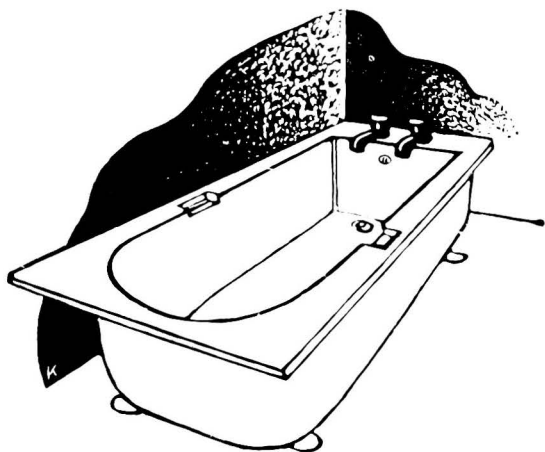


EXERCISES IN THE BATH

The Togna System of Home Gymnastics
to Promote Health, Prevent Disease
and Prolong Life



T. R. Togna

With an introduction by
Sir Leonard Hill, M.B., F.R.S., LL.D.

Exercises in the Bath

The author of this book has been experimenting for twelve years with a system of simple exercises that has the supreme merit of keeping the body fit and shapely without strain or fatigue. He has proved, as anyone can prove for himself, that exercises can be performed *in water* with practically no increase in the pulse rate, and hence no strain on the heart. Moreover, not only may prolonged and vigorous exercise thus be taken without any of the fatigue that ordinary exercise induces, but exercises in the bath actually remove fatigue; they are restorative.

The importance of Mr. Tognà's discovery is obvious. For the ordinary man and woman it means an easy and enjoyable method of keeping the body fit, muscles in condition, and adipose tissue at bay. For elderly people, and those whose health debars them from athletics, the new system is even more important: it means renewed health without risk of strain to heart and blood vessels.

In addition to the general advantages of the author's system, experience has shown that it is of immense benefit in specific cases of nervousness, insomnia, abnormal blood pressure, varicose veins, rheumatism, obesity and constipation.

EXERCISES IN THE BATH

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to Promote Health, Prevent Diseases and Prolong Life*

By

T. R. TOGNA

*with an Introduction by
Sir Leonard Hill, M.B., F.R.S., LL.D.*

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TO
MY WIFE
AND
MY SISTER
AMALIA

INTRODUCTION.

By Sir Leonard Hill, M.B., F.R.S., LL.D.

Mr. Tognà has worked out on himself a useful system of exercises taken in the bath which help to keep the body in a fit condition without undue strain or fatigue. I had the pleasure of seeing Mr. Tognà perform these exercises in a bath at the St. John Clinic. Such exercises are very suitable for city people who wish to keep at bay the disabilities which arise from sedentary occupations.

His book is put in simple and clear language and the illustrations show the principles of his methods and make it easy for anyone to carry them out.

Chalfont St. Peter,
Bucks.

October, 1938.

PREFACE.

In his foreword to my pamphlet published in 1928, Sir W. Arbuthnot Lane, Bt., C.B., states: "Mr. T. R. Togna has made a very intelligent study of health exercises. He has devised a sequence of movements which afford a stimulation to every muscle in the body, so that they are kept constantly in a state of healthy activity.

"Since the exercises are carried out in the bath, they make a minimum demand on the nerve and muscle energy. They can be performed by those of a delicate and feeble physique, as well as by others who are more robust."

I have now, after ten years of further experience, enlarged my original pamphlet into the book which follows.

My justification for presenting to the public yet another system of physical training, lies in the fact that exercises performed in the bath involve a smaller expenditure of energy than those performed in the air. This has been proved, not only by

my own personal experience, but by direct scientific determination of the oxygen consumption in both cases, as shown in the Appendix. Experiments carried out at the London School of Hygiene, University College and the Red Cross Clinic, established that the oxygen requirement in water is from one-third to one-half that in air.

It follows that less strain is placed on the heart by water than by air gymnastics, though the same movements of muscles, limbs and joints are performed. Also my exercises offer the means of carrying out, in the privacy of the home, a treatment which is a useful extension of those commonly followed in special Clinics. It should be clearly understood that although frequent reference is made in the book to the treatment of diseases, I do not advocate the use of my exercises by sick persons without previously consulting a Medical Practitioner.

I am illustrating the exercises with photographs of myself, and the reader will be able to judge how well I have main-

Preface

xi

tained my physical condition and the tone of my muscles generally.

I wish to take the opportunity to inform all those who may try my system that I should be very grateful to them if they will be good enough to inform me of the help secured. Such information will always be treated confidentially and used only for scientific purposes.

T.R.T.

Tuscan Hotel,
Shaftesbury Avenue,
London.

October, 1938.

CONTENTS

	PAGE
PREFACE	ix
I. THE VALUE OF BATHING IN HEALTH AND DISEASE	I
II. THE EXERCISES IN THE BATH	II
III. THE BATH EXERCISES AS A PICK-ME-UP	22
IV. DISORDERS OF THE HEART AND BLOOD VESSELS	25
V. SKIN AND COMPLEXION	41
VI. OBESITY AND CONSTIPATION	48
VII. RHEUMATISM	57
VIII. STRENGTH AND IMPROVEMENT OF THE FIGURE	69
IX. HINTS ON THE PERFORMANCE OF THE EXERCISES	76
X. THE EXERCISES ILLUSTRATED	82
XI. SOME PERSONAL EXPERIENCES	97
APPENDIX	107

APPENDIX.

HYDROTHERAPEUTICS.

MODERN under-water remedial exercises are based on those originally conceived by the late Robert W. Lovette, of Boston, U.S.A., in 1912. Lovette devised his exercises for the treatment of infantile paralysis, and they were performed, not in the water, but on a surface rendered practically frictionless by the use of talcum powder. Thus movement was made as easy as possible for the partially paralysed limbs of the patient. His movements were assisted by the operator, who supported the limb being exercised, in order to counteract gravity.

With the object of discovering the type of exercise to be given to each group of muscles, a thorough physical examination was carried out, and a chart made showing the degree of paralysis present in each group. Regular re-examination and the correction of the chart allowed progress to be noted. While in the early stages the

movements of the patient were almost entirely due to the efforts of the operator moving his limbs and body, it was the whole essence of the treatment that the paralytic should actively will them himself. Thus the object was achieved not merely of rehabilitating the muscles themselves by giving them movements, but of stimulating the weakened nerve cells to resume control over them. This was a clear advance on the old methods of massage and passive exercises, in which little more was gained than the regeneration of the muscles by the fillip given to the local circulation. Lovette's gymnastics aimed at reviving that intimate connection between brain and muscle which controls movement. It was hoped not only to stimulate the weakened nerve cells, but even possibly to excite dormant cells to action and encourage them to take over the function of those that had been destroyed by the disease.

While there are no allusions, before the present century, to the use of specially prescribed under-water exercises, the practice

of placing in water those who had largely lost the use of their limbs was common. In May, 1924, Dr. Lowman, one of the greatest authorities on infantile paralysis, combined in the manner already mentioned the theory of Lovette and the knowledge of the buoyancy conferred by water into a single system of healing, by establishing in the grounds of the Orthopædic Hospital, Los Angeles, a large pool for the carrying out of therapeutic under-water exercises.

The idea came to him, he relates, after a visit to the Spaulding School for Crippled Children of Chicago, where he noted paralysis cases being given muscle training in a wooden tank. As he had himself employed bath tubs in the treatment of spasms since as early as 1911, the broader application stimulated his mind to the idea which resulted in the construction of the large pool in the garden of his own hospital in Los Angeles, California. Three years later the second great centre for the treatment of infantile paralysis arose at Warm Springs, Georgia.

Under-water gymnastics were first

evolved for the treatment of infantile paralysis, but it was not long before doctors began to discover that other conditions, notably chronic arthritis, could also be benefited by them. The mechanics of the production of the deformities, resulting from chronic infantile paralysis and chronic arthritis, are much the same. It is a well-known fact that a person suffering from either of these diseases makes his movements with the strong, contracted groups of muscles, the weaker, stretched groups being permitted to remain idle. The result is that these latter groups atrophy and become progressively weaker. Free, unregulated exercise, even swimming, tends to accentuate deformities, for the stronger muscles continue still further to grow at the expense of the weaker. Only properly prescribed gymnastics, directed at the weak muscles and at the correction of faulty bodily mechanics, can hope to resist this process.

The primary intention of my exercises is to maintain health, but at the same time they are capable of accomplishing any-

thing which may be accomplished at a clinic, except in the most extreme cases of distortion, or when the loss of joint and muscle function is so complete that all movement has become impossible without the assistance of a nurse.

Under-water gymnastics, whether they be those practised in hydrotherapeutic institutions or those in accordance with my own system of exercise in the bath, utilise what Dr. Euclid Smith has characterised as the fundamental agencies of physical therapy: heat, exercise and massage. To these three may be added that other valuable healing agency, immersion in water. The combination, as Dr. Olsen has pointed out, of the bath at a proper temperature, with various manipulations and exercise carried out under water, is very effective in stimulating flabby or semi-paralysed muscles to resume their normal functions.

But the greatest advantage of performing the gymnastics with the body immersed is that buoyancy of the water almost entirely overcomes the force of

gravity. What this means to the weakened or paralysed muscles of an invalid can well be imagined. Free movement in every direction is permitted, the buoyancy of the water at all times sustaining the part being moved. (This buoyancy can be still further increased by the addition of common salt to the bath.) The psychological effect on the patient is enormous, when he finds himself able to move limbs over which he thought he had lost all control. Thus the first steps to recovery have been firmly taken, for it is of the utmost importance that *any* voluntary movement should be secured, in order that the patient's idea of movement should be restored to him. It is sufficient later to secure increased strength in the muscles and nerve impulses.

The fact that the body, at the time of exercise, is constantly receiving warmth from the surrounding water, is another favourable characteristic of under-water therapy emphasised by doctors with experience of the technique. This warmth imparts its beneficial effects in a number of ways. In the first place, as Dr. Euclid

Smith, among others, has pointed out, the temperature is sufficient to produce a marked dilation of the capillaries in the skin. This augments the flow of blood and lymph to the parts under treatment, stimulating the nutrition of the muscles and promoting the breaking down and washing away of the toxins in and around the muscles and joint. The amount of work the muscles can do without becoming fatigued is greatly increased. The importance of the continual application of warmth to the body *at the time of exercise*, facilitating as it does the breaking down and excretion of toxic matter, must be emphasised. The above method may be contrasted with that whereby superficial heat is first applied to the part under treatment, followed by exercise in the air. The dilation produced by the dry heat is not constant, the part cooling as the exercise in the air progresses. The capillaries contract, toxic waste material is retained, and the amount of exercise which the muscles can perform becomes reduced, due to fatigue.

As to the temperature of the water, some

conditions have been found to respond better when it is relatively cool, and some when it is relatively warm. Within the limits of each disease there are further fluctuations in the ideal temperature, corresponding to the individual idiosyncrasies of the patients. Dr. Currence has pointed out that the flexibility of temperature control in a large tank intended for the treatment of infantile paralysis is inadequate for the satisfactory treatment of chronic arthritis, while Dr. Gaenslen has stated: "It is doubtful whether the great sacrifices, financial and otherwise, made in many instances to provide pool treatment are justified by the results. The ordinary tub in the average home will answer very well, except in unusual cases. It has the advantage that the temperature can be regulated to suit the individual and that the water is renewed for each bath."

The effect exercised by water on the central nervous system has been emphasised in recent times by Dr. H. G. Scholtz, of Berlin. He points out that the characteristic of a bath is that simultaneously a

large number of sensation points and warm points of the skin are stimulated, whereby a reciprocal increase of stimulation is produced. There is no doubt in his mind that central nervous functions are affected. Experience has shown that the power of concentration and the general nervous excitability can be changed by a bath. Whether the effect be bracing or relaxing depends, to a certain extent, upon the temperature. A spasm of a spastic patient, he says, must not be considered as a disturbance arising from the central nerves, but must be assumed to be maintained reflexively by irritations coming from the skin. Such spasms can be soothed by a warm or lukewarm bath.

Having briefly reviewed the favourable features shared in common by the underwater gymnastics carried out at hydrotherapeutic institutions, and by my own exercises and massage in the bath, I shall now attempt to point out the additional advantages of the latter.

Each of my exercises, as I have already pointed out, takes the form of a rhythmic

movement, which brings every muscle of the body into a concerted action. They are carried out in the recumbent position in an ordinary bath, a pool or tub being unsuitable for the purpose. Unlike the usual forms of under-water gymnastics, where movement is more or less confined to the part under treatment, with a resulting local distension in the vascular system, my aim is to restore normal function in the joint or muscle group by promoting a general regularisation and increase of the circulation. This idea may be contrasted, not only with the under-water gymnastics of hydrotherapeutic institutions, but with the usual systems of physical culture, in which the muscles are exercised only in groups.

When mobility has been restored to a joint by a course at a clinic, it not unseldom happens that a relapse occurs after treatment has ceased. The same is true of the patient actually in process of attending a clinic, who tends to retrogress between treatments. As Dr. Currence, speaking on chronic arthritis, has pointed out: "The

maximum benefit in increasing muscle and joint function and in the prevention and correction of joint adhesions in chronic arthritis, can be attained only by regular, systematic treatment, preferably daily, because the benefits are definitely cumulative if the therapeutic efforts are sufficiently systematic. Unless the treatments are given daily, the tendency to retrogress during the interval is too marked to achieve noteworthy success."

I myself would go further and state categorically that a tendency to retrogress occurs even when the treatment is carried out daily, unless the time chosen is before the evening meal or before retiring. This is due to the fact that when under-water exercise is carried out during the day, the dispersion of toxins is immediately followed by fresh accumulations, whereas, when undertaken later, the ensuing night's rest assists the processes of recovery. I may add that with my exercises the attendance of an expert operator is rendered unnecessary in the majority of cases, because the very nature of the exercises excludes all risk of an overdose.

The Relative Energy Expenditure in Muscular Exercises Performed in Air and in Water.

BY DR. G. P. CROWDEN,
M.Sc., M.R.S.C., M.R.C.P.

(Reprinted, by permission, from the Proceedings of the Physiological Society, March 16th, 1935)
Journal Physiology. Vol. 84.

The subject of the experiments recorded below was an Italian, Mr. T. R. Togna, who had devised a system of muscular exercises which could be carried out in an ordinary bath, with the body submerged in the water up to the neck. He claimed for these exercises that they involved very little exertion. Having regard to the fact that graded exercises in water often form the routine treatment of stiffened joints and muscles in cases of chronic rheumatism in hydrotherapeutic institutions, and that although initial benefit may be derived, relapses are common after the patients are discharged, it appeared worth while to investigate the type of exercise devised by Mr. T. R. Togna as it might prove a convenient form of home treatment which would enable the patient to maintain mobility of muscles and joints without undue exertion.

Increase in Oxygen Requirement Per Min. Exercises.

Type I.

Exercise	Air c.c.	Water c.c.	
Arm and Leg bending	2178	1130	First 5 min. of exercise in water.
	2117	1215	After 10 min. of previous exercise in water.
Mean	2147	1172	

	Air	Water
Relative O ₂ Cost of Type I Exercise.	1.83	1

Type II.

Exercise	Air c.c.	Water c.c.	
Trunk Raising	3080	980	First 5 min. of exercise in water.
	3860	1401	After 20 min. of previous exercise in water.
Mean	3470	1190	

	Air	Water
Relative O ₂ Cost of Type II Exercise.	2.91	1

A preliminary experiment with Mr. Togna as subject, showed that he was practically exhausted after a period of 2 minutes' exercise in the air, but in water he could carry on the exercise almost indefinitely at the same rate.

In the previous table, which gives the results of experiments carried out at the British Red Cross Rheumatism Clinic, the relative increase in oxygen requirement over the resting level, either in the air or in the water, is given, and it is seen that with a simple arm or leg bending exercise, the increased oxygen requirement per min. of exercise is about twice as great in the air as in the water, while in another type of exercise, in which the trunk is raised and lowered, the increase in oxygen requirement in water is only one-third of that for the same exercise performed in the air. It is thus possible that individuals whose respiratory and cardio-vascular systems are not able to stand the strain occasioned by even moderate exercise in air may be capable of the same movements of muscles and joints provided the buoyancy of the water is used to lessen the work done against gravity in lifting the limbs and trunk. Regular exercise of muscles and joints is essential if mobility is to be maintained by individuals who have suffered from rheumatism in some of its forms.

Dr. G. P. Crowden, M.Sc., M.R.S.C., M.R.C.P.
London School of Hygiene,
Keppel Street,
London, W.1.

30th September, 1936.

Dear Sir,

Mr. Togna is going to show you some observations which I made on his behalf on two men.

These people were well over middle-age and in past years had been very heavy drinkers. Their systolic pressure was much above normal but both had a comparatively low diastolic. There was no evidence of aortic incompetence. The readings will show you that in both cases there was a considerable decrease in the B.P. figures after 10 minutes' immersion in lukewarm water. This decrease was accentuated by 10 minutes of exercises No. 1 and No. 2. Further observations were taken of case No. 1.

This man underwent the exercises No. 1 and No. 2 for several months; his initial B.P. readings were 220/120. Fortnightly control of his blood pressure showed a gradual decrease of these readings which, after six weeks' exercises, were 198/102, and since then were almost stationary at such a figure.

Together with this, the patient reported a general improvement of his health and better sleep, no headaches, no exertion when climbing stairs.

Mr. Togna intends to follow these observations and forward their result to you in due course.

I am, dear Sir,

Yours truly,

(Signed) O. GALLI, M.D.

Exercises in the Bath

October 21st, 1935.

SUBJECT A.F., AGE 65.

	Blood Pressure	Pulse Rate	Respirations
Normally	220/120	... 84	... 20
After 25 mins.'			
lying on bed	210/110	... 80	... 20
Further 10 mins.'			
lying in water 91 F.	178/ 95	... 70	... 18
Further 10 mins.'			
exercises Nos. 1 & 2,			
in water, 91 F.	170/ 90	... 80	... 18

October 7th, 1935.

SUBJECT L.N., AGE 59.

	Blood Pressure	Pulse Rate	Respirations
Normally	180/100	... 92	... 20
After 15 mins.'			
lying on bed	174/ 96	... 86	... 20
Further 10 mins.'			
in water, 91 F.	160/ 86	... 86	... 20
Further 5 mins.'			
exercise No. 2	150/ 78	... 82	... 20

SUBJECT G.D.M., AGE 62.

	Blood Pressure	Pulse Rate	Respirations
Normally	146/81	112 Arrhythmic	34
After 10 mins.'			
lying in water, 91 F.	138/80	86 ,,	28
Further 10 mins.'			
exercise in water,			
91 F.	140/84	88 Normal	28

SUBJECT G.D.M., AGE 62.

	Blood Pressure	Pulse Rate	Respirations
Normally	130/60	... 78	... 20
After 15 mins.'			
exercise in water,			
91 F.	132/50	... 75	... 16

OPINIONS OF EMINENT DOCTORS ON THE
TOGNA SYSTEM

R. Università di Roma
Istituto di Clinica Medica

Rome, 8th November, 1928.

I have seen Signor Togna in London executing muscular exercises in the bath. I consider that this type of exercise constitutes an ideal type of indoor gymnastics. These exercises are also advantageous from the practical point of view.

(Signed). PROF. ASCOLI.

Conf. Dr. Dumitrescu-Mante,
Medic Primar al Spitalului Brancovenesc,
Strada Brezoianu N. 34.

Bucarest, Sept., 1928.

Dear Mr. Togna,

After a long voyage in France, following my agreeable stay in London, I am now back in my country, and hasten to answer your very interesting leaflet.

I have read it with great attention, and find in it many points well in harmony with human physiology.

The exercises in the bath that you prescribe will, in fact, promote muscular circulation without fatigue. That is what I should call an internal massage.

The effect on the cellular vitality remains to be seen, but it is more than obvious.

I congratulate you on the happy ideas of your leaflet, and wish you every success.

When returning to London I shall allow myself the pleasure of paying you a visit.

With kindest regards,

(Signed). DR. MANTE.

TABLE I

The following Table shows the measurements which were first taken in October, 1922, before I had thought of the Exercise in the Bath; in September, 1926, after six months of exercise; and later at the dates mentioned.

T. R. TOGNA	Oct., 1922	Sept., 1926	Nov. 2, 1926	Nov. 22, 1926	July, 1927	July, 1928	Oct., 1932	Feb., 1933	Oct., 1934	June, 1938
Neck ...	15	15	15½	15½	15½	15½	16	16	16	16
Chest, Normal ...	36½	16½	37½	37½	37	38½	38	38	38	39
" Contracted ...	36	35	34½	34½	34½	35	36	36	35½	35½
" Expanded ...	38	38½	39½	39½	39½	40	40	40½	41	41
Biceps, Right ...	13	13	13½	13½	13	13½	13½	13½	13½	13½
" Left ...	12	12	12½	12½	12½	12½	12½	12½	13	12½
Fore Arm, Right ...	11½	11½	11½	11½	11½	11½	11½	11½	12	12
" Left ...	10½	10½	11	11	10½	11	11	11	11½	11½
Waist ...	34½	32	32½	31½	31½	31½	32	32	32	33
Abdomen ...	37	35	34½	33½	33½	34 3/4	34½	34½	34	35
Hips ...	37½	37½	38	37½	35½	36	36½	36	36	37
Thigh, Right ...	21½	21½	21½	21½	21½	21½	21½	21½	21½	21½
" Left ...	21½	21½	22	22	21½	22	21½	22	22	22
Calf, Right ...	13	13½	14	14	14	14	13½	14	14	14½
" Left ...	15	15	15	15	15	15	14½	14½	14½	15½
Height ...	5'5½"	5'5½"	5'5½"	5'5½"	5'5½"	5'5½"	5'5½"	5'5½"	5'5½"	5'5½"
Weight (stones) ...	11/3	10/13	10/12	10/10½	10/10	11/4	11/6	11/10	11/6	11/8

TABLE II

VENTILATION OXYGEN REQUIREMENTS AND CARBON DIOXIDE—PRODUCTION PER MINUTE EXERCISE
EXERCISE TYPE II—TRUNK RAISING

The idea of this Table is to show in the first place the great cost of energy which is required by the performance of Exercises Type 2 in the air, and its correspondingly lesser cost in the water.

In the second place a comparison is made between the cost of the same exercise in the water with the cost of other forms of exercise performed in the air by other subjects. This second comparison is made to show that the air breathed in the exercise in the water is about 5 litres less than for other exercises in the air; whereas the oxygen requirements are about equal in both cases. This result goes to prove that a greater proportion of oxygen can be absorbed from air breathed when exercising in water than when exercising in air.

It should be noticed that on account of the reduced effort in water, the pulse rate increases only a few beats.

T. R. TOGNA	Body Weight	Air Breathed	Oxygen Requirements	Carbon-Dioxide Production	Movements	Respirations	Pulse Rate Increase above rest	At Rest	Blood Pressure
Air	160 lbs.	119,200 c.c.	3,080 c.c.	4,320 c.c.	70	34	108	72	176/86
		124,070 c.c.	3,860 c.c.	4,669 c.c.					
	Mean	121,630 c.c.	3,470 c.c.	4,494 c.c.					
Water at 94°F.									
Lying at rest ...	12 lbs.	—	—	—	—	—	—	—	—
1st 5' moderate ...		—	—	—	—	16	—	72	130/70
4th 5' vigorous ...		22,800 c.c.	980 c.c.	958 c.c.	54	20	12	72	130/66
1' max. speed		27,210 c.c.	1,401 c.c.	1,197 c.c.	60	20	16	72	132/70
1' max. effort		Not taken	Not taken	Not taken	80	24	28	72	138/70
		" "	" "	" "	66	28	56	72	156/74
	Mean	25,000 c.c.	1,190 c.c.	1,077 c.c.					
In Air (1)									
Other Forms of Exercises by other subjects									
W.C. ...		33,100 c.c.	1,413 c.c.	—	—	—	53	72	
L.H. ...		30,370 c.c.	1,425 c.c.	—	—	—	58	86	
R.G. ...		35,830 c.c.	1,487 c.c.	—	—	—	57	75	
Athlete de Mar ...		32,000 c.c.	1,500 c.c.	—	—	—	40	58	

(1) These latter data were assembled by E. C. Schneider and Henderson & Haggard.

The abbreviation c.c. means cubic centimeters.

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THE author has made an exhaustive study of anatomy and physiology and the principles of physical exercises, and he has consulted distinguished scientists and medical men, in order to test his theories and to ensure the efficacy of his system. In 1926 he secured the interest of Sir William Arbuthnot Lane, who encouraged him to write a pamphlet on his exercises, which was published in 1928.

In 1932 Dr. G. P. Crowden carried out at the School of Hygiene, London University, the first of his experiments on the relative energy expenditure of these exercises in the water compared with similar exercises in the air. Later, he conducted further experiments, through the kindness of Dr. Ray, at the British Red Cross Clinic for Rheumatism. In 1936, the author was asked by Sir Leonard Hill to give a demonstration at the St. John Clinic, London, and in 1937 at the request of Dr. E. Poulton, the author gave a demonstration at Guy's Hospital.

The author trusts that, with the publication of this book, his exercises will receive further attention from scientists and from the medical profession to whom, in his estimation, the public rightly look for guidance on all such matters of hygiene.

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