra.

कर्मभिः शुचिभिर्देवि शुद्धात्मा विजितेन्द्रियः ।

शूद्रोऽपि द्विजवत् सेव्य इति ब्रह्मानुशासनम् ॥

By pure actions, O goddess, by purity of mind and the conquest of senses, a Śûdra even becomes as honorable as a twice-born, for this is the command of Brahma.

स्वभावं कर्म च शुभं यत्र शूद्रोऽपि तिष्ठति ।

विशिष्टः सद्विजातेर्ध्वं विज्ञेय इति मे मतिः ॥

Wherever in a bornûdar are found natural tendencies towards virtuous deeds, he should be known to belong to the twice-born caste, this is my opinion.

न योनिर्नापि संस्कारो न धृतं न च सन्तति ।

कारणानि द्विजत्वस्य वृत्तमेव तु कारणम् ॥

Neither birth, nor sacraments nor the study of the Vedas nor ancestry is the cause of Brâhmanahood, livelihood is the only cause of Brâhmanahood.

सर्वोयं ब्रह्मणोऽलोके वृत्तेन च विधीयते ।

वृत्ते स्थितेस्तु शूद्रोऽपि ब्राह्मणत्वं नियच्छति ॥

All persons are known to be Brâhmins who follow the duties of a Brâhmin. A Śûdra even who follows the good conduct ordained for a Brâhmin, becomes a Brâhmin.

ब्रह्मस्वभावः कल्याणि समः सर्वत्र मे मतिः ।

निर्गुणं निर्मलं ब्रह्म यत्र तिष्ठति स द्विजः ॥

Oh auspicious one ! the Brâhma quality is the same everywhere, wherever that Brâhma, who is free from all attributes and pure, dwells he is a Brâhmin.

एतत्ते गुह्यमाख्यातं यथा शूद्रो भवेद् द्विजः ।

ब्राह्मणे वा च्युतो धर्मात् तथा शूद्रत्वमाप्नुते ॥

Thus have I told thee how a Brâhmin may become a Sûdra, by not performing the duties of his order, and how a Sûdra may become a Brâhmin by doing higher duties.

Mahâbhârata, Vanaparva.

192. Q.—*Did caste depend on birth ?*

A.—Not so in ancient India.

न विशेषोस्ति वर्णानां सर्वं ब्राह्ममिदं जगत् ।

ब्रह्मणा पूर्वसृष्टं हि कर्मणा वर्णतां गतम् ॥

शूद्रो ब्राह्मणतामेति ब्राह्मणश्चैति शूद्रताम् ।

क्षत्रियाज्जातमेवन्तु विद्याद्वैश्यात्तथैव च ॥ Mahâbhârata.

There is no distinction of castes, the whole universe is the progeny of Brahma, for all men were created equal in the beginning ; by actions (karmas), they acquired various castes. A Sûdra may become a Brâhmaṇa, and a born Brâhmaṇa may be degraded to the rank of a Sûdra, so also one born a Kṣatriya or a Vaiśya.

193. Q.—*What is a Brâhmaṇa ? Is the Soul Brâhmaṇa ?*

A.—The soul (Jiva) is not Brâhmaṇa, for the one soul animates in successive lives various bodies, past and future, and one soul, through its Karma, obtains various bodies.

अतीतानागतानेकदेहानां जीवस्यैकरूपत्वात् एकस्यापि कर्मवशादनेकदेहसंभवात्, सर्व-
शरीराणां जीवस्यैकरूपत्वाच्च ॥ (Vajra Sûchi Upaniṣad.)

194. Q.—*Is the body ' Brâhmaṇa ' ?*

A.—न, आचाण्डोलादिपर्यन्तानां मनुष्याणां पाञ्चभौतिकस्वेन देहस्यैकरूपत्वात्, जरामरण-
धर्माधर्मादिसाम्यदर्शनात्, ब्राह्मणः श्वेतवर्णः, क्षत्रियो रक्तवर्णः, वैश्यः पीतवर्णः, शूद्रः
कृष्णवर्ण इति नियमाभावात् ॥ पित्रादिशरीरदहने पुत्रादीनां ब्रह्महत्यादि दोषसंभवाच्च । (Ibid.)

No, for the body of all men down to the lowest chândâla is made up of the self-same five elements, and because all human bodies are equally liable to death and decay ; nor is there any such distinction that a Brâhmaṇa is of white colour, a Kṣatriya of a red colour, a Vaiśya of a yellow color, or a Sûdra of a black colour. Moreover body is not Brâhmaṇa, because it is burnt at death by the sons, who do not thereby incur the guilt of killing a Brâhmaṇa.

195. Q.—*Does then jāti or birth from or in a particular family make a man Brâhmaṇa ?*

A.—न, तत्र जात्यन्तरजन्तुष्वनेकजातिसंभवा महर्षयो बहवः सन्ति ॥ ऋष्यशृङ्गो मृग्यः, कौशिक इ
कुशात्, जाम्बुको जम्बुकात्, वाल्मीकी वाल्मीकात्, व्यासः कैव कन्यकायाम्, शशपृष्ठात्

गौतमः, वसिष्ठ उर्वश्याम्, अगस्त्यः कन्नडो जात इति श्रुत्वात् । एतेषां जात्या विनाप्यग्रे ज्ञानप्रतिपादिता ऋषयो बहवः सन्ति ॥ (Ibid.)

No, for there have been many great Rishis born from animals belonging to various species, as well as from men belonging to various castes. Rishyaśringa was the son of a deer, Kauśika was from reed, Jambūka was born of a jackal, Vālmika from an ant-hill, Vyāsa was the son of the daughter of a fisherman, Gautama was from Śaśapīṣṭha,* Vasiṣṭha from Urvaśī, and Agastya was born in a jar.

196. Q.—Does then the possession of spiritual knowledge make a man Brāhmaṇa ?

A.—No, for Kṣatriyas and others also have possessed the transcendental knowledge.

न, ऋत्रियादयोऽपि परमार्थदर्शिनोऽभिज्ञा बहवः सन्ति ॥ (Ibid.)

197. Q.—Is it then karma that makes a man a Brāhmaṇa ?

A.—No, for all men act as impelled by their Karmas, and Karmas are three-fold prārabdha, sañchita, and āgāmi with regard to all living beings.

न, सर्वेषां प्राणिनां प्रारब्धसंचितागामि कर्मसाधर्म्यदर्शनात् कर्माभिप्रेरिताः सन्तो जनाः क्रिया कुर्वन्ति ॥ (Ibid.)

198. Q.—Is then a person who performs acts of religious merit (dhārmika) a Brāhmaṇa ?

A.—No, for many Kṣatriyas and others are also charitably disposed and give gold &c.

199. Q.—Who is then a Brāhmaṇa ?

A.—यः कश्चिदात्मानमद्वितीयं जातिगुणक्रियाहीनं षड्भिषड्भावेत्यादि सर्वदोषरहितं सत्यज्ञानानन्दानन्तस्वरूपं स्वयं निर्विकल्पमशेषकल्पाधारं, अशेषभूतान्तर्यामिन्त्वेन वर्तमानम्, अन्तर्बहिश्च आकाशवद् अनुस्यूतम्, अखण्डानन्दस्वभावम्, अप्रमेयम्, अनुभवैकवेद्यम्, अपरोक्षतयाभासाननम्, करतलमलकवत् साक्षात् अपरोक्षीकृत्य कृतार्थतया कामरागादि-दोषरहितः शमदमादिसम्पन्नो भाव-मात्सर्यनृष्या-आशा-मोहादिरहितो, दुःखमाहंकारादिभिरसि-स्पृष्टचेता वर्तते ॥ एवमुक्तञ्च ऋषो यः स एव ब्राह्मणः इति श्रुतिस्मृतिपुराण्येतिहासानामभिप्रायः ॥ अन्यथा हि ब्राह्मणत्वसिद्धिर्नास्त्येव ॥

(Vajra Sūcti Upaniṣad.)

He who has realised that the Ātmā is one without a second, that He is devoid of all difference of genus, attribute or activity, that He is free from the six-fold human infirmities (grief, delusion, decay, death, hunger and thirst), that He is free from

the six fold stages of existences (origination, existence, modification, increase, decrease, destruction), that He is true, knowledge, bliss, and infinity; that Himself unmodified, He is the substrate of all modifications, that He is the Inner Ruler of all created things, that he is all-pervasive, in and out, like space or ether; that he is indivisible, all-joy, Immeasurable, Unproveable, known by intuition alone. He is the most direct cognition, like a plum in one's hand,—a person who has realised God-vision in this way, who is free from lusts and attachments &c., who is endowed with *śama* and *dama* &c., (subjection of the senses and of mind), who is free from envy, desire, expectations, delusion &c., whose mind is untouched by pride, hypocrisy &c., such a person alone is a Brāhmaṇa, according to the real meaning of all Revelations, Traditions, Purāṇas and Itihāsas. There can be no Brahminity in anything else.

Such was the high ideal of a Brāhmaṇa. Now-a-days, however, a Brāhmaṇa is one who is born of Brāhmaṇa parents; for now-a-days caste is determined by birth only.

200. Q.—*What are the duties of a Vaiśya?*

A.—वैश्यानां कृषिवाणिज्यं वृत्तं विद्धि सनातनम् ।

येनोपायेन लोकानां देहयात्रा प्रसिष्यति ॥

The ancient duty of a Vaiśya is agriculture and trade, and all those means by which the bodily welfare (food supply) of the community is maintained. Mahānirvāṇa. VIII. 133.

अतः सर्वात्मना देवि वाणिज्यकृषिकर्मसु ।

प्रमादव्यसनादस्यं मिथ्या शार्द्वं विवर्जयेत् ॥

O Devi! He should leave all carelessness, evil habits, laziness, falsehood and cheating in dealing with others in commerce and agriculture. *Ibid.* VIII. 134.

201. Q.—*What are the duties of a Śūdra?*

A.—दक्षः शुचिः सत्यभाषी जितनिद्रो जितेन्द्रियः ।

अप्रमत्तो निरालस्यः सेववृत्त भवेन्नरः ॥

The man who follows the profession of service should be dexterous, pure, truth-speaker, master of sleep, master of his passions, free from carelessness, and not lazy.

Ibid. VIII. 143.

प्रभुर्विष्णुसमो मान्यः तज्जाया जननीसमा ।

मान्यास्तन्वान्धवा भृत्यैः इहामुत्र सुखेषुभिः ॥

The master should be respected like God Viṣṇu, and his wife like mother. The kinsmen of the master should be honored by the servant, if he wants happiness in this and the next life.

Ibid. VIII. 144.

भर्तुर्मित्राणि मित्राणि जानीयात् तदरीनरीन् ।

समीतिः सर्वदा तिष्ठेत् प्रभोराज्ञां प्रतीक्षयन् ॥

The master's friends should be regarded by him as his friends, the master's foes, his foes; he should always be ready to carry out the orders of his master, and have fear.

Ibid. VIII. 145.

शुपमानं गृहच्छिद्रं गुप्त्यर्थं कथितञ्च यत् ।

भर्तुर्गलानिकरं यच्च गोपयेदतियत्नतः ॥

He should conceal carefully the disgrace of his master, the family ruptures, whatever is said to him in privacy, and whatever would bring discredit on his master.

Ibid. VIII. 146.

अलोभः स्यात् स्वामिधने सदा स्वामिहिते रतः ।

तत् सन्निधावसद्गार्षं क्रीडां हास्यं परित्यजेत् ॥

He should have no avarice to possess the riches of his master, he should always be devoted to his master's welfare; he should leave improper speech, play and laughing in his presence.

Ibid. VIII. 147.

न पापमनसो पश्येद् अपि तद्गृहकिङ्करी ।

विविक्तशय्यां हास्यञ्च ताभिः सह विवर्जयेत् ॥

He should not look with evil mind his fellow maid-servants; he should not laugh with them or remain with them in a solitary place.

Ibid. VIII. 148

प्रभोः शय्यासनं यानं वसनं भाजनानि च ॥

उपानद् भूषणं शस्त्रं नात्मार्थं विनियोजयेत् ॥

He should never use for his own purpose the master's bed, or seat, or carriage, or dress, or household-furnitures, nor his shoes or ornaments, or weapons.

Ibid. VIII. 149.

क्षमा कृतापराधश्चेत् प्रार्थयेदप्रतः प्रभोः ।

प्रागल्भ्यं प्रौढवादञ्च साम्याचारं विवर्जयेत् ॥

He should ask the pardon of his master, if he has committed a fault: he should abandon arrogance, defiant speech, and vile conduct. *Ibid.* VIII. 151.

202. Q.—*What are the duties of the commons?*

सामान्यानान्तु वर्णानां विप्रवृत्त्यन्यवृत्तिषु ।

अधिकारोऽस्ति देवेशि देहयात्राप्रसिद्धये ॥

O Goddess! the common caste may adopt any means of livelihood other than that of a Bráhmana, in order to maintain themselves. *Ibid.* VIII. 113.

MARRIAGE.

203. Q.—*How many forms of marriage were allowed in ancient times?*

A.—Eight; *viz.* Bráhma, Daiva, Ârṣa, Prájápatya, Asura, Gándharva, Rákṣasa and Paisácha.

ब्राह्मो विवाह आहूय दीयते शक्यलङ्कृता ।

तज्जः पुनात्युभयतः पुरुषानेकविंशतिम् ॥

That is called a Bráhma marriage wherein the bridegroom being invited, the bride is given away, bedecked according to the girl's means. The son born of her purifies twenty-one persons on each side. *Yájñaval'kyā* I. 58.

यज्ञस्थम्रत्विजे दैवआदायार्षस्तु गोद्वयम् ।

चतुर्दश प्रथमजः पुनात्युत्तरजदच षट् ।

(Giving away the bride) to the Ritwij sitting at a sacrifice makes a Daiva marriage. Giving the bride after taking two cows makes an Ârṣa marriage. The son born of the first marriage purifies fourteen generations, that born of the second, six. *Ibid.* I. 59.

इत्युक्त्वाचरता धर्म सह या दीयतेऽर्थिने ।

सकायः पावयेत्तज्जः षट् षट् वंश्यान्सहात्मना ॥

Giving the girl to the suppliant bridegroom saying "May she walk in religion with you" is Kâya marriage. The son born of it will purify six and six generations together with himself. *Ibid.* I. 60.

आसुरोद्रविष्णादानाद्ब्रान्धर्वः समयान्मियः ।

राक्षसो युद्धहरणात्पैशाचः कन्यकाच्छलात् ॥

The Asura is constituted by taking of money, the Gándharva by mutual consent, the Rákṣasa by forcible taking in war and Paisácha by deceiving the girl. *Ibid.* I. 61.

204. Q.—How many forms of marriage are current in this age?

A.—Two. Bráhma and Śaiva.

205. Q.—What is the Śaiva form of marriage?

A.—This is the form of marriage solemnised under the Śiva's ordinance. Under this form, a man of one caste can marry a woman of another caste.

चक्रानुष्ठानसमये स्वगणैः शक्तिसाधकैः ।

परस्परेच्छयोद्वाहं कुर्याद्द्वीरः समाहितः ॥

The Vira worshipper may marry by mutual choice another, in the assemblage of Śakti-worshipper, when a circle is formed.

Ibid. IX. 279.

वयोवर्णविचारोऽत्र शैवोद्वाहे न विद्यते ।

असपिण्डां भर्तृहीनाम् उद्वहेच्छम्भुशासनात् ॥

In the Śaiva marriage there is no distinction of castes, nor restriction of age (such as that the girl should be married before puberty); the only condition is that she should not be a Sapiṇḍa relation, (agnate), and should not have a husband living.

Mahānirvān. IX. 278.

206. Q.—Can a widow be re-married?

A.—Yes,

नष्टे मृते प्रव्रजिते क्लीबे च पतिते पतौ ।

पञ्चस्वापत्सु नारीणां पतिरन्यो विधीयते ॥

A second husband is allowed by law for those women who have fallen in any one of these five misfortunes :—1. whose husband is missing, 2. or is dead, 3. or becomes a religious anchorite, 4. or is impotent; 5. or has fallen from caste. (*Parásara and Nārada*).

षण्ढेनोद्वाहितां कन्यां कालातीतेऽपि पार्थिवः ।

जानन्नुद्वाहयेद्भूयो विधिरेष शिवोदितः ॥

This is the law given by Śiva; the king should decree the re-marriage of that girl who has been married to an impotent person, even after a lapse of time, as soon as the defect is known.

Mahānirvāntantra XI. 66.

परिणीता न रमिता कन्यका विधवा भवेत् ।

साद्युद्वाहना पुनः पित्रा शैवधर्मेष्वयं विधिः ॥

If a girl has passed through the ceremony of marriage, but has not lived with her husband, she also should be re-married by her father, if she loses her husband, for this is the law of the Śāivas.

Ibid. XI. 67.

207. Q.—*Was Śaiva form ever prevalent in India?*

A.—Sugrīva married the widow of his brother, Bāli; Vibhīṣaṇa of his brother Rāvana and even in this Kali age Arjuna married the widowed daughter of king Airāvata.

208. Q.—*Did true Hinduism allow burning of the widow?*

A.—No. It prohibited it in strong language. It considers the body of every woman as the image of the Goddess Durgā, and to wilfully destroy the body was considered as sinful as polluting the image of a sacred deity.

भर्ता सह कुलेशानि न दहेत् कुलकामिनीम्,

तव स्वरूपा रमणी जगत्याच्छन्नविग्रहा ।

मोहाद् भर्तृविचतारोहात् भवेन् नरकगामिनी ॥

The wife should not be burnt with the husband. All women are thy image, O Goddess! thou dwellest in this world in the form of women! that woman, therefore, who through (ignorance or) delusion (or excessive love for her husband) burns herself on the funeral pile of her dead lord goes to hell.

Ibid. X. 79-80.

209. Q.—*What is the Hindu ideal of marriage?*

A.—It is considered a sacrament rather than a secular contract. And as the wife is considered to belong to the family of her husband's father, the transplanting from one family and engrafting her into another takes place at a comparatively tender age. The husband however is not allowed to approach her till several years after.

210. Q.—*What is the technical name given to this ceremony?*

A.—It is called Gaunā in these Provinces—*dvirāgamanam* or second marriage, or *garbhādhāna* or conception ceremony.

211. Q.—*At what age should this second marriage take place?*

A.—At the age when the husband is 25 years old and the wife is 16 years old.

अथ सल्लुपुमान् एकविंशतिवर्षः कन्यां अतुल्यगोत्राम् अतुल्याभिजनाम्
असंचारि-रोग-कुल-प्रसूताम् द्वादशवर्षदेशीयाम् उद्वहेत् ॥ तस्यां
षोडशवर्षीयां पंचविंशतिवर्षः पुरुषः पुत्रार्थं प्रयतेत ॥

A man of twenty-one years of age should marry a girl of twelve years of age or thereabout: she must belong to a different gotra, and different Sapiṇdaship, and must not belong to a family having any hereditary disease. The husband having reached his 25th year should approach her when she is 16 years of age, in order to beget a son. (Aṣṭāṅga Sangraha, Śarīrasthāna).

212. Q.—*What are the good consequences of following this rule?*

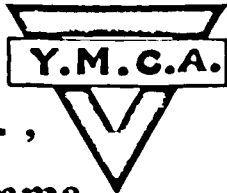
तदा हि तौ प्राप्तवीर्यौ वीर्यान्वितं अपत्यं जनयतः ॥

Both being then mature produce a strong progeny. (*Ibid.*)

213. Q.—*What are the evil consequences of violating this rule?*

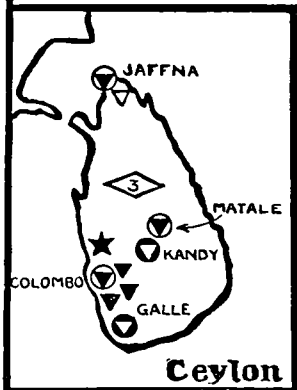
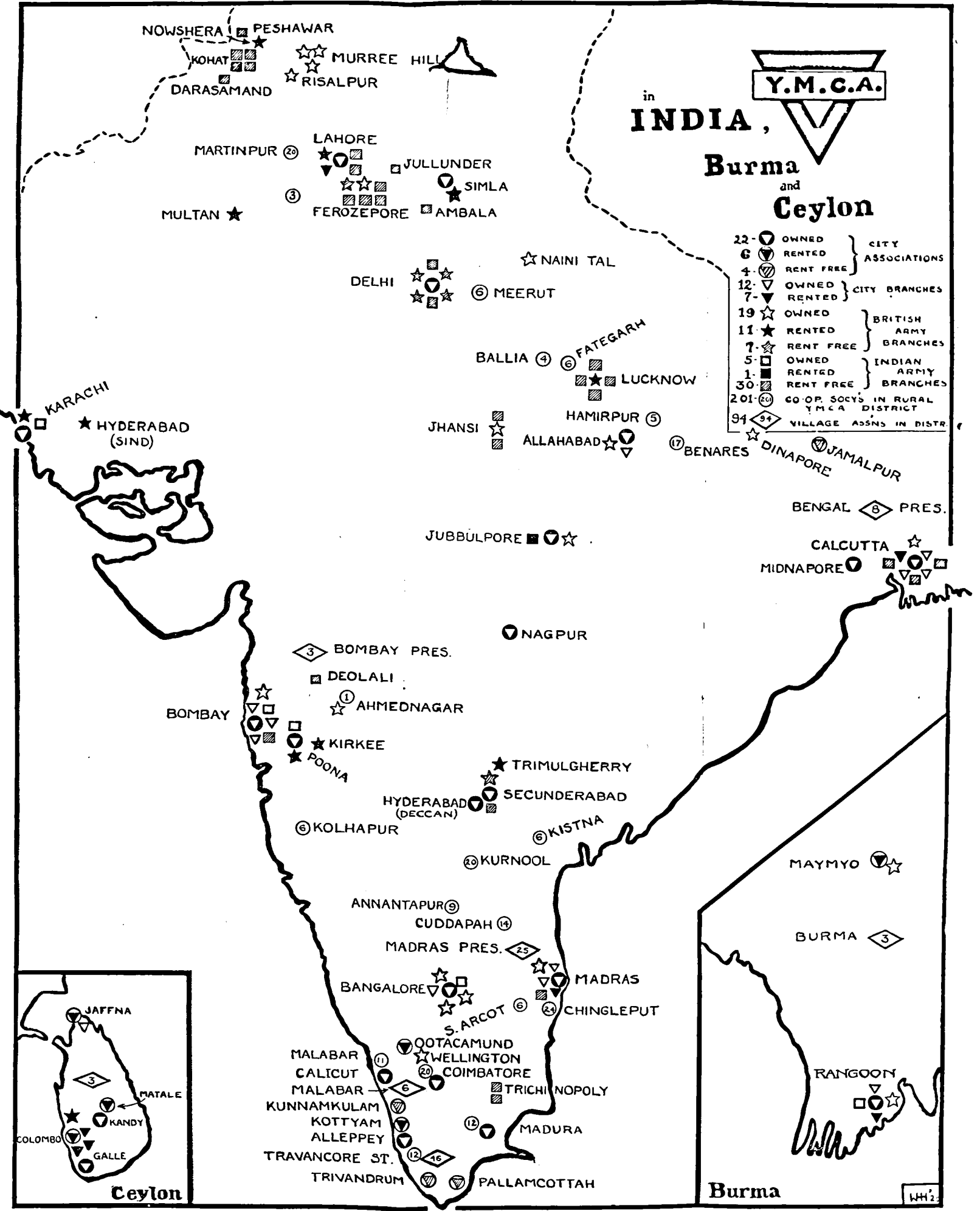
ऊनपञ्चविंशतिवर्षेण ऊनषोडशवर्षीयां आहितो गर्भः कुक्षिस्थ एव विनाशम् आप्नुयात्, अदृषायुबलारोग्यविभवो वा स्याद्, विकलेन्द्रियो वा ॥

“The conception produced by a man under twenty-five, on a wife under sixteen is liable to abortion, or the progeny of such union would be short-lived, weak and constantly ailing, or defective in some organs of sense.” (*Ibid.*).



in
INDIA,
Burma
and
Ceylon

- | | | |
|--------|--|-------------------------|
| 22-▽ | OWNED | } CITY ASSOCIATIONS |
| 6-▽ | RENTED | |
| 4-▽ | RENT FREE | |
| 12-▽ | OWNED | } CITY BRANCHES |
| 7-▽ | RENTED | |
| 19-☆ | OWNED | } BRITISH ARMY BRANCHES |
| 11-☆ | RENTED | |
| 7-☆ | RENT FREE | |
| 5-□ | OWNED | } INDIAN ARMY BRANCHES |
| 1-□ | RENTED | |
| 30-□ | RENT FREE | |
| 201-②0 | CO-OP. SOCY'S IN RURAL Y.M.C.A. DISTRICT | |
| 91-94 | VILLAGE ASSO'S IN DISTR | |



REPORT
of the
NATIONAL COUNCIL
of
Young Men's Christian Associations
of India and Ceylon
to the
TENTH NATIONAL CONVENTION
at
CALCUTTA
November 23-27, 1920
5, Russell Street, Calcutta

CUTTACK :
PRINTED AT THE ORISSA MISSION PRESS,
1920.

CONTENTS

	PAGE
I. STATISTICS AND BRANCHES	2—6
1. Statistics	2
2. Staff	2
3. Branches	4
II. RESPONSIBILITIES, PERSONNEL AND ORGANIZATION	
OF THE NATIONAL COUNCIL	6—21
1. Responsibilities	6
2. Membership of the Council	7
3. Executive Committee	9
4. Staff	10
5. Organization of the Secretariat	15
6. District and Regional Committees	18
7. Relations with Foreign Association Movements	20
III. FINANCE AND REVENUE	21—25
1. Finance	21
2. Revenue	22
IV. ARMY DEPARTMENT	25—57
1. Pre-War Work	25
2. War Work	27
3. France	34
4. Mesopotamia	37
5. East Africa	40
6. Egypt and Palestine	46
7. Work in India	49
8. Post-War Situation	52
V. BOYS' WORK DEPARTMENT	57—61
1. General Work	58
2. Hostels	59
3. Camps... ..	59
4. Boy Scouts	60
VI. BUILDING DEPARTMENT	61
VII. LECTURE AND PUBLICITY DEPARTMENT	76
VIII. LITERATURE DEPARTMENT	77—93
1. Literature	77
2. The Association Press	80
3. Magazines	91

IX.	PHYSICAL DEPARTMENT	...	...	93
X.	RAILWAY AND INDUSTRIAL DEPARTMENT	...	...	97—98
XI.	RELIGIOUS WORK DEPARTMENT	...	...	98—105
XII.	RURAL DEPARTMENT	...	...	105—110
XIII.	STUDENT DEPARTMENT	...	...	110—116
XIV.	TRAINING DEPARTMENT	...	...	116—120
	1. Training School	...	...	116
	2. Probationership	...	...	119
	3. Summer School	...	...	119
	4. Study Abroad	...	...	119
XV.	MISCELLANEOUS	...	...	120—125
	1. Basis of Membership	...	...	120
	2. Deputation of Friendly Service	...	...	123
	3. Relationships Abroad	...	...	123
	4. Conferences	...	...	124
	5. Work for Ex-Detenus	...	...	125
	6. Scholarship Loan Fund	...	...	125
XVI.	STATEMENTS OF ACCOUNTS	...	...	126—139
XVII.	GRAPHS	...	...	140—149
XVIII.	STANDARDIZATION OF INDIAN SECRETARIAT	...	...	150—152
XIX.	MEMORANDUM OF ASSOCIATION	...	...	153—154
XX.	STATISTICAL CHART			

Report of the National Council

of

Young Men's Christian Associations of India and Ceylon

to the

Tenth National Convention

at Calcutta

November 23—27, 1920

TO the Tenth National Convention of the Young Men's Christian Associations of India and Ceylon, the National Council have the honour to submit the following report of the work done since the last Convention.

When the Ninth Triennial Convention adjourned in Bombay on December 31st, 1910, it was expected that December 1913 would see the Tenth Convention in session. At the Bombay Convention there were present among the 138 voting and fraternal delegates, fifty-four students, college principals and professors; the first All-India Student Conference which met under the auspices of the Student Department of the Y.M.C.A. at Serampore December 26, 1912—January 1, 1913, formed the Student Christian Association of India and Ceylon and decided to hold a National Conference quadrennially. In order, therefore, to avoid conflict of dates in the future, it seemed best to the National Council to postpone the Convention until the cold season of 1914 and by July of that year plans were well in hand for the meeting, at some place in the North, for the New Year season of 1914-15. Then the war came, upsetting all plans of normal work. During its continuance it seemed impossible for reasons of finance and personnel to call a Convention, and it is therefore only now, practically ten years after the Bombay Convention, that the Tenth Convention is possible.

The period has been one of great changes, both in staff and constituency, and of numerous and extensive developments. The Association Movement has carried responsibilities which ten years ago no one would have thought possible; it has lived in an atmosphere of "emergency," with chronically undermanned staff; it has expended sums of money which make the "before the war" expenditure seem insignificant. It now finds itself in a new India, with perplexing problems on all sides,—divisive tendencies and the general unrest that seems to characterize the whole world. What is to be its future? Can it go on in faith that the enlarged work of the decade that is past is only an earnest of that which

is to come? Or is it to drop back to the old dimensions, as having had beneath it during these years no really permanent strength commensurate with the work that has been done under its auspices? What is the will of God for it in the immediate and more distant future?

To these and other similar questions it is hoped that the following review may help to furnish an answer.

I. STATISTICS AND BRANCHES

STATISTICS.—The first National General Secretary, Mr. David McConaughy, arrived in India in January 1890 and the first National Convention was held in Madras, February 19—22, 1891. It is therefore about thirty years since the National Union was formed.

The following statistics show some aspects of the material development that has taken place during these thirty years:—

	1890	1901	1910	1920
Number of Associations	55	149	158	241
„ Members	2451	6558	12109	10463
„ Bldgs owned	2	16	26	57
Value of „		6,47,200-0	16,51,856-0	32,74,862-0
Debt on „			2,51,340-9-1	98,052-0
Amount spent for current expenses	15,667-11-7	58,041-0	3,72,310-3-3	3,78,409-0
Number of paid Secretaries	1	20	60	231
Number of volumes in libraries	3705			27,206

In the 1920 figures for membership as compared with 1910, it should be remembered that there are now no College Associations, whereas in 1910 there were 32; and that the constituencies of the Rural and Army Departments are not recorded by any statistics.

Other interesting facts as shown by the reports from 142 branches for 1919 are the following:—1156 men were serving on committees; there was hostel accommodation for 814; the daily attendance at the 119 buildings (there are 30 rented and 32 rent-free in addition to the 57 owned) averaged 3250; at 4423 Bible class sessions there was a total attendance of 51,668; at 4228 other religious meetings, 88,108; 734 literary meetings brought together 44,233; 2264 educational class sessions had a total attendance of 52,072; there are 12 gymnasia, 144 courts and 21 playing fields; at 2338 physical department sessions, 76,097 was the attendance; 85,254 attended 733 social gatherings.

STAFF.—During the period under review 838 different paid secretaries have served on the staff, local and national. Of these, 538 were in the temporary cadre, working among the troops during the war; 202 were Indians and Ceylonese. Of the 300 on the regular staff during the period, 156 were Indians, Burmese and Ceylonese.

In December 1913 there were 86 full-time secretaries in the entire field, of whom 4 came from the continent of Europe, 24 from the United States, 29 from the British Empire outside India and Ceylon, and 29 from India and Ceylon. Forty-two of these men are still in the active service of the Association in India and Ceylon. On June 30th, 1920, the entire staff consisted of 231, of whom 149 are Indians, Burmese and Ceylonese, 3 Anglo-Indians, 28 Americans, 49 British and 2 Swiss. Of the entire number 59 are supported by local Associations (in some cases with help from the National Council), 124 by the National Council, 5 by the English National Council, 1 by the Scottish National Council, 1 by the Australasian National Council and 41 by the International Committee. In the number supported by the National Council are included the 80 secretaries of the Rural and Army Departments: 24 of the latter are working under local Associations though their present support comes from National Council funds.

Since January 1st, 1911, the following members of the staff have died :

1. J. P. Hill, Army Secretary, Poona, 22 February, 1911.
2. W. H. Beeken, Branch Secretary, Calcutta and Lahore, 13 March, 1913.
3. W. Blackford, Superintendent, Apprentices' Home (Mazagon) Bombay, 17 July, 1914.
4. T. H. Clark, Army Secretary, Mesopotamia, September, 1917.
5. S. P. Soondrum, Secretary, Hyderabad, Jubbulpore and Cannanore, 12 December, 1917.
6. Rev. Emlyn Holt Davies, Secretary in Indian Labour Corps, France, March, 1918.
7. F. D. Ballou, Army Secretary in East Africa, March, 1918.
8. R. A. Pritchett,....., March, 1918.
9. R. A. Bunyan, Assistant Secretary, Bangalore, October, 1918.
10. Howard Arnold Walter, Literary Secretary and Student Secretary, Lahore, 1 November, 1918.
11. John Irving Roberts, Army Secretary, Lucknow, November, 1918.
12. R. H. Gunawardene, Secretary, Boys' Work, Delhi, June, 1919.
13. Owen Wickrematunge, Branch Secretary, Colombo and Karachi, 15 October, 1919.
14. J. C. Eliatamby, Secretary, Jubbulpore, France, Nagpur, 17 January, 1920.

The National Council would express on behalf of the entire Association movement their sense of loss and their deep appreciation of the life and service of each of those named.

The proportionate growth of the Indian and Ceylonese staff has been very gratifying and has made it a matter of urgent importance to standardize the conditions of recruiting, training, assignments and transfers, salaries and allowances. After a long period of investigation, study and discussion the National Council have adopted for their Indian staff a plan which is reproduced in Appendix I.

In 1912 a Provident Fund was established with the aim of ensuring to new secretaries recruited in India opportunity for study at stated periods, a competency in case of retirement after a definite number of years, or an insurance for relatives in case of death. Under stated rules, the secretary deposits 5 per cent. of his monthly salary and the employing body adds a like amount, both sums being deposited with the National Council. Interest on payments is compounded. In the administration of the Fund certain difficulties have arisen from time to time which are now being considered with a view to revision of rules.

At the Secretaries' Conference in 1917 the "Secretaries' Mutual Assurance Alliance" was formed. It is open to all regular, full-time secretaries of Associations in India and Ceylon. The dues are Rs. 10-8-0, payable on application for enrolment, and subsequent assessments of the same amount, payable within sixty days of receipt of notice of the death of any member of the Alliance. Of each assessment, Rs. 10-0-0 is available in toto for the beneficiary of the next secretary to die; the remainder is for printing, postage and other incidental expenses. The Alliance is administered by a managing committee of five, plus a secretary and a treasurer, all elected at the annual Secretaries' Conference.

BRANCHES :—In 1890 there were 35 branches
 1901 149
 1910 158
 1920 242 in 206 different places.

The following is the list of Associations officially in existence and recognized by the National Council as affiliated with the National Union : *

Ahmednagar	R	Amraoti	T
"	B.A.	Anantapur	R
Allahabad Central	C	Anikad	V
" City	C	Arupukara	V
" Katra	C	Ashtamudy	V
" Muirabad	C	Attungal	V
Alleppey	T	Badulla	T
Amalapuram	V	Ballia	R
Amichary	V	Bangalore (Cenotaph Road)	C

* The following abbreviations are used: C—City Association; T—Town; V—Village; H.S.—High School; B.A.—British Army; I.A.—Indian Army; R—Rural, S—Student.

Bangalore (Bourdillon)	C	Ferozepore (4)	I. A.
" (Baghdad Camp)	B. A.	Gadag-Betgeri	T
" (Cobb Branch)	B. A.	Galle	C
" (Iggulden Park)	B. A.	Gooty	R
" (Richmond Lines)	I. A.	Gopalgunj	V
Benares	R	Guntur	T
Bhagalpur	C	Hamirpur	R
Bombay Central	C	Hyderabad (Deccan) Eden	C
" Girgaum	S	Garden Road.	S
" Procter	C	College Street	B. A.
" Byculla	C	Hyderabad (Sind)	C
" Cooperage	B. A.	Jaffna	T
" Dadar	I. A.	Jamalpur	B. A.
" Marine Lines	I. A.	Jhansi	I. A.
Calcutta Central	C	" (2)	V
" Boys	C	Jhonbanea	C
" College Street	C	Jubbulpore	B. A.
" Machua Bazaar	S	"	I. A.
" Taltollah	C	"	I. A.
" Sibpur	S	Jullundur	V
" Wellington	C	Kaliyanipuram	C
" Ronaldshay Hut	B. A.	Kandy	V
" Alipore	I. A.	Kanniti	C
" Barrackpore	I. A.	Karachi	C
" Fort	I. A.	" Keamari	B. A.
Calicut	C	"	I. A.
Cannanore	C	Karapuzha	V
Chavara	V	Karavallur	V
Chenganur	V	Karur	V
Cheppaud	V	Kattanam	V
Cherukol	V	Kayankulam	V
Cheruvallur	V	Kilvaipur	V
Chittoor	V	Kistna	R
Chingleput	R	Kodondi	V
Cocanada	T	Kodukalanghy	V
Codakal	V	Kohat (4)	I. A.
Coimbatore	C	Kolhapur	T
"	R	Kolicode	V
Colombo Central	C	Kotagiri	V
" Bambalapitya	C	Kottarakara	V
" Maradana	C	Kottayam	C
"	B. A.	Kundara	V
Cuddappah	R	Kunnamkulam	C
Cuttack	C	Kurianur (4)	V
Darasamand	I. A.	Kurnool	R
Dehiwala	T	Lahore	C
Delhi	C	"	B. A.
" (3)	B. A.	" (2)	I. A.
" (2)	I. A.	London Student Hostel	S
Deolali	I. A.	Lucknow Dilkusha	B. A.
Dinapore	B. A.	" (4)	I. A.
Dindigul	V	Madras Chintadripet	C
Donakonda	R	" Esplanade	C
Edathua	V	" Royapettah	C
Ellore	T	" Vepery	C
Erode	R	" Ft. St. George	B. A.
Erumpara	T	" St. Thomas Mt.	I. A.
Fatehgarh	R	Madura	C
Ferozepore.	B. A.	"	R
" Fort	B. A.	Malabar	R

Mallapally	V	Poona	C
Mandalay	T	"	B.A.
Mangalore	T	Connaught Institute Ross Road	I.A.
Martandam	R	Pudukottah	C
Marthicapally	V	Puthenkavu	V
Martinpur	R	Puthupalli	V
Masulipatam	T	Puvathur	V
Matale	T	Quetta	T
Matara	T	Rajamundry	T
Mavelikara	V	Ramapatam	V
Maymyo	T	Rangoon Central	C
"	B.A.	"	S
Meerut	R	Godwin Road	C
Mengnanapuram	V	Town Branch	C
Melparamba	V	"	B.A.
Midnapore	T	"	I.A.
Montgomery	R	Risalpur	B.A.
Multan	B.A.	Salem	C
Murree Hills Gharial	B.A.	Secunderabad	C
"	B.A.	"	B.A.
"	B.A.	Begumpet	I.A.
" Sunny Bank	B.A.	Shillong	T
Mussoorie	T	Simla	C
Nagercoil	T	Simla	B.A.
Nagpur	S	Sivakasi	T
Naini Tal	T	South Arcot Dist.	R
Nalumavady	V	Sylhet	T
Nandyal	R	Tellicherry	T
Narayangunj	T	Thalvady	V
Navaly	V	Tharrawady	T
Nayudupet	T	Thevalarni	V
Nedumpram	V		
Nedungadapally	V	Thiruvalluvarnadanvillai	V
Nellore	R	Tholashery	V
Niranam	V	Thottapushacherry	V
Nowshera	B.A.	Thumpamon	V
Olesha	V	Thumpamon (North)	V
Ootacamund	T	Tirupati	H.S.
Palamcottah	T	Tiruvella	T
Palghat	T	Trichinopoly (2)	I.A.
Pallam	V	Trichur	T
Palipad	V	Trivandrum	C
Panadure	T	Vellore	T
Panidem, Guntur	T	Vengal	V
Pasumalai	H.S.	Venmoni	V
Peshawar	I. A.	Wellington	B. A

During the period a considerable number of others have been in existence but for one reason or another have discontinued their activities.

II. RESPONSIBILITIES, PERSONNEL AND ORGANIZATION OF THE NATIONAL COUNCIL

I. RESPONSIBILITIES.—The National Council was constituted in 1891 by the National Union of Young Men's Christian Associations of India, Burma and Ceylon, which is the finally responsible body representing, and controlling the policies of, the Association. The National Union meets at stated periods in

National Conventions, where, among other actions, it appoints the National Council of thirty members, to whom the Union delegates the management of its affairs, under specific conditions and with specific responsibilities laid down in the Constitution of the National Union. The "Memorandum of Association," registered under Act XXI of 1860, on the 13th May, 1911, is appended to this report. (Appendix II.)

Generally speaking, the work of the National Council is to serve as the co-ordinating body of the various local Y.M.C.A.'s, organize new Associations, recruit and train secretaries, publish Association literature, arrange conferences and camps, conduct financial canvasses, provide plans and supervise erection of buildings, arrange lecturing tours, promote work for special classes (boys, soldiers, students, etc.), pioneer new lines of work, focus the best thought and progressive ideas of the Associations, maintain relationships with foreign Association movements and important outside organizations of Church and Government, secure men and money from abroad, and carry on such other work as can best be done by a central body.

The Headquarters of the National Council are at 5, Russell Street, Calcutta, in a building, with a compound of slightly over an acre, purchased for Rs. 1,95,000-0 in 1916 with funds most generously provided by friends connected with the Young Men's Christian Association of Toronto, Canada. At the beginning of the period the offices were at 86, College Street, being moved from there in 1914 on account of insufficiency of room, to 9, Russell Street, thence in 1916 to 6, Chowringhee Lane and in September 1917 to the present quarters.

Because of the age of this building (over 100 years) with the consequent need of a new building within a few years at most, and also because of the growing expensiveness of the locality, negotiations are proceeding for the sale of the property with a view to providing permanent quarters in some less expensive place, possibly some distance outside Calcutta.

His Excellency Lord Hardinge in September 1911 graciously consented to become Patron of the National Council, a mark of favour which His Excellency Lord Chelmsford has continued.

Raja Sir Harnam Singh, K.C.I.E. has continued as President of the National Council throughout the period under review.

2. MEMBERSHIP OF COUNCIL.—The present membership of the National Council is as follows (members of the Executive Committee are indicated by an asterisk) :

- Raja Sir Harnam Singh, K.C.I.E., *President*.
- A. H. S. Aston, Esq., Bombay.
- B. N. Athavle, Esq., B.A., LL.B., Bombay.
- J. R. Banerjea, Esq., M.A., B.L.,* Calcutta.
- W. J. Bradshaw, Esq.,* Calcutta.

Sir Henry P. Burt, K C.I.E., Simla.
 M. J. Cary, Esq., Colombo.
 Rev. J. R. Chitambar, B.A., Lucknow.
 F. C. Danger, Esq.,* Calcutta.
 S. K. Datta, M.B. Ch.B, Calcutta.
 The Rt. Rev. The Bishop of Dornakal, Nizam's Dominions.
 J. C. Dutt, Esq., M.A., B.L.,* Calcutta.
 Rev. A. G. Fraser, M.A., Kandy.
 W. R. Gourlay, Esq., C.I.E., I.C.S.,* Calcutta, *Honorary Treasurer*.
 The Hon'ble Mr. Justice W. E. Greaves, Bar-at-Law,* Calcutta,
Chairman.
 E. S. Hensman, Esq., Madras.
 The Hon'ble Mr. W. W. Hornell, M.A.,* Calcutta.
 J. C. Jansz., Esq., B.A., Colombo.
 H. A. F. Lindsay, Esq, I.C.S.,* Calcutta.
 A. J. Moir, Esq.,* Calcutta.
 S. C. Mukerjee, Esq, M.A., B.L.,* Serampore.
 Col. G. W. Palin, C.I.E., Poona.
 Sir Stanley Reed, Kt., Bombay.
 J. Hope Simpson, Esq.
 Rev. W. M. Zumbro, M.A., Madura.
 E. C. Carter, Esq, B.A., O.B.E.
 K. T. Paul, Esq., B.A., L.T., O.B.E. } Ex-officio members of
 F. V. Slack, Esq., M.A. } Council and Executive.

Of these, the Chairman and Messrs. Aston, Banerjea, Chitambar, Datta, Dutt, Fraser, Gourlay, Hensman, Jansz, Zumbro and the Bishop of Dornakal have served throughout the period under review.

In addition to the present membership, the following have served for varying periods since January 1911 :

R. Anderson, Esq.,* Calcutta.
 Rev. C. F. Andrews, M.A., Delhi.
 C. G. Arthur, Esq.,* Calcutta.
 Hon'ble Mr. S. R. Arthur, C.I.E., I.C.S., Poona.
 Brig. Genl. F. G. Bond, C.B., Bangalore.
 F. J. Clark, Esq., Bombay.
 Rev. A. H. Clarke, M.A., Ahmednagar.
 W. A. Cole, Esq., Colombo.
 Rev. A. H. Ewing, Ph.D., D.D., Allahabad.
 Rev. D. J. Fleming, M.A., M.Sc., Lahore.
 Hon'ble Mr. F. C. Gates, C.S.I., I.C.S., Rangoon.
 Maj. Genl. H. Hendley, I.M.S., Lahore and Quetta.
 A. L. Hosie, Esq.,* Calcutta.
 Rev. S. V. Karmarkar, M.A., B.D., Bombay.
 Dr. H. H. Mann, D Sc., Poona.
 Sir Ruthven G. Monteath, Kt.,* Calcutta.
 Dr. T. Narayana Swami, Nellore.
 Sir Henry E. E. Procter, Kt.,* Bombay.
 J. H. Simpson, Esq., United Provinces.
 Sir Francis H. Stewart, Kt., M.A., C.I.E.,* Calcutta.
 Eric Studd, Esq.,* Calcutta.

Sir Robert Laidlaw, London, G. B. McNair, Esq., Calcutta, and E. R. Wood, Esq., of Toronto, served during the early part of the period as Advisory Members of the National Council.

F. J. Clark, Esq., resigned in 1918 after twenty-seven years

of service, having served continuously since the formation of the National Council in 1891. The services of the Rev. A. H. Ewing, the Rev. S. V. Karmarkar and Dr. T. Narayan Swami were terminated by death, in 1912, 1913, and 1917 respectively.

In the lack of a Convention since 1910, vacancies in the Council have been filled, in accordance with the constitutional provision, by the Council itself, members as appointed being eligible to "remain in office until the next Convention or until the expiration of their terms of office." The Constitution also provides that members shall retire three years after their election, but shall be eligible for re-election. Strictly speaking, therefore, the entire Council as it now exists, will pass out of office at the coming Convention, though any or all members are eligible for re-election.

With this method of filling vacancies over so long a period it has been impracticable to ensure the adequate representation of the different parts of India, Burma and Ceylon on the Council. A glance at the present list of members will show the situation in this respect.

3. EXECUTIVE COMMITTEE.—The Constitution instructs the Council to "elect from its members an Executive Committee, consisting of five or more members residing in the same locality, which shall be authorized to attend to routine business and such other matters as may be referred to it by the Council. The Executive Committee may also bring forward and consider any other matters, but shall thereafter submit its proposals to the National Council for decision."

In accordance with this provision the Executive Committee, as already named, has been carrying on in Calcutta the work of the Council throughout the period. Most of the routine business is carried on by the circulation of Notes and Memoranda. Monthly meetings are also held, the minutes of which are circulated at once to the entire Council. If no two written objections to a minute are received within twenty-one days of the posting of the minutes, the minute is considered to be confirmed.

It must, however, be admitted that this control by the entire Council has become a purely formal matter. Objections, comments or questions are very rarely received and in practice the Executive Committee really is the Council. The size of the territory and the difficulty of securing the attendance at meetings of members of Council from such distances are so great that it has been all too easy to accept as practically impossible the ideal of genuine control by the whole Council.

Moreover, during the war, there was an enormous amount of emergency work which could not wait upon the tedious processes of circulation to all parts of the country. Large executive plans had to be carried through involving the expenditure of

large sums of money and under the circumstances nothing but a centralized control would answer.

It is therefore very largely the force of circumstances which has been responsible for what is often held to be an undue centralization of authority at the headquarters in Calcutta. The present Executive Committee are clear that immediate steps should be taken toward decentralization, probably by the constitution of provincial or regional committees which will act on behalf of the entire Council in the respective areas.

Sir Ruthven G. Monteath, Sir Francis H. Stewart, and the Hon'ble Mr. Justice W. E. Greaves have served successively as Chairman of the Executive, 1911-16, 1916-20, and 1920—, respectively. W. R. Gourlay, Esq., has been Honorary Treasurer throughout, except for the period November 1918-December 1919, being then absent in Europe. R. Anderson, Esq., and H. A. F. Lindsay, Esq., acted successively as Honorary Treasurer during this time.

The National Council desire to acknowledge, on behalf of the whole movement, their unstinted appreciation of the services of all these gentlemen, and especially those of Mr. Gourlay. Unnumbered hours of toil and unwearying zeal have marked these years of devotion to the work of the Y.M.C.A. on the part of otherwise very busy men. Heavy financial burdens have been borne efficiently and cheerfully and their names have been a constant guarantee to the general public of reliability and trustworthiness, for which the movement cannot be too appreciative.

As the work increased so enormously during the war it became impossible to bring every matter before the entire Executive Committee and therefore the Committee in 1917 assigned departments and functions to its different members, determining the extent of the responsibilities which might be exercised by the individual members in the name of the whole Committee and Council. The following assignments exist at present :

Hon'ble Mr. Justice W. E. Greaves :	{	Appointments.
		Training.
J. R. Banerjea, Esq. :		Religious Work.
W. J. Bradshaw, Esq. :		Buildings.
F. C. Danger, Esq. :	{	Army.
		Physical.
J. C. Dutt, Esq. :		Railway & Industrial.
		Legal Problem.
W. R. Gourlay, Esq. :	{	Finance.
		Revenue.
		Rural.
Hon'ble Mr. W. W. Hornell :	{	Student.
		European Work.
S. C. Mukerji, Esq. :		Publications.

4. STAFF.—At the beginning of 1911 the National Council had the following staff at headquarters :

General Secretary	...	A. C. Harte
Student	..	J. N. Farquhar

Evangelistic Secretary	...	G. S. Eddy
Army	"	J. Callan
Financial	"	H. G. Doud
Business	"	E. M. Moffatt
Architect	...	H. Schaetti

Besides these there were the following district secretaries, who represented the Council in the areas mentioned :

Bengal	...	B. C. Sircar
Bombay	...	F. Anderson
Burma	...	O. H. McCowen
Ceylon	...	M. G. Brooks
Malabar	...	Rev. Ed. Schaetti (Hon)
Punjab	...	G. D. Turner
Tinnevelly	...	J. Devadas
Travancore	...	T. P. Chandi
and		and
Cochin	...	P. C. Kora

Of these, Messrs. Sircar, Devadas, Chandi and Kora spent their entire time in the district work. Mr. Schaetti was in regular missionary work and each of the others had large responsibilities in connection with a local Association, so that they were able to spend only a small fraction of their time in district work.

During the year Mr. Eddy and Mr. Doud left India and Mr. F. A. Wilson-Lawrenson succeeded Mr. Moffatt, who became General Secretary of the Allahabad Association.

In 1912 Mr. E. C. Carter returned to India and became Joint General Secretary with Mr. Harte. Mr. Farquhar retired from the Student Secretaryship to give all of his time to literary work as Literary Secretary, being succeeded in the Student work by Mr. F. V. Slack. Mr. R. A. Hadley became Bible Study Secretary but spent most of his time at language study. Mr. K. J. Saunders joined the staff as Principal of the Training School.

In the district work Mr. H. Kuhner succeeded Mr. Ed-Schaetti who went on furlough and Mr. G. Alexander took the place left vacant by the resignation of Mr. Kora who had decided to enter the ministry. Mr. Anderson had to leave India on account of his health; no successor was appointed. Mr. Turner also left for good. Mr. H. W. White was made 'intercity secretary' for the district from Tanjore to Palamcottah and Mr. M. C. Samuel became district secretary for Cheppad-Alleppey. Mr. J. R. Isaac was asked to serve as Travelling Secretary for the Tamil field and his services were offered to the Student Department for such a period as the Department might desire.

In March, 1913, Mr. K. T. Paul became the third Joint General Secretary, with special responsibility for the Rural Department which was then started. Mr. Harte went on furlough in August and did not return to India, finally resigning his connection with the Council in 1916. Mr. Hadley returned to America to finish his theological studies and was unable to come back to India on account of the health of his wife. Mr. Saunders and Mr.

H. A. Walter were made Literary Secretaries, the one for Buddhism and the other for Muhammadanism. Mr. Wilson-Lawrenson became Financial Secretary, being succeeded as Business Secretary by Mr. D. W. Peterson. Mr. A. D. Solomon became Office Secretary. Mr. H. Glunkler was appointed Architect along with Mr. H. Schaetti. Mr. F. C. Freeman came for the Railway and Industrial Department. Mr. Isaac was appointed to the newly-created post of the High School Secretaryship and Dr. J. H. Gray to the new post of National Physical Director. Mr. I. Jacobi became associated with Mr. Kuhner in Malabar.

In July, 1913, the Council resolved to have, instead of three travelling secretaries in Travancore and Cochin, one secretary each in Alleppey, Kottayam and Trivandrum, placing on each the responsibility for the village and small town associations in the vicinity. Consequently Mr. Samuel became Secretary at Alleppey, Mr. Alexander at Kottayam and Mr. L. A. Dixon at Trivandrum. Mr. Chandi was transferred to Calicut as General Secretary.

Early in 1914 Mr. Dixon was made District Secretary for Travancore and Cochin; Mr. M. R. Shelton joined the staff of the Railway and Industrial Department; and Mr. McCowen left on furlough, being succeeded by Mr. C. Baker. Mr. Wilson-Lawrenson was ordered home by the doctors. Mr. J. G. Harley, formerly Student Secretary in Lahore, and at the time on furlough, had accepted the Council's invitation to become Mission Study Secretary.

Then came the war. In October 1914 Messrs. Callan, Saunders and Shelton sailed for France with the first Indian contingent. Mr. Harte was soon placed in charge of the large Y.M.C.A. work for Prisoners of War on the continent of Europe; Mr. McCowen became Chief Secretary for the English National Council in France. Mr. Callan, after six months with the Indian troops in Marseilles took charge of the entire Y.M.C.A. work in Rouen, probably the largest and most efficiently managed of all the great British Y.M.C.A. centres in France. Mr. Harley spent some time with the Indian troops in Marseilles and then took a commission.

In July, 1915, Mr. Dixon was sent to Mesopotamia as Chief Secretary, to open work there; in November Mr. C. R. Webster was sent on a similar errand to East Africa.

At the end of 1915 Mr. Carter was granted leave to spend two months in Egypt, Europe and America, inspecting the work of the Army Y. M. C. A. of India, conferring with Headquarters in London and New York, and securing additional secretaries. He left India early in 1916 and returned in August, having, in addition to the work of inspection, collected a large sum of money and secured eighteen additional secretaries in England and Scotland and thirty-eight in the United States and Canada. On his arrival in August the National Council received an urgent

request from the English National Council for the loan of Mr. Carter's services for six months, in view of the unprecedented crisis and opportunity before the Y. M. C. A. in England and France. The request was granted and the time was extended for various further periods until the United States entered the war, when Mr. Carter was appointed by the International Committee to become the Chief Secretary for all their work in France. He has not yet returned to India.

On Mr. Carter's departure in 1916 Mr. Paul was asked to assume full responsibility for the General Secretaryship and Mr. Saunders was recalled from France to carry the executive work in connection with the National Council's work overseas. This he continued until the latter part of the year when he went to England to help the English National Council. He was succeeded by Mr. Shelton.

These are only a specimen of the effects of the war on the Council staff, as may be seen from the following list which shows it as it was at the beginning of 1917:—

General Secretaries	...	{ E. C. Carter (absent)
		{ K. T. Paul.
Associate General Secretaries	...	{ M. R. Shelton.
		{ F. V. Slack.
Architect	...	H. Schaetti.
Army Department Secretary	...	R. D. Whitehorn.
Finance and Business Secretary	...	W. E. D. Ward.
High School	...	J. R. Isaac.
Literary	...	{ K. J. Saunders (on leave).
		{ J. N. Farquhar.
		{ H. A. Walter.
Physical	...	J. H. Gray.
Publications	...	D. W. Peterson.
Rural	...	O. O. Stanchfield.
East Africa-Chief Secretary	...	C. R. Webster.
France	...	S. K. Datta.
Mesopotamia	...	L. A. Dixon.
Bengal	...	B. C. Sircar.
Ceylon	...	G. P. Wishard.
Malabar	...	I. Jacobi.
Mid-India	...	J. C. Eliatamby.
South India	...	H. C. Herman.
Tinnevelly District	...	J. Devadas.
Western India	...	W. B. Smith.

During the succeeding three years Mr. Brooks and Mr. Baker resumed their responsibilities in Ceylon and Burma respectively; J. Mathers and R. B. Young served in turn as District Secretary for South India Army work; D. M. Devasahayam succeeded, as High School Secretary, Mr. Isaac who became General Secretary in Bangalore; on Mr. Devasahayam's resignation he was succeeded by Mr. J. S. Aiman who after nine months' work went to America for further study, being succeeded by Mr. G. V. Job; Mr. Whitehorn returned to England and was succeeded as National British Army Secretary by Mr.

H. W. Bryant, Mr. J. H. Fowler acting in the interim ; Mr. Paul went on deputation to England and North America and Mr. Slack was appointed Joint General Secretary with Mr. Dixon as Associate and Mr. H. T. Beaver as Chief Secretary in Mesopotamia. Mr. S. P. Singha after serving as Chief Secretary for Indian work in Mesopotamia returned to India and was made National Indian Army Secretary to which afterward was added executive responsibility for Indian Army work overseas ; Mr. Dixon went on furlough at the end of 1919 and Mr. Herman was appointed Associate General Secretary in his place, being assigned specially to Revenue work. Mr. D. Swamidoss became Secretary for the Rural Department in 1917. Dr. Gray, and Messrs. Stanchfield, Peterson, W. B. Smith and Shelton went on furlough and have not been able to return. Mr. Walter died in 1918 and Mr. Eliatamby in 1920.

The staff as existing on 1st October 1920 was as follows:—

General Secretaries	...	{ E. C. Carter (on leave) K. T. Paul. F. V. Slack.	
British Army Department	...	H. W. Bryant.	
Indian " "	...	S. P. Singha.	
Association Press	...	{ N. R. Ghose. J. H. Waller (on leave) H. Schaetti, Architect.	
Building Department	...	{ G. A. Daniel. J. D. Hermon. A. Manickam B. I. Simon	} Assistants.
Business and Finance	...	{ W. E. D. Ward. A. O. Brunnschweiler. A. H. Seth.	
High School Work	...	G. V. Job.	
Evangelistic	...	{ T. P. Chandi. H. A. Popley. D. Samuel. B. C. Sircar.	
Literary	...	{ J. N. Farquhar. K. J. Saunders.	
Physical	...	A. G. Noehren.	
Revenue and Publicity	...	{ W. H. Heinrichs. H. C. Herman. V. M. Ilahi-Baksh.	
Rural	...	{ D. Swamidoss. S. K. Datta.	
Training	...	{ G. P. Wishard.	
France	...	E. P. Hillier.	
Mesopotamia	...	W. S. McMullen.	

During the period, several of the national secretaries have served on committees of many kinds outside the Y. M. C. A. Mr. Carter, Mr. Paul and Dr. Datta have been members of the Executive Committee of the National Missionary Council and in all parts of India and Ceylon the Y. M. C. A. has been represented in the Provincial Councils. Dr. Datta helped the Bihar and Orissa

Representative Council of Missions in connection with the work in the Lutheran Mission in Chota Nagpur. Mr. Paul's services were loaned for a brief period to the Missionary Commission on Rural Education.

5. ORGANIZATION OF SECRETARIAT:—As will have been seen from the staff list as existing on 1st January, 1911, the National Council Secretariat consisted of one General Secretary, six departmental secretaries and nine district secretaries. Except in Ceylon and Travancore and Cochin these district secretaryships involved very little, if any, executive responsibility, for the reason that there were few local Associations apart from those which had full-time secretaries. Occasional visits were paid to the few existent centres and the rest of the secretaries' time was given either to general evangelistic work or to the local Associations of which they were the general secretaries. One aim discussed at that time was to build up the "vernacular work" in various parts of the country, with Indian secretaries to supervise the large number of small Associations which would have been formed, but this aim was never carried to any general fulfilment except perhaps in the Tamil districts.

In 1912 Mr. Carter, in resuming his connection with the Association in India, was made Joint General Secretary with Mr. Harte, the various departments being divided between them. This arrangement, however, did not last long, for Mr. Harte went on furlough in August 1913. In August, 1914, Mr. Carter requested authority to delegate to Mr. Paul the correspondence and administrative work for the Madras Presidency, including the district, rural, student, boys, teachers, physical and general departments. Mr. Carter was to continue with the departments of army, railway, buildings, missionary education and training school. The Council, feeling such a scheme to be important, ordered that a letter of inquiry be sent to secretaries throughout the Madras Presidency asking for suggestions and support; in the light of the replies arrangements were to be made to test the feasibility of this reorganization for the next twelve months. The scheme was subsequently dropped.

As the work rapidly increased during the first years of the war, the problems referred to the National General Secretaries from the different localities increased so largely that one or two men could not deal with them. It seemed necessary to devolve this responsibility on other secretaries of reliability and experience on whose recommendations the General Secretaries and the Council could act. Also, it proved increasingly impossible for the General Secretaries to take advantage of the various opportunities for the deepening and widening of the work, partly as a result of normal expansion and partly of the confidence placed in the movement on account of its War work. Devolution was necessary.

On the return of Mr. Carter in August, 1916, definite proposals were submitted to Council and after considerable discussion were endorsed for nine months' trial early in 1917. These proposals called for the following:—

1. A "divisional" or "provincial" secretary, who would be in effect the deputy of the National General Secretary, in each of the following areas :—
 - (a) Madras Presidency, including Travancore, Cochin, Mysore and Coorg.
 - (b) Bombay Presidency, Sind and Nizam's Dominions.
 - (c) Punjab, Baluchistan, North West Frontier Province and United Provinces.
 - (d) Bengal, Assam, Bihar and Orissa, Central Provinces and Central India.
 - (e) Ceylon.
 - (f) Burma.

The duties of each of these Provincial Secretaries were to be :—

- (1) To undertake close supervision of the Associations of the division.
- (2) To study and report upon the unoccupied fields with a view to extension in line with the national policy.
- (3) To make proposals to the National Council through the National General Secretaries on all problems affecting the Association movement in the division.
- (4) To assist the National Council in raising funds in the division.
- (5) To execute such other functions as might be assigned by the National Council.

Provincial Secretaries were to report to the National General Secretaries and through them to the Council, and were considered the executive officers of the National Council for their respective areas.

2. The appointment of one or two "Associate General Secretaries" to assist the General Secretaries as required and to relieve them for their distinctive service as executive officers of the National Council, responsible for the administration of the whole work of Departmental and Provincial Secretaries. These Associate General Secretaries were also to be responsible for such departments and other duties as might be deputed to them by the National General Secretaries.
3. The continuation of National Departmental Secretaries whose duties were :—

- (1) To initiate and secure the adoption of departmental policies for all India and Ceylon.
- (2) To co-operate with provincial secretaries in carrying out departmental policies.
- (3) To arrange for the handling of inter-provincial matters of the Department.

The relationship of any Departmental Secretary to a Provincial Secretary was thus defined :—

“In each province the plans and policies of all departments shall be arranged in consultation with the Provincial Secretary.”

4. A bi-monthly meeting of the National General and Provincial Secretaries, known as the “Cabinet,” to ensure that the General Secretaries be fully acquainted with the plans of the Provincial Secretaries and that the latter maintain the closest relationship to one another, thus ensuring the harmonious development of the national movement as a unit.

In accordance with this scheme, the following appointments were made :—

Associate General Secretaries :—M. R. Shelton ; F. V. Slack.

Provincial Secretaries :—

S. India : H. C. Herman. Burma : C. Baker.
W. India : W. B. Smith. Ceylon : G. P. Wishard
(later succeeded by M. G. Brooks)

District Secretary for Central Provinces : J. C. Eliatamby.

Mr. Shelton was given departmental responsibility for all army work overseas, for revenue and for buildings. Mr. Slack's departmental responsibilities were for student work, training, conferences and conventions, reports, special tours, and various subsidiary matters.

The assignment of portfolios to members of Council, as already explained, also took place at this time.

It will be noticed that not all the provincial areas contemplated were supplied with provincial secretaries. This was due to shortage of staff. In the areas without provincial secretaries the departmental secretaries exercised executive functions as requested by the National Council.

At the end of 1917 this plan came up for reconsideration. Certain weaknesses had appeared in its working and certain elaborations seemed necessary to its complete understanding. The General Secretary was still overloaded with details. The Associate General Secretaries had been too heavily loaded with departmental responsibilities really to exercise the functions of their office ; there was need for the further definition of finance and business department relationships, as also of those existing

between provincial and departmental secretaries and of both to the Council. These and other allied questions were made the subject of a Memorandum, drawn up by the Cabinet and approved by the National Council on 23rd January, 1918.

The main points were as follows :—

- (1) The General Secretary represents the National Council in all relations with all secretaries and local Associations. This involves both a considerable amount of touring and close touch with the Headquarters office and with the Executive Committee.
- (2) There should be at all times at Headquarters an Associate General Secretary, to act for the General Secretary in his absence in all relations, to deal at all times with as much as possible or desirable of the General Secretary's "secretariat" work in order that the latter may have time for study and deliberation. The Associate General Secretary should have no departmental responsibilities at all; he should have no other functions than those of "secretariat" work.
- (3) The Provincial Secretaries are in direct relation through the Associate General Secretary with the General Secretary and through him to the National Council.
- (4) The Finance Department, being officially related to all others in a special way, deals for the General Secretary and the Associate General Secretary with the functions of Finance and Business only, deals with the Council through them and acts on orders only in consultation with them. This is intended to secure that the General Secretary remain the primary executive officer of the Council; it does not detract in any way from the financial control of the Treasurer.
- (5) The Departmental Secretaries have, as such, no executive functions, but are "specialist" advisers of the Council on their departments, submitting proposals and recommendations through the General Secretary.
- (6) The Cabinet is an unofficial body without any authoritative functions.

As this report is being written further readjustments are being made, particularly along the line of providing a full complement of provincial secretaries.

6. DISTRICT AND REGIONAL COMMITTEES.—In Travancore and Cochin there was organized in 1912 a District Union for Central Travancore, consisting of eight village Associations, which still exists and holds occasional gatherings for mutual inspiration and conference.

More definite is the Ceylon Sub-Committee which existed before 1911 as the "Ceylon Central Committee" with no official relationship to the National Council, but was reconstituted in that year as a sub-committee of the Council. It has continued ever since, on a plan which has been revised once or twice and which, as last agreed upon in 1915, is in essence as follows:—

Nine voting members elected in Ceylon, of whom five must be resident in or near Colombo; advisory members may be added by the Committee as deemed wise; Ceylon members of the National Council are *ex-officio* voting members of the Committee; the secretary to be appointed by the Committee on the recommendation of the National Council; the Committee to have its own bank account and budget, the latter to be submitted in advance to the National Council for approval; definite amounts to be paid quarterly to the National Council; surplus balances at the end of any year to be remitted to the National Council; the Committee to meet at least four times a year.

The difficulty with the working of this plan has been almost entirely that of staff. Time after time the full-time secretary of this Committee has had to assume the responsibilities of the general secretaryship for Colombo, with the result that the work of the Sub-Committee has stopped.

In March 1912 tentative approval, subject to a fuller development of the plan, was given by the National Council to the idea of constituting the National Council members in Western India into a sub-committee for that area, with power to nominate advisory members to be elected by the entire Council, but nothing more definite came of it. It is probable that here also (though the records do not furnish any information on the point) the fact that there was no full-time secretary available made the working of the plan impossible.

So far, the decentralization process has been more along the line of the secretariat than of the Council.

In February 1919 proposals for territorial organization were submitted and were generally approved, on the understanding that they should be carried into effect from time to time as the situation in the different areas might warrant, the Council to be consulted in each case before final arrangements were made.

These provided for sub-committees of the National Council in the different areas where there were provincial secretaries, such sub-committees to have full powers to act for the Council in matters relating purely to the particular area concerned, in accordance with policies, financial relationships, etc., agreed upon in advance. These proposals were never carried through, for three reasons:

- (1) The undermanned staff. Mr. Herman went on furlough early in 1918; Mr. Smith early in 1919. No

successor was available for either. Mr. Webster, appointed to the Punjab in 1918, left for furlough a year later.

- (2) There must be a sufficiently wide-spread and varied basis of local Associations in any area if Provincial Committees are to be really representative. Outside Ceylon and the Madras Presidency, it has been a question whether that stage of development has yet been reached.
- (3) The Y.M.C.A. since the end of the war has, like all other such organizations, been very hard pressed to bring together the loose ends left from its "emergency" work and attitude of mind. There seemed to come a retrogression in many ways from the vitality of war times and advance policies have been difficult of accomplishment.

The National Council believe strongly that the time has now come for this type of decentralization and recommend that they be authorized by the Convention to carry it out, with whatever further instructions the Convention may desire to give.

7. RELATIONS WITH FOREIGN ASSOCIATION MOVEMENTS.—The Y.M.C.A. in India, Burma and Ceylon has continued to receive from the Movements in England, Scotland, Australasia, Canada and the United States liberal assistance, both in personnel and finance. A minute passed by the National Council 21st July 1913 reads as follows :—

"Resolved that we believe it would facilitate the work of the Y.M.C.A. in India and Ceylon if the foreign National Councils and Committees of Y.M.C.A.s doing work in India would regard the National Council of India and Ceylon as their agent for all work in India and Ceylon. At present many of the foreign Councils deal directly with the local Associations with reference to secretaries, finance, etc, and do not inform the National Council what they are doing; yet, when there is any difficulty when a secretary resigns or is invalided the burden is placed on the National Council."

This minute, sent to the foreign Councils concerned, received their hearty assent and has ever since been loyally observed.

The English National Council besides munificent contributions during the war, now fully supports five men, some in local and the others in national work. Scotland, which had two men before the war now has one and expects shortly to add more. Australasia supplies a general secretary and an Army Secretary in Hyderabad, besides contributing to the support of the Physical Director there. In addition, Australasia has given a generous sum for the securing of buildings for the use of the Hyderabad Association. The gifts from Canada and the United States come through the International Committee of North America, which supports

forty-one men on the staff and during the last ten years has given large sums for buildings.

The National Council, on behalf of the National Union, desire to express their most earnest appreciation of all these contributions which come from men and women interested in India and her people.

Formerly foreign Councils were in the habit of supporting definite posts; now, with the exception of Australasia whose foreign work is in that stage of development which makes it desirable to have a special place on which to focus its giving, they support men, who are placed according to local needs and personal qualifications, the idea being that the different foreign nationalities should be mingled rather than kept separate, and so make a more cosmopolitan contribution to the Indian Association development.

To facilitate direct contact between India, Burma and Ceylon and the western Association movements the National Council have appointed "liaison officers" at London and New York whose duties are to act in an advisory capacity to the English National Council and the International Committee with regard to candidates for appointment and the use of the time of secretaries on furlough from India, Burma and Ceylon. They are consulted also in various other matters regarding the work in India, Burma and Ceylon.

The International Committee appoints one of its secretaries as Senior Secretary, to act for and speak on behalf of the Committee in appropriate matters, the authority of the National Council and the solidarity of the entire staff being suitably safeguarded.

In 1916 the English National Council proposed to the National Council for India and Ceylon that the latter body include Malaysia in its jurisdiction but because its responsibilities were already so heavy, the National Council felt it could not undertake to control this work, though it was willing to help out in special circumstances whenever possible.

To a similar suggestion made with regard to East Africa in 1918 a similar reply was sent, with the suggestion of the possibility of offering the services of Indian secretaries to work under local Boards, if such were constituted, or directly under the National Council if that were feasible.

III. FINANCE AND REVENUE

FINANCE:—It is well known that the expenditures of the National Council have grown enormously during the period under review, and that by far the greater portion of the increase has been due to the Army Work. The civilian work has had a normal increase from year to year. The following table will show the receipts (including the gross profits only of the canteens in Mesopotamia) and actual expenditures for each year:—

	RECEIPTS			EXPENDITURES.		
	Rs.	A.	P.	Rs.	A.	P.
1911	36,789	12	8	37,429	7	11
1912	47,697	13	0	45,763	10	6
1913	47,837	11	10	49,875	9	3
1914	63,232	15	6	61,960	6	5
1915	63,925	0	2	63,185	13	6
1914 and 1915 Emergency fund	2,58,218	1	4	2,06,625	14	6
1916	10,22,989	12	6	6,26,656	14	3
1917	13,46,725	15	0	11,69,819	15	5
1918	20,60,835	10	9	18,48,346	15	7
1919	16,90,050	7	2	19,84,577	5	6

Previous to 1917 the Association Press accounts were included with those of the National Council ; thereafter they were kept separate.

In 1914 a National Emergency Fund, separate from the other accounts, was started to meet the financial situation arising on account of the War. In 1916 this was combined with the other accounts since it was found impractical to maintain such a separate fund in view of the close relation of all parts of the work of the National Council. The statements of accounts appended to this Report show by departments the various purposes for which money was received and expenditure made by the National Council.

The surplus at the end of 1919 amounting to about $\frac{5}{2}$ lakhs, was mainly in the form of stores remaining from investments in canteen supplies in Mesopotamia. This surplus was necessary as the National Council required capital for investment in canteen stores for Mesopotamia, the sale of which filled a real need, the profits also helping considerably to pay the expenses of the workthere. This investment at the end of the war amounted to Rs. 7,35,593-4-4. The stores, considerably reduced in value chiefly on account of the heavy fall in exchange and the necessity of rapid sale, have been sold as the work of the National Council in Mesopotamia has closed. The money realized has been used in carrying on, in India and abroad, the work for which it was originally given. Part of the surplus has had to be reserved from year to year for a working capital in proportion to the annual budget, which in 1920 was 10 lakhs. This is more especially required at this time when there is such difficulty in securing funds as compared with the War years.

REVENUE :—The problem of securing the funds necessary has been continuous and pressing, in spite of the wonderful generosity of friends in India and abroad.

Previous to the outbreak of the war the National Council

secured its funds from local Associations, grants from a few bodies in India in recognition of services rendered, grants from foreign Councils and Committees and private subscriptions secured by personal solicitation which had to be carried on with due allowance for the needs of local Associations in the same centres. It was always a "hand-to-mouth" existence.

On the outbreak of the war it was decided to make a special appeal for the army work, separate from the civilian funds, and during 1914 and 1915 this was carried out. Certain grave difficulties arose, however, in this plan. It separated the emergency from the regular work so decidedly, and so much effort for army funds had to be spent by those responsible also for the administration of the civilian work, that it seemed essential to find some more satisfactory method. This was made all the more necessary by the need of local Associations to keep their own regular activities going, and a wide canvass for army work funds soon showed that very serious results might come thus to the various local Associations.

After much consideration, therefore, the principle of the Joint Financial Campaign was adopted by which the local Associations and the National Council pooled the amounts they needed for their respective budgets, under all heads, and approached the public jointly for the entire sum. Sometimes the local Association received a certain percentage of the receipts; at others, a definite sum based on the local needs, as regularly provided in the budget by the Board of Directors. This had the advantage of making only the one public appeal in any year and of appealing on the basis of support of the entire work, details being given as to how much was needed for local and national work, with special reference to the war work in both cases.

Regular campaigns of this sort were begun in North Eastern India (Bengal, Assam, Bihar and Orissa) in 1916 and have continued ever since; also in the United Provinces, the Punjab, and South India. In Ceylon and Burma there have been one or two such combined efforts. The Chambers of Commerce, Trades Associations, and similar bodies gave, throughout the war, official assistance and to these, as well as to the most generous spirit of the various sections of the entire community we are indebted for the large sums received.

In the Bombay Presidency where, under the patronage of Their Excellencies, Lord and Lady Willingdon, the Imperial Indian Relief Fund, Bombay Presidency Branch, co-ordinated all efforts to raise money for such purposes related to the war, no joint campaign was inaugurated, the Relief Fund contributing most generously lump sums from time to time, specifically to the work of the Y. M. C. A. in connection with the troops in the field, in hospitals and in convalescent depots. Similarly in the Central Provinces assistance was given the National Council from

Lady Robertson's central fund. The Association in these sections has thus not had the opportunity to make a direct appeal to the public, such as has resulted in the other areas in many new friends and in enlarged financial support, especially from the commercial firms. A difficult financial situation is being faced in consequence.

Organization at headquarters was constituted for the necessary publicity work, planning newspaper advertisements, sending to the papers photographs and accounts of work being done, cataloguing lists of contributors, sending out appeal letters, and managing the many other necessary features of revenue campaigns.

The following illustrated pamphlets and folders, among others, were issued describing the work done :—

With the Indians in France

At the Sign of the Red Triangle

The Army Y. M. C. A. of India with the Indian Expeditionary Force

An Indian Hospital in France

The Army Y. M. C. A. of India with the Territorials

A Night in Camp with the Indian Expeditionary Force

A Glimpse of the Work in Mesopotamia

The Red Triangle in the East

The Y. M. C. A. National Emergency Fund, 1918

Steady and most generous support came from foreign Association Movements, especially the English National Council and the International Committee of North America. On March 1st, 1916 the English Council began giving a grant of £1,000 per mensem, later increased to £2,000, besides which it carried a large amount of expenditure for Indian troops in France, and sent various special gifts to India from time to time. The International Committee contributed \$2000 a month from January 1st, 1916 for two years, then increasing the amount to \$6000. It also gave a special grant of \$250,000 in July 1919, toward the expenses of work among Indian troops. Both of these bodies have also given generous special gifts from time to time.

The Australasian National Committee contributed personnel to Army work in Hyderabad, its "sphere of influence" in India Association work.

The following Honorary Treasurers have accepted responsibility in the various provinces :—

Bengal, Bihar and Orissa, Assam ...	W. R. Gourlay, Esq., C.I.E., I.C.S.
Punjab ...	Lt. Col. E. C. Bayley, C.I.E.
United Provinces ...	J. LaPraik, Esq.
	K. M. Balfour, Esq.
Bombay ..	L. Robertson, Esq., C.I.E.
Madras ...	Sir William Beardsell, Kt.
	Sir Bernard Hunter, Kt.
Ceylon ..	T. Villiers, Esq.
Burma ...	D. W. Dalziel, Esq.

Hearty thanks are due to all these gentlemen, and especially to W. R. Gourlay, Esq., C.I.E., who also has worked more than indefatigably as general Honorary Treasurer throughout the entire period.

IV. ARMY DEPARTMENT

I. PRE-WAR WORK :—Before the war Y.M.C.A. work amongst troops was of two kinds : in Army branches of local Associations and at Volunteer Camps. Army branches for British troops existed in 1913 at Bangalore, Poona and Maymyo. The Madras Army branch had been closed a few years earlier. At Volunteer Camps in South India, Burma and Ceylon, Association "huts" were provided for lectures, reading and writing, games, concerts, tea and coffee, in short much of the type of work which became so common during the war.

In this work, which so unexpectedly proved to be the foundation on which the war work was done, the endeavour was to work out a new method and type of institutional work for soldiers, supplementing other agencies through an organization whose definite objective was to minister to all phases of a man's life as over against one-sided, partial appeals, and which was in close and intimate contact with Indian life, thus making the Army work a contribution to the life of India.

With the conviction that the soldier often went wrong simply for the lack of something better to do, there was a definite aim of ministering to the social life ; because most soldiers were on-lookers at games, instead of participants, the endeavour was made to get every man into games, under Christian direction ; to help meet the great need of the 15,000 men who were leaving the Army annually and of whom 75 per cent. did not get satisfactory employment, a strong intellectual stimulus was felt to be needed, which would bring to the soldier the best in art, literature and science, preparing him to take up civilian life successfully ; to help offset mere sentimentality in religion the attempt was made to meet the need for a strong, deep, moral and ethical note in all religious contacts.

The Chief Y.M.C.A. centre for troops was Bangalore where in the years just before the war Mr. J. Callan had established an effective and well-planned, all-round work which was bearing visible fruit in the erection of the Central Army Branch of which H. E. Lord Hardinge laid the corner-stone in November 1913. The work in Poona was carried on in the Connaught Institute, leased from the Army authorities, and in Maymyo in the Soldiers' Home, given to the Y.M.C.A. in 1912.

In 1909 the Bangalore Army branch started work at the camps ; in January 1910 Mr. H. W. Bryant was in charge of a camp for the R. A. at Doddballapur and another for the infantry at Hebbal. In February—May, 1912, the Branch worked among

the 1500 gunners encamped at Rajangunti, fifteen miles from Bangalore, and the contingents of infantry, each 300 strong, at Hebbal. Pandals were erected for lecture halls, and separate halls were made for billiard tables, games, reading and writing, and light refreshments. Outside, there were facilities for football, hockey, basket ball and quoits. One hundred and thirty-eight teams played through eleven tournaments; and there were 1117 entries for twenty-nine indoor games tournaments. Illustrated lectures, concerts and social gatherings occurred almost nightly; religious addresses were given twice a week, with an attendance of 8900 at twenty-nine meetings. Free paper and envelopes, pens and ink were provided free and stamps were on sale for the large amount of letter-writing which was done. Over 3000 letters were despatched.

A very successful Holiday Camp for the Cameron Highlanders was held near Poona, January 1-5, 1914, taking over 250 men away from the temptations of the New Year season.

The largest piece of work of this sort before the war was at the Dacca Concentration, in January and February, 1914, where 4000 troops, both European and Indian, were gathered for five weeks. At the request of Government, and at their expense, the Y.M.C.A. took charge of the recreative life of the camp. Two large pandals gave accommodation for (1) lectures and (2) games, reading and writing, library, bookstall, post-office and refreshment bar. The attendance averaged from 1500 to 2000 each night, for the lectures, concerts and religious meetings. Thirty teams competed in an inter-company football tournament and there were inter-regimental championships in athletics and aquatics. A combined athletic meet for Indian and British troops created great interest.

It will thus be seen that the greatly enlarged work done during the war did not come about fortuitously, but had a solid back-ground of experience behind it. And the Y.M.C.A. of India and Ceylon may well take pride in the services rendered not only in its own war work but also in that of other countries, as indicated by the following list:

O. H. McCowen (General Secretary, Rangoon), Chief Secretary of the entire British Y.M.C.A. Army work in France.

J. Callan (National Army Secretary), Chief Secretary in Rouen, the largest and most efficient British Y.M.C.A. centre in France.

W. Jessop (formerly Secretary, Chowringhee Branch, Calcutta), Chief Secretary of all Y.M.C.A. work in Egypt and Palestine; pioneered work in the Dardanelles.

A. C. Harte (National General Secretary), established and directed Y.M.C.A. work in the prison camps in Europe.

E. C. Carter (National General Secretary), Chief Secretary of all American Y.M.C.A. work in France.

R. L. Ewing (formerly General Secretary, Madras), Chief Secretary of all American Y.M.C.A. work in Great Britain.

H. W. Bryant (formerly General Secretary, Bangalore), Chief Secretary the North Midland Division in England, where eighty-five Y.M.C.A. war centres were established for British troops.

Long before the war broke out the National Council were planning to secure funds to make possible the steady advance of the Army Department and the opening of new work. Those plans were carried by the war far beyond anything that had been dreamed of.

2. WAR WORK

BEGINNINGS.—The war took the Association by surprise. Immediately after the declaration of war, the situation in India was obscure, but after a few days of uncertainty, work seemed to continue as usual. However, the previous efforts on behalf of the army, as already described, had begun to fructify; and seemed to point the way to something special and definite for the welfare of the divisions which were being mobilized to be sent over-seas. The Association in India had no experience of work with the Army in the field to go upon, though in its records were accounts of work which had been done by the Japanese Associations with the Japanese army in the late Russo-Japanese war. What the English National Council were preparing to do, was unknown in India at that time.

Late in the month of August 1914, certain definite suggestions were made by Mr. Carter in which he proposed that the workers of the Association should accompany the Army which was proceeding overseas. After certain preliminary negotiations as to volunteers, who were mostly recruited at that time from outside the Association ranks, as well as to the financial problems involved, a small group of men met at Simla and there, together with representatives of the National Council definitely formulated a scheme of work. Negotiations were immediately opened with the civil and military authorities. In the third week of October, the first party of Y.M.C.A. workers had actually sailed for France, disembarking at Marseilles early in November. They were the first Y.M.C.A. workers of any nation to arrive in the war area. The party consisted of the following members:—

Regular Association Secretaries:—J. Callan (Chief Secretary), K. J. Saunders, M. R. Shelton.

Temporary Secretaries (Specially recruited):—K. K. Benjamin, Hakim Din, Fazal Shadi Khan, Rev. T. E. Riddle, Rev. A. Duncan Dixey, B. M. Roy, and Dr. Buchanan. Another temporary worker, Dr. S. K. Datta, was at the last moment

prevented by sickness from accompanying the party but he together with Mr. S. K. Rudra joined them a few weeks subsequently.

During the period of the war, this work begun on such a small scale, extended to very great dimensions. As responsibilities in France became heavy the staff was very largely increased. The characteristic of the work in France was that it devoted itself wholly to meeting the needs of Indian soldiers. Work for the British soldiers was undertaken naturally by the English National Council.

The work in Mesopotamia was begun eight months later. It was probably the largest piece of organized work undertaken by the Council anywhere. It was methodically planned and efforts were made to cover as far as possible the whole of the Army field.

In November, 1915, responsibilities were taken for work in British East Africa. Here the work was undertaken on behalf very largely of the British army. Work for the Indian soldier did not develop as rapidly as was expected, indeed it was more or less in the background. Another feature of this work in East Africa was the acceptance by the Association of full responsibility for the canteen arrangements of the Army. This enabled it to eliminate the sale of alcohol, though on the other hand it crippled the intensive work and the many-sided efforts on behalf of the soldier, which characterised the work of the Association in other theatres of war.

The work in Palestine and Egypt done by the Indian National Council was established very late in the war, the reason being that the authorities both military and civil in Egypt believed that facilities given to a Christian society to work for non-Christian soldiers would create a misconception regarding the objects of our work, in the minds of the local inhabitants. This effort in Egypt and Palestine was small. It never was extensive, due partly to the fact that by 1917 our resources in personnel were so depleted that it was impossible to send a large number of men to this particular area.

Side by side with efforts made for the overseas forces a greatly larger and heavier demand was made upon us by the actual situation in India. Towards the end of 1914 a large number of Territorial battalions, consisting of 30,000 men, arrived in India to take the place of the old British army which had been sent overseas. The advent of these soldiers gave the Association a great opportunity. Here were young men, many of them of education and culture, whose minds were open and who for the first time in their lives had been sent abroad to a country where the difficulties of climate and social environment were damaging both to health and character. The Association believed that a

special effort should be made to help this particular class of men who came to India. Later, work was extended not merely to meet the needs of the British army in India, but to the hospitals and base camps for Indian soldiers, where there were large numbers of Indian recruits for the rapidly expanding army.

GENERAL ACTIVITIES.—The scope and purpose of the overseas work done by the Y.M.C.A. were common in all other theatres of war. The same problems in every case arose, with, of course, variations; but in the main, the efforts made to meet these needs were very similar.

The actual work done by the Association may be classified under the heads of Personal, Social, Educational and Religious. We shall consider these separately.

I. PERSONAL.—When the first party of workers arrived in France a very large part of their duty was to keep the men in touch with their homes. This was done mainly by letter writing. Our workers from all the theatres of war report in a similar strain. Letters were written literally by the thousand and the stationery distributed reached a colossal figure. Apart from letters in the case of the Indian army, a special feature was made in obtaining news for men who had been cut off from their homes. It was difficult for relatives during the earlier part of the war to open up channels of communication with those who had gone abroad. The Association established an enquiry bureau in Lahore which was under the charge of Mr. W. H. Hume. To his efforts thousands of soldiers owe letters of communication from their friends and relations.

Those who are familiar with the Indian village will realize that the villager has an almost constant fear lest his land and property should be seized either by the money-lender or by some unscrupulous relative. After a few days of work overseas, the Association staff recognised the anxiety which was being caused to a very large number of soldiers and "petition writing" became a regular feature of the work. By this means the civil and military authorities in India were approached on behalf of a soldier and not infrequently his anxiety was thus removed.

The report from Mesopotamia, particularly one from Mr. Leonard Dixon for the year 1916, gives some very interesting information regarding work done for Indian soldiers in hospitals and during the period when sanitary and medical arrangements were very bad in that theatre of war. Here the Association helped both the British and Indian soldier alike. We quote from Mr. Dixon's report:—

"Early in December after the battle of Ctesiphon, a large number of wounded men were brought down the river to the hospitals at Amara and Busra. Their conditions were pitiable. As soon as the boats which brought them arrived in Amara, we

were able to take a supply of hot tea and coffee to them as they lay on the decks in the cold wind. It was not much, but it was most gratefully received. A few weeks later when the convoys of wounded arrived we were better prepared for it. The first boat came in on a Sunday night. It was cold and raining heavily. There were hundreds soaked through. The Colonel of a famous Scotch regiment who was among them has described the situation as follows :—

“The scene is on the Tigris. There are three boats on the river. They are large boats and they are full, overflowing with wounded soldiers. There are highlanders from Scotland and highlanders from the Himalayas; there are Christians, Hindus and Muham-madans, but all have this in common, they are wounded and on those three boats there is space for great suffering, yet room for little comfort. When the three boats reached Amara there came on boat two men from the Y.M.C.A. depot. These two men worked in conjunction with the army doctor. I cannot tell you what a change they wrought among these 300 wounded men. The food they distributed, the shelters they contrived against the rain, the quilts and mattresses they lay under the wounded on the decks that were swimming in water.”

Continuing his report, Mr. Dixon says, “Probably our best work among the Indians was done in the hospitals. Any one who knows what it means to be a patient in a hospital amongst strangers in a strange land knows how to appreciate the visit of a cheerful friend. Let such a person try to picture the thousands of Indians who have at various times passed into the hospitals of Mesopotamia, let him try to appreciate what it means to them to be away from their beloved home conditions and friends in a place where they seldom have anyone to visit them with words of friendly comfort and cheer, and he will realize the need of our work in these places. Our men have gone into the wards with the express purpose of cheering, comforting and helping in every possible way. They have taken with them gifts, illustrated papers, gramophones, cinemas and games. They have written thousands of letters and postcards.”

SOCIAL.—The centre of the social work of the Association overseas was the “hut,” which varied both in size and in comfort. In France there were quite often large and spacious wooden huts which provided frequently the social centre of the camp. In Mesopotamia, marquees were used for advanced areas. Huts were constructed of unburnt brick covered over with thatch. In East Africa the materials used were matting and bamboo.

The hut is both a place where certain elementary needs of the soldier can be met, usually by a small canteen, and a centre of social expression on the part of the men. The intention of the Association has been to provide such facilities as will enable such expression. The canteens appear to have varied. The

minimum stocks were carried in the huts in France where only a few things were needed, as the army ordinarily buys the provision through their own canteen service. In Mesopotamia the canteens were better stocked and in East Africa, as recorded above, the canteen service of the army was represented by the Association itself. For British soldiers the hut activities were comparatively highly organized and the equipment was superior. The Indian with his fewer needs received less, although in France where the National Council's efforts were mainly directed in work for Indian soldiers, the equipment was quite as good as in British huts. Where a British hut had an organ or a piano, the Indian was content with a gramophone.

A special feature was made of entertainments: for example a party of jugglers was sent from India to perform in various huts in Mesopotamia. In Egypt and Palestine Mr. Nasir organized a very successful touring party. It travelled in the lines from Jerusalem to Cairo giving entertainments in various camps, hospitals and convalescent depots. In France theatrical parties organized by the men themselves were a very successful feature.

Another feature which was developed both in France and in Egypt and Palestine is worthy of notice. In France a club was opened in Paris for the entertainment of Indian officers on leave from the front and later for members of the various labour companies. This experiment was attended with very great success and became one of the most interesting places in Paris. In Alexandria a similar, though larger, club was established for Indian officers and men on leave from Palestine. This club did signal service and was much valued by the military authorities.

EDUCATION.—One of the features of the later years of the war was the establishment of a regular educational programme, particularly with the British forces. It received very great development in Mesopotamia. The educational work took the form of classes for the teaching of special subjects, particularly in view of ultimate demobilization, when the soldier should find himself a civilian again. These classes were at a later stage extended, though on a much smaller scale, to the Indian army. But it must be remembered that the problem was very different. The problem with the British army was to afford facilities which would result in education and culture, or to give opportunities to young men to continue their studies which had been interrupted by the war. The case was different with the Indian soldier. His main problem was illiteracy, as was soon discovered by the demands made on us to open classes where elementary reading and writing should be taught. The reason is not difficult to understand. For the first time in his life, the Indian soldier was wholly dependent for news to and from his relatives through the channel of letters. The opportunity to reduce illiteracy in the Indian Army was a very great one and if it had been seized by

the military authorities, they could have rendered India a real service by affording to the men much greater facilities, particularly during the period of demobilization. Very good work was done in Marseilles and in the Bagdad area in teaching Indians to read and write.

The programme of education for British troops carried on, on a very colossal scale, by the English National Council in France has now found a permanent place in the post-war army and has been carried on by the military authorities themselves, through the agency of a special Army Department recently organized.

The second method of educational work included libraries. Here again it was much easier to obtain libraries for British soldiers and every hut was so provided. These, we believe, were very much appreciated by a large number of men. With regard to the Indian soldier, library provision was a great difficulty. In the first place, the bulk of the men could not appreciate it as they were mostly illiterate. In the second place, the diversity of languages proved a difficulty and in the third place suitable books were almost impossible to obtain. Still, in spite of these drawbacks, some attempt was made to meet the needs of the men who were illiterate. To illustrate the difficulties which existed we shall take an example from France. With the advent of the labour companies towards the end of 1917 and the beginning of 1918, it was discovered that books in at least seven languages were necessary if any library provision was to be made for the men. Languages as far removed as Lushai and Khasi were represented among the labour camps. A large consignment of books in these languages arrived in France and were sent to the town of Albert on the Somme. A few days after its arrival came the great drive of March 1918. Albert was captured by the enemy together with all materials including our stock, with the result that these books perished probably by fire. Thus ended a special form of effort that we had made to meet the needs of different groups of tribal peoples.

LECTURES.—Much more reliance was placed on the lecture (with pictures or without) as a means of education. Special lecturers in Mesopotamia rendered very conspicuous services among British troops in Mesopotamia, in teaching the men about the country, its problems, and people. Much elementary instruction was given to Indian troops by most members of the Association staff, but in France it was possible to use by interpretation the regular service of lecturers constantly visiting the British Army from England.

RELIGIOUS WORK.—The religious work of the Association with the overseas forces was ordinarily limited to the British army. Services were organized in many of the Army huts as also Bible classes and study groups. Lectures were given as means of

interesting soldiers in missionary work and particularly in Christian work being done in the occupied regions.

Religious work was also undertaken on behalf of Indians who were Christians. Of these large numbers had been enlisted as camp followers or in the labour companies. Indeed the Association workers in France and in other theatres of operations performed duties which ordinarily would have fallen upon chaplains. With multifarious vernaculars spoken by Indian Christians, it was impossible for the army to find suitable chaplains who could be responsible for pastoral duties. Efforts of this kind on the part of the Association workers proved a very great opportunity and they solidly contributed to the spiritual welfare of many Indian Christians.

We also have to record that while no organized religious work was done for non-Christian soldiers in the Indian army, still conversation and example brought before the notice of men the fact that the stimulus of service was due to the message of Christianity. It might not be out of place to record here that testimony to this effect was forthcoming. It is strange, but nevertheless true, that to a large majority of our Indian peasant soldiers Christianity has no meaning at all save as a disruptive force which is at the basis of the upheaval of society. The Christian to them is one of a very humble origin, who has probably been bribed to make a profession of a new religion; that any good could come out of him was impossible. We are assured that hundreds of soldiers have returned to their homes with the conviction that they had for the first time met Christians who were worthy of friendship and to whom they owed much for service freely rendered in a spirit which was apart from that of ordinary life.

It is interesting to record the many requests were received from and granted Indian soldiers for the use of our huts and furniture for services of their own religion. All the great festivals for Hindus and Muhammadans and Sikhs were not infrequently celebrated under our auspices. We were also a channel through which hundreds of religious books such as the Quran, the Ramayana, the Gutkas and others found their way to the soldiers.

The account given above covers the general activities of the Association in many theatres of war. As we have said before, each theatre represented its specific problems and these were met, as far as it lay with the Association, in a spirit of Christian service. The Association was permitted to make its own special contribution also. It acted as the great interpreter to men who were in strange and unknown surroundings. In France the Association worker found the minds of the men often stimulated, and they were eager and anxious to understand the country where they temporarily sojourned. It was the duty of the Association to promote a better international understanding and large numbers of Indians,

humble peasants though they were, began to think in terms of other countries. For the first time, in our experience, the Indian became internationally-minded. We have also referred to the fact that the National Council's work in France was the first effort made by any national Association to work for troops in the field. As the result of the conspicuous success of our staff similar work was opened for other Asiatic troops in Europe. Very successful efforts to minister to the needs of Chinese labourers were made both by the British and the American Associations. This was due to the work that had been established by us for Indian troops in France. In East Africa, another experiment was made. Work was begun and developed for African troops co-operating with the British Indian Army. Our representatives began this work and the National Council recruited in the United States a number of secretaries belonging to the African community who were sent out to minister to Africans in the army.

FRANCE

The work in France was begun on the 5th November, 1914, when a party of workers from India arrived. The story of their being permitted to travel in army transports to France is a romantic one. Most of the workers, who were not regular members of the Association staff, but voluntarily offered themselves for service, arrived in Bombay early in October and together with Messrs. Callan, Shelton and Saunders contributed very materially to the welfare of the troops who were awaiting embarkation. A friendly officer made arrangements that they should find passages in the various transports and they actually sailed from Bombay with the expeditionary force. After their departure, instructions were issued by Government ordering that they should be compelled to disembark at Port Said. Fortunately, these instructions were received too late to be acted upon, the transports already being in the Mediterranean by that time. On arrival in Marseilles they experienced difficulties, as they were unauthorized visitors. Happily for them, the Base was under the command of an experienced officer of the Indian army, Colonel Tinley, C.B., D.S.O. In an interview with him, the secretaries were told that the military police were at that time having considerable difficulty in securing that the men be kept within bounds. The temptations and novelty of a city like Marseilles it was feared might undermine discipline and morals.

The Commandant welcomed the Association and gave permission for the staff to begin work. A small wooden hut was secured for their use in the great Indian camp. The first duties of our workers were limited to providing entertainments and to meeting the ordinary needs of the men. For example, a hair-dressing saloon was for a few weeks the most important part of our activities. Another duty was the writing of letters and distri-

bution of stationery. Within a few weeks, the local military authorities recognized the extraordinary possibilities for good of the work that had been begun in this voluntary and unofficial way. Permission was soon secured to erect a large hut in an Indian camp. The work during 1915 did not extend as rapidly as it might have under more favourable circumstances. The gravest defect was that the Indian work in France during the year was without a leader responsible for extension of centres to all parts of the country where Indian troops were stationed or operating. Mr. Callan who had been appointed in India in charge of the National Council's work in France, tempted by the greater opportunities of British work, had accepted other responsibilities without definitely severing his connection with the Indian work. Early in 1915 Mr. J. G. Harley, who was then on furlough in Scotland, joined the Indian staff in France. It was due to his efforts that work was extended to the northern hospitals, particularly at Boulogne, Hardelot, and Montreuil. Towards the end of 1915, the Indian work suddenly became small as the infantry divisions left France for Mesopotamia. Work, however, continued in Marseilles and at the hospital at Montreuil, which in the early part of 1916 was transferred to Rouen.

The work during 1916 was confined to four centres in Marseilles and two at Rouen. Mr. Shelton who had taken Mr. Callan's place towards the middle of the year left for America. His place was taken by Dr. Datta. The situation continued unchanged until the early months of 1917, when Dr. Datta was transferred to take charge of all Indian work and attached to the headquarters staff of the British Y. M. C. A. at Abbeville. This brought him into close touch with the headquarters of the Indian army. Work was then developed with the two Indian divisions which included five brigades in the line. Brigade centres were opened up mostly with the help of short service men, usually Englishmen who had lived in India as missionaries or government officials.

Towards the middle of that year, the Indian work again increased in France due to the arrival of forty labour companies. Work for these companies was most successfully undertaken by the Rev. A. W. MacMillan of the London Missionary Society, Benares. He gathered round him a group of very devoted workers and undertook the responsibility of opening seventeen centres with the labour companies in the 3rd and 5th army areas. Towards the end of the year, it was decided to open in Paris a club for Indian officers of the two cavalry divisions. The officers of the Indian army themselves asked the Association for facilities of this particular kind. The higher military authorities were at first averse to giving Indians leave to visit Paris, but due to the efforts of Lieut.-General Sir Edward Locke-Elliot, Indian Military Adviser, sanction was accorded to the Association by the Com-

mander-in-Chief to proceed with this scheme. The club became the centre of a very great activity under Mr. M. N. Chatterji, who had joined the staff from the United States. The club was opened on the 4th November, 1917, and continued throughout 1918 and part of 1919. Probably no piece of work that we undertook in France brought more encouragement or popularity to the Association. In passing, we would add that the club was visited by many distinguished people including Lord Sinha and His Highness the Maharaja of Bikanir. The club was a most interesting experiment and was the first effort of the kind undertaken by Indians for their own people abroad. Early in 1918, the work still further extended, due to the arrival in France of Indian munition columns which were attached to British divisions. Mr. Chatterji was largely responsible in establishing this work on a successful basis. After the signing of the armistice and with the advancing Army of Occupation new centres were opened, particularly in Calais, and Dieppe and clubs were opened at Brussels and Cologne in Germany.

In the summer of 1919 Mr. E. P. Hillier took charge of the work from Mr. Chatterji, and by the summer of 1920 the work in France was closed as evacuation by Indian troops was complete.

This is a short description of the work that was accomplished in France. It was our oldest work overseas, and, in many ways, the most successful. The problems it faced were more simple as the Association was ministering only to the needs of Indian soldiers who were comparatively small in number. Facilities of all kinds were easier to obtain, and the English National Council on whom the main financial burden fell were liberal beyond praise in the money and resources they placed at the disposal of Indian work. To them the thanks of the Indian National Council are hereby tendered.

We desire to take the opportunity of paying a tribute to all the friends and supporters of the Association in the Army. To the Lieut.-General Sir Edward Locke-Elliot and Lord Ampthill, Indian Labour Adviser to the Army, the best thanks of the secretarial staff in France are due. Both of these officers supported the Association through many critical periods. They called upon the Association for help and they gave to it their best co-operation and thought. To Col. Tinley, who to our very great regret died in service, is due the credit of having foreseen during the earliest days of the war the possibilities of the Association to give to the men that moral uplift which was necessary in a strange land with its manifold temptations. To Col. Bamfield, Commanding the Indian General Hospitals at Montreuil, and later, Assistant Director of Medical Services at Marseilles, we desire to express our thanks for the personal interest that he took in the welfare of every member of the Association staff. In him the staff had a friend to whom they owe much.

MESOPOTAMIA

It was not until July of 1915 that the National Council was in a position to open up work among the troops of Indian Expeditionary Force "D." Mr. L. A. Dixon who previously was in general Association work in Travancore was then sent to Basra, where he opened a centre for British soldiers in a convalescent camp. During the remainder of the year another centre was opened, and three other workers joined Mr. Dixon.

A brief reference to conditions in Mesopotamia at the time will not be out of place. The conditions of fighting, the climate, the isolation and the hundred and one hardships consequent on difficulties of transport led many of the officers and men who had come from France and Gallipoli to say that while they had no "picnic" there, by any means, they would infinitely prefer to be back there than on the Tigris. Needs ghastly and pressing were everywhere present with the Mesopotamian force, and inasmuch as the Association aimed to meet men's needs, they carried the Red Triangle into every one of the camps in so far as the resources of men and money permitted. From Basra, Association work spread to Amara and Nasariyeh on the Euphrates. At first only British centres were permitted by the authorities and, by the beginning of 1916, there were established fourteen British huts with thirty-two workers. These supplied the various needs, namely (a) canteens, (b) healthy recreation, (c) athletics, (d) religion. In January 1916, Indian work was begun. It was the same kind as was done for British troops. Hospital work, that is, visiting the sick and wounded, distribution of small gifts and letter-writing were much appreciated by patients. To be spoken to in their own language and to get a word of cheer penetrated their hearts and the happiness they showed amply repaid any effort made on their behalf.

The equipment supplied to the huts, both British and Indian, consisted of pianos, billiard tables, libraries, gramophones, canteens, games, papers, writing-tables, cinemas, athletic equipment, tables, dholaks, harmoniums, etc. Services rendered were various: as money forwarded to "wife and bairns," foreign money changed, missing men traced, commissions attended to for people in the lonely outposts. There was nothing too small for the secretary in his endeavours to serve the men in khaki. The Indian work rapidly developed so that at the end of the year there were nine centres and eighteen workers for the sepoy.

In January 1917, twenty-three centres in all had been opened and were worked by a staff of fifty. This success was due to (1) the capacity of the Y.M.C.A. to meet the need; (2) the financial help given and the trust reposed in the Y.M.C.A. by the public; (3) the cordial co-operation of the military authorities. By the end of 1916 work in advance area had already begun. At first men travelled in hospital boats up and down the

river. British and Indian work had been opened at Sheik Saad. New centres were begun at Sunniyal on the left bank of the Tigris and at Surim. In March 1917, work was started at Azizie. In the middle of May 1917 three centres were opened at Bagdad, the Princeton Hut, the Karada or Madras Hut and in a large Indian hospital.

Troops moved forward in four directions after the occupation of Bagdad and the Red Triangle followed each of them. The work on the Diala river was opened first. Then a fine centre was given by the G. O. C. at Baquba. In June work was started in Teluja, and in September at Samarra. On the line of communication work was started at Kut-el-Amara. At Amara special stress was laid on hospital work both British and Indian. This very rapid growth of Indian work was due to the appointment of Mr. S. P. Singha as Associate General Secretary in Mesopotamia. Work at Kurna was started and the centre at Nasireyeh improved. At the base at Basra the numbers of the centres increased to twenty so that practically all British and Indian camps and most of the hospitals were then provided for. The increase of Indian Christians in Mesopotamia made it necessary for the Association to accept particular responsibility for them.

By October 1917 there were fifty-two centres with fifty-one secretaries, each having more work than he could handle satisfactorily.

In that month Professor Archer of Yale arrived and planned an elaborate educational system of regular classes, popular lectures and "khaki universities." There is no doubt that many profited by the classes and obtained promotion in the army and subsequently, after their demobilization, better positions than they could otherwise have obtained. A case in point was that many soldiers learnt Arabic so as to get the gratuity promised by the Government to those who passed an examination in Arabic. The Association gave such men regular instruction. The educational work was also a great benefit to the Indian troops, though the Indian secretary had to bear most of the burden himself, as it was not possible to provide him with help.

One main result of these activities was the impression made on the men. From the conception that the Association stood for a *Tamasha Ghar* they associated it now with the ideas of service and its workers they now looked upon as men with whom they had a real and vital relationship.

As the work increased, the staff was enlarged. In the month of July 1918 work was started with the Indian brigades, ten secretaries being attached to ten brigades.

The signing of the armistice in November 1918 found the Y.M.C.A. with 102 centres and 100 secretaries on their staff. By March 1919 the demobilization of the army began in earnest,

though 30,000 British and 70,000 Indian troops were to remain as the army of occupation. In April 1919 there were sixty-six centres, twenty-four British and forty-two Indian, with ninety secretaries. The army of occupation had its special needs. To meet them a comprehensive educational programme was undertaken though its results do not appear to have been anything extraordinary. The average attendance at the classes per week was 412 British and 665 Indian soldiers. Part of this was due to the constant movements of units. Popular lectures were provided by Messrs W. R. Burrell and W. G. Fletcher. A company of Indian jugglers from India toured for three months amongst both British and Indian centres and the Arabs too had the benefit of their entertainments on occasions. Concert parties were organized. Indian dramas, about fifty in number, were staged for the Indian troops, in many cases by the men themselves. There was work also amongst 2000 Chinese labourers, carried on by two Christian Chinese lent by the Depot.

In September further contraction reduced the work to only thirty-five centres. The English National Council took over the British army work in February 1920 and due to lack of adequate staff for supervision the Indian work was closed in March 1920.

A few facts regarding the work in Mesopotamia will illustrate the magnitude of the Association's operations in that theatre of war :—

DATE	No. OF CENTRES.	No. OF WORKERS.
September 1915	16	4
do 1916	23	52
October 1917	50	51
January 1918	66	78
October 1918	102	100

During the whole five years 274 secretaries were employed of whom 118 were Indians and Ceylonese.

CANTEENS.

DATE	CANTEEN PROFITS.
1916	86,741 13 7
1917	339,279 8 2
1918	625,067 2 1
1919 (approx)	350,000 0 0
	<u>14,01,088 7 10</u>

MAINTENANCE EXPENSES.

1916	1,85,585 3 5
1917	5,30,270 8 2
1918	12,15,876 5 5
1919	9,87,845 0 0
	<u>28,50,577 1 0</u>

The maintenance expenses, as will be readily seen from these columns, were twice the canteen profits. This deficit was met by payments from the amount placed at the disposal of the National Council by the public. The canteen prices were approximately 15 per cent. above cost to cover transport, deterioration, losses and handling charges. Among free gifts writing paper and envelopes was the most important item; no less than 600,000 sheets a month were distributed. As parts of the programme to reduce illiteracy 100,000 vernacular readers were given away to Indian soldiers.

EAST AFRICA

I. BEGINNINGS.—Soon after the outbreak of war the Nairobi Y. M. C. A. opened correspondence with the National Council in India requesting that secretaries be sent to East Africa, but on account of heavier demands in other war areas it was not until November 1915 that any men could be sent. The first secretaries to be sent to East Africa from India were Messrs. C. R. Webster, H. Newell and Fazl Shadri Khan, who arrived at Mombasa in November 1915. Prior to their arrival a large marquee had been sent to Nairobi Camp and the Nairobi Association had re-adapted its building for the use of the troops, but nothing had been done in the way of institutional work outside Nairobi. Branches were immediately opened at the three largest camps at the front, Maktau, Kajiado and Bissel.

II. FIELD FORCE CANTEENS.—In July 1915 the Nairobi Association had been requested to take control of the Field Force Canteens which consisted of small shops managed by the Director of Supplies and Transport. The local Board of Directors was unable to commit themselves to this project. At that time it was a very small undertaking compared with its later growth, the receipts being less than Rs. 4000/- per month from the three existing depots.

On 2nd December 1915, at a conference of senior officers and representatives of the Y. M. C. A., a tentative agreement was drawn up, whereby "Supply and Transport" were to provide the stores, and the Association as "selling agents" were to undertake the distribution and sale. The Y. M. C. A. were to receive certain concessions of transport and accommodation, and the profits accruing were to be administered by the General Officer Commanding. Provision was made for charging against canteen funds the cost of providing recreation for the troops.

It was soon found that the S. & T. purchasing agents in Bombay were unable to procure stores in sufficient quantities adequately to stock the canteens. Accordingly the Purchasing Department of the National Council Y. M. C. A. of England were asked to become buying agents, a work they carried out most efficiently. The original capital of £50,000 was advanced at five

per cent interest from the War Office and funds were repaid as stocks were liquidated.

The canteen business rapidly assumed large proportions, necessitating the employment of a staff of nearly one hundred salesmen, book-keepers, inspectors, motor drivers and clerks. A number of these were assigned by the military authorities and others were privately employed in special capacities for canteen work. This staff was quite apart from the secretaries and their assistants who were responsible for the Y. M. C. A. Institutes, for which separate books and records were kept, although frequently the secretary held the dual post of Y. M. C. A. secretary and canteen manager.

Up to 30th June 1918 the sales exceeded fifty lakhs of rupees and the profits were two and a half lakhs. The record "takings" at a single camp in one day amounted to Rs. 7600, by two men; at another camp one man single handed took in Rs. 4300. From time to time appropriations were made towards the Y. M. C. A. work, totalling £3500 at the above date, and later a sum of £1000 was remitted to the English National Council towards the erection of an "East African Hut" in France.

III. DEVELOPMENTS IN 1916—1918.—Up to the end of 1915 the military operations had been largely confined to guarding the railways and important towns of the British Protectorate. In January 1916 the South African forces under General Smuts began to pour in and the rapid advance of the British, Indian and African troops began, with Nairobi as the base.

The slender resources of the Y. M. C. A. in men, equipment and stores were strained to the utmost. Large camps, posts and bases would be established and flourish for a time; then the evacuation of the line of communication would begin and soon it would be found necessary to transfer the establishment several hundred miles to another line.

The arrival in March of fifteen Association workers from South Africa made possible rapid headway in establishing new branches at Kajiado, Bissel, Longido and Kumbulum—for the cavalry division which operated to the north-west of Mount Kilimanjaro. So rapid was the advance through this territory and so acute the transport difficulties that the Association workers could not hope to keep up with the movements of the troops, who were frequently on part rations. At the most distant branch, 200 miles from the railway, the secretary's stores were reduced to lead pencils and boot-laces and as there was no prospect of transport facilities improving, advance work on this line had reluctantly to be abandoned.

From Voi Junction on the Uganda Railway a line was constructed for military purposes and the Association was able to use rail-head as a depot, pushing stores and recreation facilities

ahead by motor transport. At Voi two branches were established, one in the main camp and a refreshment room at the railway station. The large branches at Maktau and Mbuyuni provided for the needs of men who were poured in towards the German Frontier. Soon after the capture of Moschi, the junction point of the military line and the German railway, at the foot of Kilimanjaro, a large institute and canteen depot were opened.

From there the work rapidly extended down the Usambara Valley to Sanje River, Nauri Bridge, Korogwe, Handeni and Tanga. A few days after the fall of Dar-es-Salaam, the chief town in German territory, in August 1916, the Y.M.C.A. staff arrived with their very much needed stores and equipment. Up to this time Kilindini, the port of Mombasa, had been used as a base depot, but from this date stores and equipment were landed in Dar-es-Salaam harbour. The headquarters offices were also removed from Nairobi to the splendid building provided by the military authorities in Dar-es-Salaam.

During December 1916 and the early months of 1917 the most strenuous efforts of the Y.M.C.A. were required to cope with the needs of the South African forces as they waited for the transports on which they were re-embarked from Dar-es-Salaam. At this stage also two branches were pushed up the Central Railway, just as soon as reconstruction of bridges and transport facilities made it possible. Makessi was the first to be opened and from it a temporary branch began at Summit Camp, fifty miles from the railway. Morogoro and Dodoma, opened later, proved to be very large and important centres, each catering in their earliest days to a large proportion of the men who were bearing the brunt of campaigning. A branch was also opened at Tabora and by arrangement with the Railway Department every month a Y.M.C.A. truck was attached to the pay train, and brought stores, literature, cinema, and gramophone entertainments to the many small garrisons scattered along the line from Dar-es-Salaam to Kigoma.

Branches were also opened at Kilwa and Lindi, both port towns to the south-east of German territory, in which most of the operations were carried on during 1917. The big advance from Kilwa about July 1917 was responsible for the opening of the branches at Kisiwani and Mtandawallah, the latter place being 150 miles from the coast. From this point stores were pushed out to the front whenever transport was available from the A.S.C., the Y.M.C.A. Fords having at last failed to negotiate the indescribable roads. On the Lindi line branches were opened at Lindi, Condell's Creek, Schaedell's Farm, Mtama, and a travelling secretary did an excellent non-equipment work in the camps extending right across the Portuguese frontier.

Towards the end of 1917 the German forces were finally driven across the Rovuma River into Portuguese East Africa.

Almost simultaneously the Association entered Port Amelia and branches were opened at Mtugi and Mtusi.

Early in 1918 the National Council of South Africa was requested by the secretaries from India to take entire responsibility for the work in Portuguese East Africa. The South African Council agreed to do this and to provide for any future developments in that country. As the fighting zone was transferred to Portuguese territory the camps in German East Africa were gradually closed down. Nairobi and Mbagathi, in the British Protectorate still remained open. The Dar-es-Salaam Institute and camp centres continued with even increased vigour, the cinema, lectures, concerts, and sports furnishing a constant supply of recreation facilities for the troops who were being evacuated. Lindi and Dodoma likewise remained open throughout the year. With the signing of the Armistice came the end of the fighting; the troops were speedily removed and the war work of the Y.M.C.A. closed entirely in February 1919.

The vast areas covered during 1916-8 and the long lines of communication extending towards several different fronts made it exceedingly difficult to reach the troops who were actually in the fighting zone. Several times however the workers were under shell fire and in many places where permanent camps were not established the Association was able to render very practical service and lessen the hardships endured. While the primary responsibility was for British troops, who suffered greatly because of climatic and other conditions, a considerable amount of work was also accomplished on behalf of the Indian and African troops, and in several centres separate branches were opened for them.

IV. SECRETARIAL STAFF.—The National Council of India and Ceylon sent to East Africa altogether nineteen European and nine Indian secretaries. Eight others came from South Africa and seven splendid negro secretaries from the United States. In addition three were recruited from missionary societies in East Africa and one left a business appointment to join the staff. The above figures do not include canteen staff.

Of the twenty-eight secretaries sent from India no less than thirteen were invalidated out of the country for health reasons.

V. Y.M.C.A. INSTITUTES.—(a) *With British Troops.*—The work for British troops included the usual features provided in other war areas, a great drawback however being the lack of volunteer help which was available in some of the other war areas. The accommodation varied greatly with the exigencies of the campaign. Sometimes the Red Triangle was displayed on a mud or grass hut, the familiar marquee, or one of the more substantial buildings which were turned over to be used as institutes for the men, as at Tanga or Dar-es-Salaam.

The religious and educational work was often carried on under difficult conditions owing to the transitory nature of the

camps. Meetings, lectures and concerts were frequently held in the open air. Portable cinemas were sent to remote camps, the expressions of appreciation on these occasions amply compensating the secretaries for the efforts involved.

At Dar-es-Salaam the main hall was crowded nightly at cinema, musical, or other entertainment, and one night weekly a special performance was arranged for officers and sisters, this being the chief social event in the town. Among the lecturers and speakers from the Association platform might be mentioned the following: the late Bishop Peel, of Mombasa; Bishop West of Zanzibar; Bishop Willis of Uganda; Col. Montgomery, Red Cross Commissioner; the Hon. F. H. Guest, M. P.; Col. Tillbury Brown, R.A.M.C.; Captain Sheary Kearton, big game photographer and explorer; and others of note. Athletic and aquatic and indoor sports were promoted and some excellent tournaments were carried out. A party of professional actors, known as the "Jambos," were organized under the Association auspices and their tours were one of the popular features of the Association activities.

(b) *The Indian Work*.—At Nairobi and Dar-es-Salaam large institutes were provided under canvas for the educated Indians, of whom a considerable number were employed in the postal, railway, medical and other departmental services. A very encouraging feature of this work was the readiness with which Hindus, Muhammadans and others joined together in visiting their less fortunate countrymen in the hospitals, taking with them gramophones, literature and writing materials. Occasionally all races and castes joined in taking a meal together, and the usual programme of lectures, debates, indoor games and tournaments was actively promoted.

(c) *Work for African Troops and Carriers*.—The great mobilization throughout East Africa of black fighting men and porters gave the Association an opportunity in the base camps of rendering a service to these simple and good natured people. Seven American negro secretaries went to these camps with their mirth-provoking apparatus, and the wonderful sense of humour possessed by the African made it easy for them to amuse whole camps at a time. Night classes were started with the aid of native teachers and in these classes many hundreds first learned to read and write. Others were taught English and simple arithmetic, enabling them to become more efficient in their military duties. Seven branches of this type were conducted in Dar-es-Salaam alone, where the co-operation of the chaplains was freely given, and they were greatly helped in their efforts on behalf of the mission boys enrolled in the Carrier Corps. The Association was requested by the Director of Military Railways to conduct a Technical Training School, the aim being to provide native employees for the Railways. Seventy-five students were

enrolled and were put under training for the work of telegraphists, signallers, clerks and book-keepers. When the railways passed from military to civil control a change was made and the railway authorities assumed complete responsibility for the school which was continued on a much smaller scale.

(d) *Number of Branches.*—During the period under review work was carried on at fifty-one points as under :—

British	32
Indian	6
African	13

6. THE PROMINENT RESULTS ACHIEVED.—The following might be stated in general terms to be the results achieved :—

(1) Through the management of Field Force Canteens liquor was eliminated from all camps and the troops were protected from being exploited by unscrupulous traders.

(2) The Association work helped greatly in reducing the hardships endured by the troops, in a country where campaigning conditions were exceedingly difficult. Within one month of the work in the camps being started Major General Tighe, then General Officer Commanding, wrote :

“On my tours of inspections on all parts of the front I have had repeatedly brought to my notice the keen appreciation by the men of the work of your secretaries and staff. There can be no doubt that your institutions are proving of the greatest help in ameliorating the hardships and discomfort of campaigning.”

(3) The Association lectures and classes led to a better understanding between the races. Racial prejudices were strong among some of the troops and these were largely overcome by the presentation of the best of life in India and Africa.

(4) The presentation of the missionary enterprise in Africa by missionary lectures enabled the men to gain a knowledge of missions and sympathetic outlook towards the African people.

(5) The troops were given opportunity of improving themselves through the Association libraries, night classes, and educational groups.

(6) Moral and health safeguards were made possible through the Association lecture platforms. Frequently medical officers were assigned by the authorities for this work.

(7) The co-operation of the chaplains of every denomination was given whole-heartedly, the Y. M. C. A. huts and marquees being used for parade services. The Roman Catholic and Jewish Chaplains also used the Association facilities.

(8) The beginning of permanent Association work for the Indian and African population was made, the latter taking the form of industrial training for which there is the greatest need.

EGYPT AND PALESTINE

Indian troops were stationed in Egypt, mostly along the Suez Canal, as early as August, 1914, but the requests of the Y.M.C.A. of Egypt for permission to begin work among them did not receive a favourable response until March, 1917. Then an appeal was sent to the National Council in Calcutta for workers, and in June Mr. S. C. L. Nasir, who had worked in France and England, reached Cairo to start the work under the general supervision of the Egypt Committee.

Suez was then the most important centre for Indian troops, with a Base Camp and two large hospitals, and here Mr. Nasir began his activities. A medium-sized mat hut was placed at his disposal for recreation purposes, suitably furnished with forms, tables and a counter. After a few days during which the sepoys wondered whether this was a canteen opened by the military authorities, or a Recreation Company of some sort, or a department of the post office, the personal friendliness of Mr. Nasir, helped by some of the troops who had known the Y.M.C.A. in the camps in France, made itself felt and the hut began to fill with men eager to have letters written, play a game of draughts, listen to the gramophone or enjoy a cool drink. The secretary also was able to be of much help in shopping and doing odd jobs for the men in the town of Suez, then out of bounds on account of plague. Open-air entertainments were given in the evenings, the men coming forward willingly to provide the various items, dancing, singing and conjuring tricks. Entertainments were also provided for the hospital patients. Writing paper was distributed to those who could write and letters were written for the illiterate.

In September, 1917, a second secretary arrived in the person of S. Bakkal who, after a brief period in the hospital work, was sent forward to Palestine where General Allenby's great advance had begun. Mr. Bakkal proceeded to the Jordan Valley where he divided his time between Jerusalem and the front line. In Jerusalem he acted as guide to the sight-seeing parties of Indian troops who came to visit the holy places, and rendered much service in preventing the enemy agents in the guise of guides getting at the credulous and simple-hearted Indian sepoy with their propaganda work.

The Jordan Valley is a very thirsty country. Consequently a large amount of effort was spent by Mr. Bakkal in providing drinking water, lime-juice and cocoa. Letter writing was carried on briskly, a canteen was established and gramophone and harmonium made available. Occasional lectures were also given. Orders for all sorts of things for the men were sent weekly to Cairo,—from repairs to old watches to the buying of new coloured handkerchiefs, and once a fortnight when Mr. Bakkal

went to Jerusalem on duty, for a night, he would buy and carry back about £100 worth of things ordered by various men.

Ten centres purely for Indians were going during the year September 1917-'18.

Early in January, 1918, a very large number of Indian troops began to arrive in Egypt from Mesopotamia, and France till by April the number had grown to 1,00,000. Towards the end of March the Indian Base Camp was transferred to Kantara, on the Canal between Ismailia and Port Said. The Y.M.C.A. work in Suez was accordingly closed and Mr. Nasir proceeded to Tel-el-Kebir, temporary headquarters for the Indian Cavalry, just come from France. Many old friends from Rouen and Marseilles were found and a centre immediately sprang up which was of great service. Five weeks later Mr. Nasir moved on to Kantara, but other workers had begun to arrive, making possible the continuance of the Tel-el-Kebir centre and the opening of another at Ismailia where an Indian Leave Camp had been opened.

Kantara now had two large Indian Camps, the Infantry Base Depot and the Cavalry Base Depot, situated at no great distance from each other. Two centres could therefore be super-vised and were at once opened. The usual activities were carried on in the huts, though the best sphere of the secretary's work lay in his little bell-tent which was open to visitors, mostly Indian soldiers and officers, at all times of the day. Here the work of friendship was quietly carried on, private family matters discussed and advice given, legal petitions written and many other personal services rendered.

In July a big Indian drama was staged in the Cavalry Camp; with the aid of properties and clothing furnished by the Association, officers and men themselves got up the show which was a huge success. Out of this grew the idea of forming an Indian concert party and touring among the Indian Camps in Palestine. A party of six was organized and equipped. Permission for the tour was readily granted by the military authorities and in September a start was made. Thirty shows were given to sixteen camps in Ludd, Kantara, Suez and Cairo, the programme consisting of songs, dances, conjuring tricks and sketches from Indian life.

After the signing of the Armistice a very wide-spread distribution of the Indian troops took place. At least four divisions were located in Egypt while three others remained in Palestine and Syria. The arrival of a few new workers made possible a somewhat more adequate occupation of the field though the work suffered from the beginning from shortage of staff.

Two Indian divisions were scattered over a large area in Alexandria. The military authorities, recognizing the need for a place where the men on leave could safely spend their time and feel at home, secured the old Indian School in Rue Abil Dardar

and asked the Y.M.C.A. to run it as an Indian club. The Association furnished it adequately at considerable expense, and provided comfortable lounges and smoking, reading, writing and dining rooms for officers and other ranks of Indian forces. There were also different rooms for smokers and non-smokers and separate cook houses. Sleeping accommodation was likewise provided. A specialty was made of Indian sweets prepared on the premises.

In Cairo two centres were carried on, one in a medium-sized room at the Abbasia Convalescent Depot and the other in a large marquee near the Pyramids. Canteen, games, reading and writing departments were open on all days of the week from nine to nine, and the lending library (containing Hindi, Gurmukhi and Urdu books) every afternoon. Football and basket-ball each afternoon attracted crowds to the grounds outside the Y.M.C.A., and every evening there was either a lantern lecture, a sing-song or a concert given by various units. The Concert Party arranged by Mr. Nasir gave four performances to an audience of about 3000 each night.

A third centre was opened in Kantara and occasional entertainments were given in the three hospitals which were there at the end of 1918. New centres were also opened in Suez, which early in 1919 again became a centre of considerable importance, with a big Indian Transit Camp and three hospitals.

In July 1919 the Indian secretaries at Cairo and Suez were asked to arrange for special Peace Celebrations for the Indian troops. In Cairo 4500 Indians of all ranks (1700 from different units outside Cairo) were entertained for five and a half hours at Luna Park, Heliopolis. The attractions of the Park, scenic railway, water chute, hurdy-gurdy, maze, helter-skelter, merry-go-round, etc., were open to all, free. There were also sports in the gymnasium, tea and Indian sweets, an Indian sing-song and dancing and fireworks. An address was made by the General Officer Commanding, Cairo District, explaining the reasons for the celebrations.

In Suez 6000 men were entertained at the Indian Transit Camp, Y.M.C.A., with cold drinks, cakes and grapes, and later a variety entertainment.

In addition to the above work which was continued throughout 1919, expansion took place in northern Syria where Mr. Bakkal, with Aleppo as his base, started a number of centres among the thousands of Indian troops scattered in brigades and battalions within a radius of 120 miles. Huts were established in Aleppo and Aintab in April and within the next few months the secretaries were able to get into more or less close touch with all the units of the North Forces. Fortnightly tours were made to distant camps with games and writing paper, as far as the Euphrates river and Jerublus (Kakomiah) in Upper Mesopotamia.

As was often the case in Palestine the huts were used by both Indian and British troops, some learning English, some Hindustani, through the limited medium of Arabic. The other usual activities were carried on. In Aleppo much was done also by way of visiting hospitals, organizing outdoor games, helping in the Army Educational Scheme, running refreshments for Hindus and Muhammadans at sports, meetings and teaching classes.

The help of the military authorities was freely and most kindly given. Without their assistance it would have been impossible to carry on.

The work in Egypt and Palestine still goes on and is expected to continue throughout 1920.

WORK IN INDIA

When the war broke out, there were three centres, which by January 1915 had been increased to ten, the expansion being largely among the Territorial regiments which had arrived in India. Further expansion was impossible at the time because of lack of resources. By the middle of 1919, army centres had increased to eighty-two which were worked by forty British or American and thirty-four Indian secretaries. During the five years there was a total of 115 branches, seventy-four for British and forty-one for Indians; 412 different men and women several as full-time paid workers, for varying periods.

Mr. R. D. Whitehorn, who was responsible for this branch of work, thus laid down the object of Y.M.C.A. activities: "to carry out a work of Christian service to soldiers. In all activities we emphasize the Christian character of our work by encouragement of the study of the Bible, of religious and missionary subjects and by religious services so far as this does not conflict with the work of chaplains."

Here, too, the same activities were carried on as in centres overseas. The Association endeavoured to assist soldiers on the educational side by means of lectures on various subjects, also by study groups and classes, by the provision of libraries and reading rooms. Another aspect of the work was the physical side of the soldier's life, and the Association catered also for the social and recreational needs by providing games, billiards, concerts, cinemas, tea rooms and supper bars. The work was mainly carried on in rented houses or in tents, sometimes in buildings which had been specially erected for the purpose. Special work for men on furlough from Mesopotamia was conducted in 1917 and 1918.

The Indian work differed from the British inasmuch as no religious work was done except in the case of those regiments consisting wholly of Christians.

We give below a list of places that were established both for British and Indian troops.

The centres established during 1915-1919 were as follows :—

1. In the Frontier Brigades: Centres were established with the Waziristan Field Force which included four British and four Indian branches. Also at Bannu and with the Derajat brigade.

2. Peshawar Division: At Peshawar itself the Y.M.C.A. accepted responsibility to work the local Church of England Institute. Centres were opened at Nowshera and Risalpur, where a building was erected.

3. Rawalpindi Division: British work was undertaken here in the winter of 1917 and 1918. Indian work was also opened during the latter half of 1918. In the Murree hills, work was begun in July 1916. By 1917 four centres were opened and a permanent building was erected to serve British troops. A centre was temporarily opened also at Abbottabad.

4. Lahore Division: Work was started in March 1915 in the Lahore Cantonment and has been continued ever since. Some work was carried on also at the Fort in Lahore. Indian work was begun in the cantonments and a hut was erected towards which a Sikh Raja gave a donation of Rs. 7,100-0-0. At the following places work was carried on: Multan, Ferozepore, Dalhousie, Simla, Jutogh. In Simla and the neighbourhood, two hostels for accommodation of soldiers on furlough were opened.

5. Karachi Brigade: Work was opened at Karachi itself, Kiamari and at Hyderabad, Sind. In this brigade Indian work was done on a large scale particularly in the convalescent camps at Karachi. Industrial work for Indian troops was also provided.

6. Quetta Division: Temporary work was carried on with Quetta as a base, with the men of the East Persia Cordon during 1919; but this work was not developed because of the necessity of transferring staff and finances to the Afghanistan Expedition.

7. Mhow Division: Work at Mhow, Ajmer and Jubbulpore and Jhansi. At Ajmer, a hostel for British troops on furlough was maintained during 1918. Most of the work was done by a local Honorary Secretary and the expenses were also borne locally. At Jubbulpore a large permanent army building was erected costing Rs. 45,000-0-0. The Indian work was begun in April 1916 and a bungalow was placed at the disposal of this work by a prominent Indian resident of the town. At Jhansi, a bungalow was converted into an army centre for British soldiers at a cost of Rs. 31,000-0-0. Two branches with Indian secretaries were opened in 1917 and 1918.

8. Poona Division: Work at Poona, Bombay, Ahmednagar and Deolali. The Connaught Institute at Poona had been placed at the disposal of the Association free of rent by Govern-

ment ; it has some hostel accommodation. Several other centres were also carried on for both British and Indians. During 1918 a furlough camp was opened at Kirkee. Indian work was started with the Bombay University Corps in 1918 but was closed soon after. It was later re-opened for labour companies. In Bombay two huts with ample accommodation were erected, one each for Indian and British troops. Very extensive work was carried on in hospitals and with men embarking and disembarking. At Ahmednagar a hut was built for British troops. In the Prison Camp work was also done, financed from a special fund. At Deolali both British and Indian troops were served on a considerable scale.

9. Meerut Division: Work was carried on at Delhi, Naini Tal and for a short time at Agra. At Delhi a centre was opened in December 1914. This was later expanded to three centres. A centre for Indian work was also carried on here. At Naini Tal the Association building was used during the war entirely as a Soldiers' Home, accommodating seventy-five men.

10. Lucknow Division: British and Indian work was carried on at Lucknow itself. Some work was done at Allahabad and Benares. Permanent work was initiated in Calcutta and several out-stations both for British and Indian troops. The Ronaldshay Hut was erected on the maidan at a cost of over Rs. 36,000/- At Dinapore, Y. M. C. A. work was maintained under an Honorary Secretary.

11. Secunderabad Division: British and Indian work was carried on at Secunderabad where a permanent building has been erected for the use of British soldiers. At Trimulgherry the Church of England Institute was worked by the Association. In Bangalore the Cobb Army Branch was carried on toward completion at a cost of Rs. 67,500/- During the period of the war several temporary centres were opened for Indian and British work. Permanent Indian work is carried on at the Remount Depot. Work was also carried on at Wellington, Ootacamund and Madras; also at Calicut and Cannanore and Madura.

12. Burma Division: In Rangoon a hut was erected in 1916 for British troops. Work was also carried on at Mandalay, Maymyo and Meiktila. Three centres were opened for Burmese or Indian troops.

13. Ceylon: Work was established at Colombo and several other places in the island, most of them temporary. It is proposed to assign a portion of the new building projected at Colombo for work for British Soldiers.

During six months in 1919, in connection with the Afghanistan Expedition, ten branches for British troops and ten for Indian were carried on at Peshawar, Jamrud, Ali Masjid, Landi Kotal, Landi Khana, Dakka, Chaman and Fort Spin Baldok.

3. POST-WAR SITUATION—As every one now knows, though most people failed to realize it at the time, the War period and conditions continued long beyond the Armistice; indeed it was not until the beginning of 1920 that the situation gave any dependable signs of settling down to normal. During 1919, therefore, it was not possible to come quickly to post-war conditions, though a gradual decrease of work took place overseas and a few branches were discontinued in India.

The East Africa work was finally closed in February, 1919; in France, Mesopotamia, Egypt and Palestine work continued on the usual lines.

In Mesopotamia there was a steady reduction of centres from 102 at beginning of 1919 to thirty-five at the end, concentrated in Baghdad, Amara and Basra. Special emphasis was laid on educational work for both British and Indian troops during the demobilization period. In March 1920 the British work in Mesopotamia was transferred to the English National Council, but it was decided to continue work among the Indian troops, both in Mesopotamia and Egypt and Palestine. A few secretaries are still at work in the latter area, but on account of certain later developments it seemed best to allow the Indian work in Mesopotamia to lapse for a time. Mr. W. S. McMullen, who has been appointed Chief Secretary, left in October on a tour of investigation, and on the basis of his report plans for the future will be made.

The work in France closed about the middle of 1920; in Egypt and Palestine a small number of secretaries are still working.

In India there was a general reduction to a peace-time basis during 1919: at the beginning of the year there were fifty-six British branches; at the end, thirty-two. The Indian branches increased instead of diminished, for reasons that will appear below.

Plans were initiated early in 1919 for work in East Persia, but the outbreak of the Afghanistan trouble made a shift necessary. In connection with the Afghanistan Expedition ten British and ten Indian branches from Peshawar to Dakka and at Chaman and Fort Spin Baldok were opened. The work continued for six months, closing at the end of November.

Special work was done during 1919 for troops under demobilization at Deolali and a special hut at the docks in Bombay was erected to speed departing troops and welcome the new army. Writing paper and various pamphlets of educational and moral value were distributed to incoming and outgoing men.

British Army. One interesting experiment in co-operation with other agencies in work among British troops is worthy of mention. At Wellington, in the Nilgiris, there has been, for several years, a Church of England Institute, in the management

of which the Y. M. C. A. co-operated during the war. As a result of negotiations between the Bishop of Madras, who was sole Trustee of the then existing building, and the National Council, which had received a grant of Rs. 50,000 from the Madras War Fund for the Army Y. M. C. A. at Wellington, it was agreed that (1) in consideration of the fact that this money is spent mainly on the improvement and enlarging of the existing Institute a second Trustee should be appointed by the National Council, the whole property, including all buildings, to be held in common by both Trustees. Further conditions of the agreement are: (2) The management of all Y. M. C. A. work in Wellington and the camps connected therewith is vested in a Committee consisting of the following *ex-officio* members:—

The two Trustees; the Y. M. C. A. secretary or secretaries appointed to work at Wellington; one Chaplain of each Christian denomination appointed by Government for work among the troops at Wellington and stations connected therewith; and five lay members nominated by the *ex-officio* members of the Committee and appointed annually by the two Trustees.

(3) The Committee is to appoint annually a Chairman and a Treasurer from among its own members and the senior Y. M. C. A. secretary is to be secretary to the Committee.

(4) Four members form a quorum at all meetings and the Chairman shall have a vote and a casting vote.

(5) The Committee is responsible for the management of the funds of the Y. M. C. A. and also for raising money locally for the support of the work.

(6) One or more sub-committees are to be appointed annually by the General Committee for the management and control of particular branches of the work, such as work in the different camps, among furlough men, the organization of tea parties and amusements, arranging for lectures, concerts, debates, Bible classes, study circles, etc. Members of the sub-committees need not necessarily be members of the General Committee.

(7) The accounts are to be audited quarterly and presented to the National Council of the Y. M. C. A.

(8) The constitution of the Committee may be altered by the Committee itself with the consent of the Trustees and of the National Council.

As early as 1915 the National Council felt the necessity of appointing executive or advisory committees for several of the new Army Associations in order to greater permanence and stability and such committees were appointed for Jhansi, Ferozepore and Ahmednagar. The Council also gave power to the National General Secretary to appoint other members to these committees and further committees on behalf of the National Council as occasion required. During the last few months such committees

have been constituted in Hyderabad (Sind), Lucknow, Dinapore, Risalpoore, and Murree Hills, with a view also to ensure local interest and support.

A new constitution for local army centres, where there are no Boards of Directors, has been drawn up and approved by the National Council, and is now operative. Under this constitution responsible local committees may be formed, to guide and direct the work of the local branch, working within a prescribed budget. Sub-committees for the various activities may also be formed. An army membership has been started for all India, the membership cards being available for any army branch in India. To link the men up with the Home Associations, a letter of introduction to the secretary of the Y. M. C. A. nearest the man's home, is given to every member on his return to England.

By the formation of governing local committees and sub-committees, and the creation of an Army membership, an effective and permanent work will be possible for the British soldier in India.

The Army Authorities have recently adopted a scheme of education for soldiers in India. In this new scheme the National Council believe the Y. M. C. A. has a definite place. It was the English Y. M. C. A. which led the way in this work in France, during the War, sending out the very best lecturers from the colleges and schools, who worked under the Y. M. C. A. Educational Director, Sir H. Haddow. After the Armistice, when the full value of this educational work could be appraised, Mr. H. A. L. Fisher, President of the Board of Education, said in an introduction to the Report on the Y. M. C. A. Educational Work during the War that "it was the greatest educational experiment in history."

An Educational Officer in a North Indian garrison with whom our local secretary, recently, co-operated writes:—

"During the past two months, on the suggestion of the local secretary I have been making use of the slide service of the Y. M. C. A. in the educational work of the battalion. I cannot speak too highly of the system as a whole. Every effort appears to have been made to obtain the best views possible, and I am convinced that they have been of real use in awakening in the men some interest in countries other than their own and in matters not purely military. On subjects with which the lecturer is not personally acquainted the written lectures should provide ample information upon which he can work.

The new scheme of education in the Army is only in its infancy and such things as illustrated lectures are almost impossible in India unless there is co-operation between the Education officer of a unit and the Y. M. C. A. local secretary."

With our present number of centres and our personnel an effective work is being done, but with the development of our British Army work in other centres, and an increase of staff, we shall be in a position to make a larger contribution to the moral well-being and comfort of the soldier in India.

Indian Army.—As has been pointed out before, the Indian Army Work in India during the war came under the category of war work and so, though ordinary Depot work was attempted, no serious thought or planning was given to it. But before the war terminated, the extensive and much-appreciated Indian Army work in the Field had undeniably proved its utility and promised a bright and useful future if made a permanent feature of Association activity in India. To this end the National Council decided that the Indian Army work in India should be no longer merged with the British Army work, but created into a separate Department, with a special National Indian Army Secretary. Mr. S. P. Singha, Chief Secretary for Indian Army work in Mesopotamia, was asked to take charge, on his return to India, of this work. The appointment was made in June, 1919, when the separation into two distinct Departments was completed, with separate budgets, and each having its own departmental head.

The Department is aiming to establish work in every important cantonment in India. The undertaking is very big, and its execution will largely be determined by the funds available. As a first move it is intended to have at least one Depot centre in each of the most important cantonments. These centres will serve as models and as inducements for further invitations. The work will then be gradually extended as funds become available.

At the middle of the year 1920 the Department had :—

1 Centre in Peshawar	(started June, '19)
1 " in Kohat	(started February, '20)
1 " in Parachinar	(started March, '20)
1 " in Thal	(started March, '20)
1 " in Lahore	(started October, '20)
3 Centres in Ferozepore	(1 centre started February, '18)
3 " in Delhi	(started November, '19)
4 " in Lucknow	(1st centre started August, '17)
1 Centre in Karachi	(started September, '16)
2 Centres in Jhansi	(started November, '17, and Jan., '18)
1 Centre in Dinapore	(Burmese Troops—started August, '19)
3 Centres in Calcutta	(started '19)
1 Centre in Deolali	
1 " in Jubbulpore	(started with Hospital work April, '16. Work for convalescents in the bungalow of Dewan Bahadur Ballab Das, April, '18. For combatants in military Hut since middle of '19).
2 Centres in Bangalore	(some work in '18; Hut started, '19)
2 " in Bombay	(August, '16 and October, '17)
1 Centre in Poona	(started April, '18. Begun in the first instance with Bombay University Corps).
2 Centres in St. Thomas Mount, Madras.	(since '17)
2 " in Trichinopoly	
1 Centre in Rangoon	... (started February, '18)
1 " in Secunderabad	...
1 " in Meiktila	... (started January, '18)
1 " in Maymyo	... (started September, '18)

Total, 37

Besides these, temporary work was done in Rawalpindi, in 1918, with two secretaries and two centres; in Abbotabad in 1918; Bolaram in 1917.

The major portion of the work is being done in military barracks, there being only six *pukka* central Huts, viz.,

- | | |
|----------------|---|
| 1 at Lahore | (gift of Raja Fateh Singh of Sheikhpura, built at a cost of Rs. 7100/-. The Local Government is considering the erection of a large institute at a cost of about Rs. 50,000/-.) |
| 1 at Rangoon | (gift of English National Council) |
| 1 at Deolali | (erected from certain War Funds) |
| 1 at Poona | |
| 1 at Bangalore | |
| 1 at Bombay. | |

During the year 1920, a system of standardized equipment has been introduced and the centres have been listed in three classes—A, B, and C. Efforts have been made to bring the centres up to the standard as far as financially feasible. The standard of work has also been greatly improved and a policy to make this an educational force has been particularly emphasized with much success. Definite class work has also been undertaken especially for Indian Officers and N.C.O.'s, besides running regimental schools wherever required. On account of expenses and difficulty in securing suitable films the Association has discontinued the cinema in most places, substituting instructive magic lantern lectures. Special stress has also been laid on dispelling false rumours.

Co-operation from the Military has been much less than during the War. Opinion is also expressed in some quarters that the Y.M.C.A. is not necessary for troops during peace-time. This, the Association believes, is due to a superficial estimate of Indian Army work, taking into consideration only its recreational side and disregarding the more serious aims, such as education, higher morality, interest in social reforms, sanity in civic views, co-operation and improvement in agriculture, and such like. The Department feels convinced of a successful future.

The individual regiments are on the whole keen, and not averse to having a Y.M.C.A. But the chief difficulty always is accommodation. The Indian Depots have no recreation rooms provided, and the regiments inviting the Y.M.C.A. can make room for it only with difficulty. An inflation in the number of troops, or more exacting needs of an incoming regiment after a transfer of battalions, means necessarily the vacation of rooms by the Y.M.C.A. in favour of more primary and definite military demands. Thus an Indian Army centre is ever exposed to sudden death. The only remedy for this is to build small regimental Huts, or have regimental recreation rooms sanctioned by Army Headquarters or to confine the Associations activity to central institutes as in British work.

We already have six Out-of-Depot Huts. More can be built only by a gradual process as they are rather expensive, but in the long run the central rendezvous is more economical, requires less man-power and is capable of more comprehensive service. At present it is apt to prove less effective and popular as compared to the regimental centre, for the sepoy is neither used to these central clubs, nor can he always leave his Depot freely. G.O.C. Brigades are almost everywhere in favour of these central Huts where the distances are not prohibitive. As these Huts are made more and more attractive, they are bound to gain in popularity as is borne out by the steady growth in attendance already visible in the Huts now in existence.

Finally it may be said that growing financial support and official recognition by Government are pre-requisites of a successful future for this Department. The Department is optimistic as to the former, but considers it to be to a certain extent dependent on the latter, which, in many ways, is the more important because of the peculiar nature of the work.

One of the results of Indian Army work is the beginning in May, 1919, of work for demobilized sepoys, returned from France, Serbia, Gallipoli, Egypt and Palestine, Mesopotamia, and East Africa, and anxious to learn to read and write and to improve conditions in their villages. The majority are familiar with the Red Triangle service and aims. In one village in the Ferozepore District there is a secretary at work, carrying on extension work also in thirty surrounding villages, containing 600 returned sepoys. General recreative work and a school for men and boys are carried on.

V. BOYS' WORK DEPARTMENT

At the beginning of the period special work for boys was being carried on in Madras, Rangoon and Calcutta. In Madras it was begun in 1901 with a membership of thirty-eight Indian boys, which had increased by 1910 to about 100. In that year a whole-time Indian secretary, Mr. S. Manuel, was in charge; quarters for the exclusive use of the boys had been set apart and a library of 150 volumes built up; lantern lectures, educational lectures, Bible classes and other religious meetings, gymnasium classes, various clubs, a museum, a manual training class, socials and games, comprised the activities. The first Association boys' camp in India was held near Madras in December, 1910, with twenty Christian boys in attendance. During the same year a boys' club at Royapettah was opened with Bible study, games and sports.

The Rangoon boys' work was begun in 1902 with a Boys' Brigade which enlisted fifty European and Anglo-Indian boys between the ages of twelve and seventeen in regular religious meetings, talks, drill and out-door sports. In 1904 a camp was

held and has been repeated each year since. At the end of 1906 Mr. J. W. Storey arrived as Boys' Work Director and re-organized the Boys' Brigade into a Boys' Department. In 1910 there were seventy members ; a library of 400 volumes was in existence ; and a well-rounded programme was being carried on. Football, gymnasium classes, Bible classes, a games tournament, and the annual camp which was attended by seventy boys were the main features of the work. Mr. Storey left during the year to continue his studies and did not return.

In 1903 the first, and, up to the present, the only Y. M. C. A. building specially erected for boys was opened with sixty members in Calcutta. It provided one floor of three rooms for the boys and a gymnasium which was to be shared with the adjoining College Branch. The first secretary was a missionary kindly loaned by the Church Missionary Society. In 1904 Mr. C. S. Paterson arrived from Canada to become secretary of the branch ; he has continued in the post ever since. A steady and vigorous development characterised the branch from the beginning. In 1906 Miss Helen Gould donated a library of 1000 volumes. Bible classes, lantern lectures, gymnasium classes, debating clubs and literary societies, lectures on examination text-books, sports and games, annual outings, and socials were regular features of activity. In 1910 there was a membership of 250. Nine Bible classes were conducted with an attendance of 100. A hostel was opened with five boys in residence.

During this earlier period the Allahabad, Bangalore, Bombay and Lahore Associations made beginnings in special work with boys but none of the attempts proved permanent.

The general types of work initiated by Madras, Rangoon and Calcutta have been continued and developed during the period under review in this Report, but despite the solid work done in a few centres, not yet has any standardized policy on a wide scale been worked out and applied in this Department: a condition that may be expected to continue until the Movement gives to the work with and for boys the wide-spread, specialized attention so greatly needed.

GENERAL WORK.—Among the general developments of the period may be mentioned the following: in Madras, the growth of the Royapettah branch until in 1919 it became possible to acquire at a nominal cost a very well adapted property with a large compound, where it is hoped to erect a boys' hostel as well as to provide members of the branch with adequate space for athletics ; and the coming of Mr. A. H. Tebben as Boys' Work Director ; in Rangoon, the opening in 1914 of a branch for Indian boys in connection with the Town Branch, the starting of Scout work, and the arrival of Mr. W. B. Hilton as Director of the Boys' Department ; in Calcutta, the growth of the membership to over 500 boys, representing thirty high schools, the sending of Mr. M.

R. Biswas for a special period of training in the Boys' Department of the Shanghai Y. M. C. A.; in Allahabad, the institution in 1917 of an "honour system," being an attempt, through a system of honours awards, commendations, etc., to arouse, stimulate and maintain interest and participation in constructive undertakings, conferences of older men interested in work among boys, a night school for street boys, and the assignment in 1920 of Mr. M. W. Harlow as Boys' Work Secretary; in Colombo, the appointment in 1914 of a Boys' Work Secretary at the Bambalapitiya Branch, the formation of Scout troops and the assignment in 1920 of Mr. W. H. Marrison to the Boys' Department; in Calicut, the formation by volunteer effort of a boys' branch in 1917 and the starting of Scout work; in Delhi, an attempt under Mr. A. P. Park to develop athletics and sports on a character building basis in the high schools; in Lucknow, the assignment of Mr. H. G. Hart to the study of Urdu preliminary to the development of boys' work in the city, a plan broken off by the death of Mrs. Hart, forcing Mr. Hart to return to America.

HOSTELS.—The hostel started in Calcutta in 1910 has continued ever since and with steadily increasing success. It accommodates twenty boys, a number limited only by the available space. In 1915 a hostel was opened in Jubbulpore with accommodation for sixteen boys; because of financial difficulties it was closed early in 1919. Seven boys are accommodated in the City Branch Hostel, Allahabad.

CAMPS.—Camps have become a regular feature of boys' work. Rangoon has continued regularly its very successful annual camp which is held for a fortnight on the lakes or at the sea-coast. In 1913 the Wellington Branch, Calcutta, conducted a camp for twelve days at Christmas with forty-eight Anglo-Indian boys in attendance. The following year a second was held at Puri with sixty boys. Some of the Associations have initiated or participated in camps for high school boys conducted in co-operation with other agencies.

These High School camps have been held at various times during the period, in or near Madras, in the Central Provinces, Telugu Districts, Tamil Districts around Trichinopoly, Tanjore and Tinnevely, and the United Provinces. Members of the upper forms in high schools were frequently invited to some of the Student Camps formerly carried on by the Student Department of the Y.M.C.A., a practice continued by the Student Christian Association.

The camps for high school boys largely owe their initiation to the work of Mr. J. R. Isaac who, late in 1913, was set apart by the National Council to make a special study of the High School field, with particular reference to South India. After over a year of study a report was presented to the National Council by Mr. Isaac, on the basis of which the Council in March, 1915,

confirmed as permanent the post of High School Secretary and approved a plan of work for the ensuing year which consisted chiefly of the arrangement of eight or nine camps in the following areas: South Tamil, North Tamil, Telugu coast, Telugu interior, Mysore and vicinity, Travancore, Madras City and Malabar. The first camp for high school boys was organized in the Telugu Districts and met for four days in September, 1914, the object being Bible study, devotion and discussion of methods of service. There were present 127 boys and eight leaders, representing seven schools. In November, 1915, Mr. J. C. Eliatamby organized and carried through a camp for high school boys at Hoshangabad where fifty-three boys and twenty leaders gathered for five days. This camp was repeated in 1916, with sixty-six boys.

The first United Provinces Christian Boys' Camp was held in 1917, being a union effort of the churches and the Y.M.C.A. Forty boys attended.

Growing out of the work for high school boys as represented by most of the camps, has come the endeavour to help create and sustain among Christian teachers in high schools a sense of personal responsibility outside of school hours for the boys under their care. Special camps with this purpose have been held in Ceylon, Madras, Tanjore and the Central Provinces, and help has been given in the formation of groups of Christian high school teachers who should carry on such camps on their own initiative.

In 1916, Mr. Isaac was sent to Mesopotamia for several months, on account of the great pressure of the need there, and on his return was posted to Colombo as General Secretary. He was succeeded in the High School Secretaryship by Mr. D. M. Devasahayam, who served until June 1918, when Mr. J. S. Aiman was appointed. Mr. Aiman went to America in 1919 for further study and was succeeded by Mr. G. V. Job who still occupies the post.

During the visit of the Deputation of Friendly Service, Mr. C. F. Angus prepared a graded course of Bible lessons for sixth form boys which is being widely used in the Christian high schools. It was published by the Christian Literature Society.

BOY SCOUTS.—A few Associations have had Boy Scout troops, *e.g.*, Rangoon, Colombo, Calicut and Delhi, but it is the general conviction that the best service the Y.M.C.A. can render this excellent organization is not by having troops, but rather by having, where desired by the Boy Scout Associations, Y.M.C.A. secretaries serve as Scout leaders and on committees; by helping in the recruiting of competent Scout officers; and by placing Y.M.C.A. equipment at the disposal of Scout troops for tests, troop meetings, and rallies. Thus in several cities local secretaries have the privilege of acting as members of advisory committees. The National Council secured and loaned to the

Boy Scouts' Association of Madras, the services of Mr. J. Vincent Mendis, and to the similar body in Mysore State, for one year, of Mr. Frank C. Irwin, both of whom have rendered most excellent service in putting the Scout movement on solid foundations in those areas. A third man, Mr. J. Ross, has similarly just been recruited for the Central Provinces.

Under the auspices of the Boys' Division of the Allahabad Association a two weeks' Scout Master Training Class was held at Ewing College in June 1920, where thirty men received a very practical training in the full meaning of scouting and are now prepared to start troops of Boy Scouts in their respective schools. Twenty of the members of the class were Christians; the remainder Hindus and one Muhammadan.

VI. BUILDING DEPARTMENT

The National Council Building Department was created in September 1910, on the arrival from Switzerland of Mr. H. Schaetti, Architect. At that time the following Associations were already provided with buildings:

1. Bombay—Wodehouse Road Branch: cost, including equipment, Rs. 1,88,325. Rent for the site is paid to the Bombay Improvement Trust to the extent of Rs. 1500 annually.
2. Calcutta—Chowringhee Branch: cost, including site and equipment, Rs. 3,00,000.
3. Calcutta—College Street and Boys' Branches: cost, including site and equipment, Rs. 3,00,000.
4. Madras—Central Branch: cost, including site and equipment, Rs. 1,89,258.
5. Colombo—Racquet Court: cost, including equipment, (site on lease at Rs. 290/- per year) Rs. 90,000.
6. Rangoon—Central Branch: cost, including site and equipment, Rs. 2,32,544.
7. Simla—River View: cost, including site and equipment, Rs. 67,300.

The College Street Branch, Calcutta, was originally a hospital, converted and added to at various stages; to accommodate a student branch, a boys' branch and residences for secretaries. The Simla building, originally intended for a bungalow, was purchased, repaired and added to at different stages.

On the Madras, Rangoon and Simla buildings there were debts respectively of Rs. 18,500, Rs. 1,48,348, and Rs. 50,000.

Moreover, all these buildings were erected, or adapted, before anything like a general form of Association architecture had been produced. The plans were therefore untried and ex-

perience has proved that not one has been really satisfactory from an architectural view-point. Simla has been condemned ; Racquet Court, Colombo, has been reclaimed by Government and no longer exists.

The following buildings were under construction at the end of 1910 :—

8. Allahabad—Central Branch.
9. Lahore.
10. Bombay—Student Branch.

Allahabad was finished early in 1911, at a total cost (including five acre site valued at Rs. 30,000) of Rs. 73,000, of which Rs. 14,000 came from abroad. The Bombay Student Branch was completed in May 1911, at a cost of Rs. 1,05,141, exclusive of the site ; including site, Rs. 1,50,000. The Lahore building required a year longer, being opened in June 1912. The total cost was approximately Rs. 85,000.

The aim of the National Council in establishing the Building Department was to help meet the situation caused by the development of a considerable number of local Associations, previously housed in rented and ill-adapted quarters, to the point where they were anxious to have their own equipment specially planned for their distinctive needs. There had come from the Associations of North America the promise of a large sum of money to help in the erection of buildings in India and this promise had encouraged many of the local Associations to fulfil the conditions laid down for securing a share of the money. Building fund canvasses were being planned or carried on in twenty centres. Sites needed to be selected, plans made, mistakes in former buildings avoided, the experience of one Association made available to others, and general standard plans for different types of Associations developed.

The original purpose of the Department was to serve in consultation only. Any local Association might apply to the National Council for the services of the Architect for help in selecting sites and in preparing suitable plans. It soon became clear, however, that this could not be the only responsibility of the Department. Plans can easily be made in an office anywhere in India, but whether they will be carried out by local agencies in keeping with the intentions of the Architect, is another problem. To find local agencies that could and would carry out such plans in the best interest of the Association and of the donors of the funds, proved practically impossible.

From the very beginning, therefore, with the request for advice and help with plans came also requests that the Architect take personal charge of erection. All such requests have been met within the limits of the time and strength of the Architect. Thus competent supervision has been secured and local secretaries

have been relieved of a responsibility which is generally beyond their capacity and which would seriously interfere with their regular Association work.

This involved the development of a good and efficient staff for the Department. The work of arranging the contracts, supervising the work of the contractor in order to make sure that plans and specifications are followed, measuring up the work and settling the final bills with the contractor, are the responsibility of the Architect and should be carried out by him or by some competent person immediately responsible to him. Equally important is it constantly to watch the expenditures and to keep them inside the sanctioned estimates.

During the first five years the Architect was without any permanent assistants, thus being forced to move about almost constantly from place to place where buildings were under erection. During 1910—12, when few buildings and those mostly in one section of India, were being erected, the Architect was able to get along with such temporary help as could from time to time be found. In more than one instance, however, such temporary help proved to be not of the right kind; as a result the work suffered.

Early in 1913 a second architect was brought from abroad, in the person of Mr. H. Glunkler, who took charge of the buildings in South India, particularly Bangalore and Bombay. The outbreak of the war, however, resulted in Mr. Glunkler's internment, making it impossible for him to continue his work, though he did as much as was possible on the plans for the British Army Branch in Bangalore. No other architect has been secured in his place.

In cases where it was not possible for the Architect to live in the place where a building was to be erected it was essential to put in charge an overseer who had had some experience in the Architect's office. Thus Mr. A. Manickam, after spending two years in Bangalore, was sent to Bombay in charge of two buildings being erected, where the success of the experiment fully proved the wisdom of the arrangement. For Calcutta, where also two buildings were being erected, no such man was available, so that temporary help had to be engaged to look after the work during the Architect's absence. This proved very unsatisfactory, the work done during those days being not up to standard.

As it seemed impossible to find Indian Christian young men with practical and theoretical training in building work, the National Council decided to train such men themselves and in 1915 Mr. J. D. Hermon and Mr. B. I. Simon were taken on the staff and sent to the Technical School in Bangalore for a two years' course. On the completion of their study they joined the Building Department staff where they are still working. A fourth man Mr. G. A. Daniel, a graduate of the Madras Engineering College,

was taken on in 1919 with special reference to large building operations in Colombo, for which the Colombo Association have asked the Building Department to take full responsibility.

The office of the Department has been shifting from the beginning, as the Architect settled for a time in one place after another. The work has now, however, assumed such proportions as to make a permanent office essential, with a man in charge who can keep the files of plans and letters and carry on the office routine. Mr. Simon is now serving in this capacity. Since 1918 the office has been successively in Calcutta, Bangalore, Poona and Madras. It should be permanently established at the National Headquarters, as soon as those are finally fixed.

One of the most vexing problems facing the Association movement at the inspection of the Building Department was that of the debts on already existing buildings. These devoured money badly needed for other purposes, and were a heavy weight on local Boards of Directors and secretaries alike.

In January, 1911, a group of representative secretaries met and passed the following resolution which they asked the National General Secretary to present to the National Council :—

“That the most imperative need of our work in India is the immediate extinction of all debts on buildings; and that they urge upon the various councils and committees interested in the work in India and Ceylon, the vital importance of co-operation in securing immediate relief from these overwhelming burdens. They further urge the importance of an agreement on the part of the various councils and committees concerned and the local boards of control in India to the effect:—that no further debt or mortgage be incurred on existing buildings, or on any new buildings which shall be constructed in India.”

As a result, the National Council at its February meeting unanimously passed the following resolution :—

“The General Secretary is directed to request the co-operation of the American International Committee, the English National Council, and the Scottish National Council in an effort to liquidate all debts on buildings in India; and further that the International Committee, the English National Council and the Scottish National Council be urged to stipulate, when assisting Associations to get buildings, that all buildings shall be erected free of debt; and that no building shall be mortgaged without the consent of the National Council, it being understood that this consent will not be granted unless there are exceptional reasons for it.”

The Foreign Committees concerned gladly agreed to the wisdom of making such conditions. In all the money given from these countries since that time, it has been stipulated, with a few exceptions, that the final payment of their share should only be made on condition that payment would complete the building absolutely free of debt.

The entire indebtedness at the beginning of 1911 on a total building valuation of Rs. 16,75,427 was Rs. 2,33,000 toward the cancellation of which, as a result of the initiative of the National General Secretary, Mr. A. C. Harte, Rs. 27,500-0-0 had

been subscribed in India. Other secretaries were enlisted in the effort in India and abroad with the result that the only part still remaining is Rs. 40,000 on Rangoon Central.

The indebtedness at present on total initial costs of build-ings of Rs.32,74,862 is as follows :—

Allahabad Central Branch	Rs.	1516	0	0
Bangalore City Branch	...	3846	0	0
Calcutta Student Hostel	...	25,000	0	0
Hyderabad—College Street Branch	...	20,000	0	0
Rangoon—Central Branch	...	40,000	0	0
" Student Hostel	...	7,700	0	0
	Rs.	98,062	0	0

Since January 1st, 1911, the following buildings have been added to Y.M.C.A. property in India, Burma and Ceylon. In their planning and erection the Building Department has been able to render large service to the local Associations. In some cases the construction was entrusted to other parties, on account of pressure of other work in the Department or for local reasons, but in most, the plans have been made and the construction super-vised by the Architect and his assistants.

AHMEDNAGAR.—British Army Branch: Plans were pre-pared for a small building which was completed in 1919. The cost was Rs.10,000, met by a gift of £750/- from Nottingham, England. Because of poor construction this Hut is probably worth not more than Rs. 3,000 at present.

2. **ALLAHABAD.**—City Branch: A site of 5½ acres was secured with the help of Government in 1914, within Allahabad City, at a cost of Rs.17,000. Because of lack of sufficient funds to construct the entire building it was decided to erect only an open hall, 27 by 39 feet, equipped as a lecture hall, and a gymnasium, as also a partially complete small bungalow for the Branch Secretary. This was done in 1915. Sir James Meston (now Lord Meston) opened the Branch, December 11th, 1915. Additional funds were secured in 1918 and plans were completed for the entire equipment, with athletic field. One wing of the new building was erected in 1919 and it is hoped that the remain-ing portion may be finished shortly. The secretary's bungalow was completed in 1920. The total cost amounts to: site, Rs.17,000; building, Rs.22,500; equipment, Rs.2,500; secretary's bungalow, Rs.3,900; total Rs.45,900, toward which Government gave Rs.8000 (besides acquiring the land), the National Council Rs 3,000, and the International Committee Rs.30,000; Rs.4,900 was secured in local donations.

ALLEPPEY.—A small building comprising an institute and hostel, completed in 1913, at a cost of Rs.5,000. With site and equipment the property is valued at Rs.7,650. Toward this

amount Rs.2,500 came from America, the remainder being secured locally.

4. ARANGAON.—Indian Army Branch: A small "hut," for which Brigadier General Nore had secured Rs.10,000, was erected early in 1919. Before the end of the year all the Indian troops were removed from the camp and the hut has been dismantled.

5. BANGALORE.—Cobb Army Branch: In December, 1912, a site of six acres was given the Bangalore Association by the military authorities of the 9th Division, and in November, 1913, His Excellency Lord Hardinge laid the corner-stone of the new building, the first to be erected by the Y.M.C.A. in India in the interests of the British soldier. It was particularly intended to provide facilities for technical education so as to prepare the soldier for civil life. The work progressed rapidly until September, 1914, when the outbreak of war brought a lack of supervision and of funds. In 1916 the great influx of troops to Bangalore and the imperative need for larger quarters made necessary the resumption of the work. The masonry work and one roof were completed and the building, though quite unfinished, was taken into use. It has not yet been wholly completed, on account of lack of funds, though each year has seen some addition. Alterations have been made in the plans to provide for expanded work and the final product will be a considerably larger scheme than was originally planned for. The completed equipment will consist of a large athletic field suitably equipped, a commodious institute, with restaurant, lecture hall and stage, class rooms, etc., a separate library and a secretary's bungalow. His Excellency Lord Chelmsford opened the library in November, 1919. The amount expended so far as been Rs.67,500, of which Rs.15,000 came from America, Rs.35,000 from the National Council, and the balance from friends in India.

6, 7 & 8. BANGALORE.—British Army Branches at Hebbal, Maude and Baghdad Camps, erected for temporary use during the war at a total cost of Rs.23,500; Hebbal and Maude Branches have now been done away with. Baghdad is valued at Rs.7,500.

9. BANGALORE.—British Army Branch Tea Pavilion at Iggulden Park: An attractive centre for social life, with garden and tennis court attached, provided in 1918 at a cost of Rs.10,000, from Bangalore funds. It is still in operation.

10. BANGALORE.—Indian Army Building in Richmond Town: An attractive "hut" of the bungalow type erected in 1919 at a total cost of Rs.21,000, of which Rs.15,000 was provided from National Council Army funds.

11. BANGALORE.—Bourdillon Branch: In 1916 a building and grounds were purchased from the London Missionary Society

Tamil Church at a cost of Rs.10,000; and were remodelled and equipped at a cost of Rs.5,250, to provide for the removal of this growing Branch from its former inadequate quarters. The necessary funds, Rs.15,250, were secured from the International Committee.

12. BANGALORE.—City Branch (Cenotaph Road.) In August, 1912, His Highness the Maharaja of Mysore laid the corner-stone of this building, for which he had most generously given a beautiful site of $5\frac{1}{2}$ acres. It was formally opened by Dr. John R. Mott in November of the same year and was finally completed a few months later. The cost, exclusive of site, was Rs.62,573-7-6, of which Rs.48,035 came through the International Committee from a former secretary and his sister. There is a debt of Rs.3,846, which is gradually being liquidated. Because of the closer supervision of the Architect this building is more satisfactory than others erected during the same period. It has proved to be in many respects the ideal equipment for an association in a city of the size of Bangalore. The building contains the usual institutional features, with a good lecture hall, and on the first floor a hostel for twenty-two men in single rooms. There is a separate bungalow for the Branch Secretary, which adds to the attractiveness of the group of buildings. The materials used being the beautiful Mysore granite, the exterior of the buildings is indestructible and never needs repairs. The grounds are attractively laid out, with games courts and gardens. There are three courts for tennis, two for volley-ball, several for badminton, and a full-size football field with running track. In this building the first attempt was made to install up-to-date sanitary fittings in a city without public sewers: they have proved a great attraction and have amply justified the expenditure.

13. BOMBAY.—Byculla Branch: Completed in 1915 and opened in August of that year by Her Excellency the Lady Willingdon. It contains institutional features, a hostel for thirty residents and excellent quarters for the secretary, with separate entrance. The actual cost of the building and equipment, exclusive of site, was Rs.66,164-1-4 toward which the International Committee contributed Rs.25,000. Government gave an equal amount.

14. BOMBAY.—Central Branch Tennis Pavilion: Erected on the tennis courts of the Wodehouse Road Branch, in 1914, at a cost of Rs.2,468.

15. BOMBAY.—British Army Branch: An attractive and commodious Hut at the Cooperage erected in 1917 at a cost of Rs.30,263, met from local funds, and still in use.

16. BOMBAY.—Indian Army Branch: A Hut for Indian Troops in the Marine Lines, erected in 1917 at a cost of Rs 18,705-12-2, met from local funds and still in use.

17. BOMBAY.—Procter Branch: Formerly the Mazagon Apprentices Home. A new building was completed early in 1915: His Excellency Lord Willingdon, Governor of Bombay, opened it in March of that year. It contains social rooms, a hostel for sixty Anglo-Indian apprentices, single rooms for boarders, and accommodation for a married secretary, an assistant secretary and a house-keeper. The actual cost of building including equipment, was Rs.1,00,276-8-7, toward which Rs.43,750 was given by Government, Rs.25,000 by the International Committee and the balance by citizens of Bombay.

18. CALCUTTA.—National Headquarters: In 1916 the property at 5, Russell Street, was purchased at a cost of Rs.1,95,000, to provide accommodation for the largely increased work of the National Council. On equipment an additional sum of Rs. 13,107-8-3 was spent. The money was given for this special purpose by Association friends in Toronto, Canada.

19. CALCUTTA.—Chowringhee Branch: Remodelled in 1914 at an expense of Rs.4,000; certain other changes were made in 1912 and 1918, costing Rs.2,000; the funds were secured locally.

20. CALCUTTA.—Ronaldshay Hut: a very well equipped and popular Hut erected in 1917 on the Maidan at a cost of Rs.36,000; the cost being met jointly from local and National funds.

21. CALCUTTA.—Barrackpore Indian Army Hut: erected in 1918 at a cost of Rs.1,000. This has since been replaced by a large pucca barrack made available by the O.C. 73rd. Carnatics.

22. CALCUTTA.—Student Hostel: In December, 1913, the site of approximately one acre, at 62, Machua Bazar Street, was purchased for Rs.96,000. In April, 1914, construction was begun and in July, 1915, the hostel was opened. The contract was placed in the hands of a local firm who carried out the work in a very unsatisfactory way. Moreover, much of the work had to be done very inexpensively in order to keep within the available funds. This, together with the bad workmanship by the contractors, made the building below the desired standard in some respects. As regards plan the building has proved satisfactory:—thirty-five single and four double rooms for students, social rooms and residential quarters for the Warden and Assistant Warden. The estimated cost was Rs.84,613; actual, Rs.82,126-7-5. The grounds are laid out as a student playground, with two tennis courts, two basket-ball courts, two volley-ball courts, an open-air gymnasium, three hand-ball courts, a squash racquets court and a badminton court. Building and grounds together are considered to be in many respects an ideal equipment for a student hostel and playground in a large city. The total cost including equipment was Rs.1,95,286-3-9, toward which Government gave Rs.74,364. Of

the balance the International Committee contributed Rs.97,112; the National Council advanced Rs.25,000 to cover the remainder and hopes to recover it from a special grant from Government which would doubtless have been paid in 1915 except for the outbreak of the war.

23. **CALCUTTA.**—Wellington Branch: An institute and hostel for Anglo-Indian young men and a residential flat for the secretary, at 42, Corporation Street, completed in February, 1915. In the grounds are two pukka tennis courts and a badminton court. The estimated cost of the building was Rs.83,500; actual cost Rs.80,257-11-2. The total cost, including site and equipment, was Rs.1,56,189-5-3, of which Rs.40,000 came from America and Rs.50,000 from Sir Robert Laidlaw.

24. **CALICUT.**—Opened March 1st, 1913. It is a composite building, comprising institutional features, a hostel and a secretary's residence. Because of an existing building which had to be preserved and brought into connection with the building, the working out of the plan for the new construction was not quite satisfactory and some inconvenient features could not be avoided. The building cost Rs.14,000; the total value of the entire property is Rs.25,270. Of this amount Rs.10,000 came from America and the balance locally.

25. **COIMBATORE.**—A composite equipment containing the usual three features, institute, hostel, and a small residence for the secretary. It was opened in March, 1912, and cost Rs.14,038. With equipment the total cost was Rs.16,099-7-6; of which amount Rs. 7,000 came from America. To make the size of the building in keeping with the needs of the Association, the work had to be done as cheaply as possible, and in consequence there is constant and considerable expense for upkeep.

26. **COLOMBO.**—Racquet Court: Between 1910 and 1913 extensions and improvements were carried out at an expenditure of Rs.21,000. The building was dismantled in 1916 on orders of Government, to make way for rat-proof rice granaries; a new site was given by Government and compensation of Rs.1,05,000 for the building. The Architect is now engaged on the plans and erection of a building on the new site, at an estimated cost of Rs.5,00,000, including a Soldiers' and Sailors' Institute to cost Rs.1,75,000.

27. **FEROZEPORE.**—British Army Branch: In 1918 the Wesleyan Missionary Society Institute was purchased by the National Council at a cost of Rs.6,000, to which was added Rs.2,650 for necessary repairs, additions, fixtures, stamps, etc.

28. **GALLE.**—In 1913 the local Association purchased for Rs.7,500 an old building in need of reconstruction for which the Architect prepared plans. The work was carried out locally in 1916 at a cost of Rs.2,500. Toward the total cost of Rs.10,000,

the International Committee gave Rs.3,000. The building and equipment are valued at Rs.20,000.

29. **GOPALGUNGE.**—For a small building, plans were prepared by the Department and the building was erected in 1913, at a cost of Rs.2,600, of which Rs.1,700 was given by the International Committee, the balance being secured locally. Unfortunately the cyclone that devastated a large portion of East Bengal in 1919 destroyed the building; only the steel frame of the walls and the roof being left. Efforts are now being made to rebuild.

30. **HYDERABAD.**—Chapel Road Anglo-Indian Branch: In October, 1911, the building which had been erected in 1896 at a cost of Rs.5000 was enlarged, at a cost of Rs.15,000, half of which was raised locally and half donated through the National Council by the International Committee. At present the branch is not affiliated.

31. **HYDERABAD.**—College Street Branch: In 1919 a gift of Rs.29,772-5-11 from the Australasian National Committee made possible the purchase of a building of considerable size for this branch (established in 1912,) which cost H. S. Rs.50,000. It was necessary to take out a mortgage for the extra Rs.20,000, on the joint security of the Australasian Committee and the National Council. It is expected that this will shortly be wiped out by the generosity of the Australasian Association.

32. **JHANSI.**—British Army Branch: A bungalow re-built in 1918 at a cost of Rs.31,100, met entirely by the National Council.

33. **JUBBULPORE.**—British Army Branch: In 1918 Lady Robertson, wife of Sir Benjamin Robertson, late Chief Commissioner of the Central Provinces, secured from the Feudatory Chief of Sirguja, the generous gift of Rs.15,000 for a Y.M.C.A. Hut for British troops in Jubbulpore. It was then expected that the building would cost Rs.25,000 and the National Council agreed to furnish the balance. For various reasons the amount originally estimated was insufficient and in all the National Council has given Rs.25,000. The building, which is unusually substantial and adequate, was opened July 3rd, 1919, by Sir Benjamin Robertson. The plans were prepared by T. Mackenzie, Esqr., Garrison Engineer, who incorporated in the plans some suggestions made by the National Council Architect; D. N. Thompson, Esqr., M. W. S., superintended the building operations free of charge.

34. **JUBBULPORE.**—Civilian Branch: This building was erected in 1914, with the idea that it should serve as a "cosmopolitan" centre for all communities: the situation in Jubbulpore has not yet allowed of the attaining of this ideal. The total cost including site was Rs.24,718-2-1, of which Rs.5,000 came from Government, Rs.9,000 from America through the National Council and Rs.11,000 from individuals in Jubbulpore and other parts of India. During 1916 it was closed on account of an increasing

debt incurred for current expenses, decrease of membership on account of the war, and the lack of a full time secretary, and was rented to the Army Clothing Department, with the result that the old debt has been paid off and the surplus placed on fixed deposit until the Branch shall be reopened, which is expected to be in the near future.

35. **KANDY.**—The plans call for an institute and a small hostel, for which a site of exceptional attractiveness, beside the lake, was leased from Government in 1914 for Rs.5 per year, free of taxes. In 1917 the institutional section was erected and equipped at a total cost of Rs.11,000 of which Rs.3,000 came from America; the hostel has not yet been built, on account of lack of funds.

36. **KARACHI.**—Completed in October, 1914, the plans having been prepared by the Architect who made frequent visits during construction, which was done by a local contractor under the supervision of an engineer of the Public Works Department who acted in an honorary capacity for the Building Committee. The building contains institutional features, a good hostel, and an annexe for the secretary. The grounds are very spacious, 50,000 square yards, of which 8000 are held on 99 years' lease and the remainder on temporary tenure as recreation grounds. There are two tennis courts, and football and hockey fields. A gymnasium (still unequipped) and lecture hall is connected with the building by a covered passage. The total cost was Rs.80,000, of which Rs.15,000 was given by Government, Rs.15,000 by the International Committee, Rs.5,000 by the National Council and the remainder, Rs.45,000, by citizens of Karachi.

37. **KARACHI.**—Gaza Lines Hut and equipment costing in all Rs.12,800, provided locally and erected in 1918. The Keamari Hut and the two Rest Camp Huts, one for Indian and the other for British troops, have just been closed down for want of secretaries.

38. **KUNNAMKULAM.**—Plans and estimates have been prepared for an institutional building, for a hostel and secretary's residence. It is doubtful whether funds will allow of the entire equipment desired, but the cornerstone of the main building was laid by Mrs. G. S. Eddy in June, 1919, and the building has reached the plinth level. Rs.9,500 have been subscribed locally, of which Rs.5,300 has been collected. A promise of Rs.10,000 has come from abroad.

39. **LAHORE.**—Indian Army Branch: A Hut erected at a cost of Rs.11,822 of which Rs.7,100 was donated by the Rajah of Sheikhpura, Rs.1,000 by Lady O'Dwyer and the balance by the National Council.

40. **MADRAS.**—Anglo-Indian Hostel: Now in course of reconstruction at a total cost, estimated, of Rs.50,000, secured locally.

41. MADRAS.—Royapettah Branch: Purchased in 1919, especially as a centre for boys' work, for Rs.20,000; repairs to the extent of Rs.5,000 carried out in 1920. The entire cost came from America.

42. MANDALAY.—A building was purchased in the latter part of 1911, but because of the closing of the Association was sold in 1919.

43. MIDNAPORE.—In 1914 Mrs. Duckett of Duckett's Grove, Ireland, gave Rs.7,500 for a building at Midnapore. A centrally located site of about five acres was leased at a nominal rent from Government and local gifts were secured amounting to about Rs 4,000. The cornerstone was laid in 1914, but actual building work was not undertaken until December, 1918. It was finished about a year later at a cost of somewhat over Rs.13,000, the balance of the funds being supplied by the National Council. The original plans included a hostel, but only the institute section has been built.

44. MURREE.—Sunny Bank Army Branch: A gift of Rs.5,000 from Lt.-General Sir Arthur Barratt, for the erection of a Hut to be called the Lady Barratt Memorial Hut and originally intended for Rawal Pindi, was shifted to the Murree Hills where it will serve as a social centre and a Furlough Home. The building was completed in June, 1920, at a cost of Rs.20,500, the remainder of the funds being supplied by the National Council.

45. MURREE.—Gharial British Army Branch, erected in 1918, at a cost of Rs.5,000; including equipment it is valued at Rs.10,000.

46. NAGPUR.—Student Hostel: During 1913-1915 several plans were prepared until an agreement was reached with Government as to site and building plans. The hostel was finally completed in 1918 at a cost of Rs.51,000. It has accommodation for thirty-five students and a social room, and stands in very attractive grounds near the Morris College. The plans include a separate bungalow for the Warden, but because of the great increase of prices during the war the funds available, Rs.25,000 from Government and Rs.25,000 from America, proved insufficient to erect the bungalow. As soon as funds can be secured the bungalow will be constructed and the grounds will be equipped more completely for games.

47. NAINI TAL.—Originally a civilian branch, with a bungalow and compound then valued at Rs.26,000, given the Naini Tal Association in 1912. During the war the equipment was devoted entirely to British Army work, serving chiefly as a furlough home for the large numbers of soldiers on leave. On account of the age and bad condition of the existing buildings it has been necessary to arrange for an almost complete reconstruction and extension. Plans were prepared and up to date about

one third of the proposed work has been carried out at a cost of approximately Rs. 18,000.

48. **NAVALY.**—(Ceylon): A small building erected in 1914 at a cost of Rs.1,600 on which there is a debt of Rs.225.

49. **POONA.**—British Army Branch: The Connaught Institute was taken over from Government in 1913 at a cost to the National Council, for compensation to the R. A. T. A., for alterations, equipment and repairs, of Rs.9,755. It has continuously been used rent free as an Army Branch ever since. Repairs and improvements have since been added from time to time, at a cost of Rs.9025, locally secured.

50. **POONA.**—Indian Army Hut: Erected in 1918 at a cost of Rs.12,000, locally secured.

51. **RANGOON.**—British Army Branch: Through a gift of £300 from the English National Council, added to local subscriptions, funds were provided for an Army Hut in Rangoon which was erected in 1915 at a cost of Rs.8,000. It was further extended in 1917 at a cost of Rs.6,000.

52. **RANGOON.**—Indian Army Branch: A Hut completed in 1919 at a cost of Rs.8,000, of which Rs.5,000 was received from the "India Day" collections made by the English National Council in Great Britain. The balance was secured locally.

53. **RANGOON.**—Student Hostel: An attractive building accommodating thirty-five Burmese students, with Warden's quarters and tennis courts, erected from plans drawn up by the National Council Architect, under the supervision of a local architect. The building was finished in the latter part of 1913 at a total cost of Rs.73,808-1-7, toward which the International Committee gave Rs.22,500. There is a debt of Rs.7,700.

54. **RISALPUR.**—British Army Branch: Institute, built in 1918-19; and large compound partially laid out. The initial gift of £500 came from Her Highness the Princess Victoria's Fund and to this from time to time the National Council has added. The total amount sanctioned is Rs.42,500, of which Rs.25,500 has been spent, the remainder being in hand for the early erection of a secretary's bungalow and the completion of certain necessary equipment of the Institute.

55. **SECUNDERABAD.**—Plans for a small building for the civilian branch were prepared in 1912 and the corner-stone was laid on September 6th by the Hon'ble the Resident, Lieut.-Col. Pinhey. The construction was in charge of local agencies and the building was completed in 1913, being opened by General Sir Arthur Phayre, C. B., in January 1914. The cost was Rs.12,000 of which half was raised in India; the remainder came from America.

56. THIRUVALUTHINADANIVILEI.—A village Association building—the smallest building and longest name on the list! and the first Y.M.C.A. to own a building in the Tinnevely District—erected at a cost of Rs.120 in 1912, completely at the charges in labour and money of the Association in this Tinnevely village.

57. WELLINGTON.—British Army Branch: During the war a temporary agreement was made between the Bishop of Madras and the National Council for the management of the existing Church of England Institute. This has worked so satisfactorily that all concerned have decided to make the arrangement permanent. In August, 1919, a grant of Rs.50,000 to the Y.M.C.A. from the Madras Presidency War Fund made possible extensive improvements and additions to the property. The existing wooden Hut is being replaced by a permanent concert hall and other buildings, and a bungalow for the secretary is being also erected on the same site. It is expected to complete the work early in 1921. The entire property, equipment included, will be held in common by the two Trustees: (1) The Bishop of Madras and (2) the nominee of the National Council.

Besides the above buildings which have been added to the Association equipment since 1911 there are a considerable number of places where investigation of sites has been made and preliminary sketches prepared. Because of the lack of funds, or for other causes, the buildings have not yet been started; but it is still hoped that the necessary funds may be forthcoming, when construction will be started :—

1. DELHI.—The Delhi Association and the National Council have applied to the Delhi Government for two sites, one in New Delhi and one in the City Extension area, for buildings for European and Indian young men and boys. The Delhi Municipality have already granted a site in the Queen's Gardens, near the heart of the main city, on which a semi-pukka pavilion will probably be erected in the near future, primarily to serve the educated Indian Community.

2. JAFFNA.—A site tentatively planned to be leased from Government was found unsatisfactory.

3. JUBBULPORE.—Indian Army Branch: Plans are in hand for a building similar to the Bangalore Indian Army Branch and it is hoped to begin erection soon.

4. KOTAGIRI.—A site of nine acres in this hill station was secured in 1914, with the aim of providing equipment for summer conferences, training institutes, and a holiday home for secretaries and members of South Indian Associations. The plan has not yet been worked out.

5. KOTTAYAM.—For the past ten years this Association has been endeavouring to secure a site and put up a building, having been housed in rented quarters for the entire period. In

1920 a site was secured and as soon as money for actual building is available the work can be begun. The sum needed is Rs. 35,000.

6. LAHORE.—Student Hostel : Several tentative plans have been prepared. A site was purchased in 1915 by means of a gift of Rs.50,000 from Scotland, on condition that a similar amount be raised locally. The equipment is to include secretary's quarters and a playground. Because the local funds are not yet available and the site is not wholly satisfactory, the construction has not yet been started.

7. MADURA.—A site and a small building near the great temple were purchased, for Rs.14,606-15-10, toward which the International Committee contributed Rs. 12,000. Ever since that time efforts have been made to secure funds for a new building but so far without sufficient success to warrant proceeding with the building. Several plans have been prepared.

8. OOTACAMUND.—Several studies have been made of the possibilities of various sites under consideration. In June, 1920, the Government presented a good site in the middle of the town to the Association, which has taken due possession of the same. As soon as funds become available the work will be started.

9. PALAMCOTTAH.—For ten years it has been hoped to find a satisfactory site and erect a building here. Some money has been secured, but not sufficient to warrant going forward with construction. Nor has a suitable site been found.

10. POONA.—City Branch : Ever since 1914 this branch has been promised help to secure an adequate building, but the effects of the war have so far prevented the fulfilment of the promise. A site was purchased, the International Committee giving Rs.10,000, and plans and estimates were prepared before the outbreak of the war ; only the outhouses, hostel kitchens, etc., have been built and these are being used as games and meeting rooms for the Branch. The expenditure on site and these outhouses was Rs.25,000. The building is urgently required, but the tremendous increase in the price of building materials makes complete new plans necessary and demands twice the money originally estimated. Final plans and estimates are ready.

11. SALEM.—A site of one acre and eighty cents has been purchased for Rs.560 and a contiguous strip of about one acre has been leased at a nominal rent from the local Zemindar; Rs.750 is available toward a building, plans for which are being matured.

12. SIMLA.—River View : The present building is not well suited for Association purposes and, besides, has been condemned and must be replaced. Unfortunately funds are not yet available. The location is very good. Several plans have been worked

out and Government has been asked to help financially on the ground of the service rendered by the hostel.

There are thus at the date of writing fifty-seven buildings owned by the Y. M. C. A. in India, Burma and Ceylon, erected at a cost of Rs. 32,74,862, and with building debts amounting to Rs. 98,062. No attempt is here made to estimate the present value, which is in many cases far greater than the original cost. The majority of the buildings belong to local Associations, but in a few cases the National Council holds the title. In addition, there are thirty rented and thirty-two rent free buildings, making in all 119 occupied for Y.M.C.A. purposes.

In connection with these buildings hearty acknowledgment is made of the liberality of many different people in India, who have given largely—Government, ruling princes, missionaries, Hindu and Moslem Zemindars, Indian Christians, Parsee business men, and the large number of those whose small gifts have joined to make the large total which has been invested in the permanent equipment which provides for the Associations the centres from which to carry on their work.

Much of the incentive to this giving has come from the most generous gifts from abroad, to whose donors we are incalculably indebted.

For the purpose of utilizing any further gifts from abroad for buildings the National Council have appointed a Building Commission whose duties are to study the entire situation as regards new buildings needed and to make recommendations to the Council for the distribution of all funds secured for building purposes. In full consultation with the local Associations concerned, a complete survey of the different cities and towns is being carried out with a view to securing all the relevant facts and arriving at such recommendations as will ensure the adequate equipment of all Associations so far as the securing of the necessary funds permits.

VII. LECTURE AND PUBLICITY DEPARTMENT.

For several years the National Council has had a Lantern Slides Department for the service of local Associations, carried on with varying degrees of efficiency and co-operation from the Associations concerned. With the war the demands for lecture material grew very large and for most of that period the service was practically limited to the Army Department.

During these years, also, there has been an increasing need of attractive and complete publicity material in connection with the various financial campaigns and with the securing of men and money from abroad.

It therefore seemed desirable to the National Council to

develop both of these departments and to appoint a special secretary to have charge of them. Consequently, in April 1920, Mr. W. H. Heinrichs was appointed Secretary for the Lecture and Publicity Department, and was directed to study the material available and the needs of the field, and to submit proposals in detail for the working of the Department.

During the time that has elapsed since the creation of the Department the slides equipment has been thoroughly renovated; all the slide sets have been renumbered and refilled, over 800 broken or cracked slides repaired, ninety new sets purchased and sixty secured as donations, fifteen new lectures prepared to go with the slides (100 more such lectures are needed), and a department established which has been opened to missionary societies and other similar bodies on certain conditions, as well as to branches of the Y.M.C.A.

At the beginning of the work there were on circuit 94 sets of slides in fair condition, with 3974 slides. There are now 339 complete sets with a total of 13,021 slides, many of which are hand-coloured. Over forty lectures have been duplicated and suitably bound for circulation. An adequate supply of special boxes for shipment has greatly reduced the damages sustained by breakage in transit.

In the Publicity Department 200 blocks have been assembled, cleaned, filed and placed at the disposal of local Associations. A complete list of all the photographs now available for advertising purposes, exhibits and displays has been made. Eleven large wall charts and twenty-five large panels of ten photographs each, showing Army Work in France, Mesopotamia and East Africa have been prepared for the Indian War Memorial. For the forthcoming National Convention over 600 different pieces of local Association printed matter have been assembled on 100 mounts, besides ten large "Thrift Campaign" posters, 200 photographs and twenty-six graphic charts of Y.M.C.A. work in India, 250 of Y.M.C.A. Army work in France, Mesopotamia and East Africa, and certain other exhibits. A complete file of branches of the Association in India and Ceylon has been prepared, and a cultivation list of some 550 selected names.

VIII. LITERATURE DEPARTMENT.

The large development in this department gathers about the work of Dr. J. N. Farquhar, who, in 1912, by an arrangement made possible by Dr. John R. Mott, was set apart entirely for literary work. Previous to this time Dr. Farquhar had become one of the leaders among that group of missionaries in India who felt the need for a new method of Christian apologetic for Hindus, involving a thorough overhauling of their ideas of Hinduism, a frank and full recognition of all the good that is in it, and a clear,

well-thought-out statement of the relation in which its teachings stand to Christianity. He had previously published *Gita and Gospel* (1903), and a *Primer of Hinduism* (1911), and had joined a small group of men—Dr. N. Macnicol of Poona, Dr. H. D. Griswold of Lahore, Professor A. G. Hogg of Madras, Dr. R. E. Hume of Bombay, and later the Rev. John Mackenzie of Bombay—who banded themselves together for the definite purpose of producing a series of books which should be thoroughly scholarly and trustworthy, sympathetic in attitude to the religions of India, yet steadily loyal to Christ. Each chose a subject and an agreement was reached as to the general character of the books and their publication. Dr. Griswold and Dr. Farquhar were selected as editors of this “Religious Quest of India Series.” Dr. Hume and Professor Hogg dropped out of the company in course of time, but the rest have held on.

By the new arrangement of Dr. Farquhar’s work he was to spend the winters in lecturing in India, keeping in close touch with missionaries, the Indian Church, and non-Christian activities and opinions, while his summers were to be spent in Oxford under conditions that would give him uninterrupted leisure for writing. In his new position he was designated Literary Secretary of the National Council.

During his first summer in England he was able to form a connection with the Oxford University Press which has since then developed into a league between the Press and the Literature Department. In the summer of 1912 Mr. Milford, the head of the Press, published the second edition (the first had been published by the Christian Literature Society, Madras) of the *Primer of Hinduism* of which not less than 10,000 copies have been sold, taking the two editions together. His Majesty the King-Emperor used it on his way out to India in 1912.

During the same summer, Mr. K. J. Saunders, a Cambridge man, who had for some time been teaching in Trinity College, Kandy, Ceylon, passed over to the service of the Y.M.C.A. in India. About the same time two valuable books on Buddhist subjects, which he had written in Ceylon, were published, *Buddhist Ideals* (C. L. S. Madras) and the *Buddha’s Way of Virtue* (Murray, London), a translation of the *Dhammapada* one of the Buddhist canonical works. Both have proved most valuable.

Dr. Farquhar’s first winter’s work in India as Literary Secretary proved very encouraging. H. A. Walter, a brilliant American student, who had already published a notable volume of religious verse, *My Creed*, arrived in India to take up work under the Y.M.C.A. among educated Muhammadans. It was, therefore, arranged that he and Mr. Saunders should be appointed Literary Secretaries alongside of Dr. Farquhar, Mr. Walter taking

Islam as his subject, Mr. Saunders Buddhism, and Dr. Farquhar Hinduism.

During the same winter two new series of books were planned. The first was to be called *The Religious Life of India* series, and was to deal with Hindu and Muhammadan sects, the Outcastes and the Wild Tribes. The second, *The Heritage of India* series, was meant to be a lengthy series of small volumes, each dealing with some healthy element in the civilization of India. The Bishop of Dornakal became Joint Editor of the Heritage Series with Dr. Farquhar while, at a later date, Dr. Macnicol undertook to be Joint Editor of the Life Series.

In the autumn of 1913, Farquhar's *Crown of Hinduism* was published by the Oxford Press. The subject of the volume is the relationship of Christianity to Hinduism. It thus raises the whole question of the right attitude of the Christian to the religions of India. The book provoked a certain amount of hostile criticism; yet the great majority of the reviews were favourable. The original edition soon ran out; and the book is being sold in cheap editions in England and in India. There can be no doubt that it has exercised a wide and deep influence on missionaries and the Indian Church in India, and also on Christian opinion in Britain and America. Many leading Hindus have read the work, and it is frequently referred to in *The Indian Social Reformer* and other organs of moderate opinion in India. A number of Roman Catholic priests in India have studied it.

Having been appointed Lamson Lecturer at Hartford Theological Seminary, Conn., U.S.A., Dr. Farquhar delivered eight lectures there in November, 1913, on *Modern Religious Movements in India*. According to the conditions of the Lectureship, the lectures are published by the Macmillan Co., New York. The MSS. was sent to New York early in the Summer of 1914.

During his visit to India in 1913-14 several new writers were secured, notably Mrs. Stevenson of Rajkot, Kathiawar, who joined the *Quest of India* group. In 1914 nothing was published, but in February, 1915, the *Modern Religious Movements in India* appeared in New York. The book was at once acclaimed as a valuable addition to our knowledge of India, and has been accepted as authoritative on all hands. It is constantly quoted and referred to by writers on India. The section on Theosophy has been translated into Dano-Norwegian and Marathi. The following year the author received from Oxford University the degree of Doctor of Letters (D. Litt.) on the ground that the *Modern Movement* forms a valuable contribution to learning.

1915 proved a very fruitful year, for two volumes of the *Quest Series* were published by the Oxford Press, Dr. Macnicol's *Indian Theism* and Mrs. Stevenson's *Heart of Jainism*. Both books were well reviewed and are now accepted as standard

works. When questions come up in a law-court in Gujrat with regard to what Jain teaching is, *The Heart of Jainism* is frequently quoted as the last word on the question. Indeed, the leading Jains of Gujrat would have liked to publish the work for use in the Jain community, since they have no book of their own that expounds the religion so faithfully, but they desired to omit the last chapter, which shows the relationship of Christianity to Jainism, and naturally, Mrs. Stevenson would not have her book mutilated. The same year the Oxford Press also published the first volume of *The Heritage of India Series*, Saunders' *Heart of Buddhism*, which is a collection of translations from Buddhist hymns and popular texts, of great value to the student.

Early in 1916 the first volume of the *Religious Life of India Series* was published by the Oxford Press, being *The Village Gods of South India* by the Bishop of Madras. The book has proved exceedingly useful, as is shown by the fact that it has gone out of print. A revised and enlarged edition is now in the press.

Thus the Oxford Press had undertaken to publish all three series of special works on Indian subjects which the Department was endeavouring to get prepared. But the rise in the price of paper occasioned by the war soon made it impossible for the Oxford Press to publish the Life Series and the Heritage Series at the low prices necessary for India. An arrangement was therefore made that the Association Press in Calcutta should have the volumes of these series printed and published in India, while the Oxford Press would import supplies from India and publish outside India. The Quest Series remained in the hand of the Oxford Press.

In 1917 another volume of the Heritage Series saw the light, *Asoka*, being a biography of the great Buddhist emperor, by Dr. J. M. Macphail, a medical missionary stationed at Bamdah in Bengal. It was the first of our volumes printed in India in accordance with the new arrangement. Every one acknowledged the high quality of the printing and binding. The department owes a great debt to Mr. Gould of the Wesleyan Mission Press for the accurate and artistic work he has produced.

Dr. James Hope Moulton of Manchester University, who, according to Harnack, was the greatest authority of his day on the language and the grammar of the New Testament, and was also an accomplished Zoroastrian scholar, came out at the invitation of the Y.M.C.A., to lecture to Parsees. He lost his life, through submarining, on his way home. While in India, however, he had written *The Treasure of the Magi* the only work in existence on Zoroastrianism which is at once adequate, reliable and readable. It appeared in the Quest Series some six months after his death.

The same autumn a volume on *Indian Painting* by Mr.

Percy Brown, Principal of the Government School of Art in Calcutta, appeared in the *Heritage Series*. It is the first complete introduction to the subject ever published.

During the winter of 1917-18 two other volumes of the *Heritage Series* saw the light, *Kanarese Literature* and *The Samkhya System*. Kanarese is one of the vernaculars of South India, and possesses a great literature stretching back into the past for over a thousand years. Mr. Rice's volume is the first history ever written, and at once took its place as an authoritative work. The Samkhya is one of the six orthodox philosophies in recent years, and the new volume gives a clear and full account of the history of the school and the development of the system such as has not appeared before. The author is Dr. A. Berriedale Keith, Professor of Sanskrit in Edinburgh University. Dr. A. A. Macdonell, Professor of Sanskrit in Oxford University, Prof. Poussin of Ghent, and one of the junior instructors of Johns Hopkins University, have each promised a volume for the *Heritage Series*. That these men should associate themselves with our literature is clear evidence that it is scholarly and reliable.

In 1918 two volumes were published, which do not fall under any one of the series. The first was *The Story of Buddhism* by Saunders, which sketches the whole history of Buddhism and is thus most helpful to students. The other was *Ancient Indian Education* by the Rev. F. E. Keay of Jubbulpore, and is the pioneer volume on that most important subject.

A great sorrow fell on us on the 1st of November, 1918, when Howard Walter died of influenza in Lahore. He was by far the most brilliant man in the Y.M.C.A. staff in India, and was making careful preparations for writing a great work "Islam in India." Shortly after his death, a small book from his pen, *The Ahmadiya Movement* was published as the second volume of *The Religious Life of India Series*. Every reviewer has recognized its high qualities.

In the summer of 1919 a new volume of the *Quest Series* appeared, *Redemption: Hindu and Christian* by Dr. Sydney Cave, formerly an L. M. S. Missionary in Travancore, now Principal of Cheshunt College in London. It has had an excellent reception in India. In the autumn a fresh volume of the *Heritage Series* was published, Dr. Macnicol's *Psalms of Maratha Saints*, which, from the literary point of view, is probably the best book we have yet published.

A fresh work by Dr. Farquhar—his war-time opus—has just been published by the Oxford Press in the *Quest Series*: *An Outline of the Religious Literature of India*. It is meant to provide materials which will make the serious study of the religions of India more possible than it has been in the past.

During Dr. Farquhar's tour in 1919-20 a larger number of new writers were enrolled than ever before, amongst them a few Indian Christians. Eleven fresh volumes were arranged for. It was decided, after a good deal of thought and discussion, to try to produce a series of informing volumes on the women of India. Two have been arranged for. Miss Cornelia Sorabji will edit this interesting series along with Dr. Farquhar.

The Chamars, by the Rev. G. W. Briggs, in *The Religious Life of India Series*, and *Hindi Literature*, by Rev. F. E. Keay, in *The Heritage of India Series*, appeared in September, 1920.

How far has this literary movement proved successful? It has certainly been successful in leading many missionaries and Indian Christians to adopt the new attitude to the religions of India. The books have also roused many missionaries and a percentage of Indian Christians to far more earnest study of the religions than was usual twenty years ago; and they have also helped to convince mission boards and secretaries in the West that it would be wise to give prospective missionaries a brief training in the religion and the civilization they are to be faced with, before they leave home; so that, when they arrive, they may understand a good deal of what they see and be able to carry their studies still farther without difficulty. We are also glad to find that it is now a good deal easier than it was seven years ago to persuade capable missionaries and Indian Christians to undertake books on Hindu subjects or on elements of the civilization.

Its influence on cultured people in Western lands is also worth noting. The league with the Oxford University Press is certainly very significant. The books will be found on the shelves of most University libraries in English-speaking lands. But the most striking fact is the way in which all Orientalists have accepted the books as trustworthy literature of a high order.

The most serious test to which such books as ours are exposed is their reception by non-Christians. If they fail at this point, they fail altogether. How have our books been received by Hindus, Buddhists, Jains and Parsees?

First of all, they are actually being read; they are not put aside as negligible. That in itself is a great matter; they are sufficiently interesting to attract the attention of non-Christians; and their tone does not repel. Secondly, all non-Christian reviews fully recognize their trustworthy scholarship. That also is a matter of great importance. We are steadily building up a library of descriptions of the faiths of India of a truly scholarly character. Thirdly, non-Christians recognize our sympathetic outlook, our eagerness to be absolutely fair in criticism; but, naturally, they do not accept our Christian conclusions. Nor do we expect them to do so all at once. It is a great triumph to have our books accepted and read as scholarly productions. Lastly, it is clear that

our sympathetic attitude has begun to tell on non-Christian leaders. This fact manifests itself most clearly in a new friendliness to the Y.M.C.A., and an increased willingness to help our work forward.

A further fact of great importance is this, that our literature pays its way; we need no subsidies. All of our books which are published by the Oxford and other presses are published at the charges of these presses; while all the books being published by the Association Press bring in at least as much as they cost.

Clearly then we have succeeded in making a beginning at least in the production of a fresh type of apologetic literature in English, a literature marked by scholarship, sympathy and Christian faith. But much yet remains to be done; we want many more writers; for there are a large number of sects, of outcaste groups and of wild tribes which have never yet been described. The value to the missionary and to the administrator of a scholarly monograph on some group marked off from others by their religion and social life is very great. Until all the chief outcaste groups and wild tribes have been carefully dealt with, the missionary has to work without one of his most helpful tools. Further, scholarly study of Hinduism has reached a point where further fruitful work will be exceedingly difficult until each of the great sects has been reliably described. The whole strength of Hinduism for fifteen centuries has lain in the great sects; so that no trustworthy estimate of the religion can be formed until they are well known. Thus for several years more we shall have to hunt for competent men and women to undertake each a much-needed volume.

A look into the future at this point may be pardoned. Even if our apologetic is as yet tentative and fragmentary, there is no need to be downhearted; we are gathering stores of material which are necessary for a really great apologetic; and we are trying many lines of approach to the Hindu. May we not say then with confidence that we are preparing the way for the great apologist who, we hope, is to come?

We next give, under each series, a list of books published, in the press, and being written, and thereafter an analysis of the whole list of writers:—

1. THE RELIGIOUS QUEST OF INDIA SERIES.

a. PUBLISHED.

Indian Theism	...	...	Dr. N. Macnicol.
The Heart of Jainism	...	...	Mrs. Sinclair Stevenson.
The Treasure of the Magi	...	...	Prof. J. H. Moulton.
Redemption: Hindu and Christian	...	...	Dr. Sydney Cave.
An Outline of the Religious Literature of India	...	...	Dr. Farquhar.

b. IN THE PRESS.

The Rites of the Twice-born	Mrs. Sinclair Stevenson.
-----------------------------	-----	-----	--------------------------

c. BEING WRITTEN.		
Hindu Ethics	...	Rev. John McKenzie.
The Religion of the Rigveda	...	Rev. Dr. H. D. Griswold.
Buddhism	...	K. J. Saunders.
The Vedanta	...	Rev. Dr. W. S. Urquhart.

II. THE RELIGIOUS LIFE OF INDIA SERIES.

a. PUBLISHED.		
The Village Gods of South India	...	The Bishop of Madras.
The Ahmadiya Movement	...	H. A. Walter, Lahore.
The Chamars	...	G. W. Briggs, Cawnpore.
b. IN THE PRESS.		
The Village Gods of South India (New edition)		The Bishop of Madras.
c. BEING WRITTEN.		
The Vaishnavism of Pandharpur	...	Dr. N. Macnicol.
The Chaitanya Sect	...	M. T. Kennedy.
The Sri-Vaishnavas	...	E. C. Worman.
The Tamil Saiva Siddhanta	...	Gordon Matthews.
The Vira Saivas	...	W. E. Tomlinson.
The Brahma Movement	...	Manilal C. Parekh.
The Ramakrishna Movement	...	J. N. C. Ganguly.
The Khojas	...	W. M. Hume.
The Malas and Madigas	...	The Bishop of Dornakal ; P. B. Emmet ; S. Nicholson.
The Dheds	...	Mrs. Sinclair Stevenson.
The Mahars	...	A. Robertson.
The Bhils	...	D. Lewis.
The Criminal Tribes	...	O. H. B. Starte.

III. THE HERITAGE OF INDIA SERIES.

a. PUBLISHED :		
The Heart of Buddhism	...	K. J. Saunders.
Asoka	...	Dr. J. M. Macphail.
Indian Painting	...	Principal Percy Brown.
Kanarese Literature	...	Rev. E. P. Rice.
The Samkhya System	...	Prof. A. Berriedale Keith.
Psalms of Maratha Saints	...	Dr. N. Macnicol.
Hindi Literature	...	Rev. F. E. Keay.
b. IN THE PRESS.		
The Karma Mimamsa	...	Prof. A. Berriedale Keith
Hymns of the Tamil Saiva Saints	...	Rev. Francis Kingsbury & Rev. G. E. Phillips.
c. BEING WRITTEN :		
Hymns from the Vedas	...	Prof. A. A. Macdonnell.
Mahayana Hymns	...	Prof. L. de la Vallee Poussin.
Translation from the Upanishads	...	Rev. F. J. Western.
An Introduction to Hindu Philosophy	...	Farquhar & McKenzie.
Sankara's Philosophy	...	A. K. Sharma.
Indian Architecture	...	R. L. Ewing.
Indian Music	...	H. A. Popley.
The Minor Arts	...	Percy Brown.
Indian Coins	...	C. J. Brown.
Life of the Buddha	...	K. J. Saunders.
Life of Akbar	...	F. V. Slack.
Hymns of the Bengali	...	E. J. Thompson.

Hymns of the Alwars	...	J. S. M. Hooper.
The Tulsi Das	...	G. J. Dann.
Sufi Hymns	...	{ Prof. R. Sirajuddin, Lahore and W. R. Wilson, Esq., I.C.S.
Bengali Literature	...	C. S. Paterson.
Marathi Literature	...	Nicol Macnicol.
Tamil Literature	...	Francis Kingsbury.
Telugu Literature	...	P. Chenchiah and Raja Bhujanga Rao.
Malayalam Literature	...	T. K. Joseph.
Sinhalese Literature	...	H. S. Perera.
The Syrian Christians	...	K. C. Mammen Mapillai.
Indian Folk Tales	...	W. Norman Brown.
Poems by Indian Women	...	Mrs. Macnicol.
Indian Temple Legends	...	K. T. Paul.

IV. WOMEN OF INDIA SERIES

Editors:—Dr. J. N. Farquhar and Miss Sorabji.

BEING WRITTEN:—

Hindu Women of Bengal	...	Mrs. W. S. Urquhart, Calcutta.
Punjab Village Women	...	Miss Bose, Asrapur, Amritsar Dist.

While our strength for the last ten years has gone into the effort to write well on the religions of India, we have also done a little in the way of purely Christian literature. The following are the most noteworthy publications:—

I. THE COLLEGE COMMENTARIES (FOR NON-CHRISTIANS)

1. Farquhar, The College St. Matthew.
 2. Young, The College St. Mark.
- A third is being written by Canon Holland, The College St. John.

II. THE INNER SHRINE (Devotional Booklets)

1. Walter, Selections from St. Augustine's Confessions.
2. Pearson, Selections from the Imitation of Christ.
3. Mrs. Stevenson, Songs of Pilgrimage.

III. A STUDENTS' LIFE OF CHRIST IS BEING PREPARED BY C. B. YOUNG OF DELHI.

ANALYSIS OF LISTS OF WRITERS.

- | | |
|--|---|
| a. ORIENTALISTS. | The Rt. Rev. the Bishop of Dornakal. |
| Prof. A. A. Macdonnell, Oxford. | |
| Prof. A. Berriedale Keith, Edinburgh. | e. MISSIONARIES. |
| Prof. J. H. Moulton, late of Manchester. | Rev. John MacKenzie, Bombay. |
| Prof. L. de la Vallee Poussin, Ghent. | Rev. E. J. Thompson, Bankura. |
| Dr. Norman Brown, Philadelphia. | Rev. J. S. M. Hooper, Madras. |
| b. THE CIVIL SERVICE. | Rev. G. J. Dann, Patna. |
| O. H. B. Starte, Esq., Bijapur. | Rev. Dr. Macnicol, Poona. |
| W. R. Wilson, Esq., Dera Ghazi Khan. | Mrs. Macnicol, Poona. |
| c. GOVERNMENT COLLEGE PROFESSORS. | Mrs. Sinclair Stevenson, Rajkot. |
| Principal Percy Brown, Calcutta. | Rev. Dr. Sydney Cave, Principal of Cheshunt College, England. |
| Prof. J. C. Brown, Lucknow. | Rev. Dr. Griswold, Lahore. |
| d. BISHOPS. | Rev. Dr. Urquhart, Calcutta. |
| The Rt. Rev. the Bishop of Madras. | Rev. George W. Briggs, Cawnpore. |
| | Rev. F. E. Keay, Jubbulpore. |
| | Rev. G. E. Phillips, Bangalore. |
| | Rev. Dr. J. M. Macphail, Bamdah Bengal. |

- Rev. E. P. Rice, formerly of Bangalore.
 Rev. F. J. Western, Delhi.
 Rev. Gordon Matthews, Coimbatore.
 Rev. W. E. Tomlinson, Gubbi, Mysore.
 Rev. P. B. Emmet, Kurnool.
 Rev. S. Nicholson, Cuddapah.
 Rev. A. Robertson, Poona.
 D. Lewis, Esq., Jhalod, Kathiawar.
 Rev. C. B. Young, Delhi.
 Rev. C. G. Pearson, Barisal.
- Y. M. C. A. SECRETARIES.**
 H. A. Popley, Madras.
 K. J. Saunders, Calcutta.
 C. S. Paterson, Calcutta.
 F. V. Slack, Calcutta.
 H. A. Walter, late of Lahore.
 M. T. Kennedy, Calcutta.
 E. C. Worman, Madras.
 W. M. Hume, Lahore.
- J. N. Farquhar, Calcutta.
 R. L. Ewing, New York.
- INDIAN AND CEYLONESE WRITERS.—**
 K. T. Paul, Calcutta, General Secretary of the Y. M. C. A.
 J. N. C. Ganguly, Calcutta, Y.M. C. A. Secretary.
 The Bishop of Dornakal.
 Prof. R. Siraj-ud-din, Lahore.
 Prof. A. K. Sharma, Patiala.
 Miss Bose, Asrapur, Punjab.
 Manilal Parekh, Rajkot, Kathiawar.
 T. K. Joseph, Trivandrum.
 Rev. Francis Kingsbury, Bangalore.
 K. C. Mammen Mapillai, Travancore.
 P. Chenchiah, Madras
 H. S. Perera, London.
 Raja Bhujanga Rao, Ellore.

THE ASSOCIATION PRESS.

“Association Press” is the Publication Department of the National Council, and contributes to the purposes of the entire Association movement by making available in India, at the lowest possible prices, good literature of ethical and religious value. It also imports and produces various types of publications of a more technical character, which are needed in Y.M.C.A. and allied work.

The agreement with the Oxford University Press has already been mentioned. The Association Press is also sole agent, with rights of reprinting and translation, for use in India and Ceylon only, for the publications of the Association Press, New York, which is the Publication Department of the International Committee of Young Men’s Christian Associations. Negotiations are being carried on with a view to establishing a similar relationship with the Red Triangle Press, London. The Press also holds the right, subject to a small royalty, to reprint publications of the British Student Christian Movement for circulation in India and Ceylon only.

The Association Press is treated by the National Council as a self-contained trading branch of its work and is aided from the general funds by an annual subsidy duly included in the Budget. A report of the policy of investment and of business done, with audited financial statements of all funds invested and entire stock held, is presented to the National Council each year.

An Editorial Committee, to advise the Press secretaries with regard to suggested publications, was appointed in 1919 and consists of the following secretaries: Dr. S. K. Datta, E. C. Worman, M. T. Kennedy, B. L. Rallia Ram, Dr. J. N. Farquhar and K. J. Saunders.

Two secretaries are in charge of the Press, N. R. Ghose and J. H. Waller. Mr. Ghose is in general charge of production, advertising, importing and office sales; Mr. Waller of publicity and promotion. To D. W. Peterson, who was in charge from 1915 until 1918, the Press largely owes its present sound condition.

An idea of the growth in the amount of literature produced by the Press since 1911 may be gathered from the following table of volumes printed per annum :

1912	6 books and pamphlets	13,000 copies
1913	9 " "	15,000 "
1914	12 " "	18,000 "
1915	9 " "	23,700 "
1916	25 " "	67,000 "
1917	35 " "	1,73,000 "
1918	31 " "	1,61,000 "
1919	42 " "	2,20,000 "

A large proportion of this increase was due to the fact that during the war, the Press produced large quantities of literature for Army Y.M.C.A. work in the various areas. Importations of books also increased in volume during the war; from October 1918 until September 1919, 3,24,276 English and vernacular books, magazines and pamphlets, of a value of Rs.1,07,934-2-9, were supplied to Army centres in India and overseas.

The value of stock on hand at the end of each year since 1914 was as follows :—

1915	...	...	10,413	14	6
1916	...	...	13,820	10	6
1917	...	...	18,517	8	4
1918	...	...	39,108	14	9
1919	...	...	55,269	14	0

A comparative statement of accounts from 1910 to 1919 is appended to this report (Appendix).

The following publications were issued by Association Press during the period under review :

1911

- Bombay Convention Souvenir.
- Christian Student and the Indian Church—Dr. S. K. Datta.
- How to Organize a Y.M.C.A.—B. R. Barber.
- Indigenous Expression of Christian Truth—C. F. Andrews.
- Letters of a Teacher—D. J. Fleming.
- Practical Service by Christian Students—D. J. Fleming.
- Primer of Hinduism (Indian Edition)—J. N. Farquhar.
- Secret Prayer Life—John R. Mott.
- Some Attempts at Social Service in a Ceylon School—K. J. Saunders.
- Suggestions for Student Camp Committees—F. V. Slack.
- Value of the Committee System—B. R. Barber.

1912

- Association Hymns.
- Buddhist Ideals—K. J. Saunders.
- Christ's Message of the Kingdom—A. G. Hogg.

Hymns for Student Camps.
 Kali Charan Banurji—B. R. Barber.
 Prayer—L. P. Larsen.

1913

Approach of Christ to Modern India—J. N. Farquhar.
 Civic Virtues—J. N. Farquhar.
 Constructive Suggestions for Character-Building (Indian Edition)—G. S. Eddy and J. R. Mott.
 Decision of Character—John Foster.
 Doubt—Suggestions for those having Intellectual Difficulties—(Indian Edition) G. S. Eddy.
 Personal Work—J. Krishnaswamy.
 Social Mission of the Church in India—D. J. Fleming.
 Social Study, Service and Exhibits—D. J. Fleming.
 Victory—Temptation and How to Meet It—G. S. Eddy. (Indian Edition).

1914

Eight Studies in Psalms—The Bishop of Dornakal.
 Faith of the Crescent—J. Takle.
 Faithfulness—L. P. Larsen.
 Intercessors: The Primary Need—John R. Mott.
 Life and Works of Jesus according to St. Mark—W. D. Murray.
 Morning Watch—(Roman Urdu)—Alex. McLeish.
 Prayer—L. P. Larsen.
 Pioneers—K. J. Saunders.
 Studies in the Book of Acts—G. S. Eddy.
 Studies in the Book of Acts—G. S. Eddy.
 Studies in the Pauline Epistles. Vol. I—G. S. Eddy.

1915

Awakening of Asia—G. S. Eddy.
 Constructive Suggestions for Character-Building—G. S. Eddy and J. R. Mott.
 Handbook of Work with Student Enquirers—H. A. Walter.
 India and Missions—V. S. Azariah (Revised Edition). Christian Literature Society and Association Press.
 Manhood of the Master—Harry Emerson Fosdick.
 On Some Painters of the Renaissance—Mrs. Sinclair Stevenson.
 Primer of Hinduism—J. N. Farquhar.
 Supreme Person and Supreme Quest.—Rev. R. A. Hume.
 Truth in a Nut Shell.

1916

Adventures of a Christian Soul—K. J. Saunders.
 Association Hymns.
 Awakening of Asia—G. S. Eddy.
 Bible Reading Calendar (Tamil).
 Bible Studies in the Book of Acts. (Tamil)—G. S. Eddy.
 Christ's Message of the Kingdom—A. G. Hogg.
 Constructive Suggestions for Character-Building—J. R. Mott, and G. S. Eddy. Nos. 1 and 2.
 Heart of Buddhism—K. J. Saunders, (Heritage of India Series.)
 Helps for the Tempted—Amos. R. Wells.
 High Emprise—Rev. R. A. Hume.
 Karma and Christianity—C. B. Young.
 Life and What to Live For—G. S. Eddy.
 Manhood of the Master—Harry Emerson Fosdick

Meaning of Prayer—Harry Emerson Fosdick.
Meaning of Prayer—Harry Emerson Fosdick. 2nd Impression.
Secret Prayer Life—John R. Mott.
Spiritual Awakening—Life and Lectures of Charles Finney.
Studies in Acts. (Marathi)—G. S. Eddy.
Supreme Person and Supreme Quest—Rev. R. A. Hume.
Upanishads and Life—Rev. W. S. Urquhart.
Village Gods of South India—Bishop of Madras.
 (Religious Life of India Series)
Zenith of Moral Power—Rev. R. A. Hume.

1917

Asoka—J. M. Macphail. (Heritage of India Series.)
Bible Study for Personal Spiritual Growth—Dr. J. R. Mott.
Christ in Every Day Life—E. I. Bosworth.
Christ's Uniqueness—J. H. Osmaston.
Doubt: Suggestions for those having Intellectual Difficulties—G. S. Eddy
How to deal with Temptation—Robert E. Speer.
Indian Painting—Principal Percy Brown. (Heritage of India Series.)
Jesus of History—Dr. T. R. Glover.
Maker of Men—G. S. Eddy.
Manhood of the Master—H. E. Fosdick.
Meaning of Prayer—H. E. Fosdick.
Morning Watch—Dr. J. R. Mott.
Paul in Every Day Life—Dr. John Douglas Adam.
Power of Crucified Love—J. H. Osmaston.
Power of Jesus Christ in the Life of a Student—Dr. J. R. Mott.
Rational Sex Life for Men—M. J. Exner, M.D.
Studies in the Pauline Epistles. Vol. II.—G. S. Eddy.
Suggestions for Social Service.—Edited by Rev. H. A. Popley.
Things that make a Man—R. E. Speer.

1918

Abundant Life—G. S. Eddy.
Ahmadiya Movement—H. A. Walter. (Religious Life of India Series.)
Challenge of the Present Crisis—H. E. Fosdick.
Compelled Men—Fred L. Pattee.
Facts and Meaning of Islam—H. A. Walter.
India's Place in the World—(Statistics).
Kanarese Literature.—Rev. E. P. Rice. (Heritage of India Series)
Life and Work of Jesus according to St. Mark.—W. D. Murray.
Manhood of the Master—H. E. Fosdick.
Meaning of Faith—H. E. Fosdick.
Jesus as a Friend Saw Him—Paul Super and Jay A. Urice.
Life's Clinic—Edith H. Hooker.
Medical Examination Cards.
Meeting the Master—Ozora S. Davis.
Personal Evangelism.—Messrs. J. H. Oldham, W. J. McKee and Miss Bertha Conde.
Practice of the Presence of God—Brother Lawrence.
Rational Sex Life—M. J. Exner.
Samkhya System of Philosophy—Prof. A. Berriedale Keith. (Heritage of India Series)
Secret Prayer Life—John R. Mott.

- Second Mile—H. E. Fosdick.
 Selections from Thomas A. Kempis' *Imitation of Christ*—C. G. Pearson.
 (Inner Shrine Series.)
 Selection from the *Confessions of St. Augustine*—H. A. Walter. (Inner Shrine Series.)
 Social Principles of Jesus—Walter Rauschenbusch.
 Thirty Studies about Jesus—E. I. Bosworth.
 Triangle Athletic Handbook—Compiled by Dr. J. H. Gray.
1. Major Games.
 2. Indian Games.
 3. School Compound Games.
- Victory or Temptation and How to Meet It—G. S. Eddy.

1919

- Bible Study for Personal Spiritual Growth—John R. Mott.
 Christian Church in the Roman Empire—T. R. Glover.
 Compelled Men—F. L. Pattee.
 Decision of Character—John Foster.
 Doubt—G. S. Eddy.
 Fight for Character—H. C. King.
 Friend or Enemy—M. J. Exner.
 How to Deal with Temptation—Robert E. Speer.
 How to Make the Bible Real,—John R. Mott.
 How to Find God—G. S. Eddy.
 Intercessors the Primary Need—John R. Mott.
 Jesus Christ a Reality—John R. Mott.
 Jesus of History—T. R. Glover.
 Life and What to Live For—G. S. Eddy.
 Makers of Men—G. S. Eddy.
 Manhood of the Master—H. E. Fosdick.
 Morning Meditation—A. G. Hogg.
 Morning Watch—John R. Mott.
 Nietzsche and the Superman—G. C. Walker.
 Physician's Answer—M. J. Exner.
 Power of Jesus Christ in the Life of a Student—J. R. Mott.
 Psalms of Maratha Saints—Nicol Macnicol. (Heritage of India Series.)
 Rational Sex Life—M. J. Exner.
 Secret Prayer Life—John R. Mott.
 Some Modern Facts about Alcoholic Drink—Franseau-Stoddard.
 Songs of Pilgrimage—Mrs. Sinclair Stevenson (Inner Shrine Series.)
 Soul Surgery—H. A. Walter.
 Spiritual Awakening—Charles G. Finney.
 Things that Make a Man—R. E. Speer.
 Victory—G. S. Eddy.
 Why We Believe in a Personal God.—H. E. Fosdick.

1920 (Until September 30th.)

- The Chamars—G. M. Briggs. (Religious Life of India Series.)
 History of Hindi Literature—F. E. Keay. (Heritage of India Series)
 Some Aspects of the Holy Communion—R. L. Pelly.

Besides these there have been twenty-two pamphlets and other pieces of miscellaneous printing, such as constitutions, report forms, prospectuses, etc. Catalogues have been issued at regular intervals.

The promotion side of the Association Press' work has suffered through the department being almost constantly understaffed, with the result that in comparison with the growth of business during the war, the present turn-over is neither so large nor rapid as it might well be. Until the Press can employ a man who will be able to give the whole of his time to this section of its work, adequate promotion cannot be expected. Advertisements are published in various religious and secular papers; consignments of assorted books are sent for exhibition and sale to student camps and other religious conferences and conventions; catalogues are distributed widely twice a year. At a Mela held in December, 1919, at the Eden Gardens in Calcutta, the Press had a very attractive display and did good business; likewise at the Welfare and Health Exhibition held somewhat later in the Calcutta Town Hall. During the year a Branch was opened at 86, College Street, Calcutta, and beyond a few minor displays, agencies have been established in the following cities:—

Allahabad—North India Tract and Book Society.

Benares—Wesleyan Missionary Society.

Bombay—Tract and Book Society.

Jubbulpore—Indian Sunday School Union.

Lahore—Punjab Religious Book Society.

Lucknow—Methodist Publishing House.

Madras—Oxford University Press (Wholesale) and the Christian Literature Society.

Nellore—Chambers' Hall Book Depot.

Poona—Scottish Mission Industries Co., Ltd.,

"The Heritage of India" and "Religious Life of India" series are displayed on railway bookstalls in many parts of India. To anyone ordering a copy of each English publication, or of any vernacular, or of both, to be sent by V.P.P. on publication, the Press gives a 25 per cent discount.

The publications in the "Heritage of India" and the "Religious Life of India" series have been regularly brought to the attention of educational authorities of Provincial Governments and Native States, with the result that some of the volumes have been officially recommended as library and prize books.

MAGAZINES

Three magazines have been published for varying periods:—

Kerala Yuvavu, The Inquirer, and The Young Men of India.

KERALA YUVAVU.—A Malayalam monthly journal intended for circulation on the west coast, was authorized in January, 1912, with a subsidy from the National Council of Rs. 100 - per

year. Later the amount was increased to Rs. 250/-. The magazine continued, under the editorship of Mr. I. Jacobi, until the end of 1918 when, because of largely increased costs it had to be discontinued. During the six years of its existence it had a steady circulation and was of very real help, especially to the number of small Associations and other similar groups along the Malabar coast.

THE INQUIRER.—A weekly, devoted to Christian apologetics, edited in Calcutta, has been in existence for several years, and at the beginning of the period under review was being ably edited by Mr. F. W. Steinthal, then one of the secretaries of the College Street Branch of the Calcutta Association. In 1912, owing to the absence from India of both Mr. Steinthal and Dr. Farquhar, and to the inability to find anyone to fill satisfactorily the Editor's place, the publication was suspended temporarily, with a possible revival after six months. By that time, however, Mr. Steinthal had resigned his connection with the Y.M.C.A. and the difficulty of finding a successor still continuing, it was decided not to resume publication. This decision, though necessary, was very regrettable, for the *Inquirer* had been of very genuine value, with its able and sympathetic answers to the questions of many men throughout India who were desirous of learning more about the Christian Faith.

THE YOUNG MEN OF INDIA.—The official organ of the Association movement, has continued its existence throughout the period. It is a monthly magazine which aims to record Association events and to treat public questions and subjects of moral and religious interest in a spirit of enlightenment and Christian leadership.

It has been edited successively since 1910 by A. C. Harte, E. C. Carter, K. T. Paul, W. Harvey Moore, F. V. Slack and Dr. S. K. Datta. Beginning the period with twenty-four pages monthly, it has been enlarged to sixty-four pages and has also been greatly improved in appearance and quality. A special expression of appreciation is due to Mr. Harte on this account, for it is to him that the magazine owes its new start in 1912.

The subscription price was increased in February 1912 from Re. 1-0-0 to Rs. 1-8-0 per year, with a special rate of 8 annas for Christian students. In December 1913 the rates were again increased to Rs. 2-0-0 and 12 annas respectively, and in 1914 to Rs. 3-0-0 and Re. 1-0-0. In 1916 the cost of production was 5 annas per copy. The rate for students was extremely low, the subscription price paying little more than the cost of postage. In spite of these low rates, the magazine became self-supporting for the first time in its history, in 1914, this being made possible by the increased number of advertisements, and the fact that nothing was charged to its account for editorial work or for handling. In 1915 a subsidy of Rs. 1000 was necessary. The

year 1916 was better, but during the following year, because of the tremendous increase in cost of production, (the cost of printing in 1916 was Rs. 3,915-12; in 1917, Rs. 7,420-5), a subsidy of Rs. 1,250 was necessary. In 1918, there were specially heavy costs for promotion, so a subsidy of Rs. 1,400 was given, in addition to which there was a deficit at the end of the year of Rs. 438-15-1. The year 1919 saw a shrinkage in subscriptions of Rs. 1,791 below the 1918 figure, (during the War the magazine was used widely in Army Branches and in publicity work; 1919 marks the end of that situation) and an increase in printing charges of Rs. 1200 over 1918. Consequently in spite of a subsidy of Rs. 1100 there was a deficit of Rs. 2,318-7-11 at the end of the year.

The following table gives the figures for receipts from advertisements and the number of copies printed for each year since 1911 :—

	Receipts from advertisements.	Number of copies printed.
1911	Rs. 232 5 0	
1912	820 7 0	19,000
1913	1118 11 0	20,650
1914	1558 1 7	20,600
1915	2099 3 5	20,500
1916	2342 9 9	20,700
1917	2374 14 10	20,400
1918	2903 3 0	19,800
1919	2515 1 0	18,600

The circulation has thus averaged about 1700 per month.

Receipts from subscriptions and expenditures on printing and postage during the period were as follows :—

	Receipts	Expenditures.
1911	736 11 0	2384 12 3
1912	1223 3 0	4000 6 3
1913	1693 8 6	4626 4 3
1914	3646 13 11	4910 8 4
1915	1903 9 0	4722 10 0
1916	3066 9 2	5415 13 5
1917	5436 15 2	8993 15 9
1918	4692 8 6	8064 5 3
1919	4272 8 4	9215 4 3

IX. PHYSICAL DEPARTMENT.

Games and sports have been one of the prominent features of Y.M.C.A. work in India and Ceylon for many years, but it was not until 1908 that the broad modern programme of physical education and welfare, as typified by the work of the specially trained "Physical Director," was inaugurated. In the autumn of that year Dr. J. H. Gray was brought to Calcutta from America to pioneer this work, one third of his budget being provided by the Calcutta Association, one third by a few citizens of the city and the remainder by the Government of Bengal, to whom he acted as Advisor in matters relating to physical education. The first years had to be spent in demonstrating just what was meant

by physical education, a process fairly well completed, so far as Calcutta was concerned, by the beginning of 1911. By that time, also, one Indian Physical Director had been trained, Mr. P. K. Biswas of Calcutta.

As Dr. Gray's work became more widely known there began to come requests from other Governments, so that the beginning of 1914 saw the Imperial Government, and the Madras and Punjab Governments, in addition to Bengal, sanctioning substantial grants for the extension of the physical work through the Y.M.C.A.

At the end of 1913 Dr. Gray was made National Physical Director, being succeeded in Calcutta by Dr. C. P. Segard. Mr. C. R. Webster was posted to Bangalore, but with the outbreak of the war was transferred to other work. In 1914 the Bombay Association engaged the full-time services of Mr. Donald Munro. In 1915 Messrs. J. S. Robson arrived for work in Lahore, A. G. Noehren for Madras and H. G. Beall for Hyderabad, H. H. the Nizam's Government having also sanctioned a grant and the Australasian National Committee having contributed as well.

By December 1916 the following staff of Physical Directors was at work :—

J. H. Gray	...	National Physical Director.
J. Alexander	...	Madras Association for training.
P. A. Bassinger	...	Jubbulpore Association.
H. G. Beall	...	Hyderabad Association and H. E. H. the Nizam's Government.
P. K. Biswas	...	College Street and Boys' Branches, Calcutta.
R. W. Cammack	...	Colombo Association.
L. Hoxsey	...	Bangalore Association.
G. Law	...	Allahabad Association.
D. Munro	...	Bombay Association.
J. I. Muthiah	...	Lahore Association.
A. G. Noehren	...	Madras Association and Madras Government.
J. S. Robson	...	Lahore Association and Punjab Government.
W. Sarcka	...	North Calcutta Association.
E. E. Saunders	...	Trivandrum Association.
C. P. Segard	...	Calcutta Association and Bengal Government.

Of these, Messrs Cammack, Hoxsey, Law, Sarcka and Saunders were short service men who came in connection with the Army work. They were, therefore, able to give only brief periods to the physical work.

This list represents the high-water mark of physical directors during the period. Within the next two years Messrs. Alexander and Bassinger left the Association, Dr. Gray went on furlough, Mr. Sarcka was succeeded by Mr. P. B. Means who also returned to America at the end of 1918. Dr. Segard went on furlough not to return. Mr. Robson was forced to return to America on account of the death of his wife.

In September, 1919, Messrs. H. C. Buck, E. C. Earl and W. D. Healy arrived and were assigned respectively to Madras, Lahore and Rangoon, a grant having been sanctioned by the Burma Government in 1917.

The following physical directors are now on the staff (September 30, 1920):—

A. G. Noehren	...	National Physical Director and Advisor to Madras Government.
H. G. Beall	...	Hyderabad Association and H. E. H. the Nizam's Government.
P. K. Biswas	...	College Street and Boys' Branches, Cal.
H. C. Buck	...	Madras Association.
E. C. Earl	...	Lahore Association and Burma Government.
W. D. Healy	...	Rangoon Association and Burma Government.
J. I. Muthiah	..	Bangalore Association.
W. M. Zaccheus	...	Assistant in Madras.

Together with this decrease of staff, which will be further accentuated in the spring of 1921 by the departure on furlough of Messrs. Noehren and Beall, the Department is faced with increasing demands for service. The Calcutta Association needs a physical director for its entire work and an additional man for North Calcutta. Bombay and Colombo also need men. Moreover the Governments of Baroda, Central Provinces, and Bihar and Orissa have requested that the Y.M.C.A. provide men under conditions similar to those of the other Governments. The staff situation of the Department is genuinely perilous and can only be met by the speedy securing of more men from abroad—a very difficult matter—and the adequate training of Indians, Burmese and Ceylonese.

TYPES OF WORK DONE.—The work done in connection with the various Governments has consisted of lectures and demonstrations in the schools and at Training Colleges; training classes for drill-masters, of whom hundreds have been thus trained; school inspection of hygienic and sanitary features and physical activities—meeting the problem of the weak boy with no desire for exercise, improving gymnastic drill methods and apparatus work, introducing purely recreative programmes and stimulating interest in physical training; standardizing of school athletics, and the framing of standard physical efficiency tests for Indian boys; inspection tours and miscellaneous advisory duties to Government. Special services have also been rendered from time to time, *e.g.* advising as to physical welfare facilities at the Dacca University, testifying before the Calcutta University Commission on physical education and welfare in colleges. Physical training drill text-books in English and Urdu have been produced for the Bengal and Madras Governments.

Assistance has been given to various municipalities in connection with the initiation and development of public play-

grounds, notably in Calcutta, Madras, Colombo and Hyderabad. Several notable exhibitions have been carried through, by way of demonstrating the possibilities of mass play and of giving adequate and enjoyable exercise, not merely to a few picked boys, but to large numbers who have no special inherent capacity along these lines.

The Department has also been able to render aid to Mission Schools by means of special training classes during holiday seasons. Twice at Mahableshtar, once at Sat-Tal and once at Hyderabad, such classes have been conducted with from seventeen to fifty in attendance.

Inter-school athletic associations have been organized at Hyderabad and Secunderabad. Service has also been rendered to a great variety of athletic organizations. For some years Dr. Gray acted as Honorary Secretary of the Bengal Presidency Athletic Sports Meet and in Bombay the Association has conducted a sports meet open to all parts of the Bombay Presidency.

In the regular physical department activities of the Y.M.C.A. itself emphasis has throughout been laid on encouraging regular habits of normal, recreative exercise among the rank and file of the membership through gymnasia, swimming, out-door games, individual physical examinations and the prescription of corrective exercises, and general instruction in personal physical welfare. In the Calcutta Student Hostel Playground much has been done toward the solution of the problem of providing adequate opportunity for exercise to student communities living in the midst of a congested city. The various members of the staff have been able, in their personal relationship to a large number of students and others, to impart wise and much needed education and advice in matters of sex. Particularly in Lahore and Madras a study of indigenous games has been carried on with a view to adapting them to the requirements of schools and group physical work. In Hyderabad investigations have been carried on as to the relation of the weight and height of boys to athletic achievement. Many demonstrations of mass play and physical training have been given in various parts of the field. Some inter-high school track and field meets have been held; also inter-collegiate tennis tournaments and other similar activities. Some of the local Associations, notably Lahore, Calcutta, Madras and Colombo have engaged in the International Hexathlon contests.

Mass games and athletics were conducted for Burmese and Indian troops at Secunderabad, weekly parades being ordered by the regimental O. C's. As many as 900 and 1300 men were engaged in sports at one time. Athletic meets and games tournaments for British troops have also been conducted in Hyderabad and Bangalore.

There are at present among the local Associations reporting on this department of work, 12 gymnasia, 144 courts of various kinds—tennis, badminton, volley-ball, basket-ball, etc.—, and 20 athletic fields.

The outstanding problem of the Physical Department is the training of Indian, Burmese and Ceylonese physical directors. Only so can the great opportunities for service in this aspect of life be met. Foreign physical directors can never be secured in sufficient numbers, even if that were desirable. Adequate plans must be made for all such training which can possibly be secured in India and Ceylon: even then it will be desirable for at least some years to send picked men abroad for additional study. The beginnings of a school of Physical Training were made in August, 1920, in Madras under the leadership of Mr. Noehren and Mr. Buck. Five men are under instruction in the following subjects: Principles of Physical Education, Methods of Physical Training, Play and Playgrounds, Anatomy, Physiology, Hygiene, First Aid to the Injured, and Sex Hygiene. The National Council have provided the necessary funds.

X. RAILWAY AND INDUSTRIAL DEPARTMENT.

The work in Jamalpur, where the Railway Institute is managed by the Y.M.C.A., has continued throughout the period with the East Indian Railway Company providing Rs. 3000/- per year for the support of the Secretary. During the war emergency conditions made necessary frequent changes of staff, as in many other departments.

In the latter part of 1913 an arrangement was entered into with the Tata Iron and Steel Company at Sakchi, for the management of the Institute for European employees. The Company met the expense involved and the National Council loaned a secretary who served under a local Committee appointed by the National Council as a General Committee of Management. About a year later the arrangement was renewed and continued until June, 1915, when it was reported that as a result of a change in the management of the Company, the authorities were not giving the Secretary the same degree of support that was accorded formerly. It was therefore decided to withdraw from Sakchi.

On May 31st, 1919, the National Council sanctioned the opening of Industrial Welfare work in the Empress Mills, Nagpur, for an experimental period of one year on lines agreed upon with the management of the Mills, who were to furnish Rs. 10,000/- to cover the estimated expenditure. At the end of the year the exact relationship between the Mills and the Y.M.C.A. was to come up for revision. By the end of the year a staff of three secretaries was at work and a new agreement has been entered into for a further period, with a local Committee of Management,

half representing the Mills and the rest the Y.M.C.A. Educational work, institutes, games, sports and other similar activities are carried on.

One other piece of industrial work should be mentioned. A Workingmen's Institute was established by Government at the Salt Depot, Madras, to provide wholesome and cheap food, amusement and recreation, as counter attractions to the common evils prevailing among the working classes, especially drinking. Government provided equipment and buildings at a cost of Rs. 14,000/- and asked the Madras Y.M.C.A. to assume the responsibility of management, supplying a full-time secretary. This has been done and the Institute is now in active operation.

XI. RELIGIOUS WORK DEPARTMENT.

From the very beginning of Y.M.C.A. work in India, Burma and Ceylon it has always been held by the responsible bodies, both local and national, that the religious aim and emphasis should be chief among the objects of the Association. Bible classes, devotional and evangelistic meetings, the annual Week of Prayer, individual efforts to win men and boys to see in Jesus Christ their personal Saviour and Lord, were the inspiring elements of all the work. Secretaries came into it with deep spiritual motives under the dominance of Jesus Christ as Lord and Saviour.

In many of the smaller Associations, particularly, the distinctively religious work continues to occupy practically the entire attention. With the development, however, of other aspects of the three-fold aim of the Association, the religious work as such has not received the proportionate amount of attention that was formerly given to it. There is, indeed, good reason for affirming that the bulk of work done along religious lines is not less than formerly, but it is undoubtedly true that other phases have developed to a much greater extent during recent years. The Movement of course aims to have every phase of its activity inspired by moral and spiritual power, and adheres to its repeated insistence on the real sacredness of all that is wholesome and good in life. And yet it must be confessed that there has been a decided shifting of the distinctive emphasis on religious work, as such, as the centre of the Movement's interests. The development of economic service in the Rural Department and of social service generally and, in particular, in the Army Department during the war, has paralleled the marked shifting of outstanding interests in the educated life of the entire field during the past ten years. Many people who have during the past five years especially, been deeply interested in the work of the Y.M.C.A. have been attracted by these so-called "non-religious" aspects of its work : they have given their money and time to those aspects. Undoubtedly much good work harmonious with Christ's own life

of service has been done and large numbers of those engaged in it have been inspired by His spirit in it. Definitions have been broadened, conceptions of Christian service widened, contacts with the true source of all unselfish service deepened. But the solid "spade-work" of quiet, steady and enlarging spiritual contacts with men has not kept pace with the other developments.

On January 1st, 1911, the Rev. B. C. Sircar, formerly secretary at the College Branch, Calcutta, was made field secretary for Bengal with special reference to evangelistic work. Later Mr. Sircar was in such frequent request for special evangelistic work in other parts of India that he was made a national evangelistic secretary, in which position he has been doing most effective work ever since.

At the end of 1910, Mr. R. A. Hadley arrived in India to take the post of Bible Study Secretary left vacant a few years before by the departure of Mr. H. J. Keith. Mr. Hadley remained for three years, of which period he spent two-thirds in language study, carrying on certain minor duties meanwhile. Unavoidable circumstances prevented his return after furlough and the post has not since been occupied.

In March, 1913, Mr. George S. Ingram became Honorary Secretary of the Mission Study Department, which already owed much to his zealous interest, and continued until 1916. Mr. J. G. Harley, formerly student secretary in Lahore, was called in 1914, being then on furlough, to the secretaryship of the department and had accepted when the war broke out and he was unable to come. The post lapsed and has not since been occupied.

Special series of evangelistic meetings under the leadership of Dr. John R. Mott and Dr. G. Sherwood Eddy, were held in Colombo, Madras, Bombay, Lahore, Allahabad, Calcutta and Rangoon, in the cold season of 1912-13, which were specially related to the student communities and entirely under the direction of the Y.M.C.A. Again, in 1915-16, Dr. Eddy and Mr. F. N. D. Buchman made another visit to work in co-operation with the churches in an evangelistic campaign started by the South India United Church, and which resulted in an awakening of the Indian church to a sense of its evangelistic responsibility and power. A month was also given to evangelistic work in North India, under the Association, and five united conventions were held in Travancore—at Kunnankulam, Kottayam, Tiruvalla, Mavelikara and Kottarakara—under the auspices of the Y.M.C.A., at which a total of 200,000 people were present. One result was the initiation by the Mar Thoma Syrian Church of a forward movement through the whole church to deepen the spiritual life, reorganize its finances and make the church more of an evangelistic and missionary force for the whole of India.

Largely as a result of this visit and by the kindness of the

London Missionary Society and the International Committee, the National Council were able, in July 1916, to appoint the Rev. H. A. Popley, to whom the South India United Church had committed much of the responsibility for the evangelistic campaign, as National Evangelistic Secretary. Mr. Popley gave a great deal of his time in the first two years to the development of the Evangelistic Forward Movement in connection with the Madras Representative Council of Missions and was asked by the National Council to submit a scheme consolidating the evangelistic campaign work of the Council in different parts of India. With Mr. Sircar, Mr. Popley arranged for the services of Messrs. B. Bhaskare, John Devadoss and T. P. Chandy, all association secretaries, to be added to the Department and also secured the co-operation of the Rev. E. Stanley Jones of the Methodist Episcopal Church in special evangelistic work among educated Indians, a form of work in which he had specialized with notable results. During the following years, these men rendered very acceptable service to the churches in all parts of India, in occasional meetings, special campaigns, and in helping to train in evangelistic work the rank and file of members of the churches.

In 1918, Mr. Popley organized in Madras a Summer School of Lyrical Evangelism in order to help preachers to utilize better their musical talents in presenting the gospel to non-Christians. Twenty-two students were sent by ten different missions and churches.

In January, 1919, Dr. Eddy arrived for his third visit during the period under review, again working very largely in connection with the churches. Mr. Popley was again in executive charge of the preparations and carrying through of the campaign. The other secretaries of the department also co-operated, as well as a large number of Associations in the different places visited, such as Lahore, Allahabad, Calcutta, Poona, Madura, Bombay and Travancore.

Meanwhile, a number of the regular secretaries of the Y.M.C.A. were becoming increasingly concerned over the general situation as regards religious work inside the Associations themselves. At the annual conference of secretaries (a body with no executive authority but representative of what may be termed the "expert" opinion of the Movement) in 1918, those present from different local Associations all over India came to the unanimous conclusion that increased emphasis should be placed on the religious work of the Association. This need was felt to be so insistent that they requested the National Council to set aside a secretary who should devote his time to the study of the problems and methods of religious work. They also appointed a commission of experienced secretaries with a view to formulate for submission to the local Associations and the National Council a policy for the future religious work of the Association, asking

the commission to confer with representatives of the Church, outside the Association, before making definite recommendations. The Conference also expressed its convictions on the following subjects:—

1. Religion is the fundamental underlying stratum of all Association work and as such is related to all departments of Association activity. The Association is "a Christian brotherhood seeking to build Christian manhood," which must remain dominantly religious in its aim. Its one supreme purpose is to win young men to Jesus Christ: to inaugurate a religious programme adequate to the realization of that aim, through religious education, Christian service, full and hearty co-operation with the Church and other organized efforts in the realm of social and religious endeavour for the promotion of the ideals of the kingdom of our Lord and Saviour Jesus Christ.

2. Recognizing the Church as the supreme agency in the promotion of the religious life, the Association reaffirms its loyalty to the Church; intends that all its activities shall be used to the extension of the influence of the Church; seeks to supplement, not to duplicate, the work of the Church by putting emphasis on activities which the Church may not be able to develop; to point men to the Church and to lead them into any branch that they may prefer.

3. It is the duty of the Association to help the churches in all possible ways in fulfilling their evangelistic aims. The Association's distinctive part is: (1) inside its own membership, through Bible classes and personal relationships, to lead educated young men into the fellowship of the Church and not to allow the Association to become a substitute for the Church; (2) to present the claims of Christ to the educated classes generally; (3) to stand whole-heartedly for an evangelism which links itself to the religious past of India and utilizes the wealth of India's religious history in its presentation of the gospel.

4. The special development of Bible study as a most effective means of leading men to the knowledge of Jesus Christ and the development of Christian character.

5. The responsibility to secure recruits for Christian leadership should lead the Association to unselfish co-operation with the Church in bringing before men the challenge of the various Christian callings.

6. The recruiting and training of secretaries is a most vital problem. All candidates should have genuine Christian character and a real desire for service in the Y.M.C.A. for a period of years. The facilities for training should guarantee the preservation and growth of the candidate's religious experience and train him in the common types of religious leadership which are expected of an Association secretary. There should particularly be careful

instruction and practice in the common forms of religious leadership, *e.g.*, Bible class leadership, personal work and leading in public prayer.

The Commission presented its report at the 1919 Secretaries' Conference and after full discussion it was again urged that special emphasis be given to the religious work objective and the National Council was again asked to set aside a man for this special work. Certain difficulties raised by the war work and in the relationship of the Association to the Church led the Conference to appoint a second Commission, very representative of all parts of India and of different types of work, to make a survey of the religious work now being done by the Associations in India, to ascertain the opinion of church leaders in regard to the religious work of the Association, and to study the religious work policy of the Association in other lands.

The report of this Commission was presented to the 1920 Conference. Its investigations were conducted through personal enquiries in various Associations by members of the Commission, by a detailed questionnaire submitted to all of the general secretaries in the field, through correspondence with 100 representative missionaries and through personal contact with Indian leaders of the Church. It also had at its disposal the experience of the travelling secretaries who knew most of the local Associations intimately. A brief summary of the report is here given.

1. WORK AMONG EUROPEANS AND ANGLO-INDIANS (CIVIL AND MILITARY).—Very little religious work is being done: a few Bible classes, several Sunday evening meetings of more or less religious significance; secular activities not highly flavoured with Christian ideals.

During the war the necessity of keeping men happy, contented, and physically fit led to the placing of too great emphasis upon the secular side of the programme; secretaries have been slow to adjust themselves to the changed conditions.

Most secretaries realise the deficiencies of the religious work as evidenced by their use of every sort of apology and their eagerness to seize upon every occasional meeting that could possibly be credited to the religious programme; but the institutional activities draw so heavily upon their time and resources that the religious side is neglected.

2. WORK FOR NON-CHRISTIANS.—About half of the Associations reporting have Bible classes attended by non-christians; 70 per cent have Sunday meetings but the attendance of non-christians is generally small, with certain notable exceptions; 60 per cent conduct discussion groups; 50 per cent attempt social service, but the participation of non-christians is very limited; three Associations conduct comparative religion study groups, Christian literature is meagrely used; few co-operate with

non-christian organizations that are working for the uplift of India; most co-operate with the pastors in street preaching and in the Evangelistic Forward Movement.

Aside from this last effort the programme of work for non-christians is generally inadequate. Chief emphasis should be laid on co-operation with church agencies, but not to the exclusion of the Association's teaching function in the Bible class, religious meeting, personal interview and common service. The work, with few exceptions, bears evidence of too little careful planning: the reports indicate intermittent and spasmodic effort. By neglecting service and co-operation in community affairs the Association fails to win the confidence and good will of men who otherwise would respond to effort made for them and who in turn would be a source of strength to the Association.

3. WORK FOR CHRISTIANS.—Twenty-two Associations report a Christian membership of about 2,500, among whom there are the following activities:—

- 55 Bible classes, some of which have non-christian members.
- 33 Christian members leading classes in the buildings
- 53 Christians leading classes outside the buildings.
- 16 Prayer groups, apparently including hostel and secretaries' prayer meetings.
- 2 Social service study groups.
- 5 Evangelistic bands.
- 23 Weekly religious meetings.
- 12 Associations conduct special religious meetings.
- 3 Associations emphasise personal interviews.
- 1 Bible Teachers' Training Class.
- 3 Classes for boys.
- 106 Christians doing social work outside the building, chiefly relief work of a temporary nature.
- 2500 (Approximately) religious books in libraries of which about 1,250 were used during the year. Only two Associations report a total issue of more than 25 per cent of the library totals.

Practically all Associations report some religious magazines, but the general grade is very low.

Associations are assisting the pastors in the following ways:—

- 7 conduct Bible classes,
- 12 give lectures,
- 5 conduct boys' clubs,
- 16 supply preachers,
- 9 supply office bearers,
- 9 join in general activities such as Christian Endeavour meetings, Sunday-schools, etc.

Very little effort is being made to acquaint the Christian community with the best Christian literature.

The Association has failed to make progress in religious work commensurate with that of other phases of activity. The meagre reports and the confessions of secretaries amply justify this statement. Work for Christians, while more extensive than

that for non-Christians, lacks plan and objective. Most Associations are omitting the essentials of a growing religious work, namely, prayer, training, and plan. Co-operation with the Church, while encouraging, needs renewed emphasis.

4. **CHURCH RELATIONSHIPS.**—These are admittedly not what they should be, though criticism is much more prevalent than constructive suggestion. There is a general feeling that a gulf exists between the Y.M.C.A. and the Church. This is due to a variety of causes, among which are the following:—

(1) Some missionaries, accustomed to control all agencies that deal with their young men, see in the Association an attractive organization which enlists their young men in membership and activities but over which they have no control.

(2) The Y.M.C.A. is charged with taking men from the ministry and other forms of mission work by offering attractions, chiefly higher salaries, beyond the reach of the Church, thus hindering the best development of the Indian Church. (It is admitted that the Indian ministry is low in standard and sadly underpaid.) Other reasons for men serving in the Y.M.C.A., rather than in the Church, are thus stated: less personal sacrifice required; more freedom and less control; liberal terms of training in America; more responsibility; better social position; work easier; a free and irresponsible life; more showy; no theological tests; can begin without training; more real brotherhood.

(3) Most missionaries feel that the Y.M.C.A. emphasis is on the social side rather than on the distinctly religious.

(4) The Indian minister, especially in small centres, often looks upon the Association as an unnecessary organization since it has the same men in it that he has in his midweek prayer meeting and his young people's society. Within the Church he controls them, but in the Association he sees them doing things with which he has little sympathy and over which he has no control.

(5) Lack of realization, on the part of secretaries, of the need for thoughtful consideration of the point of view of those outside the Association.

The Commission made definite suggestions as to the correcting of the present difficulty and outlined a programme of general religious activity, ending with a renewed appeal to the National Council for the appointment of a National Religious Work Secretary.

In September, 1920, the National Council approved the creation of a Religious Work Department, on the following plan:—

RELIGIOUS WORK DEPARTMENT:—

I. Association Branch—whose objects shall be—

1. To stimulate and conserve the religious emphasis in all Association activity.

2. To assist local secretaries in outlining and inaugurating programmes of Religious Education. This implies special effort along the line of Bible study, social study, religious meetings, personal interviews, etc.

3. To train effective leaders among the Association members for work in the Association and the Church.

4. To secure the production and distribution of new religious literature that may be necessary, and to co-operate in the distribution of existing literature.

5. To assist local Associations in securing suitable religious books and magazines for libraries and reading rooms.

6. To assist where necessary in arranging such programmes of service as may give expression to the religious work of the Association.

7. To serve as a clearing house for the latest and best methods of religious work for men and boys, and to keep secretaries informed of these methods.

II. EXTENSION BRANCH—whose objects shall be—

1. To carry on the evangelistic work of the Association.

2. To help in organizing co-operative evangelistic efforts among the churches.

3. To assist the churches in the conservation of the results of such evangelism.

4. To produce and distribute such literature as may be necessary for these purposes.

5. To help the churches in carrying out a social work programme.

6. To arrange for the services of experienced evangelists to be at the disposal of the churches.

7. To assist the churches in co-operative efforts in continuation training of pastors and other Christian workers, and in the promotion of Lyrical Training Schools.

It is understood that there will be the closest co-operation between the two branches of the Department.

Mr. H. A. Popley was appointed secretary of the Extension Branch and Mr. E. C. Worman was invited to become secretary of the Association Branch.

XII. RURAL DEPARTMENT. ✓

On 15th December, 1913, Mr. K. T. Paul, who had been appointed one of the National General Secretaries with special reference to plans for the development of work among rural communities, presented to the National Council a memorandum recommending the organization of Rural Young Men's Christian Associations on the lines of registered Co-operative Societies, and through them to (1) foster habits of prudence and thrift; (2) increase the earning power of the villager by making available the recommendations of Government experts in agricultural and cottage industries, and by procuring from the financing Co-operative Banks the necessary capital at a cheap rate of interest; (3) enrich the social side of village life by means of *bhajan*s, excursions, and festivals such as are suited to villagers; and (4) attend to their physical culture by providing facilities for healthy and cheap Indian sports and gymnastics. The activities were to be under the guidance of district secretaries who would be given the necessary training in the Co-operative Societies' Department of Government and in an Agricul-

tural College. It was suggested that a beginning be made with three such district secretaries in 1914, the work to be increased as rapidly as experience would warrant. The start was to be made in South India and the cost of the three districts for 1914 was estimated at Rs.4,500.

After detailed consideration of the Memorandum, the Executive Committee decided that the work was necessary, a legitimate sphere for the Y.M.C.A., and likely to meet with support from Government. It was voted to take on S. Manuel at once for the first district, but that before further steps were taken, efforts to ensure financial stability should be made. Definite assurance was to be asked from missionary societies up to one-third of the cost and the County Work Department of the International Committee was to be asked to contribute two-thirds of the budget the first year, one-half the second and one-third the third. The latter plan was not carried out.

In February, 1914, a budget of Rs.2,550, later increased to Rs.3350, was adopted for the year and three secretaries, S. Manuel, D. Swamidoss and D. Gnanasundram were appointed as from May 1st. On that date all went into training in the office of the Registrar of the Co-operative Credit Societies, Madras, and at the end of three months were assigned to work in Malabar, Ceded Districts and Salem-Coimbatore, respectively. In January, 1915, two additional secretaries, I. Isaiah and S. Thiruvengadiah, were appointed as from May 1st, 1915, on condition that additional funds were secured to cover the extra expenditure. From the beginning it was proposed to develop in the various districts local Boards which would act in a manner somewhat (though with necessary alterations) analogous to Boards of Directors in ordinary Associations. One such District Board was created on a tentative basis, at Erode in June, 1915, and as a result of experience gained there and elsewhere the following plan was finally worked out and approved by the National Council in 1919.

OBJECTS :

1. To arrange for effective supervision of the Y.M.C.A. Co-operative Societies in the District.
2. To organize new societies.
3. To develop the work of societies and unions.
4. To direct the work of the Rural Secretary and help him in his comprehensive programme of service.

CONSTITUTION :

(All members must satisfy the conditions of active membership in the Y. M. C. A.)

1. Representatives of missions and church organizations which contribute to the funds of the District Boards.
2. Representatives of the affiliated Unions, elected by the Unions.
3. Co-opted members from among the panchayats of one or more isolated societies which cannot be organized into unions.
4. Nominees of the National Council, Y. M. C. A., so long as it gives a grant.

5. The Rural Secretary as Secretary of the Board.

FUNCTIONS :

1. Organization of new Co-operative Societies.
2. Promotion of organization of unions for purposes of supervision.
3. Arrangements for supervision of isolated societies.
4. Safeguarding interests of the Christian Central Bank and the recommendation of loans to affiliated societies.
5. Periodical surveys of the field with a view to securing lines of advance.
6. Promotion of other Association activities as opportunities offer.
7. Employment and supervision of the work of the Y.M.C.A. secretary.

FUNDS :

1. Contributions from missionary and church organizations.
2. Contributions from affiliated Unions.
3. Fees from Societies directly supervised by the Board.
4. Contributions from Christian Central Bank toward the work of supervision.
5. Donations from individuals.
6. Grants from National Council, if necessary.

GENERAL :

1. Area of operation to be determined by the National Council in the first instance and subsequent alterations to be made in consultation with the District Board.
2. The National Council to undertake to recruit and train secretaries and to provide expert advice to the District Board regarding programme and finance.
3. Any National Council grant-in-aid is to be on a sliding scale.
4. The Rural Secretary to be under the direction of the District Board as regards all his work. The National Council to determine his salary. Conditions of service to be as agreed upon between the National Council and the District Board.
5. Each District Board to frame its own rules provided they do not contravene the principles of this Constitution.

At the end of the first twelve months of work twelve Rural Co-operative Societies in connection with the London and Basel Missionary Societies had been registered, of which six were in the Ceded Districts, with a borrowing power of Rs.11,000-0-0 and benefitting a community of 1200 people. It had become perfectly clear that the number possible was limited only by the available funds for financing. An effective point of contact had been established with the villagers through this economic service.

Early in the development of the Department the need was manifest for larger funds available for the Christian societies which could not, for various reasons, secure sufficient from the already existing agencies. Plans were set on foot, largely on the personal initiation of Mr. Paul, for the creation of a Christian Central Co-operative Bank which was finally started in October, 1916, at 22, Popham's Broadway, Madras, with the object of lending money to Christian Co-operative Credit Societies. It works on a limited liability system, borrowing money to the extent of eight times its paid up share capital and reserve. Neither the Y.M.C.A. nor any

Y.M.C.A. secretary has any official connection, *i.e.*, as a paid officer, with this Board, which is an altogether independent body.

The Department steadily expanded year by year, but was confined to the South until early 1918 when work was begun in Punjab, at Martinpur, District Gujranwala, in connection with the United Presbyterian Missionary Society. Mr. Hira Lal was the first secretary. Somewhat later in this year secretaries were stationed in the United Provinces.

In 1918 also there was added to the staff the first men to give full time attention to developing cottage industries. This was Mr. I. Washington a trained weaver, who after carrying on work in several villages has started a class in weaving at Jammalamadugu, on a two-year course intended to enable the pupils to pass the elementary and intermediate Government Examinations in weaving.

Through the generous kindness of Sir Daniel Hamilton, a beginning has been made in developing the fruit growing industry. One orchard is now being planted at Panyam.

A report printed early in 1919 shows the results of the first five years of work, as follows:—

The number of secretaries has increased from three to twenty-three; Co-operative Societies from five to 110; membership from 200 to 4,000; the working capital of societies from Rs. 5,000 to Rs. 1,50,000. All the secretaries are trained in co-operative work, four in agriculture, one in weaving, and one in sericulture. The following definite results achieved may be of interest:—

Several individuals and families are now free from the hands of money-lenders; small areas which have been lying fallow are now brought under cultivation; in a few villages the number of cattle has doubled; thousands of rupees have been invested in the purchase of food stuffs during the harvest time when commodities are cheap; several new houses have been built and thatched huts have been replaced by tiled houses; landless people have been enabled to acquire lands; panchayat members have been disciplined for in temperance and bad business methods; the introduction of fly-shuttle looms has made it possible for weavers to double and treble their income; cheap Meston ploughs have been introduced with success in a half dozen villages; village congregations have increased their contributions for Christian work; in many places the rate of interest charged by money-lenders has come down; a dozen law suits were amicably settled through the arbitration of the panchayat of the Co-operative Societies.

The latest statistics available (January 1920) show the present situation:—

169 societies: 128 in Madras Districts, 23 in United

Provinces, 7 in the Punjab Districts, 11 limited liability societies in the towns, number of members 5135 benefitting approximately 25,000 individuals.

Working capital of the 158 Rural Districts, Rs.1,44,000. Of this sum Rs.29,000 is share capital subscribed by members; Rs.18,000 represents deposits of members; Rs.11,000 deposits of outside individuals; the balance, Rs. 87,000, has been borrowed from other banks (Rs.67,000 from the Christian Central Bank). Money lent at rates of interest ranging from 9½ to 15 per cent, as against the current rates varying from 37½ per cent upwards. Loans given under fair conditions which encourage thrift. Few loans overdue up to 1919, when failure of monsoon made necessary the renewal for a further period of twelve months of loans amounting to Rs.20,000 made in 1918.

The work in Malabar, one of the very best of the districts, was closed in June, 1920, and the co-operative societies started there by the Y.M.C.A. are now taking care of themselves under the general oversight of the Government Co-operative Department.

The National Departmental Secretary is Mr. D. Swamidoss who pioneered the work in the Ceded Districts in 1914, where the first society was formed, at Yadiki within the Anantapur jurisdiction.

During the six years that have elapsed since its inception, the Department has attempted to serve the Christian Church in India through a definite economic and social programme aimed to help solve the problems of poverty, debt, ignorance, drink and dirt. It has worked mainly in Mass Movement areas and while as a rule it has entered only those villages where there is a Christian element in the population, its services in these villages are extended to the whole community, irrespective of creed. Loans in the societies are made on the basis of character, among people who have little or no tangible property. The staff of the Department is entirely Indian.

Thus far the economic section of the original plan has naturally received almost the entire attention of the Department.

A few educational attempts of simple character have been made among the older boys, but the results have not been very encouraging. Games, lantern shows, and sports of various kinds have met with a good reception. There is great need for special work among village boys, based on a thorough study of their condition. There is also need of wholesome general literature in the vernaculars for the use of village Christians. More secretaries of good educational qualifications, with Christian character and sympathy, are badly needed—not less than 100 within the next five years, to be added consistently with firm and steady growth. The problem is a tremendous one and the work the rural secre-

taries have undertaken is fraught with difficulties and disappointments. Years of oppression and slavery have left indelible marks on the people. To lift them up from their state of degradation and make them respectable citizens is not the work of a day. It needs plenty of grace and patience to deal with these people and to put up with their shortcomings. However, it is the Department's firm conviction that in the years to come the same people will prove a source of strength and influence in the Church and in the community.

XIII. STUDENT DEPARTMENT.

Throughout the first twenty years of the existence of the National Union, work among students received a very large share of attention. Student Young Men's Christian Associations were established in many colleges, and in the larger student centres there were institutional Y.M.C.A.'s that addressed themselves particularly to the student community by means of hostels, and literary, social, physical and especially religious work.

The development of this department at the beginning of the period under review is shown by the following facts submitted in the report to the World's Student Christian Federation at the end of the college year 1910-1911. There were 32 Student Associations with a membership of 2,045 (half being high school boys of the upper forms); and 5 boys' branches with a membership of 627. Ten student camps were held during the year with a total registration of 773, of whom 436 were college students. There were, in the various branches, 766 student members in regularly conducted Bible classes and 148 in mission study circles. Social service of a simple character was carried on in 9 branches, of which 6 reported a total of 57 students working at one form or another of social service. One National Secretary, Mr. J. N. Farquhar, gave his entire time to the work of this Department.

The work was under the general supervision and direction of a special Student Department Committee which had been appointed early in 1910, with a view to a more effective specialization on work among students as a class apart; on the securing of secretaries who would concentrate entirely on this work as their one and only responsibility; and on the development of a movement among Christian students for which they themselves would be entirely responsible.

The members of the Committee were: Rev. D. J. Fleming, and Dr. S. K. Datta, of Lahore; Rev. C. F. Andrews, Delhi; Rev. W. E. S. Holland and N. C. Mukherji, Esq., of Allahabad; Rev. R. Gee, Rev. W. S. Urquhart and W. W. Pearson, Esq., of Calcutta; J. X. Miller, Esq., Pasumalai; K. C. Chacko, Esq., Madras; A. G. Fraser, Esq., Kandy; Rev. V. S. Azariah, Dornakal; and Dr. H. H. Mann, Poona. The Committee had held its first meeting in Calcutta, May, 1910, J. N. Farquhar, Secretary,

and Dr. Garfield Williams and the Rev. Arthur W. Davies, then secretaries of the Student Department, being also present.

Resolutions to the following effect were passed:—

- (1) The development of a specialized work for students, with secretaries to concentrate entirely on this community;
- (2) The ultimate development of a national, indigenous movement controlled and directed by the students themselves;
- (3) Every secretary assigned to work among students, to receive a very careful and thorough training both in study (of an Indian vernacular, Indian religions and conditions), and practice in work among students in such a quiet way that the study may not be interfered with.

Very considerable differences in point of view had developed in the Committee, one group contending for practically complete independence of other types of Y.M.C.A. work, both locally and nationally, with complete control of both local and national student workers by the Committee, and the other holding to the theory of ultimate control of student work as of other branches, by local Boards of Directors in the case of cities and by the National Council, in the wider relationships. The latter agreed that freedom for the "student missionary," as the proposed specialist was designated, should be ensured, but held that this could be done through proper committees locally appointed. Under this idea the Student Department Committee would be more of an advisory than a controlling body, in its functions regarding any individual "missionary" in a local field.

At the second meeting of the Committee, held in Allahabad in March, 1911, the question of the control of the student work received further definition, as will be seen from the following resolutions:—

- (1) That there shall be two types of control of those working in connection with the S. D. C.:
 - (a) Those who enlist for the work under the control of local associations.
 - (b) Those who enlist to work permanently under the S. D. C.
- (2) That for purposes of study and training, both classes of workers shall be directly controlled during their first two years by the S. D. C., in consultation with their Home Committee.
- (3) That the S. D. C. shall not place work of class (b) in any city, where there is an already established Y.M.C.A., without the consent of the local authorities.
- (4) That in no circumstances shall a student worker be diverted by the local authority to any other line of work except with the consent of the S. D. C.
- (5) That in places where there is not a Y.M.C.A. the S. D. C. shall control all student workers, either directly, or through a local committee appointed by them.
- (6) That in such cases the S. D. C. shall do all in its power to stimulate local responsibility by delegating control in so far as leaders suitable for

the direction of student work can be found, and ultimately to form local Student Associations.

(7) That where a Y.M.C.A. is already in existence and expert guidance in student work may be obtained, an arrangement shall be made whereby a committee of student specialists shall be appointed to control the student worker. This committee shall be appointed either by the S. D. C. or by the local Association in consultation with the S. D. C., but in this case only workers of class (a) can be appointed.

It will thus be seen that the principle of local control, with safeguards, had been granted by the majority of the Committee.

At this meeting Messrs. J. N. Farquhar and K. C. Chacko were appointed as representatives on the General Committee of the World's Student Christian Federation.

Some of the members of the Committee and Messrs. Williams and Davies still found themselves unable to agree with the remainder in the matter of student work relationships to the Y.M.C.A. as a whole, in consequence of which they resigned, in the early part of 1911.

At a meeting of the Executive of the Student Department Committee, held in Delhi, October 28, 1911, a number of practical matters were decided upon. Special efforts were to be made to secure the services of young Indians leaving the universities for travelling work among the colleges. It was decided to prepare and keep in stock various kinds of literature for use in student camps: hymn sheets, Bible studies, suggestions for camp committees and for delegates, and Resolution cards. Four pages of the *Young Men of India* were to be filled monthly with student notes and reprints were to be supplied to students and Student Associations at a fixed rate. This was begun in January 1912.

During this year proposals were made by the Committee to place a Y.M.C.A. student worker in the Scottish Churches College, Calcutta, to work under the College Council (the Association to have minority representation on the sub-committee controlling his work), and to give his entire time to personal friendship and religious work among the students of the College. The proposal was recommended by the College Council to the Home Committee, which, however, felt itself unable to agree, on the ground that it would be unwise to give the agent of another society a definite position within the College and in its internal work.

The regular work of the Department was continued throughout 1911 and 1912, Mr. Farquhar resigning from the secretaryship in April, 1912, to give his entire time to literary work, and being succeeded by Mr. F. V. Slack who was joined within a few months by Mr. K. K. Kuruvilla as travelling secretary, generously loaned and paid by the National Missionary Society. Meanwhile events were so developing as ultimately to turn the immediate attention

of the Department from the question of the control, training and work of "student missionaries," to that of the development of a Student Movement controlled by the students themselves.

This hope had existed from the beginning of Y.M.C.A. work among students, and had been clearly expressed at the first meeting of the Student Department Committee. Now, joined with the hope of the older men was an increased desire on the part of the students for the expression of their own initiative. The marked growth throughout India of the national spirit during the first decade of the twentieth century was one of the leading influences toward this most desirable end.

A Bengal Student Christian Union was formed in 1909 and a Punjab Union the next year, the latter being somewhat the more vigorous. At the Punjab Student Camp in February, 1912, the idea of an All-India Camp was broached by the students, and the Student Department Committee offered to defray the expenses of any two Punjabi students whom the other students might choose, for a trip among other student centres, to carry the spiritual greetings of the Christian students of the Punjab and to discuss various questions connected with an All-India Student Camp.

This trip was carried out in August and September, by Messrs. B. L. Rallia Ram and S. P. Singha, who visited Bombay, Ceylon, Travancore, the Tamil country and Madras.

Meanwhile, in May, a good friend of the Student Department had made possible the bringing together for a Retreat, at Dharmopore, in the Simla Hills, of seventeen students and three older friends, from different parts of India. Here, where the time was spent in Bible study, corporate intercession and close personal intercourse, it was made known that during the succeeding cold season Dr. John R. Mott, General Secretary of the World's Student Christian Federation, and Mr. Sherwood Eddy, widely known among Indian students, were coming to India, Dr. Mott's main errand being the holding of several important missionary conferences, as Chairman of the Continuation Committee of the Edinburgh Missionary Conference. It was understood that Dr. Mott and Mr. Eddy would be available for a limited series of evangelistic meetings for students in the chief university centres. After some discussion and prayer the students unanimously voted that such meetings be held, and at their own expense issued a Call to Prayer to friends throughout India for the meetings. They also appealed for an All-India Conference and asked the Student Department Committee to take the initiative in calling such a Conference, which should be planned and managed by a special committee to which each provincial group should nominate a member.

During the next cold weather, therefore, large and widely known series of evangelistic meetings were held, almost entirely for students, in Colombo, Madras, Bombay, Calcutta, Allahabad,

and Lahore. In all Christian students took a large part in making local arrangements and in supporting the meetings in prayer and other individual effort. Deep impressions were made by the meetings themselves, but the work of conserving results was not successful.

The All-India Conference met in Serampore, December 27, 1912—January 2, 1913, bringing together 194 Christian students from seventy-four colleges. Dr. Mott was present throughout. From the point of view of the organic Movement the most important event was the passing of the Serampore memorandum, by which the Student Christian Association of India and Ceylon was formed, to assume responsibility for the work formerly done by the Young Men's Christian Association among Christian students and in Christian colleges. On the General Committee of the new Association the National Council was empowered to appoint eight members, in addition to the two General Secretaries of the Council, members ex-officio.

The Student Department Committee of Y.M.C.A. continued until the new General Committee was constituted, on April 1st, 1913, and then ceased to exist.

The university year, 1912-13, is therefore the last in which the Student Department of the Young Men's Christian Association carried on special work for and among Christian students. During that year there were fifty-one student Associations and two national secretaries. Including Serampore, thirteen camps were held, of which four—Ceylon, Tamil, Mysore and Burma—met for the first time; there was a total attendance of 894 delegates. Bible circles enrolled 600 students; thirteen colleges reported local bands of "student volunteers" with 124 members. One hundred were in mission study classes and 700, approximately, in social service of various types. Delegates were sent to the Lake Mohonk Conference of the World's Student Christian Federation.

The National Student Secretary was loaned to the Student Christian Association and served for two years as its General Secretary, when he went on furlough. In addition, the National Council gave a grant of Rs.750 per annum to the new Association; since 1918 this grant has been decreasing at the rate of Rs.50 per annum.

As a result of these new developments the special student work of the Young Men's Christian Association has been confined to student hostels, which now exist in Lahore, Bombay, Calcutta, Nagpur, Rangoon, Madras, and to the work of local secretaries, generally in institutional buildings, in Lahore, Allahabad, Calcutta, Bombay, Madras, Bangalore, Poona, Calicut, Kottayam and Colombo.

The relationship of a student secretary of the Y.M.C.A. to

the local branch or branches of the Student Christian Association is of a purely informal and unofficial character and depends on personal relationships, just as the case with other individuals in the city. In most places the Y.M.C.A. secretary has been able to give a considerable amount of such friendly help to the Christian students, being called to their assistance on their own initiative.

The following resolution of the Student Christian Association General Committee is recorded in the National Council Minutes of 16 December, 1915:—

Resolution received from the Student Christian Association:—The General Committee felt the necessity of a more vital connection with the National Council in the work among students and hence the following resolution was passed:—

"150. Relation with local Y.M.C.A. student secretaries. Read Mr. Slack's memorandum and other papers and after prolonged discussion it was resolved that the General Committee of the Student Christian Association realizes the responsibility of the Movement for all work that has to be done by way of service to the students of India and Ceylon, but regrets that at the present time it is not in a position to undertake complete control of the various local activities of the Indian National Council of Young Men's Christian Associations for and among students. Accordingly it recommends to the Indian National Council as an interim measure to appoint a special Student Work Committee for the present on which the Student Christian Association may be represented to the extent of half its number; it being understood that the Student Christian Association representation consist of a majority of non-students."

The National Council voted to accept this proposal as an interim measure until the time of the next National Convention and to leave the appointment of the Committee to the General Secretaries of the Council, their recommendations to be confirmed by the Executive.

Because of the lack of a whole time National Student Secretary these instructions have never been carried out. It is most desirable that the vacant post be filled as early as possible and that these or similar arrangements be carried through. It is likely that at the next All-India Conference of the Student Christian Association, meeting in Poona in December, 1920, considerable changes will be made in the constitutional provision for representatives of the Y. M. C. A. on the Student Christian Association General Committee.

The student hostels named above have the following accommodation:—

Lahore	25	Madras	65
Bombay	60	Rangoon	35
Calcutta	45	Nagpur	32

Of these Nagpur and Calcutta are directly related to the National Council, the former because there is no local Association to which it could be affiliated, the latter because of a debt which

the National Council regret they have not yet been able to wipe out.

After long consideration the National Council, on 4th February, 1920, opened in London a club and hostel for Indian students to help meet the pressing problem of living accommodation there. Its central feature is that it is under Indian management, with an Indian staff. A local Committee of which Mr. Edwyn Bevan is Chairman controls the work on behalf of the National Council.

The "Shakespeare Hut," formerly used by the Australian Y. M. C. A., at the corner of Keppel and Gower Streets, W C. 1, was taken over at an annual rental of £3000 and, after re-building and furnishing at a cost of about £8000, contains 102 cubicles, providing accommodation for about 130 students. Forty beds are reserved for students of British parentage. There is also Institute accommodation for 500, equipped with a reading room, library, recreation and social rooms, a gymnasium, and a restaurant with Western and Indian menus, open to resident and outside members.

XIV. TRAINING DEPARTMENT.

I. TRAINING SCHOOL.—Previous to 1911 no special course of training was provided for new recruits in the secretaryship. Men were taken on the staffs of local Associations to fill definite vacancies or to provide for definite expansion and apart from the practical training afforded by their duties, picked up what they could with regard to Association policies, history, methods, etc., in general. Naturally, as the work began more and more to expand this desultory method of training proved ineffective, as well as unfair both to the man and to the work. In some cases men were of necessity given responsibilities which it was unfair to expect them to carry, with the consequence that they left the Association branded as failures. Others, with insufficient foundations in general education, stopped growing after the first few years and prevented progress. Still others, who were ultimately successful, were severely handicapped, having to learn by often bitter experience what they should have been taught in advance.

Plans were put under way by the National Council in 1910 for the opening of a small Training School at the headquarters in Calcutta and the first session began in January, 1911, under the principalship of Mr. A. C. Harte, National General Secretary, with ten students, of whom three dropped out before the end of the year. The following subjects were taught:—General Introduction to the Bible, Life of Christ, Religious Pedagogy, Comparative Religions, Church History, Association History, Literature and Biography, Association Policy, Administration and Records, First Aid to the Injured, Hygiene, Indian History and Literature, English Language and Literature. Practical work was also

supervised. With the exception of the courses in Religious Pedagogy and English, all were taught by Association secretaries. Seven men completed the course on January 19, 1912: one Bengali, two Tamils, two Anglo-Indians and two Europeans.

The second year's work began in August, 1912, with Mr. K. J. Saunders as principal, the curriculum being broadened on the non-Association side by the addition of courses in Science of Religions, and Psychology, Educational and Religious. During this year it became increasingly clear that the very limited accommodation available at headquarters with the consequent difficulty of securing sufficient quiet for study, made a change of location desirable, with the result that the School was moved to Bangalore for its third session, with the expectation that it would be brought back to Calcutta later when there should be more commodious accommodation. Mr. Saunders, in order to continue his studies in Buddhism, went to Rangoon as Student Secretary and Mr. J. Callan became Acting Principal of the Training School, with the help of other secretaries and, most kindly, of members of the faculty of the United Theological College. The students lived at the Bangalore City Branch.

The fourth and fifth year sessions were likewise held in Bangalore, Mr. O. O. Stanchfield having succeeded to the principalship. When the war broke out the shortage of staff was so great that both principal and students were called into war work, with the result that between the end of 1915 and July, 1917, no sessions were held. On July 7th, 1917, the School opened again under the principalship of C. F. Angus, Trinity Hall, Cambridge, one of the members of the Deputation of Friendly Service to India. By the great kindness of the Council, principal and staff of the United Theological College the students and staff of the Training School were given accommodation at the College with full use of all the equipment and permission to attend such College classes as were deemed desirable by the Training School authorities. With Mr. Angus were associated Dr. J. H. Gray (for three months) in charge of physical work, which was in turn thrown open to the College students, and, in November, Mr. K. K. Kuruvilla, lecturer in Indian Economics. Mr. Angus left in 1918 and was succeeded, after a few months' interim by Mr. G. P. Wishard.

Meanwhile considerable thought and many discussions had been devoted to the whole question of the permanent location, of the School and the type of training to be given. This discussion, so far as the employed staff was concerned came to a head at the Secretaries' Conference in 1919, where a Commission on Training submitted its report. The report defined as the aim of the Training School the providing of "adequate general and technical instruction to qualify young men for the position of all employed officers of the Y.M.C.A.," and sketched a curriculum designed to

attain this aim. Much of what this report contained was fully approved by the secretaries present, but it was felt that more emphasis should be laid on making the School a means of "linking up the spirit and devotion of India with the service of India under its modern conditions." An enlarged Commission was appointed to carry out these ideas in more detail, for submission to the National Council. At the meeting of the Executive Committee on May 3rd, 1920, Dr. S. K. Datta was made Principal and recommendations along the following lines, drawn up by him, were approved in general and the Training Department was empowered to make plans accordingly for the next session of the School, which opened October 18th, in Bangalore, the permanent location having not yet been decided upon. Mr. Wishard continued on the staff as Vice-Principal and lecturer on Association subjects.

OBJECTS :—

- (1) To provide facilities for study and research for those seeking to devote their lives to the service of India through the Young Men's Christian Association.
- (2) To acquaint and train intending Y.M.C.A. secretaries with the needs of India and those of the Christian Church and inspire them to devote their lives for the solution of some of those needs.
- (3) To provide in its staff a corporate fellowship of workers who, while themselves actively engaged in studying the problems of India and their possible solutions and educating public opinion (particularly Christian opinion) on various needy lines, will associate with themselves younger men, inspiring and training them for an efficient service for Christ and India.

SOME GENERAL PRINCIPLES :—

- (1) More emphasis to be laid on personal study under the guidance of the teacher than on class-room instruction.
- (2) Each Secretary to have a free hand, as far as possible, in choosing his special line of study and work for the years to come.
- (3) Special facilities to be provided for practical training and the observation of actual conditions.
- (4) This training to be done in specially appointed training centres where the students could carry on their study, observation, collection of data for their thesis, etc., under the guidance of some strong leader.

CURRICULUM :—

- (1) To be divided into two parts each year, the first consisting of lectures from October to March on the social message and teaching of Christianity, Indian economics, the history and development of modern Indian religious movements, Association methods, history, business, and office routine; and the second, of practical experience in chosen centres, from June to December.
- (2) In the second year each student to specialize on some special department. A third year for such as need it to carry still further their special subject.

STAFF :—

- (1) Special, whole time lecturers in Association history and methods, economics, the message of Christianity.
- (2) Close association with the school of the heads of various departments, such as Rural, Building, Religious Work, and others.

2. **PROBATIONERSHIP.**—Each recruit for the secretaryship is now taken on a year's probation before being sent for training or being confirmed. During this period he is placed in a local Association under competent direction, where he has a chance to prove to himself and to the Association whether he is of such character and capacity as will be likely to make him permanently contented and useful in the secretaryship. It is the aim that certain courses of reading shall be outlined for him by the Training Department for completion during the year, but most of the testing comes in the regular daily work under the supervision of a particular local secretary.

3. **SUMMER SCHOOL.**—While it is expected that henceforth all new secretaries will take the full training school course, there are on the staff a considerable number of older and permanent secretaries for whom that is not possible. In addition there are the foreign secretaries, who, though they have in practically all cases had previous Association experience before coming to India or Ceylon, still need help in understanding general conditions. Moreover, those who have completed regular training need from time to time the freshening influence of the study of new ideas in company with others similarly placed.

For these classes the Summer School is intended. It was first held in Calcutta in 1912 for two weeks, with eleven in attendance, the curriculum consisting of lectures on the introduction to the Life of Christ and the Book of Amos, Y.M.C.A. work in its various phases and daily gymnasium class.

In 1914 two Summer Schools were held, one in Calcutta for a fortnight, in June, and the other for a month in Bangalore, in September and October. Bible study, social service, history and policy of the Y.M.C.A., finance and business, hygiene and physical education, psychology of religion and certain technical courses were given.

Advantage was taken in 1916 of the presence of Dr. T. R. Glover, Dr. J. H. Moulton, Dr. G. H. Leonard and C. F. Angus to hold a considerably enlarged school, particularly for the junior secretaries. There were present seventy-two men (forty-three Indians and twenty-nine Europeans) representing thirty-two Associations in India and Ceylon. The next year the School was held for three weeks in Kodaikanal, with seventeen men in attendance, and in 1918 at Khandala with fourteen. The 1919 and 1920 Summer Schools met in Bangalore with approximately the same number of students.

4. **STUDY ABROAD.**—It is the desire of the National Council to send abroad for further training, from time to time, secretaries who, having completed their training here, and having satisfactorily demonstrated subsequently, for a period of from three to five years, their ability to carry large responsibilities, are consi-

dered worthy of additional opportunities. Not more than one or two can be sent in any one year and the average period of their absence is from one to two years. During the period under review Messrs. J. S. Aiman, E. P. Hillier, S. C. L. Nasir, C. E. V. Nathanielsz, J. Martin and E. A. Williams have thus been helped. T. J. Cornelius, J. N. C. Ganguly and P. D. Ranganadhan have also gone, at their own expense.

XV. MISCELLANEOUS.

1. BASIS OF MEMBERSHIP. — The question of a revision of the Basis arose first of all in Travancore, one of the most successful fields of Y.M.C.A. work in India, where there exists the great old Syrian Christian community. It is now split up into five distinct sections. With the reformed branches of the Church no difficulty arises in the matter of the Basis; but members of the Jacobite section can scarcely, in any honourable way, use the word Protestant of themselves. Hence a very real difficulty arises. In consequence of this difficulty an amendment to the Constitution was passed at the Convention of 1901, permitting the admission to the active membership such members of the Syrian Christian Churches as subscribe individually to the principles laid down in the Constitution and desire to engage in active Christian work.

The subject, however, came up again, as it did not seem quite satisfactory to have two forms of Basis.

At the Convention of 1907 the Rev. L. P. Larsen gave notice that at the following Convention he would move that sections 1 and 2 of Article II be amended so as to stand as follows:—

Section 1.—Any Young Men's Christian Association in India, Burmah and Ceylon, whose voting membership is limited to its active membership as defined below (Section 2) shall be admitted to membership in the Indian National Union and be furnished with an official certificate to that effect; on filing with the Council of the Indian National Union a copy of its Constitution and an attested copy of its resolutions ratifying this Constitution. But no Association which may hereafter be organised in a city or town where a Young Men's Christian Association already exists, shall be recognised by the National Council, or entitled to representation in the National Convention, Associations amongst special classes (*e.g.* students, railway men, soldiers, etc.) excepted.

Section 2.—Active membership in the Young Men's Christian Association shall be open to young men who, being communicant members of a Christian Church, accept Jesus Christ as their Divine Lord and Saviour according to the Holy Scriptures, and recognizing their essential unity in Him, desire to associate their efforts for the extension of His Kingdom among young men.

On behalf of Dr. A. H. Ewing, Mr. F. J. Clark gave notice that at the next Convention an amendment would be moved to alter Article II so as to read as follows:—

Section 1.—Any Young Men's Christian Association in India and Burma, whose voting members are members in full communion of Protestant

Christian Churches, or who accept the Paris Basis shall be admitted to membership in the Indian National Union and be furnished with an official certificate to that effect, on filing with the Council of the Indian National Union a copy of its Constitution and an attested copy of its resolutions ratifying this Constitution. But no Association which may hereafter be organized in a city or town, where a Young Men's Christian Association already exists, shall be recognised by the National Council, or be entitled to representation in the National Conventions, college Associations excepted.

Section 2.—Only those churches shall be held to be "Protestant and Christian" which maintain the Holy Scripture to be the only infallible rule of faith and practice, and which believe in the Lord Jesus Christ, the only begotten of the Father, King of Kings and Lord of Lords, in whom dwelleth all the fulness of the Godhead bodily, who was made sin for us though knowing no sin, and who bore our sins in his own body on the tree; and that his name is the only name under heaven given among men whereby we must be saved from the guilt and power of sin and from everlasting punishment.

Section 3.—The Paris Basis is as follows: "The Young Men's Christian Association seek to unite those young men who, regarding Jesus Christ as their God and Saviour, according to the Holy Scriptures, desire to be His disciples, in their doctrine and in their life, and to associate their efforts for the extension of His Kingdom among young men."

Section 4.—Any Association changing its test of voting membership to any other than that prescribed in this article shall be held to have forfeited membership in the Indian National Union.

Mr. Larsen also gave notice of the following amendment as an alternative :—

The active membership of the Young Men's Christian Association shall be open to young men who, regarding Jesus Christ as their God and Saviour, according to the Holy Scriptures, desire to be His disciples, in their doctrine and in their life, and to associate their efforts for the extension of His Kingdom among young men.

These proposed amendments came up for discussion at the Bombay Convention, December, 1910, when a great deal of difference of opinion was expressed. Every one was eager to find a form of Basis which would admit Jacobite Christians, and also Anglican Highchurchmen who object to the word "Protestant," but from several Associations there came objection to making the Basis a mere statement of personal belief, on the ground that in certain localities undesirable elements might come in and swamp the government of the Association altogether. So keen was the discussion that it became evident that in the short time available no decision could be reached. In consequence, a motion to postpone the whole matter and to have it thoroughly looked into by a competent committee was carried, with instructions (a) to consider the matter thoroughly with a view to discovering a Basis likely to be acceptable to all; (b) to prepare a statement regarding the reasons which have led to the desire for a new Basis; and (c) to submit this statement to the Associations through the Secretary of the National Council together with the Basis proposed, or in the event of a majority and minority report, two or more alternative

proposals, not less than six months prior to the next Triennial Convention.

The following were appointed on the Committee: Rev. C. F. Andrews, Rev. L. P. Larsen, Rev. J. H. Maclean, O. H. McCowen, Rev. V. S. Azariah, K. C. Chacko, Rev. S. V. Karmarkar and J. N. Farquhar, Convener.

Considerable correspondence was carried on by the Committee up to early 1913 but no final conclusions were reached. Certain aspects of the question were particularly mentioned: *e.g.*, the phrase "communicant members" was seen to form a very real difficulty for young Christians of both the Jacobite and Reformed Syrian Churches and at the same time certain members of the Committee felt that it should be retained, with a special clause to meet the needs of Syrian Christians.

The Convention which should ordinarily have been held at the end of 1913 was postponed until a year later and in July, 1914, the National General Secretary, on behalf of the National Council, issued a notice to the effect that at the business meeting in connection with the expected Convention the two following constitutional changes would be proposed:—

- I. That the Aims and Basis, and Declaration of Membership in the Associations, be altered to read as follows:—
 1. **AIM AND BASIS**:—In order to promote the highest physical, intellectual, social and spiritual welfare of the young men of India and Ceylon, the Association aims to lead young men into full acceptance of the Christian faith in God—Father, Son and Holy Spirit; to promote among them regular habits of prayer and Bible study; to keep before them the importance and urgency of the evangelization of the world, the Christian solution of social problems, and the permeation of public life with Christian ideals; and to lead them into the fellowship and service of the Christian Church.
 2. **DECLARATION OF ACTIVE MEMBERSHIP**:—In joining this Union, I desire to indicate my full sympathy with the aims and basis of the Association, and to declare my faith in God through Jesus Christ to whom as Saviour and Lord I desire to surrender my life.
Any young man who is a member in good standing of a Christian Church shall be considered eligible to membership in the Young Men's Christian Association, on signing the above declaration.
- II. **PROPOSED CHANGES IN ARTICLE II.—MEMBERSHIP**:—**SECTION 1.** Any Young Men's Christian Association in India, Burma and Ceylon whose voting membership is limited to its active membership as defined below (Section 2) shall be admitted to membership in the Indian National Union and be furnished with an official certificate to that effect, on filing with the Council of the Indian National Union a copy of its Constitution and an attested copy of its resolutions ratifying this Constitution. But no Association which may hereafter be organized in a city or town where a Young Men's Christian Association already exists shall be recognized by the National Council, or be entitled to representation in the National Convention, Associations amongst special classes (*e.g.* students, railway men, soldiers, etc.) excepted.
- SECTION 2.**—Active membership of the Young Men's Christian Association shall be open to young men who, being communicant members

of a Christian Church, accept Jesus Christ as their Divine Lord and Saviour according to the Holy Scriptures and, recognizing their essential unity in Him, desire to associate their efforts for the extension of His Kingdom among young men."

With the indefinite postponement of the Convention on account of the War the matter has been allowed to stand as it was, nothing further having been done, save for the new amendment circulated early in 1920, which reads as follows :—

Active membership shall be open to all young men who accept Jesus Christ as their Lord and Saviour, recognizing their essential unity in Him, and desire to associate their efforts for the extension of His Kingdom.

2. DEPUTATION OF FRIENDLY SERVICE.—One of the pleasantest and most valuable features of the general work during the war was the formation of the Deputation of Friendly Service whereby several prominent Christian scholars, evangelistic workers and representatives of the Y.M.C.A. in other countries were invited to visit India and Ceylon for the purpose suggested by the name of the Deputation. Lectures were given throughout India and Ceylon and were listened to most attentively and appreciatively. Equally valuable were the contributions made through personal contacts with a large number of Indians, Ceylonese and Europeans. The members of the Deputation were as follows :—

Rev. C. F. Angus, Trinity Hall, Cambridge; F. N. D. Buchman, Hartford Theological Seminary, U.S.A.; Rev. Dr. Percy Dearmer, London; Dr. G. S. Eddy, New York; Dr. T. R. Glover, St. John's College, Cambridge; Rev. Prof. W. J. Hutchins, Oberlin College, U.S.A.; M. W. P. Lascelles, New Zealand; Prof. George Hare Leonard, Bristol University; Prof. J. Hope Moulton, Manchester University; Rev. W. Paton, British Student Christian Movement; Rev. J. R. M. Stephens, Baptist Missionary Society, London.

Dr. Glover's lectures were later published in England under the title of "The Jesus of History."

All who in any way came into contact with Dr. Moulton were inexpressibly shocked at the news of his death, from a submarine attack in the Mediterranean. An appropriate minute of sympathy was passed by the National Council and forwarded to Dr. Moulton's relatives.

3. RELATIONSHIPS ABROAD.—Rajah Sir Harnam Singh, President of the National Council, has continued as representative for India and Ceylon on the World's Committee of the Y.M.C.A. Sir Henry E. E. Procter and J. Hope Simpson, Esq., I.C.S., were appointed to represent India at the World's Convention in Edinburgh June 10-15, 1913, and a year later Sir Henry Procter and A. C. Harte, Esq., represented the National Council at the British Y.M.C.A. Conference at Nottingham and at the Conference on work among boys at Oxford immediately thereafter; also at a

plenary meeting of the World's Committee in London. Messrs. J. R. Isaac, E. C. Worman and E. C. Carter represented the Student Department at the conference of the World's Student Christian Federation at Lake Mohonk, U.S.A., in 1913, and Mr. Isaac also attended in an official capacity the assembly of Boys' Workers at Culver, Indiana. At a similar Assembly in 1920 Mr. J. S. Aiman was present. In 1919 Mr. K. T. Paul and Mr. B. C. Sircar visited England and America in the interest of the work of the National Council. As a result of Mr. Paul's visit the official relationship between the National Council and the International Committee, and the English and Scottish National Councils, were made more definite and intimate.

In March 1920 the National Council became a member of the British Empire Y.M.C.A. Union, whose objects are (1) closer fellowship of national Y.M.C.A. organizations within the Empire; (2) wider dissemination of useful information on the work done by the national organizations; (3) interchange of visits by officers, members of governing boards or ordinary members of national organizations within the Empire, extension of a welcome to such when travelling on private business, and the utilization of their services for Association purposes; (4) securing that members of Associations on tour shall have privileges of membership accorded them in the countries visited; and (5) securing an interchange of views through channels of regular official correspondence and conference on questions affecting Y.M.C.A. work throughout the Empire.

Complete autonomy of each national organization is a fundamental principle. Twelve members of the British Committee and two each of the other national organizations form the Managing Committee of the Union; this Committee cannot involve any national organization in expenditure without the consent of the organization concerned. The members of the Union are the national organizations of the United Kingdom, Australia, Canada, India, New Zealand and South Africa. Dr. J. N. Farquhar and Mr. R. D. Whitehorn are representatives of the National Council of India and Ceylon on the Managing Committee of the Union. A grant of £25 is made annually toward the current expenses.

At the end of 1919 the National Council made a grant of £250 to the Training School of the English National Council in token of appreciation of services rendered their secretaries during the war.

4. CONFERENCE.—The regular annual Secretaries' Conferences have been held throughout the period, with one or two exceptions. These conferences have no executive authority whatsoever, their purpose being to bring together the men who are spending their entire time in the work of the Association for informal conference on methods and policies of work and for the development of that *esprit de corps* among the staff which is so

essential to the strength and growth of the movement. Each conference appoints the committee to arrange for the succeeding one.

Various smaller conferences of workers have been held during the period, mainly departmental in their scope. An All-Ceylon Convention was held in November, 1912; the Serampore Student Conference is described in the Student Department section of this Report.

The Association had a share in arranging for the tour of Dr. G. W. Knox, Union Seminary (New York) Lecturer, in the cold season of 1911-12; and of Prof. Charles R. Henderson, of the University of Chicago, Barrows-Haskell lecturer, in the following year.

5. WORK FOR EX-DETENUS.—For ten months in 1920 special welfare work was carried on by the National Council in Calcutta, for those interned under the Defence of the Realm Act and released under His Majesty's amnesty. A house was secured as a hostel where in all, somewhat less than 200 men were accommodated for varying periods. Games and normal social life were encouraged and help was also given in securing opportunities for technical training of various sorts, and for business openings for the men. The work closed in October. The total cost was approximately Rs. 13,000. Much credit is due the secretary, Mr. R. O. Raha.

6. SCHOLARSHIP LOAN FUND.—In December, 1916, the National Council sanctioned the establishment of a Scholarship Loan Fund for the purpose of assisting the educational needs of male Christian students of European, Anglo-Indian, Burmese, Ceylonese or other Asiatic parentage intending to take up Christian work in India, Burma or Ceylon. The Council made an initial grant of Rs. 1000, which it was intended should be supplemented with further funds from the same or other source. Adequate rules were drawn up for the disposition of the Fund.



NATIONAL COUNCIL YOUNG MEN'S CHRISTIAN ASSOCIATIONS, INDIA & CEYLON

Consolidated Financial Statement for the years 1911, 1912, 1913, 1914, and 1915.

(Five Years)

INCOME.				EXPENDITURE.			
	Rs.	As.	P.		Rs.	As.	P.
To Balance on 1st January, 1911				By Army Department—1911, '12,			
Individual Subscriptions ...	47523	6	5	'13, '14 ...	3365	8	6
Emergency Funds, 1914 and 1915 ...	18500	0	0	Dacca Concentration Camp.—1914 ...	3328	5	3
Association Subscriptions ...	12574	1	6	Physical Department—from 1913 ...	9058	0	1
Army Department, 1912, '13, '14 ...	2305	11	9	Railway Department ...	22951	0	6
Dacca Concentration Camp, '14 ...	3328	5	3	Tata Iron Co. Branch—1914 and '15	5400	0	0
Physical Department, from 1913 ...	9968	1	7	Rural Department—from 1914 ...	7132	11	6
Railway Department ...	21104	6	11	Student Department... ..	12306	2	7
Tata Iron Co. Branch, '14, & '15	4905	3	0	Training School	10815	13	6
Rural Dept. from 1914	1640	11	7	Training School—Loans	1750	0	0
Student Dept.... ..	10232	9	5	Subsidising Associations	19193	6	9
Training School	11197	7	2	Salaries of Secretaries	26862	11	0
Training School—Loans	70	0	0	Expenses of Secretaries	12184	6	10
Subsidising Associations	16618	7	1	Secs. Conf. and Summer School	2212	2	3
Sal. and Exp. of Secretaries	12619	12	5	Convention—1911	131	15	0
Secretaries Conf.—1911 and '12	57	13	0	Office Staff	13969	6	4
Office Staff	3468	14	9	Office Servants	510	11	9
Miscellaneous	2518	6	11	Office Equipment	2195	2	6
Library—1913	99	1	0	Office Printing and Supplies ...	4777	7	10
Lantern Lectures and Slides ...	1124	3	0	Postage and Telegrams	7125	12	0
Provident Fund	2169	4	0	Light and Power	984	5	0
Ceylon—general—1913	457	8	7	Cultivation—1914	51	10	0
Mission Study 1912 and '13 ...	891	0	0	Miscellaneous	6123	3	5
Young Peoples Miss. Movement,				Library—1911—1915	411	13	4
1911 and 1912	23	3	0	Lantern Lectures and Slides ...	243	1	10
World's Committee Y.M.C.A. ...	172	13	6	Provident Fund	3379	10	0

Ear-Marked Funds—1912	4846	1	0		
Transf. a/c with Australia	20627	8	9		
do with E.N.C., 1914	467	12	3		
Publications (Asscn. Press)	28938	10	3		
*Bible Study—Publications and Contributions, 1911, and '12	840	13	9		
*Mission Study—Pubs '11 and '12	1352	2	11		
*" Young Men of India "	16067	10	11		
*" Inquirer," Subs. and Contr. '11 and '12	772	1	6		
	<u>259483</u>	5	2		
	<u>260575</u>	1	1		

Ceylon—general—1913	664	10	10		
Young People's Miss. Movement 1911	54	6	0		
National Men's Mission—1912	268	13	6		
Worlds Committee Y.M.C.A.	614	4	0		
Ear-Marked Funds—1912	4846	1	0		
Transfer a/c with Australia	20627	8	9		
do with E.N.C., 1914	481	6	0		
Book Department 1914	1580	9	6		
*Publications (Association Press)	27451	13	0		
*Bible Study—Pubs., 1911 and '12	656	15	0		
*Mission Study—Pubs., 1911 and '12	2559	15	3		
*" Young Men of India "	20695	5	4		
*" Inquirer "—Prtg. and Postage, 1911 and '12	1248	11	8		
	<u>258214</u>	15	7		127
<i>Balance on 31st December, 1915—</i>					
General Account	1999	11	6		
Association Press	80	3	7		
" Young Men of India "	280	2	5		
	<u>2360</u>	1	6		
	<u>260575</u>	1	1		

* Details of these accounts are submitted in a separate statement by the Association Press.
 Compiled from the Audited Statements of accounts each signed as follows :—
 "We have compiled the above statement from the Books and Vouchers submitted to us and certify that it is in accordance therewith."

MEUGENS, KING & Co.,
Chartered Accountants, Calcutta,

NATIONAL COUNCIL Y.M.C.A., EMERGENCY FUND.

Summary of Receipts and Payments for the period ending 31st December, 1915.

RECEIPTS.				PAYMENTS.			
		Rs.	As. P.		Rs.	As. P.	Rs. As. P.
Subscriptions	...	2,54,167	11 2	EXPEDITIONARY.			
Interest	...	50	6 2	Tel. and Post.	3,065	9 9	
Refund of Loan	...	4,000	0 0	Current Expenses	9,248	5 4	
				Equipment	14,592	14 11	
				Less: Refund	37	0 0	
				Office Expenses	3,946	14 0	
				Travelling	20,274	4 4	
				Marseilles	24,729	14 11	
				Less: Refund	350	0 0	
				Persian Gulf	1,000	3 0	
				Poona	2,514	6 0	
				Misc. Expenses	402	4 9	
				Salaries	9,078	13 5	
				Trading stock	1,298	8 0	89,825 2 5
				TERRITORIAL—			
				Miscellaneous	1,196	13 5	
				Building Account	2,000	0 0	
				Eng. Nat. Council	19,732	3 3	
				Loan	4,000	0 0	
				Prisoners of War	2,800	0 0	
				Salaries	14,663	12 2	
				Trav. Expenses	9,478	0 5	
				Current	22,498	14 10	
				Equip. and Outfit	11,994	4 6	
				Postage	4,086	4 6	
				Office Expenses	5,850	7 0	98,300 12 1
				Transfers to General Funds, 1914			
				and 1915			18,500 0 0
				Balance			51,592 2 10
TOTAL Rs. ...		2,58,218	1 4	TOTAL Rs. ...			2,58,218 1 4

128

CALCUTTA,
15th June, 1916.

Subject to our report of even date addressed to the Committee.

(Sd) MEUGENS, KING & Co., Auditors,
Chartered Accountants.

ASSOCIATION PRESS.

Comparative Statement of Accounts from 1911—1919.

	1911	1912	1913	1914	1915	1916	1917	1918	1919
N. C. Publications :—									
Sales	237 10 3	603 3 6	4,816 2 0	4,671 7 0	3,782 15 6	5,068 8 8	7,339 9 4	17,722 0 3	21,206 0 3
<i>Printing</i>	87 5 9	500 15 9	2,311 14 10	4,008 14 6	1,742 8 3	6,193 2 10	9,724 11 0	16,919 8 0	33,746 13 3
<i>Postage</i>	10 0 0	48 9 6	373 7 0	553 6 5	446 10 3	973 15 3	662 3 7	517 10 9	491 13 4
Joint Publications :—									
Sales	...	...	...	...	...	...	4,814 12 1	3,686 3 3	2,717 6 10
<i>Printing</i>	...	...	...	...	...	...	2,720 12 7	4,163 9 9	7,356 13 4
<i>Postage</i>	...	...	...	...	...	...	374 5 9	372 7 2	429 0 2
Foreign Publications :—									
Sales	275 6 3	1,076 12 8	4,179 12 4	3,617 9 11	3,870 3 0	9,978 6 0	34,274 6 11	79,586 8 4	98,786 4 5
<i>Purchase</i>	696 14 6	1,796 6 3	4,772 8 1	3,091 14 7	3,878 13 8	9,768 14 4	25,474 7 8	69,901 9 8	101,608 2 10
<i>Postage</i>	10 0 0	56 10 6	324 3 0	403 0 7	479 10 9	1,112 9 9	512 13 11	4,921 14 2	3,117 0 1
<i>Office Establishment a/c</i>	...	...	...	420 0 0	727 4 0	1,495 9 3	2,677 7 10	7,649 3 6	10,159 1 0
<i>Office Supplies and Equipment</i>...	...	...	...	...	...	413 0 6	...	1,113 11 6	1,093 3 0
Special Subsidy for New Literature	...	...	...	...	...	5,906 11 7	...	...	...
<i>Publications Promotion</i>	...	...	...	...	...	...	606 0 6	1,080 9 9	2,802 12 1
Subsidies (National Council)	...	...	...	...	...	...	8,124 1 11	8,667 5 0	9,071 6 6
Stock a/c	...	...	...	...	10,413 14 6	13,820 10 6	18,517 8 4	39,108 14 9	55,269 14 0
Capital a/c	...	...	...	...	...	15,166 12 4	30,722 7 4	47,513 14 11	65,230 5 7

The items in italic are expenses.

NATIONAL COUNCIL Y.M.C.A., 1916, 1917, 1918.

General Income and Expenditure Account.

	Rs.	As.	P.		Rs.	As.	P.
ADMINISTRATION—							
To Stationery, Office Supplies ...	26,428	11	1	By Association Subscriptions ...	1,639	8	0
„ Office Rents and Maintenance ...	23,370	0	4	„ Subscriptions, per schedule	Rs. 34,42,076	6	1
„ Salaries, Allowances and Expenses of Secretaries ...	2,56,780	7	4	Less—Direct payments to co-operating local Associations	1,73,031	15	7
„ Secretaries' Conferences ...	7,112	6	8		32,69,044	6	6
„ Travelling Expenses of Local Secretaries ...	6,275	15	10	„ Interest from Investments, Banks, and Gain in Exchange ...	35,957	12	11
„ Passages and Expenses of Secretaries to India from Abroad ...	18,242	0	3	„ International Committee—Administration Subsidies	3,349	2	3
„ Book Grants to Indian Secretaries ...	449	11	6				
„ Prayer Cycle ...	848	9	11				
„ Provident Fund ...	3,009	4	0				
„ Advertising and Publicity ...	64,031	8	8				
	4,06,548	11	7				
MESOP. INCOME AND EXP. ACCT.—							
Deficit Transferred ...	7,31,543	14	5				
ARMY WORK IN INDIA—							
Deficit Transferred ...	9,39,753	1	1				
WORK IN EAST AFRICA—							
Deficit Transferred ...	77,691	2	0				
OTHER WORK—							
Deficit Transferred ...	2,18,726	7	7				
	23,74,263	4	8				
Balance, carried to Balance Sheet	9,35,727	9	0				
TOTAL Rs. ...	33,09,990	13	8	TOTAL Rs. ...	33,09,990	13	8

130

Compiled from Audited Statements for the years 1916, 1917, 1918.

NATIONAL COUNCIL Y.M.C.A., 1916, 1917, 1918.

OTHER WORK.

Income and Expenditure Account

	Rs.	As.	P.		Rs.	A.	P.
To Indian Army in France ...	39,060	1	2				
„ Indian Army in Egypt and Palestine ...	21,260	14	6	By International Committee:—			
„ Indian Prisoners in Germany ...	3,630	15	6	Grants-in-Aid to			
„ Association Press Subsidies ...	13,540	0	0	Local Work	Rs. 37,920	12	3
„ Boys' Work ...	6,921	13	10	Training and			
„ Building Department ...	1,886	11	0	Recruiting	... Rs. 9,442	15	4
„ Deputation of Friendly Service ...	37,030	14	9			47,363	11 7
„ Evangelistic Work ...	12,355	4	0	„ English National Council—Entire Support of Secretaries in civilian Local Work ...		9,914	0 9
„ Grants to Local Work ...	86,222	2	4	„ Railway Work ...		9,981	5 0
„ Physical Department ...	7,839	0	2	„ Rural Department, subscriptions as per schedule ...		18,079	15 3
„ Railway Department ...	9,148	4	0	„ Special Grant to Physical Work (Government Grant) ...		8,000	0 0
„ Rural Department ...	47,230	10	1	„ Special Grant to Boys' Work (from Government of Mysore for 1918) ...		2,400	0 0
„ Training and Recruiting ...	26,690	5	9	„ Association Press—Surplus transferred, 1916 ...		985	11 10
„ Student Department ...	2,634	2	11			96,724	12 5
				„ Deficit, carried to General Income and Expenditure Account ...		2,18,726	7 7
TOTAL Rs.	3,15,451	4	0	TOTAL Rs.	3,15,451	4	0

132

NATIONAL COUNCIL Y.M.C.A., 1916, 1917, 1918.

ARMY WORK IN INDIA.

Income and Expenditure Account.

	Rs.	As.	P.		Rs.	As.	P.
To Buildings, Equipment, and Special Grants	4,03,399	14	0	By Special Gifts	77,188	7	3
„ Recurring Grants to Branches	2,22,832	9	3	„ Deficit, carried to General Income and Expenditure Account	9,39,753	1	0
„ Salaries, Travel, and Allowances of Secretaries	3,90,709	1	1				
TOTAL Rs.	10,16,941	8	4	TOTAL Rs.	10,16,941	8	4

133

WORK IN EAST AFRICA.

Income and Expenditure Account

	Rs.	As.	P.		Rs.	As.	P.
To Equipment and Maintenance of Branches	44,007	4	11	By Deficit, carried to General Income and Expenditure Account	77,691	2	0
„ Salaries, Travel, and Allowances of Secretaries	33,683	13	1				
TOTAL Rs.	77,691	2	0	TOTAL Rs.	77,691	2	0

NATIONAL COUNCIL, Y.M.C.A.

Balance Sheet as at December 31st, 1919.

LIABILITIES.	Rs.	As.	P.	ASSETS.	Rs.	As.	P.
ENGLISH NATIONAL COUNCIL—				(OFFICE FURNITURE)	15,975	0	4
Suspense Account	7,060	9	9	STOCK ON HAND—			
INTERNATIONAL COMMITTEE—				Stores in Transit (Mesop. Canteens)	5,610	0	0
Indian Army Fund—Suspense	23,481	10	10	Stock in Trade	1,55,484	15	0
Contingent Fund	1,306	14	1	<u>1,61,094</u>	15	0	
Foreign Department	10,700	0	0	ADVANCES—			
Subsidies	796	4	9	Temporary	27,093	4	10
<u>36,284</u>	13	8		Permanent	6,190	0	0
AUSTRALIAN COMMITTEE	11,998	14	6	Foreign Secretaries'	4,942	12	3
WORLD'S COMMITTEE Y.M.C.A.	481	15	1	<u>38,226</u>	1	1	
EGYPT (Equipment)	2,433	11	2	CARTER WAR FUND			
I. C. T. FUND	528	13	2	Advance Recoverable	3,944	4	9
AFGHANISTAN EXPEDITIONARY WORK—				LOANS to Students (for Training)	6,764	8	5
Sundry Creditors	12,360	14	11	ENGLISH NATIONAL COUNCIL—			
WELLINGTON BRANCH, ARMY Y.M.C.A.—				Subsidies Outstanding	23,999	8	4
Grant held in trust	50,000	0	0	Suspense Account, (major portion since adjusted)	72,470	8	6
SALARIES DEPOSIT—held in trust	1,053	5	0	Busrah Office	2,200	0	0
WELFARE WORK—Empress Mills, Nagpur	2,609	10	0	<u>98,670</u>	0	10	
PHYSICAL DEPARTMENT	3,417	4	0	SCOTTISH NATIONAL COUNCIL—			
MESOPOTAMIA SUSPENSE ACCOUNT—				Advances Recoverable	847	3	2
Sundry Creditors, etc.	20,149	7	1	INTERNATIONAL COMMITTEE ACCOUNT—			
HEADQUARTERS BUILDING FUND—Surplus of				Indian Army Fund	1,13,262	10	0
Rents realized, set aside for Repairs, etc.	5,778	4	2	Subsidies	8,381	4	10
PROVIDENT FUND—Contributions held in trust	2,230	0	0	<u>1,21,643</u>	14	10	
				NEW ZEALAND Y.M.C.A.	177	0	3
				EVANGELISTIC CAMPAIGN FUND—			
				Advances Recoverable	3,010	13	8

134

FURLOUGH RESERVE—Provision for the Secretaries	Rs. 1,420	2	6
BANK OF BENGAL—Overdrawn	Rs. 1,42,525	1	3
ACCUMULATED BALANCE FOR WORKING CAPITAL—			
Balance at Dec. 31st, 1918	Rs. 8,28,698	9	9
Less: Excess of Expenditure over Income for the year	Rs. 2,94,626	14	4
		<u>5,44,071</u>	<u>11 5</u>
		<u>8,57,404</u>	<u>9 8</u>

STUDENT CHRISTIAN ASSOCIATION	Rs. 723	11	3
UNITED PROVINCES CAMPAIGN FUND—			
Funds in the hands of the Hony. Treasurer	Rs. 1,272	10	0
INVESTMENTS—			
	Rs.	As.	P.
Loan to Building Fund	25,000	0	0
War Bond Investment	3,12,000	0	0
Cash Certificates	170	8	0
		<u>3,37,170</u>	<u>8 0</u>
CASH ON HAND Dec. 31st, 1919—			
Banks	Rs. 17,549	8	6
Cash in Hand	270	1	11
Mesop. General Cash, in Bank, hand, and transit	Rs. 47,064	3	8
Cashier's Contingent Fund	3,000	0	0
		<u>67,883</u>	<u>14 1</u>
		<u>8,57,404</u>	<u>9 8</u>

135

We have audited the above Balance Sheet as compiled from the Books of the National Council Y.M.C.A. in which are incorporated the returns of the Mesopotamia Branches, and have obtained all the information and explanations we have required. In our opinion such Balance Sheet exhibits a true and correct view of the state of affairs of the Council according to the best of our information and the explanations given to us and as shewn by the Books of the Council.

Calcutta, November, 16th, 1920.

MEUGENS PEAT & Co., Auditors,
Chartered Accountants.

NATIONAL COUNCIL Y.M.C.A.

General Income and Expenditure Account, 1919.

ADMINISTRATION—	Rs.	As.	P
To Stationery, Office Supplies and Equipment ...	19,430	6	8
Postage and Telegrams ...	17,360	2	0
Purchasing and Despatching Expenses ...	5,197	1	10
Office Rent and Maintenance ...	10,918	15	3
Salaries of Secretaries and Staff ...	1,18,472	9	4
Allowances " " ...	24,600	4	10
Travel " " ...	30,054	12	10
Secretaries' Conference ...	3,019	4	1
Travelling Expenses Local Secretaries ...	3,347	8	3
Salaries, Allowances & Expenses of Men Abroad paid by our London Office ...	23,568	8	4
Passages and Expenses of Secretaries to India from Abroad ...	22,980	9	6
Passages and Expenses of Secretaries leaving India for Abroad ...	2,05,927	12	10
Less Transferred from Reserve ...	97,146	10	0
	1,08,781	2	10
Furlough Expenses ...	2,649	13	0
Book Grants to Indian Secretaries ...	387	7	3
Contributions to Co-operating Organizations ...	2,840	0	0
Prayer Cycle ...	143	15	0
Provident Fund ...	1,718	14	0
Advertising and Publicity ...	30,118	12	8
	4,25,590	4	4
Mesopotamia Income and Expenditure Account—Deficit Transferred ...	2,28,424	4	0
Army Work in India—Deficit Transferred ...	4,86,509	4	0
Other Work " " ...	2,05,452	12	10
	13,45,976	9	2

	Rs.	As.	P
By Association Subscriptions ...	1,686	0	0
Subscriptions, as per Schedule:			
International Committee ...	4,05,187	12	7
Less Refund to Foreign Dept. Int. Committee ...	53,500	0	0
	3,51,687	12	7
English National Council Campaigns and Individuals ...	3,40,380	5	7
Less Direct payments to co-operating local Associations ...	9,150	0	0
	3,31,230	5	7
Gain in Exchange ...	31,967	14	10
Interest from Investments and Banks ...	12,065	3	11
Sundry Equipment returned from Branches net proceeds ...	4,603	10	5
International Committee—Administration Subsidies ...	2,727	10	8
English National Council—for entire support of Secretaries in Administrative work ...	3,785	4	6
Special Gifts from American Indians for work of John Devadas ...	514	10	1
	10,47,379	11	3
Work in East Africa—Surplus Transferred ...	3,909	15	7
	10,51,349	10	10
Balance carried to Balance sheet ...	2,94,626	14	4
	13,45,976	9	2

136

NATIONAL COUNCIL Y.M.C.A.

ARMY WORK IN INDIA.

Income and Expenditure Account, 1919.

	Rs.	As.	P.		Rs.	As.	P.
To Special Grants	By Special Gifts, as per schedule	...	...	...
„ Grants to Branches	„ Special Grant from Government of India for	5,327	14	0
„ Periodicals	Work with the Afghanistan Field Force,			
„ Libraries and Publications	1919	...	...	50,000 0 0
„ Printing and Stationery				55,327 14 0
„ Salaries	„ Deficit carried to General Income and Expendi-			
„ Allowances	ture A/c.	...	...	4,86,509 4 0
„ Travelling Expenses				
„ Equipment Stock				
„ Buildings				
	5,41,837	2	0		5,41,837	2	0

138

WORK IN EAST AFRICA.

Income and Expenditure Account, 1919.

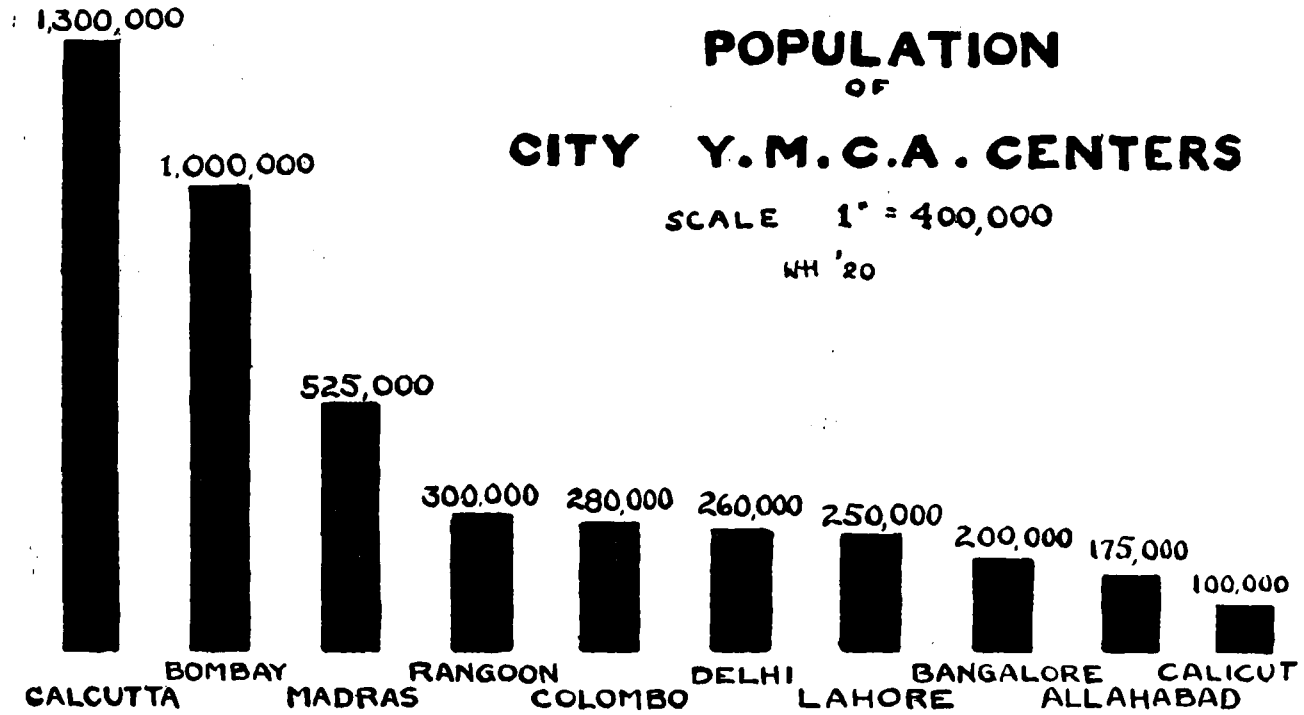
	Rs.	As.	P.		Rs.	As.	P.
To Equipment and Gifts	...	...	...	By Refund from Field on closing work	...	...	...
„ Salaries, Allowances, and Travelling Expenses	...	...	...		13,822	7	4
	9,852	7	9				
„ Surplus carried to General Income and Expendi-							
ture A/c.	...	...	...	
	3,969	15	7				
	13,822	7	4				

NATIONAL COUNCIL Y.M.C.A.,

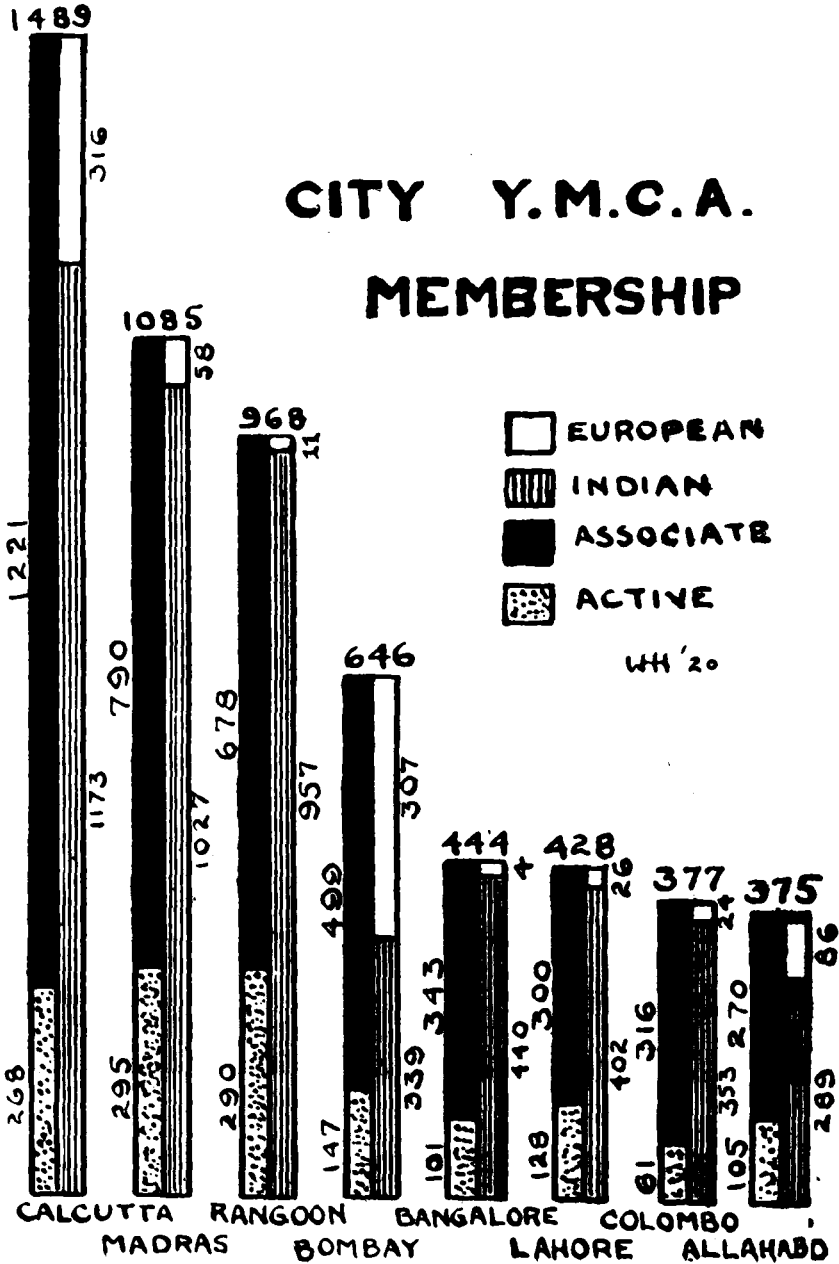
OTHER WORK

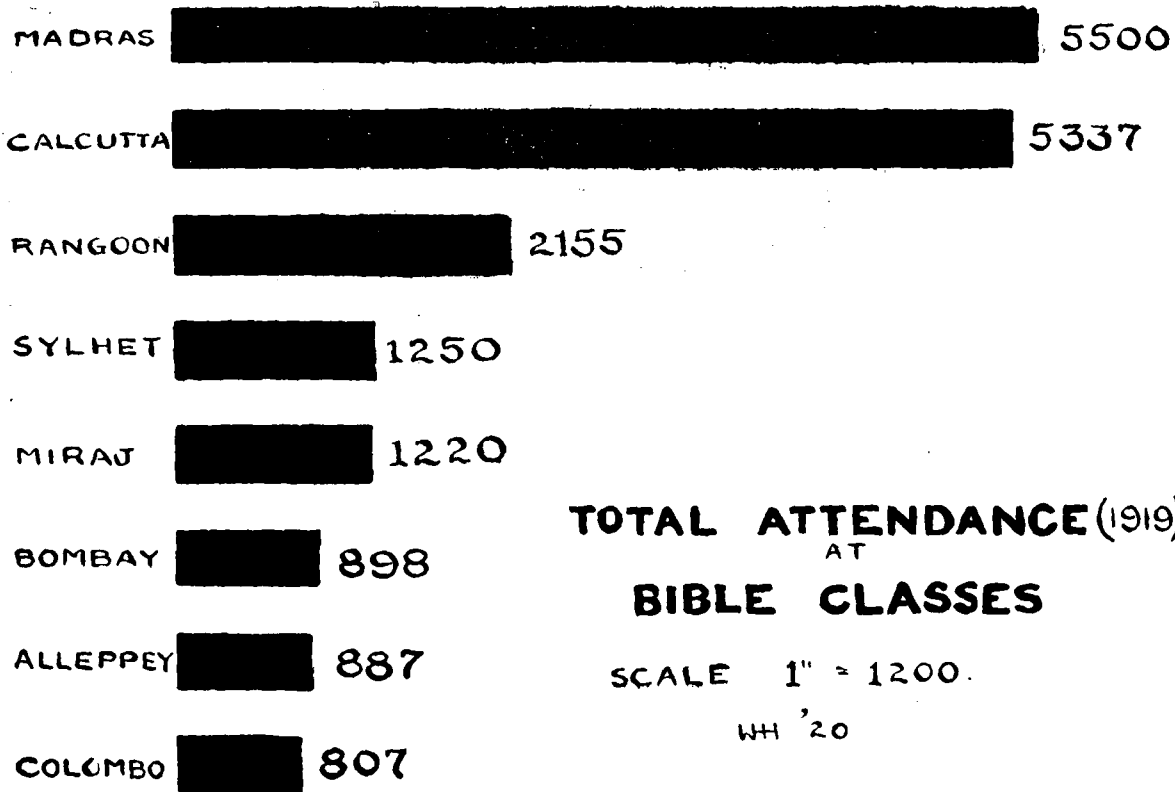
Income and Expenditure Account, 1919.

	Rs.	A.	P.		Rs.	A.	P.
To Indian Army in France,—Salaries, Allowances, and Travelling Expenses	66,627	15	1	By Special Gifts for work overseas ...	5,500	0	0
" " " —Equipment, Gifts and Periodicals	3,666	11	6	Boys' Work			
" " Egypt and Palestine—Salaries, Allowances and Travelling Expenses	24,376	3	2	Special Grant from Govt. of Mysore	800	0	0
" " Egypt and Palestine—Equipment and Gifts	25,159	13	10	From International Committee	2,495	15	10
" " Constantinople	3,362	14	8	From English National Council	1,365	4	0
Work for Demobilized Sepoys	1,950	0	0	<u>4,661</u>	<u>3</u>	<u>10</u>	
Letter-writing for Indian Troops—Punjab Agency	131	3	0	International Committee:—			
Association Press Subsidy	9,138	15	1	Grant-in-Aid to Local Work	12,944	11	8
Boys' Work	6,382	12	9	Training School	7,821	3	9
Deputation of Friendly Service	1,238	0	9	Scholarships Abroad	4,495	13	0
Evangelistic Work	10,616	11	3	<u>25,261</u>	<u>12</u>	<u>5</u>	<u>139</u>
Grants-in-Aid to Local Work—Salaries, Bldgs., etc.	33,979	14	11	Entire Support of Secretaries in Civilian work:—			
Entire Support, Secretaries in Civilian Work.	13,557	9	1	English National Council	9,348	14	1
Railway Department	2,998	12	0	National Committee of Y.M.C.A.,			
Rural Department—Salaries	24,163	11	2	Australia and New Zealand	5,046	3	10
" " other expenses	11,577	0	11	<u>15,295</u>	<u>1</u>	<u>11</u>	
Training and Recruiting	25,908	4	4	Railway Work	3,000	0	0
Student Department	1,591	12	0	Rural Department—Subs. as per Schedule	7,257	6	6
<u>2,66,428</u>	<u>5</u>	<u>6</u>		<u>60,975</u>	<u>8</u>	<u>3</u>	
				Deficit carried to General Income and Expen. A/c	2,05,452	12	10
				<u>2,66,428</u>	<u>5</u>	<u>6</u>	
				<i>Note</i>			
				Special Grant for Physical Work			
				(Govt. Grant)	4,000	0	0
				Less expended	582	12	0
				<u>3,417</u>	<u>4</u>	<u>0</u>	
				Funds carried forward			
				Special Grant from Empress Mills,			
				Nagpur, for Welfare Work	5,000	0	0
				Less expended	2,390	6	0
				<u>2,609</u>	<u>10</u>	<u>0</u>	
				Funds carried forward			



CITY Y.M.C.A. MEMBERSHIP





TOTAL ATTENDANCE (1919)
 AT
BIBLE CLASSES

SCALE 1" = 1200.

WH '20

15,570



MADRAS

9,478



BOMBAY

8510



KUNNAMKULAM

5251



RANGOON

3773



CALCUTTA

3180



BANGALORE

2785



ALLAHABAD

2270



LAHORE

2240



CALICUT

2150



COIMBATORE

2040

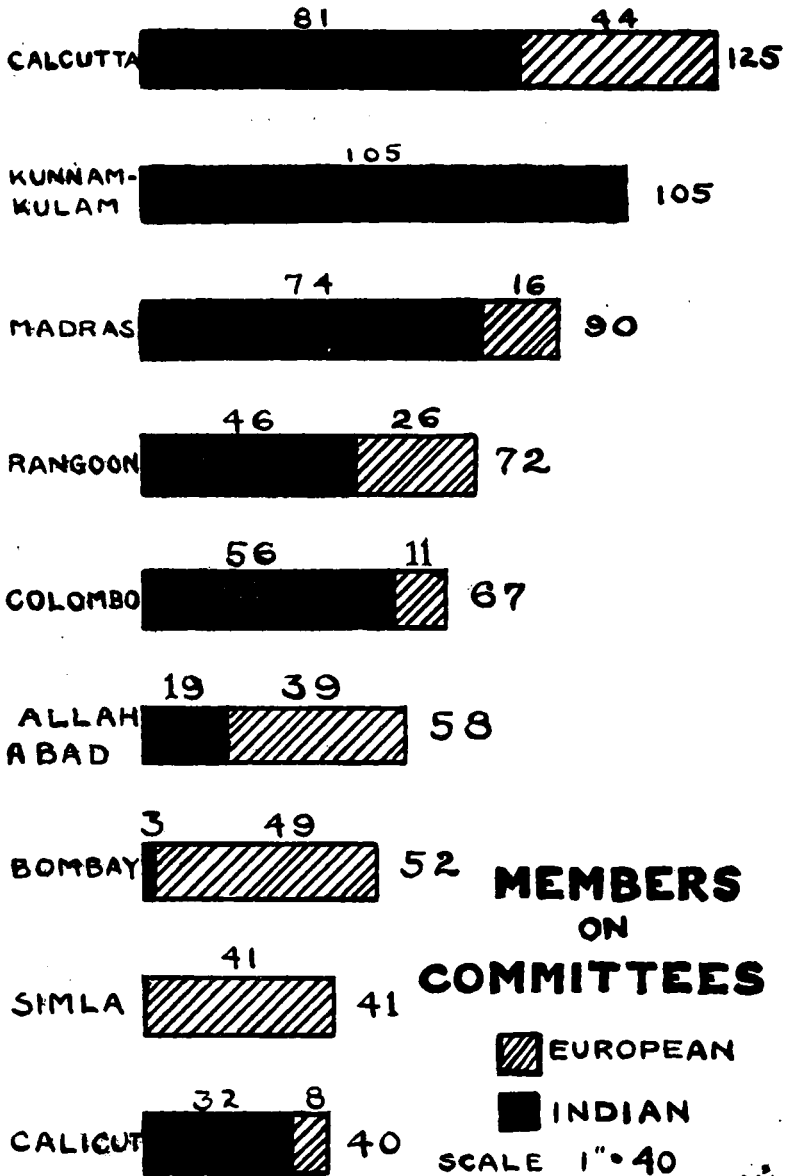


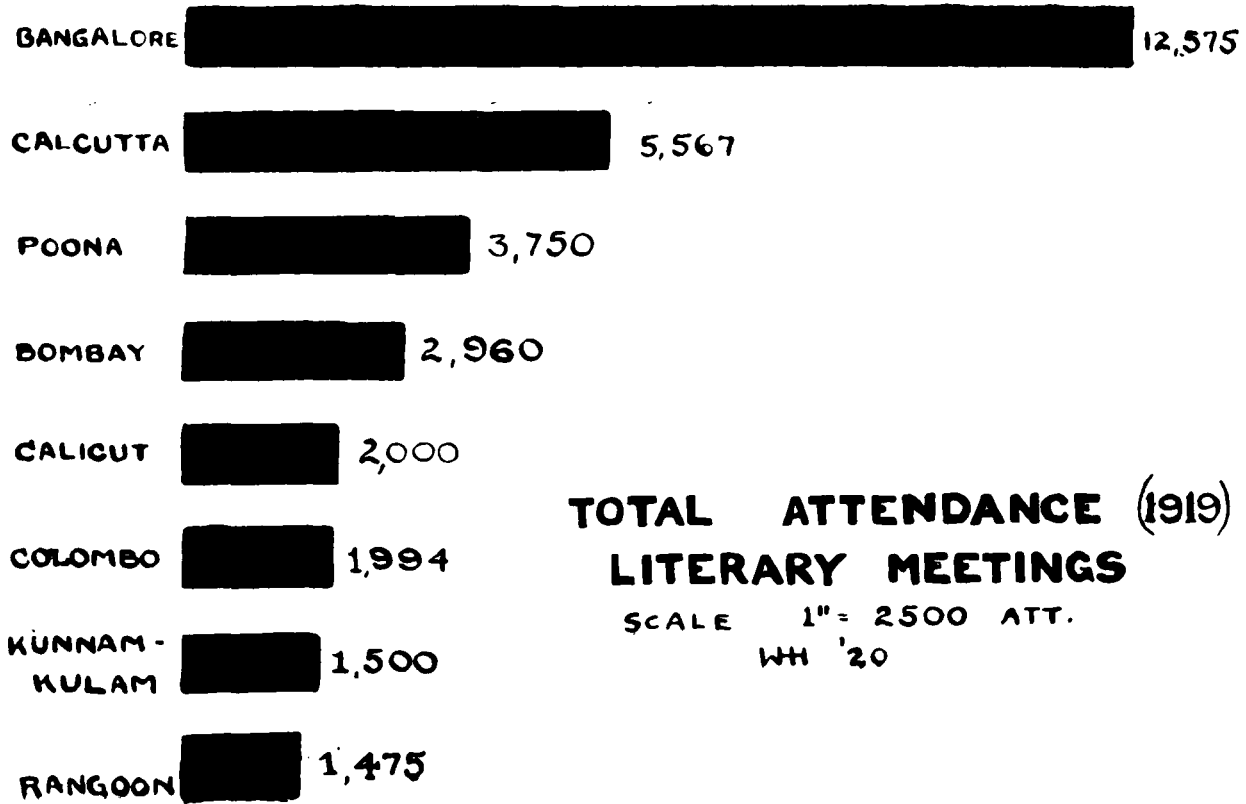
SYLHET

TOTAL ATTENDANCE (1919)
AT
RELIGIOUS MEETINGS

SCALE 1" = 4000

WH '20





CALCUTTA



MADRAS

30,552



11660

JAMALPUR



9,300

ALLAHABAD



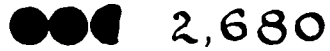
7,866

COLOMBO



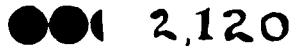
6,594

BANGALORE



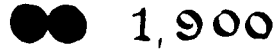
2,680

RANGOON



2,120

BOMBAY













1,900

TOTAL ATTENDANCE (1919)
 AT
PHYSICAL SESSIONS

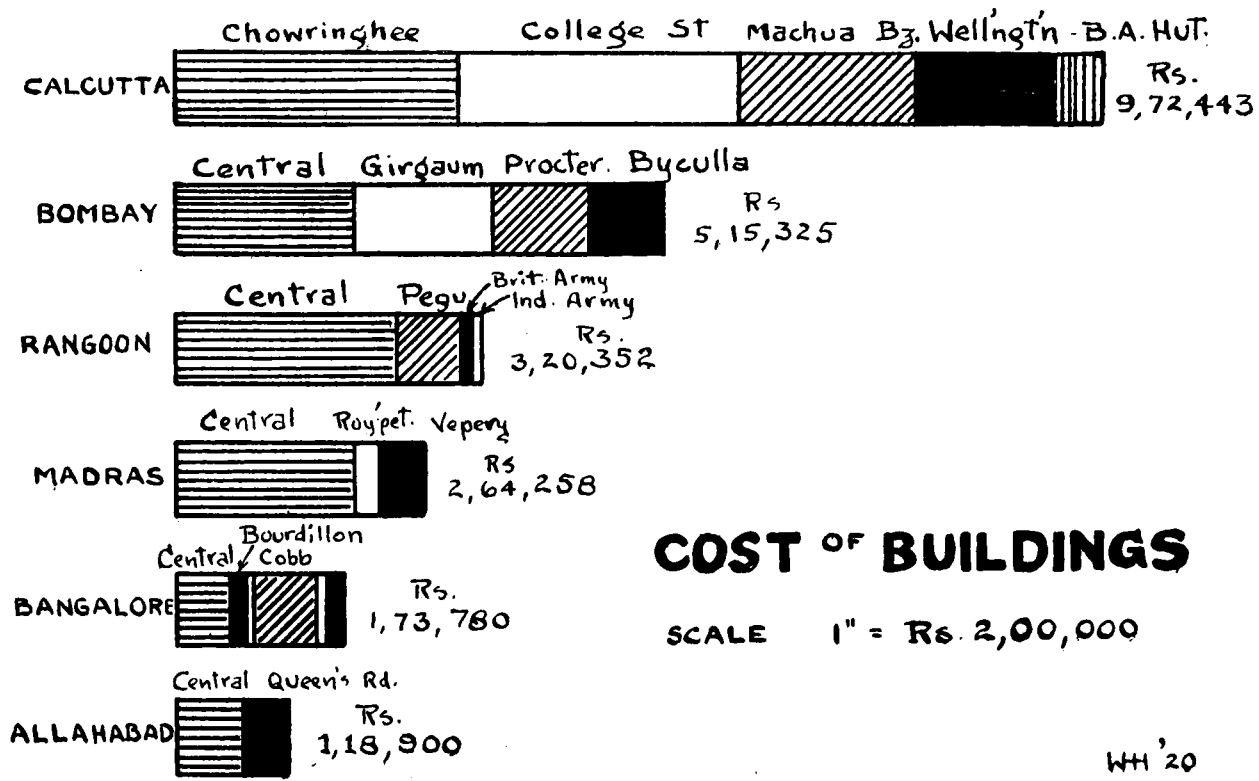
EACH CIRCLE = 1000

WH '20

BOMBAY		18,600
JAMALPUR		18,500
CALCUTTA		3,895
MADRAS		3,450
BANGA- LORE		2,490
RANGOON		2,235
ALLA- HABAD		1,750
KOTTYAM		1,400
POONA		1,200
COLOMBO		787

TOTAL
ATTENDANCE
SOCIAL MEETINGS
1919

WH20



COST OF BUILDINGS

SCALE 1" = Rs. 2,00,000

WH '20

CALCUTTA [REDACTED] Rs. 75,815

BOMBAY [REDACTED] Rs. 38,362

RANGOON [REDACTED] Rs. 31,648

MADRAS [REDACTED] Rs. 28,947

COLOMBO [REDACTED] Rs. 21,055

LAHORE [REDACTED] Rs. 20,871

ALLAH'BD [REDACTED] Rs. 16,070

CURRENT EXPENSES

OF

CITY Y.M.C.As.

SCALE 1" = Rs 16,000

WH 20

APPENDIX I.

STANDARDIZATION OF INDIAN SECRETARIAT.

I. THE CADRE.

1. There shall be one cadre of Association Secretaries in India and Ceylon as recognized by the National Council of the Y.M.C.A.'s of India and Ceylon, in the name of the National Union of Affiliated Associations.

2. Enrolment in this cadre shall be by (a) enrolling the secretaries who have completed the course of probationership and training indicated in the articles hereunder; (b) receiving the secretaries lent or nominated by the International Committee of New York, and the National Councils of England, Scotland and Australia; (c) an annual roll of the cadre shall be corrected and recorded at the end of each year.

II. RECRUITMENT.

1. The responsibility to recruit probationers shall vest in (a) the General Secretaries of Allahabad, Bangalore, Bombay, Calcutta, Colombo, Delhi, Lahore, Madras, Poona, Rangoon and such other cities as shall be added to this list from time to time; (b) such of the Heads of Departments directly worked by the National Council and such Provincial Secretaries, as are authorised by the National Council; (c) the National General Secretaries.

2. In addition to the qualities required for Association secretaryship anywhere, such as spiritual purpose, physical fitness, social gifts, powers of initiative and organization, conditions of Association work in India demand— (a) university education, (b) ability to hold happy fellowship with men of different races and belonging to different parts of India and Ceylon, (c) membership in a recognized Church, and (d) that age do not exceed 25 years. Exceptions to sections (a) and (d) may be made by special sanction of Council.

3. Before recruiting, careful enquiries should be made as to antecedents and experience with particular reference to the qualifications mentioned above, and a memorandum giving full details should be furnished to the Council, including a medical certificate from a competent practitioner acceptable to the Council.

4. The Association is pledged to work in comity with the other Christian organizations in the country; this should be observed in the matter of recruitment.

5. It should be a condition of enlistment as probationer that the candidate is willing to undergo a course of suitable training as arranged for by the Training Department of the National Council. For this reason he shall be put in touch with the Training Department immediately on recruitment.

III. PROBATIONERSHIP.

1. All candidates shall undergo a specified period of probationership, which will ordinarily be one year. On the expiry of this period, if no action has been moved by either party, the probationership continues indefinitely until action is taken either way.

2. During the period of probation, remuneration shall be as determined between the probationer and the paying body.

3. In determining whether a probationer should continue connection with the Association, the National Council will be guided chiefly by the opinion of members of the National Secretarial Staff and of the local Associations in which he has worked.

4. The Probationer shall then, ordinarily, become a "candidate" and be passed on to the Training Department, which will determine what course of training, if any, he should take.

5. When a candidate has been for six months under the Training Department it shall indicate whether he could continue further.

6. In the light of this report, the National Council shall determine whether the candidate should be placed on the cadre of secretaries or should have a further period of trial or at once cease connection with the Association. If the decision is for admission to the cadre, it shall be on the condition that he will continue the course prescribed for him by the Training Department, until he has completed it to the satisfaction of the Department.

IV. TRAINING.

1. There shall be constituted a Training Department which will be responsible for (a) a School of Training for candidates and others; (b) Summer and other sessional schools for groups; (c) determining and arranging for the special training of men in need of such; (d) correspondence courses and the direction of research work such as may from time to time be required; (e) recommendations as to arrangements for the training of secretaries abroad; (f) advising probationers as to any courses of study preparatory to entering the School of Training.

2. (a) The remuneration of candidates in the School of Training shall be determined on the recommendation of the Training Department.

(b) Family allowance during the period of training to candidates shall be fixed by the body responsible for payments to the candidates in consultation with the Training Department.

V. ASSIGNMENTS AND TRANSFERS.

At the close of the training course, local Associations may negotiate with unassigned men, either direct or through the National Council. Engagement for services shall be on the following conditions :—

(a) that during the first three years of a secretary's service in a local Association neither the National Council nor any other local Association should initiate any suggestion for transfer within that period. The employing local Association may move for his transfer, giving him six months' notice. If a transfer is desired by the secretary, he should move the local Association (with a notice of six months) which should bring the matter to the notice of the National Council, even when it opposes his motion. Ordinarily no engagement of a secretary shall be made for less than three years.

(b) that the support of the secretary shall be the responsibility of the local Association; any grant-in-aid received by the local Association towards the man's budget should be arranged on a sliding scale looking towards its complete disappearance in as short a time as possible. Allowances; contributions towards Provident Funds, travelling expenses to Secretaries' Conferences shall rest on the local Association and be included in its budget. The grant-in-aid shall be the only charge of the National Council, and should in every case be paid to the local Association.

(c) that the local Association shall undertake to collect from the secretary all his obligations to the National Council, regarding which full information should be furnished to the local Association before the engagement is finally made. The National Council shall not add to these obligations after the engagement, without the assent of the local Association. The normal rate of payment shall be 10 per cent of the secretary's monthly salary.

(d) that the salary, etc., of a secretary on transfer shall be met by the Association he leaves till the actual termination of connection and for such period as he is entitled to as vacation.

The inviting Association shall pay all the expenses of the transfer.

(e) that if a secretary has no invitation from a local Association or a National Department, he will be given a subsistence allowance by the National Council, for not more than three months.

VI. SCALE OF SALARIES AND ALLOWANCES.

(a) Under consideration of Council.

(b) Medical allowance should be given for actual doctor's fees and prescriptions up to a maximum of Rs. 50 for bachelors and Rs. 150 for married men.

Every case requiring a local allowance will also be considered as a special case by the Council.

VII. TRAVEL.

1. Secretaries whose duties require constant travelling all over the country shall be allowed Second Class fare.

2. The Class to be allowed to Secretaries proceeding to join duty or on transfer or going on leave and to secretaries proceeding to conferences, camps, Summer Schools, Training School, or on special duty, shall be as determined by the Head of the Department or the National General Secretary.

Expenditure on food while travelling will be allowed Rs. 5 a day while on train, Rs. 2-8 a day while halting, for secretaries under Class I. In regard to secretaries Under Class II, a flat rate will be fixed by the person responsible for determining the Class of train-travel.

VIII.

The Provident Fund should be made more comprehensive than at present making the savings available not only for study but also as a Retiring Endowment.

APPENDIX II.

MEMORANDUM OF ASSOCIATION.

(Registered under Act XXI of 1860 on the 13th May, 1911)

1. The name of the organization is "The National Council of the Young Men's Christian Associations of India and Ceylon."
2. The office of the Council will be situated in Calcutta.
3. The objects for which the Council is established :—
 - (a) To facilitate the work of the National Union of Young Men's Associations in India and Ceylon.
 - (b) To take over the whole or any of the building assets and liabilities of the unincorporated organizations known as Young Men's Christian Associations in India and Ceylon.
 - (c) To form organizations of Young Men's Christian Associations and federate them with the National Union.
 - (d) To foster the various departments of the Associations, viz. : the physical, social, educational and religious departments; and to assist in the securing, training, and locating of secretaries, and in securing funds for the erection of buildings, the maintenance of the work, etc.
 - (e) To employ travelling secretaries and departmental specialists for supervising, encouraging, and extending the work of the Associations.
 - (f) To promote work for special classes: boys, students, railway men, soldiers, etc.
 - (g) To arrange national conventions, week-end conferences, student camps, and training institutes.
 - (h) To publish the Young Men of India, Inquirer, and such Bible study, mission study, social service, and devotional literature for young men as is demanded by the Associations and is for their development and extension.
 - (i) To secure the services of Bible study and mission study specialists for special tours among the Associations of India and Ceylon.
 - (j) To provide and conduct a school for the training of general secretaries, physical directors, and Bible teachers, and such hostel facilities and library facilities as are necessary for the best development of the School, and the Young Men's Christian Associations of India and Ceylon.
 - (k) To purchase, take on lease or hire, or otherwise acquire and hold any movable or immovable property or any right or privileges necessary or convenient for the purposes of the National Council and the National Union of Young Men's Associations of India and Ceylon.
 - (l) To construct or alter and keep in repair any buildings required or used by or for the National Council and Associations of the National Union of Young Men's Christian Associations of India and Ceylon.
 - (m) To invest the moneys of the National Council not immediately required in such securities as may be determined on from time to time.

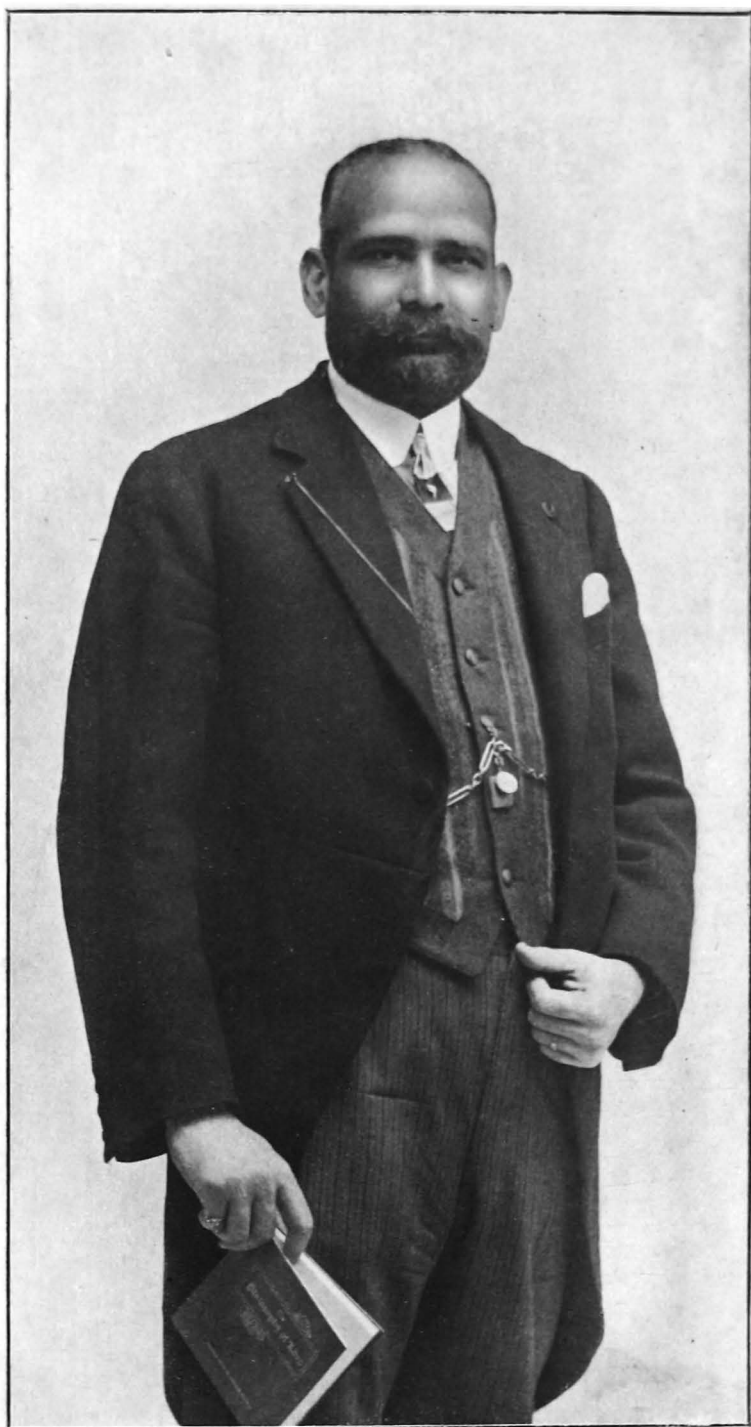
- (n) To promote, subscribe or assist or amalgamate with any other society or association, whether incorporated or registered, and having objects altogether or in part similar to those of this organization.
- (o) To borrow or raise money at interest upon banking account or otherwise by the issue of or upon bonds, promissory notes, debentures, or other obligations or securities of the National Council.
- (p) To execute or register all deeds and documents necessary for any of the purposes aforesaid and to do all such other things as are incidental or conducive to the attainment of the above objects or any of them.

4. The income and property of the National Council whencesoever derived shall be applied solely towards the promotion of the objects of the National Union of Young Men's Christian Associations of India and Ceylon as set forth in this Memorandum of National Council and no portion thereof shall be paid or transferred directly or indirectly by way of dividend, bonus, or otherwise howsoever by way of profit to the members of the National Council PROVIDED that nothing herein contained shall prevent the payment in good faith of remuneration to any officers or servants of the National Council or to any member thereof or other person in return for services actually rendered to the National Council.

5. True accounts shall be kept of the sums of money received and expended by the National Council and the matter in respect of which such receipt and expenditure take place and of the property, credits, and liabilities of the National Council and subject to any reasonable restrictions as to the time and manner of inspecting the same that may be imposed in accordance with the regulations of the National Council for the time being; such accounts shall be open to the inspection of the members. Once at least in every year the accounts of the National Council shall be examined and the correctness of the balance sheet ascertained by one or more properly qualified auditor or auditors.

6. It shall be lawful for the National Union of Young Men's Christian Associations of India and Ceylon from time to time to alter or amend its constitution but only by a vote of two-thirds of the voting members present at any convention; and provided that the amendment shall have been proposed in writing at the previous convention, and that previous notice of the same shall have been given to all Associations composing the National Union, or that a written copy of the amendment shall have been circulated to all Associations in the National Union of India and Ceylon six months in advance of a convention.

7. If upon the dissolution of the National Council there remains after the satisfaction of all its debts and liabilities any property whatsoever, the same shall not be paid or distributed among the members of the National Council but shall be given or transferred to some institution or institutions having objects similar to the objects of the National Council to be determined by the members of the National Council at or before the time of dissolution and in default thereof by such Judge of the High Court at Calcutta as may have or acquire jurisdiction in the matter.



WOMAN UNDER CHRISTIANITY

BY
SHAIKH M. H. KIDWAI *of* GADIA

PUBLISHED BY
THE ISLAMIC REVIEW, THE MOSQUE, WOKING

TO
THE SAD
BUT EVER-GREEN MEMORY
OF MY LATE
LAMENTED
WIFE

Woman Under Christianity

Before we begin this chapter we should like to explain the following two points to save any misunderstanding.

(1) We have the greatest possible respect for Jesus as a Prophet, a Reformer, and a Man. His teachings and the laws he really laid down could not but be good. But the original words in which he taught and any authentic contemporary records of the life he led are absolutely extinct, and he, being an Asiatic, the parables and metaphors he used and the right import and significance of his teachings were not properly, and in certain respects not rightly, understood by those European translators and writers who are responsible for the modern versions of the Bible. Jesus himself is in no sense responsible for those blasphemous conundrums that are supposed to be the religion of Christ and go under the name of Christianity, or for those vices and immoralities—some of which we shall have to discuss in the following pages—which are found in the religious, civil, and social laws of such nations as pretend to follow the teachings of that exalted and holy man—Jesus of Nazareth. For example, we do not believe that Jesus was disrespectful to his mother, as some versions of the Bible allege.

(2) Even when we do not express our explicit disagreement from all those Christian apostles whom we shall freely quote as the best religious authorities, who have piled vituperations upon the woman sex, or those Christian writers as good civil or social authorities who have run down woman, it must not be taken that we agree with them. On the contrary, we believe that human nature, as animal nature, is the same in the East and the West, the North and the South. The difference in latitude and longitude, in colour or even in creed, does not change human nature. There are good men and women and bad men and women everywhere. Woman as a woman is virtue-loving, sentimental, affectionate, gentle, sympathetic all over the world, even when she is in barbarous countries and under savage laws. Our respect and love for European woman, Christian woman, as a woman, i.e. when she is not unsexed, is great. We have no doubt that in a few respects the civilization that goes by the

name of Western civilization is somewhat superior to that civilization which goes to-day under the name of Eastern civilization. In fact we think that a union of the two civilizations, which can perhaps be quickened by intermarriages between the people under these two different civilizations, would evolve a very good civilization if it takes some of the good of the one and some of the good of the other to weaken the failings of the two.

We also think that the life of European woman and even man is much more regular and systematized to-day than that of an Asiatic. We admit that generally speaking even Muslim women, notwithstanding the commandments of their religion to seek knowledge, are in education and literacy far behind Christian women, although the latter have no religious commandments to acquire knowledge, just as now Muslim men are, in education and scientific progress, far behind Christian men who were once their pupils. We have no hesitation in saying that the advancement in education has produced very good results, and but for that the moral condition of women as of men under the so-called Christian civil and social laws would have been much worse than it is. We ourselves favour monogamy, which modern civilization of the West has adopted as a rule, although we do not consider polygamy a sin or anathema.

What our aim in this chapter shall be is to show how Christianity, as a religion, a moral power, a social institution, has treated woman and with what results. We shall endeavour to put a looking-glass which will reflect the condition, past and present, and some even future, of woman under the religion that goes by the name of Christianity, and under the civilization which is called the Christian civilization. In the same way in the next chapter we will show how Islam as a religion, a system, a law, treats woman, and what is the effect of that in respect of the religious, social, and moral conditions of woman when Islam is acted upon.

Every impartial person will see that perhaps there is no religion in the world which has so lowered and degraded woman as that religion which professes to worship a God, or the son of a God, born of woman alone without the agency of a male. Christians do not recognize the immaculate conception of Lords Krishna and Buddha, but they feel proud of the immaculate conception of their "Saviour."

Although they deny a father to their God or part of a God, they do not deny him a mother. And the major portion of them almost adore that mother too. They believe that to save mankind from sin, as the intercession of the "son" is required with the "Father," so also the intercession of the mother is needed with the son. Roman Catholics give a high place to the Virgin Mary in their pantheon of saints and gods. Yet all the Christians, reformed or unreformed, Catholics or Protestants, have based the very foundation of their religion on the criminality of woman. They have not only accepted the Hebrew story of the "fall of Adam," but have gone so far as to weave a network of blasphemous superstition round about it: that Eve ate the forbidden fruit first, and then instigated Adam to do so, who out of his love for her complied with her wishes so that she might not suffer alone the punishment of a revengeful God; that God sent them both down on the earth and the curse of their sin became ineradicable, so much so that every man born of woman is born in sin and the whole humanity required a saviour to satisfy by his own blood the wrath of a relentless, unforgiving, vindictive God; that that saviour, although a part and parcel of God Himself, came in the human form on this earth, was born of the Virgin Mary, lived for a few years among the fishermen of Galilee, claimed to be the King of Jews who put him on the cross, although he himself made every human effort to save himself from that ignoble death which was inflicted upon thieves and murderers, and with which his gospel—the Old Testament, in which he implicitly believed, had threatened FALSE prophets. Thus the whole fabric of Christianity rests upon the criminality of woman. If Eve had not shown the frailty of going astray, if she had not tempted innocent, childlike Adam, sin would not have become inherent in human nature, and no saviour would have been required, no spilling of human blood would have been needed to "cleanse." No wonder that pious and saintly Christians like St. Bernard, St. Antony, St. Bonaventur , St. Jerome, St. Gregory the Great, and St. Cyprian, all cursed woman, and showered such abuses upon the sex as "the organ of the devil," "the foundation of the arms of the devil," "a scorpion ever ready to sting," "the gate of the devil and the road of iniquity," "the poison of an asp, the malice of a dragon," and "the instrument which the devil uses to gain possession of our souls."

No wonder that Tertullian defined woman as "the devil's gateway, the unsealer of the forbidden tree, the deserter of the divine law, the destroyer of God's image—man." No wonder that he accused woman thus: "Do you not know that you are each an Eve; the sentence of God on this sex of yours lives in this age; the guilt must of necessity live too?" No wonder that he groaned thus: "On account of your desert—that is, death—even the son of God had to die." No wonder that that great Christian saint Chrysostom whined as follows: "Woman is a necessary evil, a natural temptation, a desirable calamity, a domestic peril, a deadly fascination, and a painted ill."

The Vicar of Crantock has summed up in the following words the complete inferiority of woman to man in different aspects and stages:—

- (a) Man's priority of creation :
Adam was first formed, then Eve.
- (b) The manner of creation :
The man is not of the woman, but the woman of the man.
- (c) The purport of creation :
The man was not created for the woman, but the woman for the man.
- (d) Results in creation :
The man is the image of the glory of God, but woman is the glory of man.
- (e) Woman's priority in the fall :
Adam was not deceived, but the woman, being deceived, was in the transgression.
- (f) The marriage relation :
As the church is subject to Christ, so let the wives be to their husbands.
- (g) The headship of man and woman :
The head of every man is Christ, but the head of woman is man.

Up to this day, under the marriage law of the Christian Church, a woman, when getting married, has to pledge solemnly to obey her husband. Both in Great and Little Russia, even to-day, the ceremony of the bride taking off the bridegroom's boots for the first time is very important. In certain parts of Great Russia the old custom still clings, that as the bride-

groom is about to take the bride from her house, her father takes a specially prepared whip, strikes his daughter gently with it, saying he has done it for the last time. He then presents the whip to the bridegroom.

Towards the end of the sixth century, the same century when the real Redeemer of the woman sex rose from Arabia, at the Council of Mâcon a bishop even raised the question whether woman really was a human being. He himself answered the question in the negative, but the majority of the assembly took a more lenient and "chivalrous" view and considered it to be proved that woman, although she was no doubt full of defects, was yet a member of the human race. Still some of the Fathers of the Church were careful to emphasize that womanhood only belongs to this earthly existence, and that on the day of resurrection all women will appear in the shape of sexless beings.

A council held at Auxelle forbade women to receive the Eucharist into their naked hands, and in various canons women were enjoined not to come near to the altar while Mass was celebrating. This sounds like a primitive Hindu custom. If a woman, a dog, or a Sudra touched a consecrated idol its godship was destroyed, and if that idol happened to be of clay, it should be thrown away, otherwise the ceremonies of deification must be performed afresh.

Jesus said that he had come to fulfil the Law, so he accepted "Thy desire shall be to thy husband and he shall rule over thee" as the maxim of a married life for women. Jesus himself, it is said, was disrespectful to his own saintly mother, and addressed her in a way which would never be allowed in any respectable society to-day. St. Paul, to whom modern Christianity is much more indebted than it is to Jesus himself, and whose personality, too, is much more historical, dictates: "Neither was the man created for the woman, but the woman for the man"; and again: "Let the woman learn in silence, with all subjection, for I suffer not a woman to usurp authority over the man, but to be in silence." Woman cannot touch the pulpit and the altar. In the Church of England, by law, she is in practice counted a thing unclean. The gulf between the sexes in non-Catholic churches is as wide as in the Catholic.

In fact, even if Christianity had not such a weak religious foundation as to be unable to stand firm before the attacks of rationalism, it would have still been doomed because of the insults

offered by its religious heads and founders to more than half the creation of the world. No self-respecting woman, who has any regard to the honour of her sex, would care to associate herself with such a religion which has nothing but curse and vituperation for her, and which has based the fundamental principles of its faith on the supposed double criminality of woman—first of her own disobedience to her Creator, secondly of instigating an innocent man to share in her crime, and thus involving the whole humanity in a sin which could not be “cleansed” but by the sacrifice of one who was at least half human.

If Judaic belief also had not involved woman in criminality perhaps all the Christian women would have blessed that nation for having put the “man-god” on the cross, and thus secured some atonement for their sin, at least for that portion of humanity which has not developed sufficient reasoning power as to see that there can be no possible connection between the sacrifice of one individual and the sins of all mankind. But the worst of all is this, that although “the only-begotten son of God” has been sacrificed, although the Jews obliged humanity by putting an innocent man on the cross, although Christ’s blood is supposed to have made atonement for the crime, yet Mother Eve’s sin has not yet been forgiven, either by God or by man, yet every human soul is born a sinner, yet woman bears the stigma of being instrumental in making the whole humanity sinful!

What is the proportion of those people who believe in the cleansing power of the blood of Christ and in his saviourship as compared with those who have no such irrational faith? Very small indeed. Then it clearly shows that the sin committed by woman could not be expiated for the majority of mankind even by the sacrifice of God’s “only son.” For the eternal perdition of the majority of the human race woman remains the chief cause! And there is still a darker side of this criminality of woman. Because of her criminality and the transmitted guilt, even the new-born infant of a Christian himself is subject to condemnation to the eternal torture of undying fire, until baptism has united it to the Church, for although it had committed no sin by its own will, it had nevertheless by its carnal conception drawn with it the condemnation of original sin. Lecky says that the opinion which was so graphically expressed by the theologian who said “he doubted

not there were infants not a span long crawling about the floor of hell " is not one of those on which it is pleasant to dilate.

The whole body of Fathers, without exception or hesitation, pronounced that all infants who died unbaptized were excluded from heaven. In the case of unbaptized adults a few exceptions were admitted, but the sentence on infants was inexorable. Even Pelagius, who denied the reality of hereditary guilt, retained his belief in the necessity of infant baptism. Because of an apple that was eaten first by mother Eve and then by father Adam an infant whose existence was but for a moment descended into eternal fire.

Poor terror-stricken pious mothers, to evade this awful sentence of their church which was passed because of woman's transmitted guilt, pathetically tried now one way, now the other. Sometimes the baptismal water was sprinkled upon the womb; at other times, in the hope that Almighty God, through the favour of His "son," would be pleased to antedate the ceremony, the still-born child was baptized, and so forth.

Even the Reformation did not do much to relieve woman of this horrible and painful result of her old, old criminality. The Protestant taught even more clearly than the Catholic the doctrine of imputed righteousness, and was therefore more disposed to dwell upon the doctrine of imputed guilt. The Lutherans, in the Confession of Augsburg, asserted the absolute necessity of baptism quite as emphatically as the Tridentine theologians. Calvin was in some respects more merciful to unbaptized infants, but no school declared more constantly and more emphatically the utter depravity of human nature, the sentence of perdition attaching to the mere possession of such a nature, and the eternal damnation of the great majority of infants. A few of the enthusiastic advocates of the doctrine of reprobation even denied the universal salvation of baptized infants, maintaining that the Almighty might have predestined some of them to destruction. All of them maintained that the infants who were saved, were saved on account of their connection with Christianity, and not on account of their own innocence. All of them declared that the infant came into the world steeped in guilt, and under the sentence of eternal condemnation.

The position of woman in the Jewish faith was low indeed, but Christianity has made it still worse. Christianity has

fathered upon her the cold-blooded murder of not only an ordinary human being, but the very "son of God." It is true that to all appearance a few Jews were responsible for getting a man on the cross who was one of them, and alleged to have come to be their king, but according to the Christian belief that man was no other than the son of God Himself, and those Jews were only working in the hands of destiny to secure the expiation of the sin committed by Eve. So woman, in fact, was really responsible even for that Jewish crime. Poor woman! The charge sheet, according to Christianity, against her is as follows:—

- (1) That woman was the first to disobey God.
- (2) That woman prompted Adam to follow her in disobedience.
- (3) That woman was the cause of the fall of Adam.
- (4) That woman's guilt has been transmitted to the whole of mankind, and every child is born in sin.
- (5) That owing to woman's crime all humanity except a number of Christians is condemned to eternal perdition.
- (6) That woman, even if she is a Christian, is responsible to see her own unbaptized infant going to eternal fire.
- (7) That God had to send Jesus to be sacrificed because of the first crime of woman, so she is responsible for the crucifixion of Jesus.
- (8) That those who believe that Jesus was more than human have every reason to curse woman more for having caused "the death of their Lord."

Does woman—Christian woman—plead guilty to these charges? Does she realize her responsibility? If she accepts the responsibility which Christianity and even Judaism have put upon her shoulders, if she submits to the degraded position these religions have allotted to her, will she not feel ashamed of herself and of her position before those sisters of hers, like the Muslim woman, who have no such responsibility put upon them and whose conscience is quite free? The first thing women in Christian lands should do to get franchised and be morally equal to their Muslim sisters is to bid good-bye to Christianity itself, because it is this man-made religion which is responsible for their subjection and degradation. Unless Christianity is boycotted or its fundamental principles are changed,

woman will not be able to secure real respect in Christian lands, nor will Christian women have any claim of respect in any land.

As to polygamy, if that means any degradation of woman—although how it does it is difficult to see—it was not forbidden by Jesus. Of course, early conception of Christian saints and priests of women was such that they considered them to be unclean and never liked to come in contact with them. So they preferred for every good man to remain aloof from women, and with those notions they could not possibly encourage polygamy. They discouraged marriage itself. Monasticism became the fashion of the day. In those days when people really followed Christianity they took Christ as pattern. There is no proof that Jesus himself disliked women; on the contrary he is said to associate himself with women, and those of not very good character. But his disciples tried to follow him in his bachelor life, and attached a sort of sanctity to singleness and monasticism. If polygamy did not prevail much in Christians, the reason for it was the general dislike of woman which was inculcated in their minds by Christian saints and priests. "If any one shall say the married state is to be preferred to the state of virginity or celibacy, let him be accursed" (Canon of the Council of Trent). The ministry of Jesus himself was too short to lay down any elaborate social laws as was done by Moses or Muhammad, so his followers had to fall back upon laws laid down by other people, and specially the Romans and the Jews. But all the three forms of marriage as found in Roman law had the effect of placing the woman in the "power" (*manus*) of her husband and on the same footing as the children. Under Jewish law also women had a very inferior status.

Canon law of marriage is based partly on Roman law, the validity of which the Church from the first recognized, and partly on the Jewish law. But among Christians the idea of the consummating act of marriage is in itself something unholy—a result of the Fall.

For St. Paul marriage is clearly a concession to the weakness of the flesh (1 Cor. vii.). The time is short, and in view of the imminent coming of the Lord the procreation of children is a matter of no importance (ver. 9). Marriage being an inferior state, it was discouraged by the heads of the Church, and the

tendency was rapidly to narrow the field within which it might be contracted. Re-marriage was only allowed after many struggles, and then only to laity. St. Paul had laid down that a "bishop" must be "the husband of one wife," and to this day the priest of the Orthodox Church may not re-marry ("Ency. Brit."). Clerical celibacy, at first a counsel of perfection, was soon to become the rule of the Church, though it was long before it was universally enforced in the West; in the East it still applies only to monks, nuns, and bishops. The marriage of the laity was hampered by the creation of a number of impediments, and in 506 the Council of Agde laid it down that any consanguinity or affinity whatever constituted an impediment. The Roman Catholic Church did not recognize divorce.

Jerome (420 A.C.), Ambrose (397 A.C.), and other well-known theologians, all encouraged an unmarried life. In the Council of Toledo, in 589 A.C., it was laid down that if a clergyman was suspected with any woman, then the judge should sell that woman and spend the money thus gained in charity to poor people. Gregory the Great was very much in favour of stopping all priests and religious Christians from getting married, and the result was that when he cleared the tank in his church grounds he found six thousand skulls of babies.

Benedict VIII, in 1022 A.C., in the Council of Panopea, decided that all those children who were born of any clergymen should be given into slavery and must not be recognized as clergymen's children. It was so until 1625, when Luther set a practical example against this monastic and single life.

But in those early days when Christians followed Christian and Judaic laws, polygamy was not considered a sin. St. Augustine observes that "there was a blameless custom of one man having many wives, which at that time might be done in a way of duty, which now cannot be done but from licentiousness, because for the sake of multiplying posterity no law forbade a plurality of wives." We shall watch with interest if the Christian priests and legislators will again allow that blameless custom of polygamy when after this death-dealing war the "need of multiplying posterity" will demand it. Will they interpret the religious law of marriage in the way St. Augustine did? Boniface, Confessor of Lower Germany,

having consulted Pope Gregory, in the year 726, in order to know in what cases a husband might be allowed to have two wives, Gregory replied on the 22nd November of the same year in these words: "If a wife be attacked by a malady which renders her unfit for conjugal intercourse, the husband may marry another, but in that case he must allow his sick wife all necessary support and assistance" (Davenport).

Many works have been published in defence of polygamy, even by writers professing Christianity. About the middle of the sixteenth century Bernardo Ochinus, General of the Order of Capuchins, wrote in favour of polygamy. Selden proves in his "Uxor Hebraica" that polygamy was allowed not only among the Jews, but likewise among all other nations.

John Milton, in his "Treatise on Christian Doctrine," after quoting many passages from the Bible in defence of polygamy, says:—

"On what grounds, then, can a practice be considered as so dishonourable or shameful which is prohibited to no one even under the Gospel; for that dispensation annuls none of the merely civil regulations which existed previously to its introduction. It is only enjoined that elders and deacons should be chosen from such as were husbands of one wife (1 Tim. iii. 2 and Titus i. 6). This implies, not that to be the husband of more than one wife would be a sin, for, in that case, the restriction would have been equally imposed on all, but that in proportion as they were less entangled in domestic affairs, they would be more at leisure for the business of the Church. Since, therefore, polygamy is interdicted in this passage to the ministers of the Church alone, and that, not on account of any sinfulness in the practice, and since none of the other members are precluded from it, either here or elsewhere, it follows that it was permitted, as aforesaid, to all the remaining members of the Church, and that it was adopted by many without offence."

"Lastly, I argue as follows, from Hebrews xiii. 4: Polygamy is either marriage, fornication, or adultery. The apostle recognizes no fourth state. Reverence for so many patriarchs who were polygamists will, I trust, deter every one from considering it as fornication or adultery, for '*whoremongers and adulterers God will judge*,' whereas the patriarchs were the objects of His especial favour, as He Himself witnesses. If then, polygamy

be marriage properly so called, it is also lawful and honourable : according to the same apostle, '*marriage is honourable in all and the bed undefiled.*'"

Polygamy flourished in a more or less pronounced form until forbidden by the laws of Justinian. But the prohibition contained in the civil law effected no change in the moral ideas of the people, and polygamy continued to be practised until condemned by the opinion of modern society. So-called monogamy was a sort of compromise between celibacy and polygamy. The wives, with the exception of the one first married, laboured under severe disabilities. Without rights, without any of the safeguards which the law threw around the favoured first one, they were the slaves of every caprice and whim of their husbands, as are the mistresses and concubines of wealthy and fashionable "knuts" of present-day Christian society. Their children were stigmatized as bastards, precluded from all share in the inheritance of their father, and treated as outcasts from society, just as to-day are the issue from left-handed marriages or from unrecognized wives.

Morganatic and left-handed marriages were not confined to the aristocracy. Even the clergy, frequently forgetting their vows of celibacy, contracted more than one legal or illegal union. History proves conclusively that, until very recent times, polygamy was not considered so reprehensible as it is now. St. Augustine¹ himself seems to have observed in it no intrinsic immorality or sinfulness, and declared that polygamy was not a crime where it was the legal institution of a country. The German reformers, as Hallam points out, even so late as the sixteenth century, admitted the validity of a second or a third marriage contemporaneously with the first, in default of issue and other similar causes ("The Spirit of Islam").

Higher classes of the Germans, as also many English aristocrats and royalties, indulged in polygamous marriages even up to the nineteenth century.

Even the clergy, in spite of the recommendation to perpetual celibacy held out to them by the Church, availed themselves of the custom of keeping several left-handed wives by a simple licence obtained from the bishop or the head of their diocese (Hallam's "Constitutional History of England").

M. Gustave Le Bon says that monogamy exists in modern

¹ St. Augustine, lib. ii. *cont. Faust*, ch. xlvii.

Christian lands in books only. It is not practised, and so although there is no legal validity for polygamy the condition of society is not any better than what it would be under a polygamous system. In fact, he says there is no reason to consider the polygamous system of the East any lower than the so-called monogamous system of the West, and that statistics show that in France adultery increased nine times from 1826 to 1880, although it was supposed to be a monogamous country.

M. Le Play goes a step farther and says that polygamy is a necessity under certain conditions of Society.

Mrs. Annie Besant says: "The second fact is the present relation between men and women in all 'civilized' countries. The true and righteous sex-relation between one man and one woman is preached as an ideal in some countries, but is generally practised in none. Islam permits polygamy; Christendom forbids but winks at it, provided that no *legal* tie exists with more than one. There is pretended monogamy in the West, but there is really polygamy without responsibility; the 'mistress' is cast off when the man is weary of her, and sinks gradually to be the 'woman of the streets,' for the first lover has no responsibility for her future, and she is a hundred times worse off than the sheltered wife and mother in the polygamous home. When we see the thousands of miserable women who crowd the streets of Western towns during the night, we must surely feel that it does not lie in Western mouths to reproach Islam for its polygamy. *It is better for a woman, happier for a woman, more respectable for a woman, to live in Muhammadan polygamy, united to one man only, with the legitimate child in her arms, and surrounded with respect, than to be seduced, cast out into the streets—perhaps with an illegitimate child outside the pale of law—unsheltered and uncared for, to become the victim of any passer-by, night after night, rendered incapable of motherhood, despised of all.* It is good for Society that monogamy should be held up as an ideal, for its public recognition as right and the inner shame connected with resort to prostitution are purifying forces; but monogamy is not practised where there is one legal wife and hidden non-legalized sexual relations. The recognized polygamy of the East degrades the social conscience more than the unrecognized polygamy of the West—'hypocrisy is a homage vice pays to virtue'—but the

happiness and dignity of the woman suffer less under the first than under the second" (ISLAMIC REVIEW).

Arthur Schopenhauer says that the laws of marriage prevailing in Europe start from a wrong position. In our part of the world, where monogamy is the rule, to marry means to halve our rights and double our duties. In Europe the institution of monogamy and the laws of marriage bestow upon the woman an unnatural position, and seeing this, men who are shrewd and prudent very often scruple to make so great a sacrifice and to acquiesce in so unfair an arrangement. Consequently, whilst among polygamous nations every woman is provided for, where monogamy prevails the number of married women is limited, and there remain over a large number of women without stay or support, who in the upper classes vegetate as useless old maids, and in the lower succumb to hard work for which they are not suited, or else become *filles de joie* whose life is as destitute of joy as it is of honour. But under the circumstances they become a necessity, and their position is openly recognized as serving the official end of warding off temptation from those women favoured by fate, who have found, or may hope to find, husbands.

"In London alone," says the great philosopher, "there are 80,000 prostitutes. What are they but the women who, under the institution of monogamy, have come off worst? Theirs is a dreadful fate: they are human sacrifices offered up on the altar of monogamy. . . . Polygamy is therefore a real benefit to the female sex if it is taken as a whole; . . . and from another point of view there is no true reason why a man whose wife suffers from chronic illness or remains barren, or has gradually become too old for him, should not take a second. . . . There is no use arguing about polygamy; it must be taken as *de facto* existing everywhere, and the only question is as to how it shall be regulated." He ejaculates, "Where are there, then, any real monogamists?" We shall see, when we come to discuss the position of woman under Islam, how efficiently and judiciously polygamy has been "regulated" so as to secure the existence of millions of "real" monogamists.

As regards rights and privileges of woman, Christianity has said or done nothing of any consequence. Woman has nothing

to be thankful for either to Christ or to any of his apostles, or to that religion which goes under his name.

In fact, Christianity as a religion has done nothing towards civilization except giving out some borrowed ethical principles of great idealistic value but hardly practicable. Even in that respect Christianity has not made any advancement upon the principles of ethics laid down by grand old teachers like Buddha and others. There is nothing in what Christ said or did that can be said to have been the foundation of the modern civilization of Christian countries. All progress in the West has been made in opposition to Christianity. The heads of the Christian Church persecuted, imprisoned, killed, and even burnt alive men of genius. As long as Christianity held her sway the age of reason, of discovery, and of invention could not dawn. Christian women, and for the matter of that Christian men, have not much reason to be proud of the faith they profess when they read any book such as Draper's "History of the Intellectual Development of Europe," or when they read accounts of inquisitions, of the ill-treatment of men of science and invention, and of the burning alive of women supposed to be witches.

Alexander Russel Webb says: "The cold truth is that this Western civilization has nothing of the true spirit of Christianity in it, but is the legitimate offspring of ambition and selfishness. It is also a well-known fact that the course of Western progress and advancement has always been obstructed by the Christian Church, ever since that Church has had an existence. It has always stood in front of the procession and shouted with uplifted hands: 'You must not go any farther, or you will weaken and degrade me.' And when it has been pushed aside and the irresistible tide has swept past it, it has tried in every way to impede and harass the moving column. And now with marvellous assurance and impudence it says: 'See what *we* have done! Look at our glorious Christian civilization and then fall down and worship us.' The truth is, and every man can ascertain it for himself, that what is called Christian civilization was born in the eighth century among the Muslims of Spain while the Christian world was plunged in the depths of ignorance and barbarism. . . . I earnestly hope that the Christians will soon learn to be rational and honest and that we shall hear no more of this senseless twaddle about 'Christian' civilization."

He is supported by Draper in these words: "I have to

deplore the systematic manner in which the literature of Europe has combined to put out of sight our scientific obligations to the Mussalman. Surely they cannot be much longer hidden. Injustice founded on religious rancour and rational conceit cannot be perpetuated for ever. . . . The Arab has left his intellectual impress on Europe, as, before long, Christendom will have to confess; he has indelibly written it on the heavens, as any one may see who reads the names of the stars on a common celestial globe."

It may be interesting to many English men and women to-day to know that the very Fleet upon which depends the existence of the whole British Empire and the lives and liberties of the people of these islands is indebted to the Muslim inventions such as the compass, etc. The very word "Admiral" is a modification of the French "Amiral," which was a corruption of the Moorish "Amir-ul-bahr."

It is very necessary for every woman in Christian lands to be impressed with this fact, that all that culture, progress, and civilization which is dangled before her eyes by Christian missionary men as a product of Christianity is in no sense a product of Christianity, and that the successors of those Christian popes, priests, and preachers who established inquisitions and other bloodthirsty courts to persecute, terrorize, and even kill such intelligent persons who made new discoveries that were against the Church myths and superstitions, should be ashamed of their false assertions. Every woman should read the history of Europe and of the Church, and she will find out that though through regal converts Christianity had spread to a great part of Europe, it had done nothing to improve the intellect of mankind, nothing to improve the social aspects of civilization, nothing to give rights to woman until it came directly under the influence of Islam, and until Muslims opened colleges of learning in Europe. The Christians of pre-Islam days were so steeped in fanaticism, and superstition among them was so dismal and dark, that the star of Reason could not rise. The clergymen and the priests did their best to dull and stupefy human intellect by their theological puzzles. Like Brahmans in India, they did not allow any layman to think for himself anything of the unreasonable faith he was asked, nay even compelled, to believe. No questions could be put to the clergy to explain religious mysteries. Men of genius who tried

to make use of their reason were condemned to misery and death. Women were looked down upon as contemptible creatures cursed by Christian apostles themselves. .

It was Christian fanaticism and bigotry that extinguished the light of culture and civilization lit up by Muslims in Spain, turned out the teachers of Europe from that land, and burnt up those valuable stores of knowledge which they had collected in their libraries. The result of this premature weakening of the foundations of the modern civilization was that though it succeeded through the influence of Islam in defying the Christian Church as to the development of its material side, it could not free itself completely from the influence of the Church in regard to social and moral affairs and aspects. And to-day, when we see gigantic progress made in scientific inventions and in the material well-being of mankind, we see also deplorable signs of moral and social decay, mostly in that aspect in which woman plays an important part. While infusing ignoble notions in men against women, Christianity failed to lay down any practicable laws of intercourse between man and woman or for the conduct of women, and the result has been that the very character of society in the West has got tarnished.

Dr. Isombert says that the homes in the East are not wrecked so often by the misbehaviour or infidelity of women as they are in the West.

M. Gustave Le Bon asserts that adultery with a married woman is considered as much unnatural among the Easterns as it is considered natural among Europeans.

Mr. Russel Webb says: "Go with me into any large American or European city and see the evidence of that resistless torrent of vice and crime that rushes and seethes through the social fabric; go with me to a fashionable ball, reception, or dinner party, and see the position in which noble woman, one of the grandest works of God, has been placed by the usages and customs of this nineteenth-century civilization; see the honoured wives of wealthy educated Christians and their virtuous daughters exposing to the view of men, whose blood and passions are fired by the fumes of alcohol, personal charms which should be seen only in the privacy and purity of the home; take up the newspapers and see the records of divorces, social scandals, and marital woes that fill us with shame and

disgust, and then tell me that these so-called Christian laws and Christian customs are good things."

There is no doubt that the influence of Christianity has been, if anything, pernicious for women and for the civil laws laid down by legists for them. Until lately women were not allowed property rights. Even to-day in England itself they are barred by law from certain intellectual professions. The law of England has made bigamy a felony, but adultery is not treated as such, and the result is that adultery is almost freely indulged in. The law itself, as it were, puts a premium upon immorality and illicit connection between man and woman. As to divorce, also because of the influence of Christianity, law permits it only in the case of adultery. Thus, when a husband and wife get tired of married life, or when they find that it is impossible for them to get on together, they have to misbehave themselves so as to be able to cut asunder the tie that "God had joined." How God joins a marriage tie is beyond the comprehension of every sane man. The relationship between mother and son, or brother and sister, can be a tie joined by God, but when a man chooses a wife and gets married to her it is difficult to see how it can be considered a tie joined by God and why it should not be separable by those persons who have been the authors of it.

Justinian was the first to prohibit divorce by mutual consent. But his successor Justin "yielded," says Gibbon, "to the prayers of his unhappy subjects and restored the liberty of divorce by mutual consent: the civilians were unanimous, the theologians were divided, and the ambiguous precept of Christ is flexible to any interpretation that the wisdom of a legislator can demand." "It was difficult," the enactment stated, "to reconcile those who were come to hate each other, and who, if compelled to live together, frequently attempted each other's lives."

Now the law prefers to compel dissatisfied husband and wife to choose between a miserable life and adultery, and why should one be surprised if they mostly choose to commit adultery to secure an end of their unbearable life in company with each other. Divorce Court proceedings are generally expensive, and so it is a luxury beyond the means of the poor, who replace it by almost openly living an adulterous life. Even the rich people avoid going to the court to wash their dirty linen

in public, and by mutual consent or connivance give a free vent to their licentiousness. In America—that land of the millionaire—statistics show that the number of rich men and women who simply desert their spouses without bothering about getting a divorce is very large.

The law of coverture was a very palpable proof of the inferiority of woman in the eyes of the legislators of even so liberal a Christian country as England.

Prof. Holland says: "The effect of marriage was to produce a unity between husband and wife, rendering each of them incapable of suing the other and constituting a sort of partnership between them, in which the husband has very extensive power over the partnership property, while the wife has not only no power of alienating it, but is also incapable of making a will or of entering into any contract on her own account. The common law of England exhibits these disabilities of the wife in their strongest form."

Hepworth puts it in a more impressive way, thus: "Our common law gives up the wife so thoroughly into her husband's power that a woman who comes to the altar young, confiding, beautiful, and rich may be compelled by brutal treatment, for which the law gives her no redress, to quit it after a dozen years, an outraged woman, with a ruined fortune and a wasted frame."

Those who would like to know more what was the position of women in England only a generation back should read Mill's "Subjection of Women." It is true that women have been given rights now, and they can possess personal property even after marriage, but for these rights they have not in the least to be thankful to Christianity. The people in England were, if anything, more Christian thirty years ago than they are to-day, and so their treatment of women thirty years ago was more Christian than it is to-day. The fact is that heads of the Church did their best to keep women without any social rights and position, and what has been done for women has been done against the Church, not by its support. As long as Western lands remained under the sway of Christian priests, woman remained without rights in those lands. All the rights which women in Christian lands have now got are a result of their own fights and of the slackening of the hold of priests over Western societies and laws. They will get further

rights only if they demand them vigorously and persistently. For a long time intelligent and educated people in Europe have ceased to believe in Christianity, yet they have been influenced against woman by the Christian notions. Napoleon, Byron, and Schopenhauer have not had much good to say of women.

Napoleon, though admitting that he owed his greatness to his mother, says that women have no rank. Lord Byron philosophizes : "Thought of the state of women under ancient Greeks—convenient enough. Present state, reminiscent of the barbarism of the chivalrous and the feudal ages—artificial and unnatural. They ought to mind home—and be well fed and clothed—but not mixed in society. Well educated, too, in religion—but to read neither poetry nor politics—nothing but books of piety and cookery. Music—dancing—drawing—also a little gardening and ploughing now and then. I have seen them mending the roads in Epirus with good success. Why not as well haymaking and milking?"

Surely his lordship's soul will be delighted to see women working on the farms, and if not actually on the roads, at least as conductors on the top of the omnibuses that ply on the road.

Schopenhauer's criticism of women is far stronger than that of their French or English critics. He has gone even to the extent of saying that as the lion has been given sharp claws, the elephant big tusks to defend themselves, so has woman been given the instinct to apply deceptive methods to gain her objects. He thinks that dissimulation is innate in woman, and almost as much a quality of the stupid as of the clever; that perjury in a court of justice is more often committed by women than by men, and it may indeed be questioned whether women ought to be sworn at all.

That among them are found the larger number of kleptomaniacs or shop-lifters. That, taken as a whole, women are, and remain, thoroughgoing philistines and quite incurable. Hence, with that absurd arrangement which allows them to share the rank and title of their husbands, they are a constant stimulus to his ignoble ambitions. And further, it is just because they are philistines that modern society, where they take the lead and set the tone, is in such a bad way.

That they form the *sexus sequior*—the second sex, inferior

in every respect to the first, their infirmities should be treated with consideration; but to show them great reverence is extremely ridiculous and lowers us in their eyes. When Nature made two divisions of the human race, she did not draw the line exactly in the middle.

Schopenhauer concedes that women are directly fitted for acting as the nurses and teachers of our early childhood by the fact that they are themselves childish, frivolous, and short-sighted; in a word, they are big children all their life long—a kind of intermediate stage between the child and full-grown man, who is man in the strict sense of the word.

He approves of the old Roman and Indian laws which ordained that a woman should always be under a guardian, and she should never be given the free control of even her own children.

In fact he is so strong on this point as to proclaim, "It is surely a revolting thing that a widow should immolate herself upon the funeral pyre of her deceased husband, as she used to do among the Hindu races; but it is also revolting that she should spend her husband's money with her paramours—the money for which he toiled his whole life long, in the consoling belief that he was providing for his children."

Schopenhauer does not like the idea of giving women rights of inheritance, and says that to allow women to squander the property in a short time, or otherwise fool it away, is a grievance and a wrong as serious as it is common, which should be prevented by limiting the rights of women to inherit.

In his work, *Die Welt als Wille und Vorstellung*, he has elaborately discussed that in the darkest recesses of women's heart, they are aware that in committing a breach of their duty towards the individual, they have all the better fulfilled their duty towards the species, which is infinitely greater. In his opinion woman is only for procreation of children, and that, and that alone, should be the object and mission of her life.

Rousseau, that ladies' man, that writer of the "Social Contract," declares, "Women have, in general, no love of any art, they have no proper knowledge of any; and they have no genius." John Knox says: "That a woman should bear rule, superiority, dominion or empire over any realm, nation, or city is repugnant to nature, contumely to God, and a subversion of good order. Women are weak, frail, impatient, feeble, and

foolish. God has denied to woman wisdom to consider, or providence to foresee, what is profitable to a commonwealth. Women have been ever lightly esteemed; they have been denied the tutoring of their own sons, and subjected to the unquestionable sway of their husbands." "Frailty, thy name is woman," is the verdict of Shakespeare. Juan Huerte, an eminent Madrid physician, in his well-known book *Examin de ingenios para los ciencias*, denies women the possession of all the higher faculties. Chamfort declares that women are made to trade with our follies and weaknesses but not with our reason. He believes that the sympathies that exist between the two sexes are skin deep only, and do not touch the mind or the feelings or the character. Selden maintains that the law condemning women to death for witchcraft was perfectly just, but that it was quite unnecessary to ascertain whether witchcraft was a possibility. A woman might not be able to destroy the life of her neighbour by her incantations; but if she intended to do so, it was right that she should be hung.

John Wier, a learned and very able physician of Clèves, in 1563, writes in his treatise "De Præsligiis Dæmonum," under the chapter "The credulity and fragility of the female sex," that women were particularly subject to evil influences, and that the witches, in mental and moral infirmities, were pre-eminent among their sex.

Even Joan of Arc, a woman of noble fame, fell a victim to the superstition of witchcraft, and was killed by an Englishman in France.

Learned men of their age like Coke and Bacon helped in passing a law that subjected witches to death. Shakespeare himself seems to have shared in that belief. Even during the reign of Elizabeth and James I poor women were killed, under the law itself, as witches.

Never in the history of Islam have women suffered like this, even under any superstitious belief as that of witchcraft. The rationalism of Islam did not allow any superstitious belief, and Islamic respect for women could never tolerate their sacrifice.

Those people who want to know how far modern men of Christian lands have changed their opinion from that of their predecessors as to the rights and status of woman should study the recent history of how she has been treated by men when she demanded her franchise from them. The

British nation has always boasted of its love of liberty and freedom. It possesses a parliament for men which is called the Mother of Parliaments. Its male portion was almost the first to realize in Europe the importance of constitutional government and of political franchise; yet when woman advanced her claim for the same privileges, she was treated in a way that will always remain a disgrace. Just before this European war, when woman out of her patriotism postponed her demand for franchise, it had become almost a crime to be a suffragette woman. They were molested even in public parks. Even the ordinary courtesy and courtesousness were no more offered to women, and the rupture between the two sexes was growing to its highest intensity, with obvious harm to the weaker sex. When, to gain their rights, women had adopted men's own methods of militancy, they were treated not as men but as animals. Now that out of their patriotism they have postponed to urge their claims, now that they are working as slaves for their country, they are again patted on the back by their lord—man. The old etiquette has been revived.

But there is no doubt that all this superficial courtesy and kindness which European etiquette offers to the members of the other sex is only to blind her to the real state of the mind of man. Even in these social formalities there underlies a hint that man is a superior person and can afford to adopt a patronizing attitude towards the weaker sex.

There is not much of an idea of respect or regard conveyed by it.

A man while addressing a mixed gathering addresses ladies first and then gentlemen; when a member of the fair sex rises to leave the room he courteously opens the door, and so forth. But does this show that he really respects the woman sex?

Does a father, when he allows several young men, shamelessly called "social butterflies," to flirt with and to kiss and caress his daughter before she gets married, to one, or is even jilted and rejected by all, respect the woman sex? Does a husband when he allows others to carry his wife round and round in a maddening waltz, arm in arm with her and front in front with her, respect the woman sex? Do these "social butterflies" respect the sex when they fly about after sucking the pure and sweet nectar from one half-blossomed flower to

another? Do they respect the sex when they call one their "best girl," intimating thereby that there are second bests and third bests, and so forth to infinity?

Do those statesmen, legislators and bishops of the House of Lords who have recognized "unmarried mothers" respect the woman sex?

Does a son when he leaves in discomfort and penury his old mother, who with personal trouble and sacrifice brought him up, and enjoys with his own family a luxurious life, respect the woman sex—the highest and noblest phase of womanhood?

Does a nation that is not ashamed of the "war babies" and "unmarried wives" respect the woman sex?

There are two aspects of womanhood which are peculiar to her, and which make her a superior being to man. One is her virginity which makes her body, nay her very breath, sacred and demands every care to be taken that it is not violated in a dishonourable way by any person. The second is her character as a mother, which demands every respect at all times. Woman with these two characteristics guards and brings up the whole of the future generation, the whole of humanity. These make her sacred. These elevate her to a plane higher than that which man can ever occupy.

The nation which respects her chastity and her motherhood does really and truly respect her sex. But even a casual observer will see how the very social system in European and Christian lands disregards those. The very conception of chastity is extremely low in Christian lands. People in Europe do not think that it can be violated not only by hands and lips, but also by profane language and even by lustful eyes.

Woman is sacred; woman is, as a creation, higher and nobler than man. It is she that makes or mars nations. It is she that can give birth and bring up good or bad people as she likes. It is only when she guards herself well as a maiden and a wife, and performs her duty as a mother as she should, that the future generation takes a high place in the moral plane of this earth.

As regards the respect of woman as a mother among Christians, perhaps the alleged words of their man-god to his mother resound in their ears, and they do not feel shy to say to their own mother to this effect—

“Woman! who art thou? What have I to do with thee?”

Nor do they feel shy to have adopted a social system which has no place for mother left once children get a spouse. To Muslims this life looks more like an animal life, to have nothing to do with the mother and the father who laboured and toiled to bring up, at personal inconvenience and trouble, their children to manhood or womanhood. But Christians can quote their Scriptures in words to the following effect, as to the justification of this social system:

“Man should be separated from his mother and joined to his wife.”

As regards the chastity of woman they have formed a very poor ideal, a very poor conception of it, and have, perhaps, been influenced in this respect also by the example they allege was put by Christ himself in liking to associate with women of ill-fame. Even if the Bible is true in depicting this character of Jesus, his followers have misunderstood it completely to draw conclusions from it that unchastity and adultery are not abominable crimes. The commandment of Jesus is clear on that point, and his association, if it was really so, with women of ill-repute could only be with the noble view to reclaim them. He was a prophet, a reformer, so he considered it his duty to mix with people of all shades and characters. It is not easy for European Christians to understand Christ. He was an Asiatic. In their vocabulary he was a “dark” man. His mother-tongue was Asiatic. He was a Jew, and Jews even to-day have not as loose moral laws as Christians have. Under Mosaic law adultery is a crime. Christ also considered adultery a crime. Christians, if they interpret his life and character in a different way, they by their own behaviour and the laxity of their social laws do nothing but insult his sacred memory. When they frame such laws for their lands and call them Christian laws, which punish bigamy but not adultery and fornication, they insult the moral sentiments of humanity, degrade the female sex, dishonour marriage, and disgrace Christianity. In many Christian lands the honourable tie of marriage, the sacred bond that unites the two sexes in blameless love, has lost its attraction, with the result that there is an increase in immorality and disease, and a decrease in population. Because of the low conception of the virtue of chastity such notions as regards marriage as the following have come to prevail:

"If, however, woman is free and big enough to learn the mystery of sex without the sanction of State or Church, she will stand condemned as utterly unfit to become the wife of a 'good' man, his goodness consisting of an empty brain and plenty of money. Can there be anything more outrageous than the idea that a healthy, grown woman, full of life and passion, must deny nature's demand, must subdue her most intense craving, undermine her health and break her spirit, must stunt her vision, abstain from the depth and glory of sex experience until a 'good' man comes along to take her unto himself as a wife? That is precisely what marriage means." (Emma Goldman.)

Be it noted that in America as in other Christian countries there are matrimonial agencies who circulate among their patrons photographs of eligible women in low-necked gowns. They sometimes use men decoys to secure matrimonial connections. Their object is solely pecuniary gain for themselves, although they thus make the institution of marriage itself a mockery.

Wherever the so-called Christian civilization goes it not only carries the Bottle of Whisky in its right hand with the Bible in its left, but sexual immorality also follows its track. Prostitution is on the increase not only in all Christian lands, but also in such Asiatic and African lands where the present "civilization" has got any footing. The whole basis of the social laws of Christian lands is wrong. The number of illegitimate children is on the increase. Even in such seats of culture, learning, and religion as Oxford and Cambridge the proportion of bastards is forty-five and fifty-three per thousand respectively. Venereal disease is becoming almost epidemic. Revelations in the divorce court shock the moral sentiments of humanity. Home life is coming to an end. The free and unrestrained intercourse between man and woman has brought the sexual human relations to nearly animal conditions. The degradation of the woman sex has reached its lowest depth. It must be stopped. There is no evil greater than this.

The illiteracy of women is bad, the close seclusion of women is not praiseworthy, the subjection of women is unchivalrous, the unenfranchisement of women deplorable, but the prostitution of women which causes the degradation of the sex is

the most heinous crime against humanity. If all that ill-treatment of woman which history has recorded be put on one side and the degradation of her sex, her prostitution, be put on the other, the latter will weigh far more heavily against her. The latter is a crime against the whole humanity.

Deprive woman of all her rights, keep her under rigid subjection, even kill her as Spartans or Arabs before the advent of Muhammad did, but for the sake of Humanity, even if not for the sake of God, do not encourage her corruption.

The very fact that women in Christian lands have begun to fight, even at the risk of their life, for enfranchisement is a proof that they have not been treated well. Nay, the very fact that women in Christian lands have left or are leaving home for politics and for rivalry with men in different professions and positions is a proof that they themselves have now come to misunderstand their due worth. When they, who are superior beings, consider it an honour to compete with man on equal terms, it is evident that the estimation of their own sex has gone down low in their own eyes. Instead of devoting their best energy to check the daily increase of those shameful creatures who sell the honour of their sex, the women of these lands have taken to fight with men for equal political rights. Instead of saving man from degenerating into a beast or a money-making machine by ennobling his sentiments by their own elevating influence, they are struggling to compete with him on the same platform. Instead of moulding the character and destiny of future generations by zealously guarding the tender nature of their youths from evil influences, they are themselves entering into business like men and are letting their children loose to become diplomats or villains as circumstances may make them ("Islam and Socialism"). They take a pride in copying man in every respect. They would smoke because he smokes, they would drink because he drinks. They would play the rough game of hockey and football because he plays. They would gamble because he gambles. They would leave the home and spend their evenings in clubs because he does the same. They would try to do all that rough work which was considered to be man's work only a few years ago, because by this means they want to demonstrate their *equality* with him. The result is sex rivalry and jealousy, disruption

of home and society, much keener struggle for existence for the whole nation. Having been brought up under the prevailing conditions of social laws and customs, woman fails to understand why her man gardener, illiterate, uneducated, uncultured, should have the franchise and should be able to assist in framing the laws for the nation, including the women portion of it, should even be permitted to have a voice in the declaration and continuance of a terrible and devastating war, while a woman, simply because she is a woman, although she be well educated and cultured, although she might have studied the economical and financial questions of the country, although she may be best qualified to frame the laws for her own sex, should not have any franchise. She is ready to go to the battlefield to help the wounded. Even to-day in this gigantic war she is taking her full share in defending her country by making munitions and relieving men at the farm and in industries to go to the front. If man is defending the country in which he has got every right and privilege by doing the fighting, woman, without any political rights, is doing her very best to keep not only the home going but the whole nation, the whole country, in a condition to enable men to fight. And after all this she fails to understand why the maxim for men should be "no vote no tax," but for her "tax, tax, and tax, but no vote." She fails to understand why she can be a queen but not a minister, why she can be a listener but not a preacher in the churches, why she has to be a client often but can never be an advocate, and so forth. In her schools she has learnt logic and politics and theology and mathematics, etc., all like the boys. She has found herself much more clever and shrewd than many dull-headed members of the sterner sex. She has found herself morally, too, better than the lying diplomats of the other sex. She has found that when a political situation demands sympathetic and generous treatment she can manage much better than men. She can captivate and rule over the hearts while man can only dominate by sword. She argues—and her argument will get a stronger backing after the present horrible butchery of human lives, ruthless destruction of property, and terrible sacrifice of money and commerce which are the result of the hopeless and criminal muddling of international affairs by *men*—that man has failed

to manage the national or international affairs in a way so as to avoid wars and rebellions, while she would have been much more successful if she had been given a chance.

All the claims which the modern suffragette woman brings against man are just when looked at from the point of view of modern and so-called Christian civilization. That man does not listen to her arguments and does not accede her claims is simply because he is more powerful. "Might is right" he says is the best motto, and he acts upon it. That has driven woman to militancy, and if the same state of affairs continues disastrous transactions between the two sexes will take place, specially after this war, which is reducing the male population of all the Christian countries and is introducing women into many walks which were supposed to be reserved for men. It will by no means be easy to oust her from those professions. Thus, most of the women will become independent, and if to-day it is man who does not like to be bound down by marriage ties or to be bothered to work for an increasing family when the struggle for existence is getting keener day by day, after this war, when the number of women further increases in the population and when she becomes self-earning, it will be her turn to despise the fetters of marriage and the travails of child-birth as well as worries of child-rearing. Her rivalry with man will increase, and this will cause a terrible disruption in society.

If one goes deep into all this upheaval which has of late been taking place in European and Christian society, this sex rivalry, this increase in bastardy, prostitution, and venereal disease, this decrease in population, etc., it will become clear that the cause of all this is the low conception of womanhood formed not only by man but also by woman herself.

The ideal of womanhood has been lowered. Even the priceless jewel a woman has—her chastity—has become a marketable thing. The English nation was blamed by its rivals as a nation of shopkeepers, but if copying is the best form of flattery, all Europe, the whole Christendom, has flattered and complimented England by following it in that respect. All European people, without a single exception, have developed in them commercial instinct to this extent that they do not mind to colour the face of the earth red with human blood simply to secure their commercial place under the

sun, and they do not mind even to put the chastity of woman in the market for commercial gain.

High-class restaurants engage pretty girls so that they may attract customers. As long as the proprietors get money by this means they do not mind if they endanger the chastity of those girls.

High-class firms engage fascinating girls in their shops to serve behind the counter to gain customers, even though they thereby expose those girls themselves to temptations and make them a target of man's covetous lustfulness. They cannot be ignorant of the result of their pecuniary avarice when they know what the phrase a "shop-girl" has come to suggest.

Well-established, *chic* theatres employ young charmers who in their half-nude attractive dresses increase the number of the audience, but also set many young men's blood aflame. Even big dukes and baronets sometimes fall victims to the snares of these mercenary and well made up coquettes.

If any minor girl over sixteen allows herself to be beguiled by any young man with any dishonourable results the law cannot interfere, but the father, to whom the daughter is as a servant, can sue for damages. The man incurs no punishment for having violated the modesty and chastity of a girl, but he has to pay a price for that to the girl's master—her father! Can commercial instinct be carried to any stronger pitch than this?

The same happens when a man becomes a co-respondent. Then he has to pay some pecuniary compensation for his adultery to the master, the husband of the woman he corrupts. Unchastity itself is no crime, but a price has been fixed for it by the Law.

All these business ways and civil laws show how low indeed has become the ideal of the Christian people of the women sex. The rules of social etiquette tell the same tale. A husband is delighted to see the personal charms of his wife become an object of public gaze and remarks. He does not dislike her efforts to captivate the hearts of other men besides himself. He believes himself to be the master of his wife, and so takes it a compliment to himself if his wife's looks are generally admired, in the same way as when any other things he possesses are admired. It is considered good manners to allow one to take the wife of some other person to dinner and sit next to her. It is etiquette to let her dance arm in arm with another man in

preference to her own husband, and so forth. Such social customs encourage woman to make herself a sort of public property and a marketable thing. As shopkeepers put their things in the window in a captivating style to draw the attention of the public, in the same way a husband puts his wife and a father his daughter before society in public functions. It is nothing but fantastic that the same act which otherwise would be considered bad becomes right etiquette at another time. If a respectable woman at any other time but in the evening and on any other occasion but a ball would meet a man in the semi-nude dress and stand in his arms, that would be considered outrageous. Yet this happens at every ball. Unfortunately the social rules and the social laws in Europe have all been planned without any regard to human nature. The result is what should have been expected—extreme degradation of the woman sex.

Although Christian lands of Europe, thanks to their materialism and the exploitation by them of non-European lands, are far and far wealthier than non-Christian lands, yet there are far more old maids left in Christian lands than in non-Christian lands. The reason for this is that the woman sex as a sex has lost all its charms in the West. Mercenary and pecuniary interests or sexual lust are the only motives of an intercourse between a man and woman, so there is no need of a lasting connection or of an honourable marriage tie left.

Schopenhauer says that there are over 80,000 prostitutes in London alone, although the laws of England in this matter are far more strict than that of other Christian countries like France, etc.

In the opinion of Schopenhauer these lost women are nothing but human sacrifices at the altar of monogamy; but we should say that they are sacrifices at the altar of the social laws of Christendom, including that of monogamy. The number of "the Piccadilly girls" in London must have increased at least four times more than what it was when Schopenhauer wrote. And the sacrifice is daily increasing.

It is difficult to pass any thoroughfare in London in the evening without being accosted in a little too much endearing terms by these human pests. According to the Bishop of London even promenades of music-halls have become the haunts of these vultures. The darkened stages of a cinema also

afford them shelter. This Babylon of the present day seems to have got infested with them.

But London is by no means the most immoral place in Europe. Even barring those God-forsaken places like Monte Carlo, where people go to "enjoy" themselves with wine, women, and gambling, and end, at least two a day, by destroying themselves, the capitals of so-called advanced powers have become notorious for the increase of immorality. Viscount de Potier, a friend of the writer of these pages, who has visited almost all European capitals, like the writer himself, and knows almost all the European languages, says that Berlin and Petrograd are worse than Paris in that respect, although Paris was considered to have reached the limit. While in England law compels a father of an illegitimate child, if the parentage is established, to pay the expenses of its up-keep, in certain other European countries law does not punish the father even to that extent. In fact, there are turnstiles put in certain philanthropic institutions in certain European cities in which a baby can be put by the unfortunate mother without anybody else being able to see it, and by turning the turnstile round the baby is exposed to the view of the matron of the institution, who takes it up without knowing who the unfortunate mother was who left that mark of her shame.

Pre-natal child-murder and abortion are becoming epidemical in European countries, and sex immorality does not seem to have any bounds.

The report of the "National Birth-Rate Commission" which has been lately published in England clearly asserts that within the last thirty-five years the birth-rate has declined by about one-third. The same tale can be told of almost all European countries. In Berlin also the birth-rate is greatly declining. And this is the condition of affairs when all over Europe sanitary arrangements have been improved, and, as compared to Eastern nations, people are better housed and better provided with nutritious food. Their natural fertility ought to be on the increase. But the British Commission reveals the fact that the decline in birth-rate is more marked in the prosperous and well-to-do classes. The conclusion drawn from this is that there is more immorality and corruption in the well-to-do classes. This conclusion is supported by the fact that the Commission has come to the finding that artificial restriction is undoubtedly growing.

Young men and women even before approaching the altar announce their intended sterility. In the East women more than even men have a desire for children; but in the West many a "sweet bride" would say, even as she prepared her trousseau, "Decidedly I am not going to have children. Children are such a nuisance. Harry hates babies. Besides, we have neither means nor time to bring them up."

But the "sweet bride" is not to blame for this. The fault lies with the civilization itself which compels one to worship mammon, to kill even the best and noblest of sentiments if they cause expense. There is no doubt that money has become the common denominator of matrimonial prospects, of their issue, and of respect and regard for woman sex.

Schopenhauer puts all the blame of female weaknesses—which he innumbrates to be falsity, faithlessness, treachery, ingratitude, extravagance to the extent of madness, jealousy, perjury, craftiness, dissimulation, incredible tendency to say what is not true, the fundamental fault of having no sense of justice, etc.—to herself forgetting that the cause of most of those weaknesses which a woman has is the dominating partner of her life—the man. It is the man-made laws for woman that are responsible for all those weaknesses which are found in the women of Christian lands.

Who is responsible if "the only business that really claims the earnest attention of young girls is love-making conquests and everything connected with this—dress, dancing, and so on"?

Who sets forth young, innocent girls while they are still at school to find out their own future husbands? They know that it is they who have to find out a husband for themselves, and as the competition is extremely keen, poor girls, they think that unless they begin very early in captivating by some way or other the hearts of young boys they might never get a chance to get a husband. As the competition is keen they have to keep an eye on and sometimes carry on a sort of flirtation with, if not a dozen, at least half a dozen young men from their schoolfellows or their church or synagogue companions. When they are forced to do this, then why should they not put themselves in the market, as it were, and make "love-making conquests" their sole business from the moment nature provides them with an ambition to make love, and the penny novel

teaches them how their elders made love before them. Poor girls! why should they not cry for good dresses and seek every occasion to go to the balls? Are they to be blamed for it?

Men have lost all taste for the appreciation of character in a woman. Woman as a noble being, a comforter, a partner, willing to share man's troubles and worries, ever faithful and loving, always ready to help him with all her might, to extend every sympathy to him, has no place left in the heart of a Western man. He only wants a woman with a pretty face—even if that prettiness be acquired by powdering or massage—a woman who could take a hand at the bridge-table, who should be a good conversationist, be able to discuss politics and probably horserace topics, and who could make a sensation in fashionable society so as to bring her spouse into prominence. An honest, truthful, bashful, faithful, modest woman cannot exist in Europe under the present social laws, and therefore those only survive who have not those virtues. Women under Islam in the East still possess those virtues, but they are looked down upon by Europeans and under the name of "civilization" pious efforts are made to "emancipate" them. Young men of the East when they come to the West become themselves a prey to the social licentiousness prevailing here. The condition of affairs shocks them at first, but gradually they are themselves carried away by it. In their own land woman was a sacred being not easily approachable. She was not in the market at all. In Europe they find scores ready to make love with them. But surely it is not the fault of the women to make themselves so cheap. It is the fault of the social system.

Schopenhauer complains of that "discord" in married life which is so frequent and almost "the universal state" in Christendom, and puts the blame of that also on woman. He argues that since women exist solely for the propagation of the species and are not destined for anything else, they live more for the species than for the individual, which gives their whole life and being a certain levity and makes the general bent of their character take a direction fundamentally different from that of man.

But as there is very rarely a discord between a Muslim husband and his wife, it becomes quite clear that it is the social laws of Christendom that are responsible for the perpetual

discord and rivalry in a Christian home he complains of, and not woman as a woman.

When, under the inevitable and immutable laws of Nature, a woman loses her physical beauty after she has given birth to a few children—i.e. after she has served man's purpose by propagating his species—lustful man, who has not undergone any such change in that period and who was infatuated simply by the youthful beauty of the girl he wed, gets tired of her. Under the social customs of Christendom he, before his marriage, had also had a *second best girl*, and if she has remained single she automatically becomes the *best girl* now that that girl who was his best girl then has lost her charms. He begins to pine for the maiden he has had in view, and neglects his wife. This gives rise to discord and to jealousy. But surely woman has not to be blamed for that? One of the causes of mutual discord between man and woman in Christendom is also this, that there is no demarcation of the rights and duties of husband and wife in a Christian home. And woman can hardly be blamed for that.

The Christian or European system of marriage, too, is not as sound as it is arrogantly considered to be. Two young persons of the opposite sex, and both very often of an immature age, get infatuated with each other, or they for the time being think that they are in love with each other. They begin to think that of all the boys the girl knows and of all the girls the boy knows, they are the best respectively in the eyes of each other. The girl is very often infatuated because that particular boy happens to be in a position to think soon of a married life. Courtship begins and marriage ceremony follows. Neither the boy has time or judgment to think what sort of wife or mother the girl will make, nor the girl feels that she can afford to lose the chance of getting married by too close a searching of the fact what sort of husband or father her "best boy" would make. The young man gets bored a few months after the marriage when the first impulse of infatuation and the first prompting of ardent passions pass by. When the young man finds marriage to be a chain to his "butterfly" habits, when perhaps the girl becomes a mother and loses some of her fascination, he finds that it was a mistake to think of that girl as the best girl. Often he finds out, but alas! too late, that she does not prove as good

a wife as she was a sweetheart, and oftener still he comes across a more handsome girl in one of the balls, theatres, or cinemas, and the quarrel with his wife increases and intensifies. The discord and dissatisfaction after marriage hurts woman much more than it does man, because she is robbed of her best jewel—her virginity: she does not remain the same that she was. She feels this, and the man, who is most often a most lustful brute, also knows this. He, like a villain, takes advantage of this, and sometimes causes the woman a living death, a remorseless torture. How often it happens that a girl really loves another man, but for some reason or other cannot marry him and gets married to another because he is in a better position to get married. How miserable that girl will remain all her life for the disappointment of not being able to have married the man she loved, and how her misery will be doubled if her husband is not good and kind to her.

Although marriages are supposed in the West to be based on mutual love, in practice they are based mostly on pecuniary and a sort of mercenary conditions alone. It is money and position that very often play the most important part in matrimony. In case it might be thought that we have formed a prejudiced notion of European marriage transactions, we shall let a native possessing penetrating powers of observance and great experience and knowledge of human faults himself speak.

Schopenhauer says that a man may often think that his social or financial position will suffer if he marries, unless he makes some brilliant alliance. His desire will then be to win a woman of his own choice under conditions other than those of marriage, such as will secure her position and that of her children. However fair, reasonable, fit and proper these conditions may be, and the woman consents by forgoing that undue amount of privilege which marriage alone can bestow, she to some extent loses her honour, because marriage is the basis of civic society, and she will lead an unhappy life, since human nature is so constituted that we pay an attention to the opinion of other people which is out of all proportion to its value. On the other hand, if she does not consent she runs the risk either of having to be given in marriage to a man whom she does not like, or of being landed high and dry as an old maid; for the period during which she has a chance of being settled is very short.

The trend of modern civilization also makes it difficult to pay that respect to woman which she deserves. This civilization has made the struggle for existence so terribly keen that, excepting a few girls in the upper class, most of the girls have to labour and sweat for their living. Even when they get married they cannot be kept as comfortably as their nature demands. In the Muslim countries even the poorest of the poor will not like, as far as he can possibly help it, to see his daughter work for her living at any other person's place. A middle-class man would sooner see himself worked to death than see that gentle, noble, sweet, beautiful daughter of his sweat. No, woman was not born to sweat. It is an insult to her sex to let her sweat. Those men in Christendom who send their daughters and sisters to work from morning to evening are cowards. They do not deserve the name of man. They are a disgrace to manhood. They insult their own chivalry and they insult the beauty of woman. Men in the East are degenerated, yet they remain men in their regard for woman. They are never unchivalrous. They never insult the beauty of woman. Women in Islamic countries are really beautiful. Most of them possess physical charms also, but even those who are not gifted with that, their sweet, innocent, faithful, confiding, affectionate, forbearing, persevering, self-abnegating, sympathetic, kind, reciprocating, grateful, pure and heroic characters give them a charm which none but a brute can ignore. Their religion and their customs evolve in them wonderfully beautiful characters.

Of all the beautiful things in this world there is nothing so fascinating for a man as a beautiful woman. The stars attract man, the new crescent moon is fascinating, the sunset and the sunrise draw out his admiration. He fondles lovely animals and birds. A melodious song enchants him. A sweet scent delights him. A full-bloomed rose thrills him. But every beauty is dimmed by the beauty of woman. A rose flower might be perfect, but a living Rose is more than perfect. It is true that it is not possible to come across every day with a human Rose, but when one does come across a human Rose his very soul is thrilled with joy and happiness. A woman who possesses the beauty of both form and character is absolutely an unearthly being. Her very smile is celestial, and reflects not only the beauty of her face but also that of her soul.

And what a soul!—more fragrant than a sweet-scented rose,
more pure than a snow-white lily.

The Oriental idea of the beauty of woman can be gauged
by the following poem from the pen of the writer of these
pages in Urdu language:—

TABASSUM-E-HABEEB.

Kali ko muskaraté usné beyshak barha daikha,
Gulé ra'na ko bhi gulshan main hansté ja-ba-ja daikha.
Nasimé subh ki athkhailian daikhin darakhton say,
Gulo bulbul ki ulfat ka bhi usney majara daikha.
Maey khushrung say daikha chhulakta rind ka saghar,
Namazé fajr main zahid kai sir ko bhi jhuka daikha.
Ghizalé dasht ko daikha chhalangain martey akser,
Nishato shauq say buchchon ka usney khailna daikha.
Chamak almas main daikhi woh jissay ankh khira thhi,
Duré khush aab daikha aur lálé beybaha daikha.
Shabé mahtab main nazzara daikha Shakhe-zarreen
ka,
 Aur usney Taj ki san'at ka naqshé dilruba daikha.
Tarap bijli ki daikhi absharon ki ravani bhi,
Shafaq ko vadiai Kashmir say hairatfiza daikha.
 Tuluai shams daikha aur hilalé Eid ka manzar,
 Shabé tarik main zuhra ko usney purzia daikha.
Dekháey usko nazzarey hazaron bazmé hasti ney,
Bahut kuchh aina khaney main usney khoshnoma daikha,
 Magar yeh jalvahai husn hain sab mand nazron
 main,
 Tabassum jab tumhara ai Habeebé dilruba daikha.
Tabassum jiska jalva hai labon per aur aankhon main,
Tabassum jisko usney sir say laeker taba pa daikha.
Tabassum jo nishani hai muhabat aur sadaqat ki,
Chhuppa sayeh main jiskey usney qalbé basafa daikha.
 Tabassum jo basharat hai khushi aur shadmani ki,
 Tabassum jisko usney kuchh ájab jadu-ada daikha,
Tabassum jisko Khaliq nay diya hai sirf insan ko,
Tabassum jismain usney jalvai khud Kibriya daikha.
 Mushir é ishq parver bhul baitha saray'alamko,
 Jab is jalvey ko usney aankh uthakar ai Khuda daikha.

The translation is as follows :—

THE SMILE OF THE BELOVED.

He saw, no doubt, many a time a bud smiling,
And a Rose in full bloom in the garden.
He saw the evening breeze playing with the sweet flowers,
And a nightingale making love with the rose.
He saw the cup of a *rind* brimful with sparkling wine,
And the head of a devout man bent in his morning prayers.
He saw an antelope pasturing in the woods,
And little innocent children merrymaking in the towns.
He saw the diamond that dazzled the eye by its brilliance,
And a pearl of the first water and a ruby of great lustre.
He saw in the moonlight night the beauty of the Golden
Horn,
And the exquisite architecture of the Taj Mahal of
Agra.
He saw the flash of the lightning and the cascade of the
waterfalls,
And from the valley of Kashmir a glorious sunset.
He saw the scene of the sunrise and of the new moon
of *Eid*,
And also the bright light of the Venus on a dark night.
In this marvellous world he saw thousands of fascinating
views
Reflected, as it were, on a clear looking-glass.
But all these scenes and views of beauty became dim
When he saw the smile on your lips, O sweet *Habeeb*
(beloved).
The smile that played not only upon your lips but also on
your eyes,
Nay, which played upon you from head to foot.
The smile which was a token of love and truthfulness,
Concealed under the shadow of which was a pure and honest
heart.
The smile which signified happiness and kindness ;
The smile which acted like a magic ;
The smile which the Creator has given only to humanity,
And which manifests His own glory ;
The love-stricken *Mushir* forgot all else in the world
When he saw that wonderful smile of the Beloved.

Yet Schopenhauer says: "It is only the man whose intellect is clouded by his sexual impulses that could give the name of *the fair sex* to that undersized, narrow-shouldered, broad-hipped, and short-legged race. Instead of calling them beautiful, there would be more warrant for describing women as the unæsthetic sex. Neither for music, nor for poetry, nor for fine art have they really and truly any sense or susceptibility; it is a mere mockery if they make a pretence of it in order to assist their endeavours to please."

Poor Schopenhauer! He has the experience only of woman in Christendom. If he had seen refined Muslim women and come to understand them he would have confessed that it is impossible to imagine anything more beautiful in physical appearance and anything more elegant and sweet in character. Every word they spoke would have been to him a piece of poetry and music combined, every movement of theirs would have been a fine art in its gracefulness and blandishment.

It is not the fault of woman as a woman if Mr. Schopenhauer or any other person in Christendom is prompted to contest the title of FAIR SEX for them. The unsexed woman of Christendom may or may not be deservedly called a member of the fair sex. But surely the women under Islam are. They are beautiful in the best sense of the word. Their sex cannot be blamed if men in certain parts of the world have made their sisters in those countries ugly. But if Schopenhauer is right, then the responsibility even for the physical and moral deformity of the woman sex lies upon the civil and social laws and on the education given to them in Christendom. All the laws are man-made laws, all the customs are man-laid. Why should woman be blamed if the result of those laws and customs makes woman ugly? If the women in the West do not remain so charming it is because they do not remain very feminine, and for that man-made social rules only are responsible.

There is no doubt that all that has been said against women by Schopenhauer and others is due to their ignorance of *real* woman—woman as Providence created her. Their experience is limited to the artificial woman of the West, who is but their own creation. Is there any woman in London, or any other big fashionable town, who does not live an absolutely artificial life? The higher in rank she is, the more unnatural and the more artificial life she lives. She cannot give a hearty laugh even.

She cannot allow herself to express any great sentiment of affection for her own little children, whom under the dictates of fashion she can only see at fixed times. She must observe all the formalities in relation to all and everybody and everything, although most of those formalities are extremely absurd and even foolish. Many formalities compel her to dissimulate, even to act as a *hypocrite*. Yet she must observe them if she wants to remain a *lady*. She is by no means, in no sense, left a natural woman—a real woman. She is artificially made up. Her hair, her teeth, her form, etc., all have to be retouched. She lives an artificial life. Her thoughts and sentiments, if she has any left, her pastimes—all are frivolous. Schopenhauer is not far wrong when he says that the woman of the West remains a child, rather a spoilt child, her life long. Self-beautification, even when she has passed the age of youth, is her most favourite pastime. When her natural beauty declines she uses all the art and artifice to look as if she is but “sweet seventeen unkissed,” although it is doubtful if there does ever exist such a person as “sweet seventeen unkissed” in all Europe. It is an insult to call a European woman old. Those that are old do not only try to deceive others, but labour also under the self-delusion that they remain young and beautiful. Just as children play with toys, women play with themselves in a looking-glass. Just as children seek fun and enjoyment in trivialities, so do the women of the West. Just as children do not mind the consequences for a temporary pleasure, in the same way the women of Christendom indulge in freaks of fashion even though that causes them inconvenience or even illness. Thin socks, even in winter, tight corsets, slit skirts, low-necked blouses, tango dances, etc., though harmful to body and mind, yet for fashion’s sake they become a rage among women. Cinemas and theatres that have no educational value are enjoyed most, and serious and intellectual plays are disliked. Music halls and operas are thronged more with a view to ensnare a man or to show off one’s own beauty than to listen to music. The more fashionable a woman is, the more frivolous she becomes in her pursuits. The more vain, unsympathetic, childish, and selfish she becomes. Her influence over the sex is always unhealthy, and spoils middle-class country women also, who otherwise are women as made of God—kind, sympathetic and hospitable, and have their natural feminine touch.

Schopenhauer says that in Europe the *lady*, strictly so-called, is a being who should not exist at all. She should be either a house-wife or a girl who hopes to become one, and she should be brought up not to be arrogant, but to be thrifty and submissive. It is just because there are such people as *ladies* in Europe that the women of the lower classes, that is to say the great majority of the sex, are much more unhappy than they are in the East. The routine of life given by a young lady to the Bishop of Manchester some years ago is the same to-day what it was then. She said, "We breakfast at ten. Breakfast occupies the best part of an hour, during which we read our letters and pick up society news in the paper. After that we have to go and answer our letters, and my mother expects me to write her notes of invitation, or to reply to such. Then I have to go into the conservatory and feed the canaries and parrots, and cut off the dead leaves and faded flowers from the plants. Then it is time to dress for lunch, and at two o'clock we lunch. At three my mother likes me with her when she makes her calls, and then we come home to a five o'clock tea, when some friends drop in. After that we get ready to take our drive in the Park, and then we go home to dinner, and after dinner we go to the theatre or opera, and then, when we get home, I am so dreadfully tired that I do not know what to do."

Schopenhauer declares that these arrogant, overbearing and good-for-nothing women of the West are the product of "Teutonico-Christian stupidity," and wittingly adds that they remind one of the holy apes in Benares, who in the consciousness of their sanctity and inviolable position think they can do exactly as they please.

The present life and character of the women of Christendom which has no doubt been the product of the man-made social, civil, and religious laws has done a great harm, inasmuch as it has given a bad name to the whole sex. Schopenhauer himself has fallen a prey to the same fallacy, and says: "But in the *West* the woman, and especially the *lady*, finds herself in a false position; for woman is by no means fit to be the object of our honour and veneration, or to hold her head higher than man and be on equal terms with him." Because he found the woman in the West unworthy of "honour and veneration," he has generalized it for the whole sex. Schopenhauer had no occasion

to have any experience of non-European women, yet he had the audacity to call all women—the whole sex—unworthy of honour and veneration by mixing with such women only who are not *real* women—who are not women as made by God, but woman as made to the order of man or by the act of woman herself under the influence and command of man. An artificial woman would naturally be different from real woman.

This ~~fact, that~~ in the West people do not know what a woman as created by God is, has been made quite clear by such assertions as that of Schopenhauer when he says "Women have an affection for their children instinctively just as other animals and birds have for their young ones, only up to the time that they are helpless." There could not be a greater insult to a woman—at least to the woman sex in Islam—than this. If people in the West find all such shortcomings in woman, they should not blame the sex but their Christian religion, their social rules, and their civil laws.

We in the East would strongly take exception to any general condemnation of the woman sex. The respect we have for our mothers is second only to the respect we have for our Creator. The writer of these pages, who lost his mother while yet a child and was brought up under the care of his father's sister—late Begum Aziz-un-nisa—can confidently assert that there could not be conceived any other person—man or woman—who could be more *worthy* of honour and veneration than was that noble lady of blessed memory. It is almost beyond human imagination to think of a more perfect woman.

Love of a mother in Islamic countries for her children lives even when her body perishes. It is not human, much less animal. It is godly. It is unchangeable. It does not decrease when the child grows up. The child himself may prove unworthy of it, although, thanks to the Islamic influence, it is very rarely indeed that a man—even if he is a villain—disrespects his mother. The love of the mother will not only remain in all circumstances, at every age, the same for her son, but would be gifted with almost equal intensity also to his or her offspring to the remotest degree.

Woman under Islam should not be judged by what she is under Christianity. Nor should the woman sex be judged as Christianity has judged her.

The best way to judge the difference between the way the

woman sex is treated in Christian lands and in Muslim lands is to go to such a place where woman under Christianity and woman under Islam both can be seen at the same time. In such places the contrast will be clear. Take, for example, Constantinople. Thanks to the tolerant spirit of the Turks, Christians are allowed to go by their own laws and customs in Constantinople, and the result is that it is only in the Christian quarter that brothels exist, that it is only in the Christian quarter that adultery and fornication prevail, and that it is only in the Christian quarter that foundlings—those living examples of the degradation of the woman sex—are found. The Muslim quarter is absolutely free from brothels. The Muslim quarter is absolutely free from such immoralities which degrade and disgrace the woman sex.

The roads and the shops in the Muslim quarter are not so well paved, not so grand as they are in the Christian quarter. A stranger, at the first glimpse, will have a low opinion of the Muslim quarter. To his materialistic eye the Muslim quarter will look very primitive as compared with the Christian quarter. But if he studies the social aspect of the two quarters it will not take him long to see what a contrast exists between the two laws—the Muslim and the Christian—in respect of the moral and social side of humanity. While the Muslim law extirpates all the vices of drunkenness, gambling, and debauchery, the Christian law encourages them all. If the houses of Muslims are ill-furnished and poor, the manly and human attributes possessed by their owners are grand and rich. If the roads in Muslim quarters are rough and rugged, the moral and social habits of Muslims are pure and chaste. They respect and honour the woman sex much more than their Christian brothers do. They indulge much less in immoralities than their compatriots the other side of the Golden Horn do.

In such Muslim lands as Afghanistan or Hedjaz, where Christianity has found no footing, there are absolutely no public-houses, no gambling dens or clubs, and no brothels. In Christian countries public-houses go together with churches; even in small towns gambling clubs are numerous, and street women in daily increasing numbers. That Christian and European conscience has become dumb to these enormities, that Brussels is proud of a public indecent fountain, that in most of the Christian lands brothels are accepted as a necessary

public institution, does not mean that all humanity should change its angle of vision. The greatest use of religion is moral. If a religion fails to improve morals, it fails in one of its most fundamental objects. Unfortunately Christianity fails not only to satisfy the reason of man, it also fails to regulate his morals. When a mere belief in the cleansing power of the blood of Jesus is supposed to cleanse all sins, where is the need of any good actions left. When Christ has already been crucified for the sins of his followers and now all their sins roll upon his back, why should his followers not give free vent to their passions? The defect in Christianity lies in the fact that much too great stress is laid upon belief—a belief which has no moral value at all and which is irrational to boot—and much too little attention is paid to conduct. The result is that all that is animal in man goes unchecked and has its full play, and so all the vices are on the increase in Christian lands. Woman has suffered most as a subject of the animal passions of man.

Woman under Christianity is really a pitiable creature in spite of all her education and culture. Buddhism treats her badly, Judaism worse, but Christianity worst. As has been shown in preceding pages, Christianity considers her a criminal of the gravest type, and so much unholy that she cannot even touch the altar or raise her voice in the church. The founders and apostles of Christianity had nothing but abuse for her, and the learned men and legislatures have always formed a low opinion of her. The social laws of Christendom have always been such as to degrade her sex, and the civil laws too have not yet given her her full human rights. She has undoubtedly won a few political and civil rights for herself, but the fact remains that under the misconception prevailing as to her real status in the social economy of humanity she is being degraded day by day from the position which God assigned to her. It is time now that the conscience of Christendom should awake to the intensity of the sin committed in degrading woman. Even if mother Eve was responsible for the "fall of Adam" and for the crucifixion of Jesus, both have been sufficiently revenged now on the woman sex. Christendom has been taking that revenge for over eighteen centuries, and should feel satisfied now. After the present war new problems, not only geographical, political, and commercial, but also social, will arise. Even now in Britain alone there are about fifty thousand more

widows because of this war, and most of them are young and marriageable again. It will be more difficult for them to live an unmarried life than it is for those maidens who have failed to get a husband from the very first, whose sex-consciousness has therefore remained dormant. There are numerous other such woman problems given rise to by this war, and in almost all Christian lands of importance. If Christendom persists in degrading the woman sex by not amending its social laws, then this war, after it is over, will prove as much disastrous to it as it would if Europe did not change its political and commercial ideas while dealing with non-European races. The condition of Europe will be much worse after this war than it is at the present moment. The woman question will be the most important question, as on one hand their number will be comparatively much larger in population than that of man, and on the other hand each nation will need urgent recuperation of its destroyed man-power to be ready for another struggle which seems destined to come not very long after the present war.

If social and sex problems are not handled properly with due regard to women it will be the turn of women to get revenged. Christendom can no more ignore with impunity its moral obligations.

History shows that nations have gone down when their population has become licentious and immoral, when the sense of right and wrong has become dull.

Dreadnoughts and mailed fists are necessary to safeguard the country from external invasion, but the internal peace and prosperity depend upon political constitution with a general and popular franchise, and national health and happiness depend upon religious, civil, and social laws of practical value and mutual beneficence in which there is no evidence of sex, class, creed, or colour antagonism. In Christendom the woman problem is acquiring dangerous proportions, and if left unsolved with due regard to the respect for the sex, it will alone be sufficient to upset the real happiness and harmony, and to wreck the civilization. If earnest attention is not paid to sociological matters, then after this war, under the strain of circumstances, real woman will disappear from Christendom and a sexless being will come into existence in her stead. The social economy of Christendom will more resemble the social

economy in a beehive—the women folk resembling the almost sexless busy-bees. With the male population reduced still more, and with the comparative increase in the female population in such countries as England, the burden of work in the upkeep of the whole national life will fall mostly upon the shoulders of women, just as it does upon the busy-bees in a colony of bees. Woman will enter into every profession; she will have to look more to her education and business teaching than she had to in pre-war days. She will have to labour more, and will have less time left to look to the home or to the discharge of her duties as a mother or as a wife. So she will have to adapt herself to these altered circumstances, and if Dame Nature is allowed to have her course, she will change women—most of women—into a neuter sex as she has done of bees. By the sheer force of circumstances a large number of women will be condemned to single and virgin life, and thus be compulsorily unsexed after some time, or they will live a dishonourable and immoral life, and thus be the cause of an increase of disease and corruption in society and nation.

This gigantic war is in some ways the beginning of the end of the so-called Christian civilization. It has demonstrated its failure in more ways than one, and it will prove a greater curse in future than it has up till now unless Christendom takes upon itself to recast its outlook of civilization. Many serious problems are in front of the men and women of thought in the West, and the woman problem is by no means the least serious of them.

Every student of history knows that the chief cause of the decay and ultimate destruction of liberty and greatness of Greece, as of Rome, was corruption of morals. Cicero himself, in his *De Republica*, attributes the loss of Roman liberty to social vices of the people.

Mitford, in his "History of Greece," says that even great men of Greece were selfish, unscrupulous, and licentious.

"The ancient political philosophers unroll the wreck chart of the free governments of antiquity, and in that chart are found darkest spots, signs of shipwrecks, slavery, and moral corruption. Those philosophers were powerless to save the sinking vessels that bore freedom's golden ingots. Destruction swept the states whose policies Aristotle sounded with trembling fear, and the loved republic of Cicero's despairing heart. Sun and soil are there unchanged where stretch broken pillars of theatres

and temples, fragments of statues, crumbling aqueducts; and where the rush of legions smote the Gaul new empires meet in heedless shock. The grandeur of Rome was her wisdom in assimilating to herself the nations she conquered, and this should more entrance us than some gilt Hercules dug up out of her ruins." ("The Old Morality.")

Those nations which seem to be determined to come out victorious in this Titanic struggle will do well to remember that many a victory in the battlefield against foreign enemies prove disastrous defeats for the nation at home in its own countries through social carelessness and moral depravity.

Every great war which Rome finished with victory on its side increased the number of slaves, and because the moral character of those slaves was debased by vice and crime, the contagion of their depravity spread even among the better classes and ended in the collapse of Rome. War took away the best and most promising part of manhood; they were substituted by weaklings of their own country or by foreign slaves. Moral and social corruption increased, woman degradation increased, sensual appetites became insatiable, and thus every victory became an indirect cause of national decay.

If not guarded against, history will return to its old, old habit of repeating itself. The decrease in the number of men and the increase in the number of women will increase licentiousness and sexual immorality. The loss of the vigorous and enterprising manhood will leave luxury-loving weaklings behind, and this great artifice of modern civilization will tumble down like a house of cards built by ingenious boys.

If Europe wants to survive the shock, then both the sides—the one which comes out victorious and the other that is defeated—will have to look to their social problems—specially those problems that are in respect of their women. The danger of eventual social wreck will be greater for that group which comes out flushed with victory than for that which comes out singed by defeat.

It is upon Woman that to a great extent the future of Christendom depends.

Together with the danger of reduced birth-rate and sexual immoralities there is a more terrible danger of venereal disease threatening the countries of Europe, not only for the present generation but for generations to come. Dr. Mary Scharlieb

says that the question of these diseases is "essentially a woman's." The effect of those diseases is hereditary. Those diseases are due to the laxity of the moral laws of Christendom as well as to social customs and habits of the peoples of Europe, which encourage free and unrestricted intercourse of man and woman, thus helping, as it were, the excitement of animal passions of humanity to an inordinate extent which makes it not very easy for young people to be able to control. The full enormity of the increase in such diseases has not yet been realized. They, if left unchecked, would not only wreck the civilization but the humanity itself. Says Dr. Scharlieb, "At the close of all great wars it was a known fact that there were epidemics of syphilis and gonorrhœa. Already, though the bulk of the male population was abroad, there was sufficient infection in the training camps to raise the percentage higher than normal. It rested with women largely to prevent the spread of the evil by implanting in the minds of young people the highest possible standard of religion and morality."

Lord Sydenham, who is the President of the National Council for Combating Venereal Diseases in England, has lately characterized those diseases as the greatest scourges which ever afflicted mankind. He has forcibly warned the people that the evidence given before the Royal Commission, of which he was the chairman, proved that the known consequences of those diseases could be traced in a multiplicity of directions, and the results arising from their transmission by heredity were of vital importance, particularly at a time when the war was making a drain upon the finest manhood of the country, and an increasing number of women were engaging in industrial work, with results not conducive to the best motherhood. He thinks that never has it been so important that a preventable source of national weakness should be removed, and it would be criminal madness to neglect the task.

But the question is, what are those preventive measures that could be employed. Lord Sydenham suggests that as the Grocers' Company had presented to the London Hospital a ward for the treatment of those diseases, and within about three months two hundred cases had been treated there, in the same way if every large hospital could be provided with wards there was little doubt that the diseases would soon be brought under

control, without which the vigour of the race could not be maintained. But if the old proverb "Prevention is better than cure" is true, the fact of providing special wards for those diseases in every hospital can not be a substitute for adopting such measures as would prevent the diseases themselves.

In our opinion the only way to prevent the diseases of this character is to improve the morals of men and women both—and specially of men. This can only be done through the agency of a practical religion, with such social laws as are framed with due regard to the human nature. It is the social laws of European nations and their low moral standard which are at the bottom of all these ominous and threatening signs of the decay of European nations, in spite of their material progress and military prowess. It is only thanks to their glorious advancement in science that they have been able to keep down the ravages from the diseases brought about by their social laws and customs. But science cannot take the place of religion. It can help in curing the diseases of body, but it cannot prevent the diseases of the mind. Science cannot improve our morals, and such diseases as the venereal are a grave reflection upon the morals of the people. Unless due dignity is restored, under the control of a living religion, to the woman sex by the men of the West, unless their social laws and customs are amended in a way to differentiate those from animal habits, such scourges as the venereal diseases will never be prevented. As far as the animal kingdom is concerned, Mother Nature has itself provided means and measures to prevent to a very great extent such diseases. But poor man has been endowed with a free will, and unless he himself adopts means to keep his animal lusts and passions under judicious and sound control, he will not escape the consequences.

Almost all the laws regarding the relations between the two sexes require a radical reconsideration and reconstruction in the West. Morally the people have become almost blind. Religious susceptibility has become almost defunct. They require a dynamic shaking by a vigorous and living religion. It is the duty of the wise men and statesmen of the Western countries to look up for such a religion. Without the help of such a religion, all the wise men of the West as also of the East will

fail to stop the visibly degrading conditions of the moral aspects of humanity.

There is no doubt that when a future Ibn-e-Khaldun will write a scientific history of the present age, or when a future Gibbon will philosophically trace the causes of the downfall of the present powerful Christian nations, he will find that the darkest spot in the civilization was its irreligiousness, and the basic cause of the collapse was its immorality and the degradation of the woman sex as a sex.

The poison that is sure to kill all the material progress, scientific advancement, monetary wealth and riches, physical comforts and luxuries, and even intellectual development, is the raging immorality and irreligiousness.

This huge, although a bit clumsy and inartistic, edifice which materialism has reared up in Europe can be seen crumbling down to pieces by those who have eyes to see. Science cannot prop it up much longer. Christianity cannot stop its collapse. Christianity itself has succumbed to materialism. It cannot control human passions. It cannot show humanity the right way. It has no remedy for immorality. It has no social laws. It has nothing but curses for women. It believes man himself to be sinful.

Not only woman, not only man, but the whole humanity, the whole civilization can only be saved by a practical, rational, living, moral religion. Men in the West are inclined to atheism. Let the women take upon themselves to find out that religion which, and which only, can save the present civilization, and let them assert their authority as the custodians of the future generations. Like those benevolent sovereigns of Japan who curtailed their own prerogatives in order to give their people the blessings of a constitutional government, let the women in Christendom give up that license which they have been given by loose social laws. Let them bring themselves under the control of sound moral laws so as to insure a healthy, sound, and vigorous generation for the future. Self-control, self-abnegation on the part of woman alone can save the situation. Man has been encouraging immorality. He has been proving himself the serpent that beguiled Eve. Women should take upon themselves to be on their guard. The occasions on which man seduces woman should be restricted. The opportunity he gets to corrupt woman should be restricted. Social decay must

be stopped. Man has failed to stop it. Let women take the task upon themselves. It is a higher task, a nobler task than political enfranchisement, higher and nobler task than municipal enfranchisement. If it is necessary that the roads be well paved, the sewage well drained, how more necessary it is that human habits and life be free from vices and regulated by sound moral laws. Men in the West have failed to look to the latter. Let women come forward. Let them actually mother these vice-steeped nations. It is their duty to do so. God created them to do so. The whole of Europe, the whole of Christendom is a sick-man. Moral leprosy caused by irreligiousness is the disease he is suffering from. Let woman nurse him back to health. Woman is always the best nurse. She alone has the privilege of being a mother. Let her be a mother and a nurse, not for individuals alone, not even for nations alone, but for the whole of Humanity. Let her be a real WOMAN.

It is marvellous indeed how the middle class, particularly country women, in the West, in spite of loose religious notions, unfavourable circumstances, keen temptations, and unwholesome customs, keep their womanly character. They have in them their instinctive virtues and the inborn beauties of a real woman. They are kind-hearted and sympathetic, even in such countries as England, where men are insular, reserved, and cold-blooded. They love good by nature. What is needed for them is only to assert themselves. Let their original God-made characters have full play; let them defy the man-made laws and customs that have a tendency to unsex them, and they will help in saving Europe from that precipitate fall to which its materialism, irreligiousness, and immorality are leading.

*RACES WITHIN
THE CHURCH.*

BY
A. B. CHAMPION, M.A.
Chaplain of Selangor:

PRINTED BY
FRASER AND NEAVE, LIMITED, SINGAPORE.
(INCORPORATED IN SINGAPORE).

1918.



PREFACE.

The basis of the following pages was a paper on Races within the Christian Church, read before a Conference of the Clergy of the Diocese of Singapore, held in May of this year at Seremban. A wish was subsequently expressed by several who heard the paper that it might be made available for a wider audience.

Revised, therefore, and in many parts rewritten, I now submit it to the judgment of a larger circle, but with a diffidence born of a growing realisation of the insufficiency and shallowness of my treatment of this immense subject. The only justification for its appearance in print lies in the fact that hitherto, to the best of my knowledge, the subject has received scant attention from the religious bodies in this country, at least as far as can be judged from public utterances. And perhaps the publication of this pamphlet may serve to arouse interest, and move abler pens than mine to the elucidation of the racial problem which confronts the Church in this land.

I must not omit to express my obligation to a friend who is mainly responsible for the biological considerations set down in Chapter 2, as well as for many valuable suggestions, and also to certain speakers at the Conference abovementioned, whose criticisms of the original paper have led me to make various alterations.

The printing of the paper has been considerably delayed owing to other claims on my time, and I have to thank the publishers for their patience.

A. B. C.

KUALA LUMPUR,

Feast of SS. Simon and Jude, 1918.

RACES WITHIN THE CHURCH.

"No more complex and difficult, no more urgent, problem confronts us at the present time, in Church and State alike, than that of the relation of the white to the various coloured races throughout the world." (1) These words written by the present Metropolitan of India with special reference to the problems raised by the presence of large numbers of British Indians in the Transvaal, have an equally cogent application to the racial problems of British Malaya. And scarcely less difficult than the question of the relationship of "white" and "coloured" is that of the relation of "coloured" races to each other, where as in this country, we find members of so many races jostling together and endeavouring to work out a possible *modus vivendi* in a country where we are all alike—including, let us remember, the Malays themselves—immigrants, and not autochthonous. This problem it is a function of the Catholic Church of Christ to solve.

Now we may take it as axiomatic, I suppose, that the Church of Christ recognises no distinction whatsoever as regards class, colour or race. The East and the West are to sit down with the children of the Kingdom. No man is to be pronounced common or unclean. There is no distinction between Jew and Gentile, bond and free, male and female. This is the "Mystery" once hid, but now made known by the Gospel. And it is based on the three-fold foundation (a) of the Fatherhood of God who "has made of one blood all nations" (2) (b) of the Redemptive work of the Son, for there is no distinction because all have sinned, (3) and need equally the cleansing of the precious Blood, and (c) of the sanctifying work of the Holy Ghost, for "we have our access in one Spirit unto the Father." (4)

Against this we are told by a certain school of politicians that race distinctions are fundamental, that they express themselves in an instinctive race repugnance and that when this wholesome natural instinct is flouted, a progeny results inferior to either parent.

I.—Historical Considerations.

Now, it is at least curious to note that this alleged "natural instinct" appears to be a thing only of recent growth. The number of races has not increased in historical times, and although the discovery by Europe of the New World and of the Far East and the modern rapid methods of locomotion have tended to bring more races into contact with each other, the fact remains that there was race contact in classical times, and that white Roman and Greek faced black Ethiopian and yet knew nothing of a Colour Problem. Nay,

(1) "British Indians in the Transvaal: an Empire problem." The East and the West. Vol. vii., No. 25., p. 66.

(2) Acts. xvii., 26.

(3) Rom. iii., 22, 32.

(4) Eph. ii., 18.

four short centuries ago, the marriage of a gallant Moorish gentleman to a fair Venetian lady was so little felt as incongruous, that Shakespeare was able to produce his "Othello" without any more offence to his age than would to us a modern drama including for its characters a Russian General married to an English wife. Obviously, Elizabethan audiences knew nothing of a Colour line.

It is true that anthropological theories have sometimes been imported into historical considerations, and philosophies of history have been built up on the slender basis of a supposedly innate race hatred between Celt and Teuton. Yet, with Mr. Chesterton, "It is hard to believe that physical difference has really played so fundamental a part in human history, as for instance the physical difference between the Celts, the Teutons and the Latins is said to have done,

"I know of no way in which fair-haired people can be prevented from falling in love with dark-haired people; and I do not believe that whether a man was long-headed or round-headed ever made much difference to any one who felt inclined to break his head. To all mortal appearance, in all mortal records and experience, people seem to have killed or spared, married or refrained from marriage, made kings or made slaves, with reference to almost any other consideration except this one. There was the love of valley or a village, a site or a family; there were enthusiasms for a prince and his hereditary office; there were passions rooted in locality, special emotions about sea-folk or mountain-folk; there were historic memories of a cause or an alliance; there was, more than all, the tremendous test of religion. But of a cause like that of the Celts or Teutons, covering half the earth, there was little or nothing. *Race* was not only never at any given moment a motive, but it was never even an excuse." (5)

Or again:—"Thus crowds of saints were Irishmen, but S. Patrick was not an Irishman. Thus as the English gradually became a nation, they left the numberless Saxon saints in a sense behind them, passed over by comparison not only the sanctity of Edward but the solid fame of Alfred, and invoked a half mythical hero, (6) striving in an Eastern desert against an impossible monster." (7)

In fact all history points the other way, *viz.*, that until quite modern times, West was not West nor East East in any Kiplingesque sense, but that for instance an embassy from Far Cathay or Hindustan was treated at all the Courts of Europe as a mission, not of an inferior species of humanity, but of distinguished strangers.

It is in fact difficult to resist the conclusion that this "natural" colour prejudice is actually one of the developments of the African slave traffic, which obviously found a welcome theoretical justification in the conception that the white was master and the black slave, not merely because the white had the material force to compel the black, but because he was of a superior species, created to rule, just as the black was created an inferior species and therefore only fit to be a hewer of wood.

(5) Chesterton. A short History of England. p. 32.

(6) S. George, Patron Saint of England.

(7) Chesterton. A short History of England. p. 60.

Slavery was known long before the first slaver sailed from West Africa. But formerly it knew no colour line, perhaps because to non-Christian habits of thought it required no such attempt at justification. The enemy of Rome, who was not killed, was captured and became as a matter of course the slave of the captor—no distinction being made between German, Nubian or Greek slaves. And when the Roman legionary knew that if he in his turn was captured by a Mede he would become a slave in a Kurdish home, he felt no indignation at the thought of a European being degraded by an Asiatic.

It also suggests itself to the student of history, that this genesis of the colour prejudice synchronizes with the event known as the "Reformation." Whether *post hoc propter hoc*, would be difficult to prove; yet it is perhaps significant that the Colour Problem in its acutest form seems to be unknown in Latin and Slav countries, and is in fact peculiar to modern Anglo-Saxondom. Perhaps the newly won popularity of the Old Testament had something to do with this, resulting in an identification of the White Conqueror of the Tropics with the Chosen Race invading Canaan. The "coloured" races, therefore, are the Allophyloi, preordained by God to be hewers of wood and drawers of water to the elect race, who would be contaminated by any relationship based on equality.

However that may be, a historical consideration of the problem makes it clear, that until quite modern times, mankind has been unconscious of any essential difference set up by Race.

II.—Biological Considerations.

Irrespective of the question whether mankind until recently was unaware of it, the point remains to be settled, whether the essential difference of race is a fact or not. Dr. G. A. Dorsey of Chicago, when lecturing at Cambridge University a few years ago, denied that there was any such thing as "race." The actual size of the brain bore no relation to the intelligence, he held, and the difference between times and races lay in the mental furniture of the brain, not in its size. The well-known anthropologist Felix von Luschan similarly states that the great majority of modern authorities claim a monogenetic origin for mankind. He finds "three chief varieties of mankind—the old Indo-European, the African and the East Asiatic, all branching off from the same primitive stock, diverging from each other for perhaps thousands or thousands of thousands of years, but all three forming a complete unity, intermarrying without the slightest decrease of fertility."⁽⁸⁾ And again "We are forced to admit the real unity of mankind. Fair and dark races, long and short headed, intelligent and primitive, all came from one stock."⁽⁹⁾

In the anatomical theatre, a black or yellow body serves as well as a white or red. The organs are identical to the minutest detail. Psychologically, the identity is equally precise—black and white equally have the faculty to remember the past, to visualize the absent, to invent

(8) Universal Races Congress Report. p. 17.

(9) " " " " p. 21.

the new, to discriminate, to compare, to conceive, to judge. Men of practically every race have sat side by side in the classrooms of the world's universities and have completed their courses with substantial uniformity of ability. In fact, common sense accepts the essential sameness of body and mind as a matter of course. When an explorer comes upon an hitherto undiscovered race of naked savages, he does not shoot specimens for the museums of his country, or to taste the edible quality of their flesh: in short, he does not treat them as if they belonged to another species of the animal kingdom, but he acts towards them as in the presence of fellow-men.

The fact remains, that "popular" science and much half-education on the subject have unconsciously tainted most people with materialistic ideas. A Negro is black; a Caucasian is white—therefore they must for ever remain different. For how can a Negro produce anything but a Negro?

But exact science recognizes, that if the Negro cannot change his skin, he can change pretty nearly everything else, particularly that which makes him a man—his soul. A race may be backward, but if it is not essentially inferior, it may be developed. The natives of Murray Island speak a language which has numerals only for one and two; yet the children taught there in the Mission School show an arithmetical proficiency, in no way inferior to an average English school boy.

This point is brought out most clearly in the contrasted treatment meted out to the transplanted African in British Jamaica on the one hand and in the American Southern States on the other. Sir Sydney Olivier, than whom no better qualified observer could be desired, read a paper in 1913 before the Church Congress at Southampton, in which he contrasted Jamaica and the Southern American States in regard to race difficulties, and quoted Professor Royce of Harvard University as saying that Jamaica simply had not got any race-problem. How has this been brought about? "The civilization and morality of the Jamaica Negro" says Sir S. Olivier, "are not high, but he is on a markedly different level from his grandfather, the plantation slave, and his great-grandfather, the African savage. The Negro in Jamaica has been so far raised, so much freedom of civic mixture between the races has been made tolerable, by the continuous application to the race of the theory of humanity and equality; equality, that is, in the essential sense of endowment in the Infinite, of shareholding in the spiritual soul of man, of sonship in the household of God. Evangelical Christianity, the most democratic of doctrines, and educational effort, inspired and sustained by the conviction and recognition that, whatever the superficial distinctions, there was fundamental community and an equal claim in the black with the white to share, according to individual capacity and development, in all the inheritance of humanity—these chiefly have created the conditions that have done what has been done for the Negro in the lands of his exile. The improvement, the progress, did not come automatically. They had to be fought for, and they have still to be fought for, by men and women who believed in these principles, and who did not believe in the finality and permanence of racial distinction and disabilities. This is not theory: it is history. Emancipation, education, identical justice, perfect equality in the Law Courts and under the Constitution, whatever the law of the

Constitution may be, these take away the sting of race difference, and if there is racial backwardness, it is not burdened with an artificial handicap. Negroes are now the equals of the white men in fields of human function in which one hundred years ago slave-owners would have confidently alleged the negro incapable of equality. All such positive materialized progress has been made by ignoring the obvious; by refusing to accept as conclusive the differences and the disabilities, by believing in the identities, the flashes of response and promise; by willing that there should be light where there seemed to be no light; by the methods of the visionary whose kingdom is not of this world, but who is insensately bent on assimilating this world to that kingdom—in part even by far less than this, by the mere resolute maintenance in the State of principles of common justice.

“ My study and comparison of conditions in the United States and in the West Indies has brought me to the belief that no solution of the American colour difficulties will be found except by resolutely disclaiming the colour-line and race-differentiation theory. American and Colonial politicians and public men are not Exeter Hall Abolitionists nor Evangelical Christian missionaries. I do not expect them to adopt the formulas and methods of missionaries or to sympathize with all their political programmes. But it cannot be ignored that it happened that the faiths of the men who laid the foundations for a peaceful development of the mixed community of Jamaica were democratic, humanitarian, and before all else uncompromisingly Christian, and that not vaguely or loosely, in the sense of mere kindness, but in the sense of that revelation of the nature and inheritance of man that gave Christianity power to undermine the enormous brutalities and criminalism of the Roman Empire. No more than this is required in regard to temperamental attitude. Where the race differentiation formula is held to it must increase civil discord. When the balance of numbers is as it is in South Africa it must tend to foster obscure preparations for rebellion or civil war. If statesmen and citizens face in the contrary direction I do not say they will immediately attain civil peace, but I am confident that they will be travelling the only road towards it.”

Confronted with such evidence, which could be multiplied indefinitely, it is useless to maintain any race fatalism. Neither History, Science nor Common Sense provide any evidence for the kind of feeling that some time ago produced in the United States the book entitled “ The Negro a Beast.” Yet though neither anatomically nor psychologically any reason for race prejudice has been discovered, the upholder of race distinction maintains that there is evidence of fundamental racial differences in the observed inferiority of the mixed to the pure races.

III.—Miscegenation.

“ Miscegenation,” says Lord Selborne speaking of the South African Problem, “ is a detestable evil ”⁽¹⁰⁾ and this verdict will be endorsed by most English people. It is strange indeed to find English people, who themselves owe so much to race mixture, to be largely apostles of race-segregation. And the brilliant French nation, who would call them racially pure or homogeneous! Has it in fact not been

(10) The East and the West. Vol. 7., No. 27., p. 284.

established that there is a considerable admixture of negro blood in all Latin races? Are they for that reason mentally or morally the inferiors of the pure-blooded Teuton? A sober and careful observer like Lord Bryce stated that the Chilian peasant, who is at least half Indian, is in no way inferior to the Argentine peasant, who is practically pure white.

To charge all Eurasians with degeneracy is to make an unwarrantable assertion. Even were it wholly true we should have to allow for the effects of climate and ask ourselves how do Europeans who have lived in India or the Tropics for two generations resist the enervating effects? Do they not come to be classed among the despised "Eurasians?" And if there is an element of truth in the charge, has not the blame of degeneracy to be placed largely at the door of social usage—the social bar sinister which leads to self-distrust, and to the too often vicious origins and surroundings, of half-castes; which origins and surroundings, it may be added, are largely due in the first instance to the impossibility of honest marriage between white and coloured, without the punishment of social ostracism?

Imagine if conditions had been otherwise,—good Christian parents, honest marriage, good education, social fellowship, and so on. What new types of Christian excellence might not have been produced? Indeed, even as they are, we have reason to blush far more for the European who, having been content to leave the Ten Commandments West of Suez, has in the great majority of cases repudiated with incredible callousness all responsibility for the physical, mental, moral, and spiritual welfare of those who are bone of his bone and flesh of his flesh, than for the follies and weakness of those whose responsibility is infinitely less. But this line of thought, though it should temper a harsh judgment of those Eurasians who fail, has of course no bearing on the case of many who do not fail, and have no need of any "apologia." In the case of these we can only express our admiration at the display and exercise of so many excellent qualities, often in directions where both the white and black man fail. I am sure that many of us are personally acquainted with families, of whom we would consider it a gross insult to suggest that they are the result of a race connection which fundamentally "ought not to be."

And here, to support our own experience, evidence comes in on the other side, which points to the fact that a mixed race does not necessarily tend to die out or grow enfeebled. Prof. Finch of Wilberforce University, U.S.A. brings forward evidences from Tasmania, Polynesia, Pitcairn and Norfolk Islands, etc. to show that race-blending, especially in the rare instance when it occurs under favourable circumstances, produces a type superior in fertility, vitality and cultural worth to one or both of the parent stocks.⁽¹¹⁾ The Rev. Stuart Clarke speaks of the "large and capable (Eurasian) community domiciled in India," as follows:—"In the higher sphere of Christian character, those who have been privileged to work amongst them can certify to the reality of spiritual experience and to the loyalty of devoted service which characterise many a Eurasian worker."⁽¹²⁾ Eurasian women have done excellent work as teachers, doctors and nurses. In the old Church at

(11) Universal Races Congress Report. p. 108.

(12) The East and the West Vol. ix., No. 23., p. 89.

Calcutta is a tablet witnessing to the worth of a Eurasian priest, the Rev. Alfred Slack, who could "preach the gospel in five vernaculars and brought over a thousand souls into the Church of Christ through the waters of Baptism." In our own Diocese the respected name of Rev. W. Gomez among others reminds us of the possibilities of the Eurasian—which we have all too little utilised.

Again, take the history of the West Indies, where negro blood is notoriously running in some of the best Planter families, or of some famous Englishmen, whose Singhalese ancestry is well known; take the number of people in this country, whose mixed parentage has not tainted them with degeneracy, but rather has helped to make them ornaments of the station in life they occupy.

Again, when the casual European speaks of the "inferiority" of the Eurasian or Eurafrican—in what does he consider such inferiority to consist? Is it not practically always in the alleged lack of "force," initiative, efficiency, power to rule? But is the modern German really an adequate moral standard, by which to measure the achievements of man's nature? What if meekness, patience, long-suffering, humility were the standard of perfection? Can there be any adequate standard of comparison which falls short of the ethical and spiritual ideals of Christ?

The results, indeed, of miscegenation are not demonstrable by scientific experiments extending over many generations, as is possible on a stud farm, and consequently assertions made by the casual observer are no proof either way. But this much at least is obvious, that if perhaps it has not yet been demonstrated in terms of a biological experiment that miscegenation produces an offspring superior to its parent stock, yet enough has been said to show the unreliability of the common assumption that miscegenation leads to degeneration.

IV.—The Christian Standpoint.

As already stated, Christianity is quite clear both on the past and the future of all human races—teaching that they once were all one in Adam and that again they shall become one in the Second Adam, Christ. And as we have already seen, it seems to be more and more a matter of general agreement among anthropologists that the Hebraic account of the origin of the human race from a single stock is correct. Many people are inclined to the opinion that questions of race relationship are best left to the scientific expert, and that consequently any such problem as that of the relations of races and peoples within the Church must be examined in the light, not of *a priori* dogmas of Christian Theology, but of the conclusions of modern scientific enquiry. Whether this attitude be wise or not, it is at any rate satisfactory to meet such objectors on their own ground and to show that scientific investigation is in this case either at one with Christian Theology, or at least can adduce no facts contrary to its teaching.

We have therefore considered it useful, if not necessary, to clear the ground somewhat, as we have done in the previous pages, by establishing the fact that there is no scientific evidence running counter to

those fundamental assumptions on which Christian Theology rests, and which the Scriptures convey to us in the narratives of the Creation, the Fall and the Dispersion of the human race. "God has made of one every race of men." "He has determined the bounds of their habitation." "All have sinned and fallen short." There is no essential vital *distinction*.

Here is a fundamental fact of the utmost significance. It lies, in fact, at the root of the problem. For it is quite clear that if the Unity of the Church is to be a real unity, and not an artificial assembling together for worship followed by separation (or even less than this, a mere semblance of unity of divergent people under a common Diocesan Bishop),—if, I say, the unity of the Church is to express itself in life and not merely in ecclesiastical organization, then that unity will mean social relationships between members of different races which will imply the ultimate possibility—and if the possibility, then the rightness—of inter-marriage between races.

Now if one were to find the scientific world in its general conclusions antagonistic to the idea of race-oneness, then one would feel a great deal happier about the attitude of the very large number of people, both worldly and devout, who hold the view, that "there is a limit beyond which fellowship is neither desirable nor good." A passage from Bishop Montgomery's "Life's Journey" shows this attitude very clearly and sympathetically expressed. "If the 'colour question' meant, for example, that the brotherhood of man, as one of the great truths of the Christian Faith, involved intermarriage between all races as a duty or as an ideal of the future, I should be extremely unhappy. But as I believe that races which have developed in the course of the world's history in very different directions *ought no longer to intermarry*, and, remember, in the fullest interests of both such races, I am not only not unhappy but most hopeful."⁽¹³⁾

The Bishop's argument is the usual one that such marriages are not successful, and that in fact the differences between (white and black) races are so vast as to involve incompatibility for marriage. With that argument we have dealt already, but here we have to consider that to place an appointed limit of this kind to the development of Fellowship forms logically a most dangerous precedent. It was exactly this kind of argument which St. Paul had to face and which led him so passionately to assert not so much the equality, as the *oneness* of all men in Christ. "Ye are all—not equal but—ONE MAN in Christ," "that He might create ONE NEW MAN, so making peace."⁽¹⁴⁾ I do not see how it is logically possible to set up a barrier here or there, and say "At this point fellowship must stop." I do not see how it is possible to say that intermarriage ought not to take place, without also saying that social intercourse (which necessarily presupposes such contact as involves the possibility of intermarriage) also ought not to take place. And if science is right and differentiation of colour does not constitute differentiation of species, then why is not that race intermixture which is wrong between white and black, also wrong between white and yellow, white

(13) Life's Journey, p. 125.

(14) Eph. ii., 15.

and swarthy, white and sallow, even white and white! Where is the logical line drawn! And if race intermarriage ought not to be, then race segregation ought to be, and the man is right who refuses to eat or walk or ride with a black man, and (since he is not a hypocrite) also to partake of the Sacrament with him.

No, the logical line does not exist, any more than the "natural instinct deeper than prejudice," which is only a pretty name for prejudice. That there are many unhappy marriages between white and black or yellow is no doubt true, but that there are no happy ones—nor can be—is a monstrous assertion, which most of us know to be untrue.

These things will be seen in a clearer light, if we take the parallel case of caste-prejudice.

Is not 'Caste' the greatest evil in India, and are we not assured that even in the Christian Church the "Caste Spirit" is never truly broken until *inter-marriage takes place* between those who were formerly of different castes? The conquering race of Brahmans formed the caste line for their own protection against men of a defeated race. It is essentially a mark of *racial* "inferiority." How are we to fight caste in India and yet draw what we ought to see is essentially the *same* line ourselves? And do not those not of the white race similarly regard the "colour line" essentially as a *caste* line, and rightly and Christianly resent it accordingly? Can the dividing line between white and coloured races be broken by any means short of that necessary to break down caste?

Thus the "rightness" of inter-marriage seems to me the supreme test—the breaking down of the "middle wall of partition." I would venture to call it verily an *articulus stantis aut cadentis ecclesie* that there is no more logical reason why a white man or woman should not mate Christianly with a black or a yellow, and bring up a truly Christian offspring, than there is why an Englishman should not marry with a Russian or a Chinese with a Japanese. The human race is a unity.

I do not wish to be altogether misunderstood. I am not suggesting that such "inter-marriages" should be in any way artificially encouraged, or that rash experiments should be tried. I know that there are at the present time inexpediences to be considered in many directions which it would be outside the purpose of my paper to discuss. I know that such marriages, if recklessly entered upon, would not as a rule be likely to be successful. I recognise that the time is not yet fully ripe, that inter-marriage comes at the end of the process of race fellowship. It is the climax, not the starting point of social relationship. But I am sure on the other hand that there is quite sufficient natural repugnance—call it prejudice or instinct—on the part of the white race to mixed marriages to prevent any rash or hasty or general acceptance of either the principle or the practice. I am also sure that there is now the possibility—nay the actuality—of such marriages being as "successful" and "happy" as it is possible for marriages to be. And I am sure that the Church itself is primarily concerned to defend and bless and uphold such marriages, and to emphasize as vital to the true conception and working out of the Catholic ideal the ultimate principle that "no race which is

Christian can remain socially segregated from other Christians if the doctrine of the Incarnation be true,"⁽¹⁵⁾ and, arising from this, that if social intercourse be right, then inter-marriage which is the outcome of social intercourse cannot rightly or logically be denied.

I should apologize for the length with which I have urged this point. It is in my opinion crucial. I assent whole-heartedly to the three principles laid down in the paper of the Rev. C. F. Andrews on "Race within the Christian Church" from which I have already quoted: (1) That the human race is one in Christ. (2) That the Blessed Sacrament is a sacrament of a Unity comparable to that of the Divine Nature. (3) That Christ fully and wholly shares the nature of every man of every race.⁽¹⁵⁾ These propositions cut fundamentally at the policy which is the only logical alternative to the one which I advocate, *viz.*: complete segregation, or at least that the races should part at the Church door, that there should be "religious union" (in the Eucharist) without social intercourse,—the idea, in short, that there is something *more unchristian* than race-alooftness, and that is the horror of Christian intimacy ending in marriage, whereby (so the subconscious thought runs) the white race receives a stain.

On the contrary, the Catholic Church, faced by the fact of white, black and mixed races existing side by side, tells them uncompromisingly that by Baptism they have become "one Family in Christ." And if it is true that such effect is so far largely potential, the Church must yet logically welcome a thorough-going application of this principle of fellowship—an application which legitimately as well as inevitably must lead to the formation of new races and nationalities, as happened in mediaeval Europe, as is happening to-day in Brazil and other parts of South America, and as is perhaps beginning to happen in Malaya.

And the Church of Christ by her very nature cannot but help to hasten such process. For the primary question is whether the nature of the Christian Fellowship is theoretical or practical? Is it a so-called purely religious fellowship or is it also a fellowship of common life? Does the fellowship confine itself to the Altar-rails and cease at the Church door? Or is it intended to issue in a social fellowship of the most intimate kind, a real Family Life, a Brotherhood?

Is the unity of the Church, in short, an artificial thing imposed from without upon elements which are essentially separate, and ought to remain "segregated"—a bond like the harness which connects a team of horses? Or is the religion of Christ intended to forge an organic unity—making indeed One Body and One Blood those who partake of the One Bread and the One Cup?

The answer, I hope, is after our considerations clear, *viz.*, that since the human race is a unity, this natural unity must be realizable, naturally and super-naturally in Christ—in the fellowship of the Catholic Church carried to its extremest limits. Christ, it is true, came not to send peace but a sword. He is, alas, a fruitful source of division—set for the fall and rising again of many: but the division is among those of the same household, between those who acknowledge and those who deny

(15) Rev. C. E. Andrews in East and West. Vol. 8., No. 31., pp. 241 etc.

Him, between those who are with Him and those who are against Him. In this sense Christ cuts right across other lines of division and causes new cleavages. But on the other hand the Catholic Church is designed to be in itself the pattern and ideal Fellowship for men of every race. In so far as it takes men outside the fellowship of the world, it must welcome them together the more whole-heartedly into the Fellowship of the Body.

The world without may rage; but we
Will only cling more close to Thee,—

and in Thee, we must add, to one another.

V.—Christian Practice.

If the foregoing chapter represents the true teaching of the Catholic Church, what then has been the practical result so far?

To-day, with all the races of the world being more closely brought into contact with each other owing to modern facilities of transport and the general contraction of the world, we cannot doubt that this closer intercourse, coming at the same time as the development of a more articulate race consciousness, constitutes both a menace and a hope. A menace, because race-consciousness tends to issue in a feeling of national hostility. The yellow man thinks himself no less superior to the white man than the white believes himself superior to the yellow. At any rate, believing himself "different" he finds it only a step from a conviction of difference to that of enmity. A feeling of inferiority tends to deepen the sense of enmity. As race-consciousness grows among the "subject-races" of the world, as for example among the negroes of North America or the people of India, it is accompanied by a growing impatience and resentment of a rule which, whether efficient or the reverse, is felt to be something less than just or other than sympathetic. It may be said that differences of language and customs—and above all differences of religion—tend to widen this social cleavage. If we consider the embroglio into which the nations of Europe have lately been plunged through international estrangement and suspicion, we can imagine the horror which might accompany a great race conflict, in which the coloured races would outnumber the white by more than two to one.

On the other hand there is hope. Science, spreading over the world, recognises no colour line. Secular education tends to become of the same type throughout the world, and is so far a unifying influence. Industrial technique, such things as railroads, telegraphs, aeroplanes, are the same in England, China and Peru. The exigencies of commerce demand the breaking down of language barriers and the unifying of the measures of weight and exchange. All these things are in their several degrees bonds between races.

But what has religion—and in particular the Catholic Religion—contributed? Scientific writers discount its influence. "It is idle," says one "to count on religion for bridging over the gulf of race. Religion cannot unite but only divide." On the other hand Prof. Caldecott (Professor of Moral Philosophy in the University of Cambridge) speaks of religion as "generating and sustaining a degree

of faith in the advance of men towards a unity of mankind such as cannot be attained without its aid."⁽¹⁶⁾

What are we to say then of the Church to-day? How far does it show forth within itself such an ideal of Fellowship? And how far does it contradict it? I do not know whether in answering this question there is any part of the Church which can afford to throw stones at any other. I fear we have all sadly fallen short. But it has for some time been a cherished opinion of my own that here in Malaya we have at least a peculiar opportunity of making a very definite contribution towards the working out of the great ideal of Christian Fellowship, and also that that opportunity is far less hampered by bad precedents and acquiescence in non-Christian standards than in other parts of the Church, where they are a cause of infinite sadness and perplexity to Christian minds.

In South Africa, for example, we cannot help feeling that the Church has failed to a tragic degree in arresting or sensibly affecting the separatist attitude of the white towards the black. "There is," writes Mr. Callaway, "an absolute and almost bitter refusal on the part of white Christians to mingle in any kind of fellowship with black Christians."⁽¹⁷⁾ - The remark—silly enough—of a certain lady, "if there are to be Kaffirs in Heaven, I hope I don't go there," is quoted as indicative of a very large section of white opinion. Mr. Hill writes as follows in a recent issue of the Paper of the Community of the Resurrection: "I am much disturbed about the native. For the old Dutch policy of repression has got into the new legislature. The principle of separation is justifiable if they set apart adequate areas for native occupation and purchase, but this they haven't done: the areas proposed are wholly inadequate, and the provisions of the bill make the position of natives in European areas very insecure."

This quotation is particularly interesting, not only as showing that in Africa as in other places the Church has failed to educate public opinion sufficiently to affect Government policy in a Christian direction, but also as a revelation of the compromising position adopted by those who are themselves convinced churchmen. "The principle of separation is justified if" Is not this giving the whole case away? Is it not the thin end of the wedge, which ends logically in denying the principle that Christian Fellowship involves social relationship? The willingness to compromise on this vital question is surely the weakness of the African Church, and we cannot feel surprised when we go on to read, "I had to minister on the Sunday to the English people three times, to the half-caste people twice, and to the natives twice. Just fancy. Mass in three places in one little "dorp," just because Christians are unconscious of the brotherhood of man." There are great hopes that the South African Church will soon realize the logical necessity of altering its attitude on this question, since they are not adverse to discussing it. In a recent conversation the Rev. C. F. Andrews informed the writer how in his visit to South Africa he had preached on the Colour question in all the Churches to which he had been invited, and knowing his views on the question of race-segregation, it is allowable to hope that he left seeds behind him which will bear fruit in the future.

(16) Universal Races Congress Report, p. 312.

(17) The East and the West. Vol. viii., No. 29., p. 60.

In India there is an equal danger of the race or colour antipathy taking the soul-destroying place in the Christian Church which " caste " takes in Hinduism. The existence of the " Establishment," the more or less rigid distinctions drawn between " chaplains " and " missionaries " and the almost complete separation of their spheres of work seem to me to add to this danger. In Calcutta you may go to one Church and find a congregation almost exclusively European, to another almost exclusively Eurasian, and another entirely Indian. This separation of congregations cannot always be avoided. Here at least the danger may be noted of a silent acquiescence in race and class feeling by encouraging such separations where exigences of language and locality do not necessitate them.⁽¹⁸⁾

Turning to the United States of America we find that (apart from the Roman Catholic whose general attitude we shall presently refer to) the so-called Protestant Episcopal Church of America alone has stood out against the segregation of negroes in separate Churches, and has so far resisted the clamour for a racial episcopate. Apart from this fact, for which we may be thankful, the situation is from the Christian point of view most depressing. Negro and white seem to have steadily drifted apart since the Civil war. There is deeper antipathy than ever. And here again is the same stumbling-block. " The sentiment against mixed marriages is so strong that it is not unlikely that National Congress will be asked to pass a Federal law forbidding it." And again, quite naturally and logically, of course, " Legislation in Southern States is definitely and consistently directed *not only against inter-marriage but against any kind of social familiarity which might suggest its possibility.*"⁽¹⁹⁾ Of course! Separate seats, separate cars, separate paths to walk on, separate pews or separate churches,—all these things which seem intolerable as between Christian brethren, and yet so justifiable, nay so necessary, if all " kind of social familiarity " which might " suggest the possibility of inter-marriage " is to be forbidden!

And that the Church itself is bowed down by compromising on this matter is evident from the following extract from the " Soul of the Black Folk " by Prof. Du Bois about a negro named Alexander Crummel, a man of exceptional spiritual power:—

" A voice and a vision called him to be a priest—a seer to lead the uncalled out of the house of bondage. He saw the headless host turn towards him like the whirling of mad waters,—he stretched forth his hands eagerly, and then, even as he stretched them, suddenly there swept across his vision the temptation of Despair.

" They were not wicked men—the problem of life is not the problem of the wicked—they were calm good men, Bishops of the Apostolic Church of God, and strove towards righteousness. They said slowly, " It is all very natural—it is even commendable: but the General Theological Seminary of the Episcopal Church *cannot admit a Negro.*"⁽¹⁹⁾ And when that thin half-grotesque figure still haunted their doors, they put their hands kindly half-sorrowfully on his shoulders, and

(18) For the whole question of the contact of the Church in India with the caste system see Articles by Rev. C. F. Andrews. " Race in the Christian Church." East and West. Vols. 8 & 10., No. 21 & 40.

(19) The italics are mine.

said, " Now, of course, we—we know how you feel about it: but you see it is impossible,—that is, well, it is premature. Some time we trust, sincerely trust—all such distinctions will fade away: but now the world is as it is."

Well, perseverance triumphed. This man stood at last a priest of the Church, and then, applying for work in a certain Diocese, received this slow and impressive reply, " I will receive you into this Diocese on one condition: no negro priest can sit in my Church convention, and no Negro Church must ask for representation there." And Crummel replied, slowly and heavily, " I will never enter your Diocese on such terms."

The man is dead. These are the closing words of Du Bois' memoir: " I wonder where he is to-day? I wonder if in that dim world, as he came gliding in, there rose on some wan throne a King—a dark and pierced Jew, who knows the writhings of the earthly damned, saying as he laid his heart-wrung talents down, " Well done," while round about the morning stars sat singing."

And this is America! Free America! Democratic America! As I read these words I am filled with fear. I am moved to protest with all my power against that facility of compromise with the opinion of the world which allows men to acquiesce in a policy of race-segregation even while they writhe at its logical result in the refusal of the priesthood, in the refusal of representation, to a man, solely on account of the colour of his skin.

I cannot help thinking that it is a great loss to our missionary councils that so few of us have any reliable knowledge as to the methods and results of Roman Catholicism in those parts of the world where white and coloured races meet. It appears in general that feelings of race prejudice are far less acute among Roman Catholic peoples, such as the French, Portuguese, Spanish or Italian, whereas the Teutonic peoples who are, generally speaking, the exponents of protestantism, chiefly exemplify the spirit of race exclusiveness. It may be that race prejudice is one of the baneful fruits of protestantism. The cause and effect of both alike is pride. It is possible that the difference is caused by racial temperament. It is also possible that the Papal Church, jealously guarding the name, has also been more careful to preserve the spirit of the Church Catholic. Mr. Tambyah informs us of the Roman Catholic Communion in Ceylon that the Vicar-General of the Arch-diocese of Colombo is (or was in 1912) a black man, that a Tamil priest in north Ceylon has a number of white priests under him in a large district. The Bishop of Kandy is a Eurasian, whose powers, spiritual and temporal, are plenary and not " assistant," " suffragan " or " missionary."⁽²⁰⁾

In South America we have an illustration of races intermingling very freely under Roman Catholic auspices. Yes, some will say, and with disastrous results. That I would venture to question. It is probable that a far fuller and more sympathetic investigation is required into conditions in South America and into the qualities of its people before any such sweeping conclusion can be justified. And at any rate it may

(20) Singapore Diocesan Magazine. August, 1913., p. 42.

be said that there is freedom from the great evils of the northern continent, lynching, race-sacraments, race-churches! With regard to the future of South America, "Those who know the facts best declare that the mixed race is showing qualities of acclimatization and efficiency that are praiseworthy."⁽²¹⁾ Nor is there, or likely to be, any "colour prejudice" in South America!

VI.—Malaya.

Malaya is a new country. Here is the great opportunity. First, because of the great variety of races domiciled here; secondly, because this very variety tends to make race-feeling less acute; and thirdly, because so far we are not irrevocably committed to any of the policies which in Africa, in India and in America seem to conflict with Christian principles. We have on the other hand a combination of those elements which in the countries mentioned seem to make a Christian solution of our problem so extraordinarily difficult.

These may be shortly considered under four heads:—

- (1) Race prejudice and antipathy.
- (2) Intellectual and moral differences.
- (3) Differences of language.
- (4) The danger of "Europeanising" rather than Christianising.

(1) Without having got very much to boast about in this Peninsula, I yet feel some confidence in saying that actual "colour prejudice" is probably less bitter and acute in British Malaya, than in any other British dependency.⁽²²⁾ No doubt there is among us the complacent assumption of the superiority—essential, inherent, inevitable—of the white races, and the inferiority of all the others. I believe it is not so great here; but anyway, whether much or little, it is wrong. I feel sure that the great majority of my readers are ready to combat this easy and comfortable assurance of racial superiority.⁽²³⁾ We probably have friends among coloured people as real and as esteemed as our white friends. If in this Diocese it should happen in the future that a Bishop of Chinese or Indian extraction should be chosen to lead us, the clergy would willingly submit to his authority and give him the homage due to his high office. Whether our European congregations—and our Asiatic ones also—would be ready to follow us in this, depends largely, I suppose, on the teaching given in our pulpits and the practical fellowship encouraged in our congregations. I feel sure, for example, that it is thoroughly good that our Asiatic brethren should, as occasion arises, be asked to minister to Europeans as European Clergy do to Asiatics; and this as an education both to Europeans and Asiatics, for it would be a great mistake to suppose that all the feeling and all the blame is only

(21) East and West. Vol. 8., p. 255.

(22) But see Mr. Thambyah's article, already referred to, for a different opinion. S. D. Magazine. August, 1918., p. 44.

(23) Obviously the European under existing circumstances often has acquired a superior mental and bodily equipment: but this is not an *inherent* superiority, but the result of greater opportunities.

on the side of the European. We may be thankful that what would be regarded as highly objectionable in South Africa or America is *un fait accompli* in this Diocese, where in certain churches not only do men of every nationality habitually meet at the Eucharist to partake of the One Bread, but are also ministered to indiscriminately by ministers of different races.

But our contention still is that if such intercourse stops at the Altar, it is something less than Christian Fellowship. I cannot think it meets our Lord's intention; for it is an "ecclesiastical," not a vital fellowship. One may well ask whether the Chinese Christians who worship at S. Peter's really regard the Cathedral as their mother church, or whether the Tamils of S. Mary's, Kuala Lumpur in their somewhat narrow nationalist outlook have any regard for the work of S. Mary's as a whole, or whether the European does not still commonly regard the "Native Christian" as a distinct and rather undesirable species?

One remedy for this separateness of vital interest is to be looked for on the lines of the S. Andrew's Missionary organisation in Singapore, which brings into touch at least the workers and those whose interest is keen. A further step, towards which we might try and work, would be the unifying of the financial arrangements of the various congregations. As far as Selangor is concerned, I feel that it would be a step towards unity of races, if the principle behind the Selangor Central Church Fund ⁽²⁴⁾ were extended to apply not only to European finance, but to the centralising of all local funds, English, Tamil and Chinese, though the local committees would still exist and manage their local business in the same way as the various English Committees do at present.

Another potential bond is undoubtedly the Singapore Diocesan Association, the aim of which is to include as members *all* communicants, not only European but Asiatic as well. In the main the Asiatic Christians have not yet been brought in, but attention may usefully be drawn to the fact that the minimum subscription to the S.D.A. was fixed at \$1 per annum in order to bring it within the reach even of the least wealthy members of the community.

Mention might also be made of the Diocesan Magazine, which in some places is read by many Asiatics and deals with the work of the whole church; and of the hope sooner or later of a Diocesan Synod, in which clerical and lay members of all races will be properly and equally represented. At Homes too and other gatherings of a social kind should be inter-racial.

And let me say here that there is at least one aspect of our secular education policy which seems very hopeful. It knows in the main no race exclusiveness. In the grounds, say, of the Victoria Institution at Kuala Lumpur, boys of all races, Tamils, Chinese, Malay, Eurasian and European, may be seen working and playing together without the

(24) A central fund for Church purposes to which the various districts of Selangor contribute, and administered by a committee appointed by these districts.

slightest consciousness of racial antagonism or "natural instinct" of separateness. They have their rivalries and quarrels, but these cut right across racial lines. A consciousness of race exclusiveness does not seem to exist amongst the children of these races,—no, I am sure, not even amongst European children,—except in so far as they have imbibed the spirit and conversation of their elders. The main hope of the future is with the children. I could wish that the Church would endeavour to work out some policy in line with the great Government educational establishments in this matter, with a view to avoiding schools or hostels marked exclusively "Eurasian" or "Chinese" or "Tamil." Such institutions, it seems to me, do more than anything else to foster race-exclusiveness and to render permanent and insuperable the barriers which the Church is designed to break down. The more we bring people *together*—and especially in their impressionable years—the more they will lose their mutual suspicions and distrusts, and this is the first step towards fellowship. (25)

(2) Intellectual and moral difficulties. As between races, these are not different in kind from differences which exist between the well and ill-educated, the moral and immoral, of any one particular race. A Christian Englishman has more in common with a Christian Indian than with a fellow countryman, who is an atheist. There is likelihood of closer fellowship between an Englishman, Indian or Chinaman of the same level of culture than between a highly educated gentleman of one of these races and an illiterate of the same. There are many incompatibilities of thought and outlook which preclude (or seem to preclude) a very intimate fellowship, which have nothing what ever to do with the question of race.

It was in 1895 that Joseph Chamberlain made the following comment on the Natal Franchise Law Amendment, which excluded from electoral lists all Indians not already possessed of the Franchise: "This measure draws no distinction between the most ignorant and the most enlightened natives of India. I need not remind you that among the latter there are to be found gentlemen whose position and attainments fully qualify them for all the duties and privileges of citizenship." And Lord Milner, even while feeling that to place coloured people in South Africa on an equality with white is "wholly impractical and in principle wrong," yet expresses the opinion that "when a coloured man possesses a certain high grade of civilisation he ought to obtain what I may call white privileges irrespective of his colour." I am sure we should all agree with this, and it seems therefore that many of the differences due to intellectual and moral variations will tend naturally to disappear in the face of a general levelling up of secular and religious education.

(25) Note:—In the convents of this country boarders of different races live together: but the existence of other "distinctions" based on standards of wealth makes the experiment incomplete. Of "Church of England" hostels almost all are run more or less on racial lines. Hostels entirely free from either race or class distinctions, therefore, have never received a fair trial, perhaps because up to the present the conditions have not been favourable. One such essential condition would be that all the inmates of the hostel should be actually Christians. For it is not claimed that such race cleavages as exist to-day can be bridged by natural means, but only "in Christ," through the power of Christian fellowship.

I am, however, very far from advocating what might be called an "aristocracy of culture," such as might easily result in an exclusiveness no less unchristian than the most objectionable race or caste feeling. It is obvious that there are and must be in many cases incompatibilities of thought and outlook which preclude a very intimate fellowship and indeed cause it to be mutually undesired. A boorish person does not feel happy in a drawing room nor a "muscular undergraduate" in the company of professors. But I suppose the Christian standpoint to be this, that however and by whom fellowship is desired of us, there and to them it is not to be refused. From no one who desires his fellowship is a Christian to turn away, on account of his colour, his lowliness, his ignorance, or his sin, any more than our blessed Lord refused the invitation to "eat and drink with publicans and sinners."

(3) The language difficulty. Here we are face to face with Babel, but it is the teaching of the Church that Pentecost reverses Babel. Whatever was the precise nature of the "gift of tongues" conferred at Pentecost, it is certain that Almighty God in the first century providentially provided a language for the dissemination of Christianity, without the aid of which the early Apostles might well have been as handicapped in the delivery of their message as the Church declares itself to be to-day. As far as Malaya is concerned at all events, I would boldly put forward the suggestion that what Greek was to the early Church that English is to the Church of to-day.

I should like to ward off a certain amount of possible criticism by saying that I do not here contemplate either the Chinese who intend to return to China or the Indians who intend to return to India. Neither of these classes can rightly be said to have a permanent place in the Church of Malaya. They are strangers and foreigners, having here no continuing city, and will find their true home in the Churches of China and India respectively. But I take it that the interests of this country primarily demand a settled population; that our endeavour should be as far as possible to induce people, not merely to come and make their living here and then go, but to settle here, to bring their wives and to rear their families here, who from the start will call Malaya "home."

It seems clear that more and more there will be pressed upon these people the necessity of having a common language. Language ultimately is a means of communication, and we may apply to it our Lord's words about the Sabbath, that language is made for man and not man for language. The question therefore whether a country ought to have many languages or one is rather like the question whether each section of a country should have its own separate railway gauge, or whether all should use a common one. The spread of Greek over the ancient world, the common use of Latin in medieval Western Europe are instructive historical precedents. The experience of Ceylon to-day as well as other British Colonies shows the natural impetus towards the acquisition of English.

Let me here quote from a recent article by Dr. H. H. Mann (Principal of the Poona Agricultural College) on the "Problems of Education in India." "The position of English in Indian education"

says Dr. Mann, speaking from a purely secular point of view, "is peculiar and has been the cause of endless controversy. Let us limit ourselves to facts. English is the one medium of communication between educated people throughout India, and must remain so. If it were not for South India, Hindustani or Hindi might serve as such, but in South India these languages are more foreign than English. This being so, opinion is generally coming to the view that, whether we like it or not, English must be known to everyone who aims at being a citizen of India, let alone of the world. The policy initiated by Lord Macaulay, though expressed in offensive words and though absurdly depreciating the older Indian learning, was in essence right and unless India was to become a hermit country, English must have been, and must be, the language of higher education, the educated vernacular of the country, and an essential to any large development." These are weighty words, applying as they do with equal force to our local conditions in Malaya, and it would seem indeed foolhardy, were we to run counter to the lessons which India has learned from long and bitter experience.

That the various races should lose their own language need not necessarily follow, for it is always possible to be bi-lingual; but as a matter of fact it probably would (as in the case of many Baba Chinese and some Straits-born Tamils.) In any case, however, the Tamil and Chinese languages can be trusted to look after themselves, and we in Malaya have no particular obligation to preserve the Chinese dialects for China, nor the Tamil for the people of South India.

We should therefore, encourage people as much as possible to learn English. In our schools instruction should be given normally in English. Where schools are vernacular, English should also be taught wherever possible. Religious instructions should where possible be given in English,—not because it is English, but simply because it is the only possible common language. It is not possible to conceive of a Malaya communicating throughout its length and breadth by the medium of Chinese or Malay or Esperanto!

(4) The fourth difficulty is the danger of "Europeanizing" rather than "Christianizing." Some will be inclined to fear that the widespread adoption of the English language will tend to this result. Experience, I think, does not bear out this fear. Certainly I know no people so narrowly national as the Jaffna Tamils, who speak English to a man. One might instance the Russian or German Pole or the ubiquitous Jew, as peoples who have not lost themselves nationally, though they have lost their national languages. Certainly a common language in itself need not bring about a merging of all racial characteristics. We must look rather for other factors which spring from those anti or non-religious elements of Western civilisation to which the Asiatic is exposed. Among these are:

- (a) A shallow and materialistic educational syllabus.
- (b) An unintelligent adoption of European manners, customs and ways of living.
- (c) An emphasis on the superiority of the European which leads Asiatics to "ape" him and despise their own people.

The first danger I am sure we all realise. It has unfortunately been the case that sometimes European and American Missionary educationalists have been too ready to subscribe to the creed of materialistic commercialism. The remedy is not to cease teaching English or teaching all the best that the West has to offer in the way of scientific knowledge; but rather to conjoin this in its true proportion and perspective with clear and definite Christian teaching; to aim at producing a nucleus of citizens who have imbibed not the materialism of the West, but its spiritual idealism. We want schools, both for girls and boys, not I think, of vast size, composed mainly of Christian scholars, in which regular Christian teaching is given and the Christian atmosphere and influence is paramount. In a large school consisting mainly of heathen children, the Christian element is liable to be swamped. In the kind of school I advocate the heathen minority should tend to rise to the Christian level. Of even greater importance must be reckoned the establishment of Christian hostels, which I have already given reason for thinking should not be confined as a rule to members of a single race only.

The danger of the adoption of European customs, combined with a sense of European superiority, is well illustrated in a recent article by Robert Keable in the "East and the West" regarding the failure of native priests with the African troops sent to France. They had grown incapable of eating native food. They complained of their accommodation on the ground that it was "too near the boys." They complained of a medical inspection which they had to undergo in common with the troops "as if we were the same as they." In a word they had grown to despise their own people. "It is," says Mr. Keable "our own fault." But, he adds, "I will never have men so trained in my parish again."⁽²⁶⁾

We can of course only emphasize that our object must be to make Christians, not to make Europeans. In so far as national customs and ideals are anti-Christian, we want to break them and we ought to break them, whether they be English, Indian or Chinese. But for the glories and excellence of the nations our purpose must be to bring them all to enrich the city of God, wherein it must be recognised that no race has a monopoly of virtues, that none is without its own distinctive beauties, and that there is no question of "superiority" or "inferiority," but only of mutual service.

The Church in short will substitute Christianity for "Europeanism" the more it puts forward a Christian standard to displace a European standard of excellence. We shall go a long way towards breaking down the impulse to "ape" the European, in exactly the same proportion as we break down the feeling of the 'essential superiority' of the European. Neither a Chinaman, nor Indian nor Eurasian would wish to imitate the European, had he not unconsciously adopted a European standard of values. And the poison

(26) The East and the West. Vol. 16., No. 61., p. 53. The writer worked as a missionary in connection with the Y. M. C. A. in Central Africa, and in connection with the S. P. G. in South Africa. The article quoted was somewhat severely criticised in a subsequent number of the East and the West, and his statements, while deserving the most serious consideration, must be balanced by witness borne by others to the good work done by African chaplains on the Western Front.

can only be eliminated by a true assimilation of that Faith which involves the transvaluation of all values,—even the Faith of Him who for the sake of all of us became poor and is not ashamed to call us “ Brethren.”

I started my paper by expressing an opinion as to the very great importance of the question we have been discussing—that of the relationship of races in the Church. In conclusion I submit that it is a matter of urgency that we should grapple with it, and draw some clear outlines for the guidance of general policy in this Diocese, which may be more and more filled in in detail as the life of the Church progresses. It is unquestionably our root problem, and if we fail to think it out clearly we may leave to our successors a legacy of confusion, waste and inefficiency. We know to-day how much we have inevitably lost, how much we are now handicapped by the inability of those who went before us, if not to see the growth of opportunity in Malaya, at any rate to buy it up resolutely. It would be a greater tragedy if we should now fail to learn the lesson, and allow our lack of cohesion, of plan, of ultimate aim, to become hardened into a Diocesan policy, the only underlying principle of which would seem to be “ Chacun à son goût.”

And let us be sure that now is a critical time; now when the whole world is feeling the ghastly effects of international estrangements and the terrible repudiation of the Catholic ideal; now when there is undoubtedly growing and sweeping over the whole world a danger of race-antagonism; not only as between white and black but also white and yellow and between yellow and black. Now therefore is the time for this Church of many races to step forward with a clear and definite enunciation of principle and of policy, which shall be the working out of the mighty truth enshrined forever in the Great Catholic Sacrament of Unity, that in the Christian Fellowship the races of mankind should be ONE, with a Unity comparable to that of the Divine Nature,—“ one, even as we are one.”

“He is our peace, who made both one, and brake down the middle wall of partition, having abolished in his flesh the enmity . . . that he might create in himself of the twain one new man, so making peace: and might reconcile them both in one body unto God through the Cross, having slain the enmity thereby: and he came and preached peace to you that were far off, and peace to them that were nigh: for through him we both have our access in one spirit unto the Father.

“So then ye are no more strangers and sojourners, but ye are fellow-citizens with the saints, and of the household of God, being built upon the foundation of the apostles and prophets, Jesus Christ himself being the chief corner stone; in whom each several building, fitly framed together, groweth into a holy temple in the Lord.”

Eph. ii., 14-21.