
THE WASHABILITY OF INDIAN COALS

by

C. FORRESTER & J. N. MAJUMDAR



UEL RESEARCH COMMITTEE
OARD OF SCIENTIFIC & INDUSTRIAL RESEARCH
REPORT No.

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NOTE — This report is a record of work forming part of a series of investigational schemes approved by the Fuel Research Committee of the Council of Scientific & Industrial Research (Chairman : Mr. A. Farquhar). The work is continuing (from October 1947) under the Director of the Fuel Research Institute.

Although the report is issued under the authority of Council, the opinions are those of the principal authors.

FOREWORD

THESE INVESTIGATIONS were sponsored by the Fuel Research Committee at the instance of Sir Shanti Swarup Bhatnagar, Director of Scientific & Industrial Research. Work of this nature has been done before in India, but not on the broad lines of enquiry which have guided the course of these investigations nor on the same co-ordinated scale. The report includes some of the earlier and private work of Dr. Forrester in addition to the work carried out on behalf of the Fuel Research Committee. The most important investigations previously carried out were those of Randall in 1924-25. These, however, were confined to narrow limits and done at a period when seams of coal inferior to what are now known as Selected Grades attracted little or no attention. The question was the beneficiation of the commercially good seams at that time which, although high in ash compared with normal English coal seams, would still be considered first-class coals in India today.

These early enquiries proved that the foreign material was too finely disseminated for beneficiation to be a commercial success. Through no fault of Randall and other early investigators, the industry too readily concluded that Indian coals in general were not amenable to coal beneficiation, and this unfortunately led to the discouragement of further research and probably retarded progress for two decades. Credit is due to those who did not concur in the popular conclusions of the industry and who consistently pursued their enquiries and have now established that Indian coals, although more difficult, are amenable to treatment and that it is only a question of selection of plant, comparative losses, and costs of beneficiation.

With the exhaustion of the better-grade seams and the increasing production from inferior ones (with bands of shale and clay and bony coal), the percentage of foreign material in the run-of-mine (r.o.m.) production has rapidly increased. This trend has been further accelerated by the abandonment of selective mining which has, very properly, been adopted in recent times. The problem has been further aggravated by the increasing reluctance of miners and loaders to produce clean coal. The quality of the r.o.m. production is also deteriorating as a natural consequence of increasing mechanization. However efficient or inefficient hand labour may be in producing and loading out coal, discrimination between good and bad is largely beyond the means of mechanized coal production. Consequently, in spite of the prejudices of the industry, based erroneously on earlier investigations, producers have been compelled to adopt coal beneficiation by the primitive and costly means of hand-picking and sorting. This has led to great waste without achieving the steady uniformity of grades and maximum recovery which can be readily obtained by coal washing. To indicate what can be done, attention is drawn to a washing balance sheet for a difficult coal, included as an Appendix to the report, and to the conclusions summarized in the final table. It will be seen that if coal has to be utilized in the best national interest, sale on specification must be made statutory, and the crude and obsolete methods of price-fixing introduced by the first Coal Commissioner must be abandoned.

Very low ash coal (at a cost) can be produced from inferior seams for special industrial processes when necessary, and from the same seams (of coking coal) metallurgical grade coal can be produced equivalent in quality to that of the better-grade seams now approaching exhaustion, *with the added advantage of uniformity*. It can be taken that by coal beneficiation moderate proportions of what were considered inferior Jharia seams may now be recovered for coke making, and, with the adoption of better combustion methods now available, the more inferior parts utilized for power purposes. The report rightly points out that figures regarding the potential reserves of metallurgical coking coals may probably be revised in an upward direction.

Dr. Forrester, in the summary of the work on page 1, may not be too optimistic in his conclusions, but the investigations at least show that the attitude of many persons, and particularly of the commercial interests, towards coal beneficiation during the past two decades has not been justifiable. If coal is to be sold on specification and utilized in a scientific manner to the common good, then the results recorded in this report show the way. We should like to pay tribute to those workers mentioned by Dr. Forrester in the report and we appreciate very much the help, support and guidance given consistently by Sir Shanti Swarup Bhatnagar. We wish to acknowledge also the assistance obtained from colliery owners and particularly the members of the Indian Mining Federation and the Indian Colliery Owners' Association, without whose co-operation many of the samples could not have been obtained. Credit is due to Mr. H. K. Sen, Chief Coal Inspector of the Tata Collieries, who was responsible for the collection of most of the samples — a matter requiring much care and experience — often under very difficult and trying conditions. The thanks of the Fuel Research Committee are also due to Dr. Forrester for the generous manner in which he has devoted a large measure of his time and knowledge to the supervision of these investigations which we trust will be a substantial contribution to the physical and chemical survey of Indian coals. We also have to acknowledge the helpful advice and assistance given in the later stages of the work by Dr. J. W. Whitaker, Director of the Fuel Research Institute, and by Dr. A. Lahiri, Secretary of the Fuel Research Committee. The washability investigations now form part of the work of the Fuel Research Institute, having been formally taken over by the Director from October 1, 1947. Washability curves of Indian coals often present unusual features, and in my opinion the results of these tests will, when submitted to careful scrutiny and analysis, yield a rich harvest, both technically and commercially.

A. FARQUHAR

Chairman

Fuel Research Committee

October 21, 1947

SUMMARY

THE CLEANING CHARACTERISTICS of over 140 samples of Indian coals, mostly from the lower seams (below No. X) of the Jharia Coalfield, have been examined, nearly 200 semi-large-scale tests being done during the period from January 1944 to September 1947.

Conclusions. In the Jharia Coalfield those seams below No. X that contain not more than .24% of ash are probably worth washing. The sulphur content of the majority of Jharia coals is so low that the problem of reduction of their sulphur content has not been studied. The high-sulphur coals of Assam tested gave disappointing results, a large proportion of the sulphur remaining in the clean coal. Some improvement can be effected in the Assam coals tested by screening off the small sizes (below 2").

Cleaning Plant. The opinion is offered that for these "difficult" Gondwana coals of India, probably the most efficient type of cleaning plant will be one of the dense medium (mineral suspension in water) type. A combination with one of the Rheolaveur type, for handling the smalls, may also be practicable.

Type of Product. The following alternative possibilities are suggested:

- A. Making a "cut" at one specific gravity to yield
 - (i) a clean product with 15-18% ash for use, either alone or blended with another coal, for manufacture of metallurgical coke and for other purposes;
 - (ii) high-ash coal ("rejects").
- B. Making "cuts" at two specific gravities to yield
 - (i) very clean coal with ash below say 6% for special industrial purposes (e.g. manufacture of carbide);
 - (ii) clean coal of intermediate quality ("middlings") for metallurgical purposes or power production;
 - (iii) "rejects" of very high-ash content.

Screening off smalls, with or without removal of finest high-ash material by de-dusting, and mixing the smalls with the clean coal, may also be profitable owing to the relatively good quality of most Jharia field small coal.

Economic Considerations. Modern improvements in the design of coal-consuming power plant permit coals of increasingly high-ash content to be efficiently used. The whole picture of the economics of coal-cleaning is constantly changing. Coals formerly selected for cleaning are now more efficiently used without cleaning, all the combustible matter being converted into heat. Similar developments in other fields, including blast-furnace practice, may bring similar changes of outlook. In the interests of national economy, therefore, we must remember that it is economically unsound to clean a coal to produce an unnecessarily low-ash product. This is important in India where the rejected material is always liable to contain a relatively high quantity of potential fuel.

ACKNOWLEDGMENTS

THIS REPORT records the results of nearly 200 semi-large-scale tests on coals from Indian coalfields, mainly, the Jharia field. The work, in continuation of small-scale investigations, started over 18 years ago, has been made possible on a larger scale by means of a grant, operating from 1st January 1944, from the Council of Scientific & Industrial Research. It has, for the most part, been confined to examination of samples received under a scheme of co-operation with the Coal Blending & Coking Sub-Committee operating under the joint aegis of the Council and the Tata Iron & Steel Co. Ltd. The first Chairman of the Committee, Mr. A. Farquhar (at present Chairman of the Fuel Research Committee), inaugurated the scheme of co-operation and has been responsible for its continuation since its adoption.

The funds have made possible the engagement from time to time of several assistants whose names are given elsewhere. All concerned have performed their duties with enthusiasm and as a team in a manner that deserves commendation. Special mention must be made of the Chief Assistant engaged under the scheme, Mr. J. N. Majumdar, formerly a member of staff of the Indian School of Mines, who has been responsible for a considerable part of the laboratory work and has latterly assumed such a degree of responsibility for the general supervision of the staff, as well as for the somewhat intricate calculations involved in working out the results and in compiling the tables and washability curves, that it is right that he be accorded part authorship in this report.

The work would not have progressed smoothly without the full co-operation of my Chief Assistant in the Department of Chemistry & Assaying, Indian School of Mines, Mr. B. B. Niyogi, F.R.I.C. His help in general supervision, particularly in the earlier stages of the work, and his intimate knowledge of Indian coals resulting from investigations into other aspects of their technology, have been of considerable value throughout the work. His co-operation in continuing to make available the full resources of the Department has gone far to ensure the satisfactory progress of the work.

The Report would not be complete without recording my indebtedness to the Council of Scientific & Industrial Research for the generous support given from the beginning. More than in many other spheres of research, work of the nature here reported on requires to be continued for long periods, and innumerable experiments have to be done, before publication of even interim results is justified. For that reason alone the continued support from the Council is most gratefully acknowledged.

Finally, I have to acknowledge my appreciation of the permission granted by the Government of India in the Department (now Ministry) of Works, Mines & Power to accept the grant from the Council and carry out the work at the Indian School of Mines.

C. F.

GENERAL ASPECTS OF THE PROBLEM

THE OBJECT of cleaning coal is to remove from raw coal, as mined and brought to the surface, such proportion of stony and other high-ash material as is justified, taking into full consideration all the economic aspects. This seldom involves obtaining merely a clean product with the lowest possible ash content or, on the other hand, obtaining the maximum yield of clean product. And although the term "washability" is almost universally used, the large-scale operations employed in cleaning coal do not necessarily involve washing as that term is commonly understood, i.e. treatment with water.

The problems associated with the presence, in coal, of incombustible mineral matter are complicated. A certain proportion of the incombustible mineral matter is, so to speak, foreign to the coal substance; a certain proportion is intimately disseminated throughout the coal substance and is generally termed "inherent". This incombustible mineral matter, whether inherent or not, is represented (after the coal has been burnt) by what is known as the "ash", and in employing that term it is necessary to make a mental reservation in order fully to understand the composition of coal with special reference to cleaning problems. It is not uncommon to see a coal described as "containing" say 15% of ash, as if to suggest that the ash exists in the raw or unburnt coal. But that is not the case. Practically all the incombustible mineral substances present in the unburnt coal are altered by heat (and some by chemical reactions) while the coal is burning, the majority losing certain constituents, or becoming chemically altered, producing residues nearly all of which weigh less than the minerals from which they were derived. These residues constitute what is termed the ash.

Thus in the imaginary case just cited the 15% of ash left by burning the coal really represents more than 15% of incombustible mineral matter that was present in the coal before it was burnt. The actual amount of such incombustible mineral matter may have been 16% or 16.5% or even more, depending upon (a) the individual mineral constituents that were present in the coal and (b) the conditions in which the coal was burnt. As the mineral matter described above as being foreign to the coal substance was derived from many different sources, it will be clear that the ratio between the weight of incombustible mineral matter present in a coal and the weight of ash produced by burning that coal is not the same for all coals. Information relating to the chemical composition of Indian coal ashes and the mineral matter from which they are derived is insufficient at present to justify any categorical statement regarding that ratio. We may for the present, however, adopt a correction factor of about 10% to indicate approximately the loss that the incombustible mineral matter undergoes in the process of burning the coal in which it occurs. That is to say, an ash "content" of 10% obtained on burning a coal represents about 11% of incombustible mineral matter originally present in that coal. On that basis the above-quoted instance of a 15% ash coal would represent a raw coal actually containing about 16.5% of incombustible mineral matter. We are not,

in this report, primarily concerned with the various aspects of this correction factor, but reference may perhaps justifiably be made to the correction formula derived, from experimental data, by the well-known American fuel technologist, the late S. W. Parr¹, according to which the ratio of the amount of incombustible mineral matter originally present in the coal to the amounts of ash and of total sulphur present is given by the formula :

$$MM = 1.08 \times Ash + 0.55 \times S$$

where MM is the incombustible mineral matter (%),
 Ash is the percentage of ash
and S is the total sulphur content (%) of the coal.

Whether that formula will be found to be generally applicable to Indian coals remains to be seen. It is possible that modifications suitable for the coals of the different coalfields will be found necessary, depending upon the results of the physical and chemical survey of the coalfields that will, it is understood, be embarked upon as one of the first tasks of the Fuel Research Institute.

Perhaps the most useful record to which further reference may be made is that by J. N. Mazumdar^{8, 9} and relating to work done on ashes of Indian coals.

Throughout this report the expression "ash content" refers to the amount of ash obtained by burning a sample of coal and not the amount of incombustible mineral matter actually present in the coal. No appreciable error results from this practice because (apart, of course, from calorific value) it is the same figure (namely the amount of ash actually obtained by burning a coal) that is used by most coal consumers in evaluating a coal.

PREVIOUS WORK

INVESTIGATIONS into the washability of Indian coals have been carried out sporadically for many years. Bibliographical references appear at the end of this report. The previous work is briefly referred to here.

In 1924, by arrangement with the Director, Geological Survey of India, Randall submitted a number of samples of coal to tests in a Mineral Separation Ltd. froth-flotation plant of laboratory type. The results are recorded in the Records of the Geological Survey of India.² They were on the whole not encouraging. By the very nature of the plant used it was, of course, essential to use finely pulverized coal. Randall tested 24 samples from seams X to XVIII, of which only one was from each of seams X, XI, XII and XIII and only two were from seam XVIII. The ash contents varied from 12.7% to 23.4%. His results were not tabulated to show yields of clean coal with specified amounts of ash, but a summary in that manner is given in a paper⁴ in the Transactions of the Mining & Geological Institute of India, from which it will be seen that yields of from 48% to 82% of clean coal with 15% ash were obtained (from raw coals, of course, originally giving more than that amount of ash).

Randall suggested the necessity for crushing to about 20-mesh size prior to cleaning, a view which this report supports only in part, though the majority of the Gondwana coals undoubtedly present special difficulties. The disappointing results obtained with the small selection of coals treated by Randall have probably done much to create pessimistic opinions in the coal-mining and coking industries of India regarding the amenability of Indian coals to economic cleaning. It is unwise to generalize from those results. As will be seen below, there are instances where appreciable reduction in ash content can be economically achieved on a large scale.

Bose and Gupta³ in 1933 carried out float-and-sink tests on certain Raniganj and Jharia coals containing 15% of ash. They concluded that a 5% reduction in ash could be achieved by rejecting about 25% of the input. As will be seen below, I have aimed at producing a 16 to 18% ash clean coal for most industrial requirements, especially for the metallurgical coke industry. Adopting that standard as a basis, coals already containing only as little as 18% of ash would not generally be treated in a modern washery in India. On the contrary, the tendency will, in my opinion, be towards accepting a higher ash content, especially for non-coking purposes.

The next recorded work is that published by myself⁴ in the Transactions of the Mining & Geological Institute of India in 1936, on the washability of coals of the Jharia Coalfield. The work was on a laboratory scale, dealing with small samples of coal crushed to pass a $\frac{1}{4}$ " screen. The original ash contents of the coals tested varied from 8.66% to 23.57%. Omitting three coals containing 8.66%, 10.1% and 10.69% of ash respectively, it was found that from 18% (in the case of

a 22.54%-ash coal) to 92% of clean coal containing 10 % of ash could be produced. The results of that work, dealing as it did with small coal, are of less significance in respect of large-scale washability than in respect of certain other aspects raised both in the paper and in the subsequent discussion. The most important point is that in general the vitrain or bright coal of the Gondwana coals of India tends to become concentrated in the smaller sizes of coal as mined (as distinct from the smaller sizes produced by further subsequent crushing). Consequently, as the vitrain has invariably a lower ash content, the smaller sizes (down to about 30-mesh or 60-mesh) have a lower ash content than the run-of-mine coal and; in consequence, a much smaller ash content than the larger screen sizes up to rubble size. In this respect these coals contrast with the majority of British bituminous coals. This point is referred to again on page 31.

Gee, in his *Study of Certain Indian Coals*⁵, records washability (float-and-sink) tests on 6-mesh to 30-mesh samples and also on more finely crushed samples from 17 seams in the Raniganj Coalfield (3 Barakar coals and 14 Raniganj coals) and 1 from Sirka seam (Karanpura field). Washability curves are given in respect of 18 seams and further details are given of the tests on the finer sizes of coal. The coals contained between 10% and 18% of ash and the results were on the whole comparable with those obtained by me in the work⁴ referred to above on the Jharia coals, as well as in unpublished work on seams in the Raniganj field.

Mandlekar and Pai have published the results of work in 1940⁶ and 1944⁷, mainly on the reduction of sulphur in high-sulphur coals, especially those of Assam and the Punjab. These authors conclude that so far as sulphur content is concerned no advantage accrues from attempts to clean Assam coals, and that a reduction to about 3.6% is possible in the case of certain Punjab coals.

THE NATURE OF THE PROBLEM IN INDIA

WITH ONE NOTABLE EXCEPTION, the cleaning of coal has not been practised on a large scale in India. The exception is the Singareni Collieries of Hyderabad where for many years a Berrisford dry-cleaning plant has been working more or less successfully.

Over 90% of India's coal comes from the coalfields of Bengal, Bihar and the Central Provinces, especially the first two. In recent years public attention has been focused on the fear of the exhaustion of the reserves of coking coal, with the consequent threat to the metallurgical industries of the country. Consequently attention has been in the first instance directed to a study of the coking coals, especially those of the Jharia Coalfield. And, by contrast with the earlier work, coal as raised to the surface (run-of-mine) or as despatched to coke manufacturers (the latter especially in the case of the very low-grade coals), has been submitted to the washability tests in quantities that ensure obtaining a reliable indication of what would be actually achieved on a large scale in a modern cleaning plant or "washery".

DESCRIPTION OF THE EXPERIMENTS

WEIGHED PORTIONS of the air-dried coal are submitted successively to the float-and-sink action of liquid mixtures of specific gravities varying from (in some cases) as low as 1.25 to as high as 1.7, by increments of 0.05, the normal range being from 1.40 to 1.58. The mixtures consist of carbon tetrachloride (sp. gr. 1.58) and benzene or petrol (benzole of sp. gr. about 0.88 is generally used) in suitable proportions. For the specific gravity 1.7 sulphuric acid was used.

For the float-and-sink treatment of the larger screen sizes, a Fraser and Chalmers' Float-and-Sink Machine was used (see Plate I). This consists of a square section tank tapering outwards towards the top and holding from 30 to 35 gallons of liquid. The coal is treated in a fairly close-fitting perforated inner container of similar shape, suspended by a cable running over an overhead pulley and balanced by a counterpoise weight. The inner container is closed at the foot by a perforated hinged flap; another perforated hinged flap fitted about half-way is provided with a means of raising it into a horizontal position, thus cutting off the upper portion from the lower. The principle is the same as that of a separating funnel used in chemical operations.

For preparing 40-gallon lots of these liquids the following approximate quantities of reagents are found suitable. The amount of benzole depends, of course, upon its specific gravity which, in turn, depends upon the proportions of toluene and other constituents present.

TABLE I
QUANTITIES FOR PREPARING 40-GAL. LOTS OF
MIXTURES FOR FLOAT-&SINK TESTS

Specific gravity	1.25	1.30	1.35	1.40	1.45	1.50	1.55	1.58
Carbon tetra- chloride—gals. (sp. gr. 1.58)	22.2	23.3	26.7	30.0	32.6	34.8	38.1	40
Benzole—gals. (sp. gr. 0.88)	17.8	16.7	13.3	10.0	7.4	5.2	1.9	0

For the test sufficient of the liquid mixture to be used, i.e. mixture of the selected specific gravity, is placed in the tank to nearly fill it, enough space being left for the coal, which is weighed, placed in the liquid, stirred thoroughly and allowed to settle for a few minutes. The denser material sinks and the lighter floats.

The portions that float and sink respectively are separated and submitted, after air-drying, to further float-and-sink tests, the former to the liquid of next lower specific gravity and the latter to the liquid of the next higher specific gravity.

The material that floats is commonly designated "floats" or "floatings", that sinking being designated "sinks" or "sinkings".

The sample of coal is thus separated into specific gravity "fractions". These are air-dried, weighed and crushed to powder and the ash contents are determined by standard methods.

PROCEDURE

The coal is generally first passed over screens of different sizes, according to the nature of the original sample or the practice (e.g. selling policy) of the colliery company, and the quantity obtained in screen size is weighed. This provides a "screen analysis". Each portion is then separately submitted to the float-and-sink test as described above. The results of these tests are then treated mathematically to give a composite picture of the behaviour of the original coal during cleaning. The quantity of coal used for each test has generally varied from about 150 lb. to about 275 lb., though as much as half a ton has been handled.

In the treatment of each lot practically no pieces remain suspended midway in the liquid, everything finally either floating or sinking completely. The inner hinged flap is now raised to the horizontal position and fixed there. The inner container is raised out of the liquid and allowed to drain. By raising it still further the lower portion is automatically swung forward and it is a simple matter to open the bottom flap and allow the material that sank in the liquid to fall out into a pail, in which it is weighed. The inner half-way flap is then opened and the material that floated is also removed and weighed separately. In this way the "floats" are obtained separately from the "sinks".

The process is repeated with the other liquid mixtures. The large apparatus is not required for treating the small screen sizes, it being sufficient to use beakers or other small containers of capacity ranging from about 2 litres to as little as 250 c.c. Only small portions of material of the smaller sizes need be treated, the necessary allowance being made in the subsequent calculations. Chapman and Mott, in their book *The Cleaning of Coal*¹⁰, prescribe the following amounts for treatment in the test:

Over 2"	...	...	4 cwt.
1" to 2"	...	...	2 cwt.
$\frac{1}{2}$ " to 1"	...	...	32 lb.
$\frac{1}{4}$ " to $\frac{1}{2}$"	...	...	1,000 gm.
$\frac{1}{8}$ " to $\frac{1}{4}$"	...	...	200 gm.
under $\frac{1}{8}$"	...	...	30 gm.

The percentage of low-ash coal, multiplied by the percentage of ash in it, plus the percentage of rejected coal multiplied by its ash percentage should be equal to the percentage of ash in the original multiplied by 100. This is shown in the following equation:

$$(C \times A_c) + (R \times A_r) = (A_t \times 100)$$

where C = percentage of clean coal,

R = percentage of material rejected in order to provide C ($R = 100 - C$),

A_c = ash percentage in clean coal,

A_r = ash percentage in rejected material,

A_t = ash percentage in original coal.

All results are calculated on an "air-dried" basis.

Example: If the original coal contains 20% of ash and it is possible, by cleaning it, to obtain 82% of clean or low-ash coal containing 15% of ash, then the yield of rejected material must be 18% (100-82) and its ash content must be 42.8% to satisfy the equation:

$$\begin{array}{r} 82 \times 15 + 18 \times 42.8 = 20 \times 100, \\ 1230 + 770 = 2,000. \end{array}$$

CALCULATIONS & RECORDING OF THE RESULTS

Two methods are normally used for recording the results, one consisting of tables showing the percentages of the various specific gravity "fractions" obtained in the float-and-sink tests and the other consisting of "washability curves" recording these results graphically.

The tabulated statement records the amounts of the specific gravity fractions for all the screen sizes and also gives the composite "picture" obtained by combining these data. "Cumulative" weights and ash percentages are also calculated. These show the yield of clean coal, and its ash content, obtainable by separation at any selected specific gravity, the procedure being known as "making a cut" at that specific gravity.

Tables II and III are examples, the former being for a coal treated as received, i.e. without screening, the latter being for a coal separated into screen sizes before being tested.

TABLE II

FLOAT-&-SINK TABLE

SIZE	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. % (a)	Ash % (b)	Wt. % (c)	Ash % (d)	Wt. % (e)	Ash % (f)	Wt. % (g)	Ash % (h)	Wt. % (i)	Ash % (j)	Wt. % (k)	Ash % (l)	Wt. % (m)	Ash % (n)
Wts. of fractions & ash contents	6.20	9.65	6.03	17.52	7.74	22.13	20.14	27.71	12.60	32.07	47.20	44.02	100	34.22
Cumulative wts. & cumulative ash contents	6.20	9.65	12.23	13.53	10.97	16.86	40.11	22.31	52.80	24.65	100.00	84.22	100	34.22

Table II is interpreted as follows: By making a cut at sp. gr. 1.40 we should obtain only 6.20% of coal [column (a)] containing 9.65% of ash [column (b)]. From the material thus rejected we could, by making another cut at sp. gr. 1.45, obtain an additional 6.03% of coal [column (c)] containing 17.52% of ash [column (d)]. Combining these two fractions we should obtain 6.20% plus 6.03%, i.e. 12.23%, of coal [foot of column (c)] containing 13.53% of ash. This figure 12.23 is a cumulative weight percentage, obtained by simple addition. The figure 13.53 is a "weighted" or cumulative ash percentage, obtained by a proportionate calculation as follows:

$$\text{ASH CONTENT} = (6.20 \times 9.65 + 6.03 \times 17.52) \div 12.23,$$

12.23 being, as shown above, the sum of 6.20 and 6.03.

By making a further cut at sp. gr. 1.50 we should obtain an additional 7.74% of coal [column (e)] containing 22.13% of ash [column (f)]. Adding this to

the coal already "floated off" we should get a total of 19.97% of coal [foot of column (e)] containing 16.86% of ash [foot of column (f)]. The figure 16.86 is obtained in the same manner as the previous ash content figure 13.53, thus:

$$\text{ASH CONTENT} = (6.20 \times 9.65 + 6.03 \times 17.52 + 7.74 \times 22.13) \div 19.97,$$

19.97 being the sum of 6.20, 6.03 and 7.74.

Proceeding to the right-hand side of the table we see that by making a cut at sp. gr. 1.58 we should obtain only 52.80% of coal [foot of column (i)] containing 24.65% of ash [foot of column (j)]. The table also shows that in order to obtain this output of relatively clean coal we should have to sacrifice 47.20% of the raw coal [column (k)], and that the material thus rejected would contain 44.92% of ash [column (l)].

Proceeding, finally, to the extreme right-hand side of the table [columns (m) and (n)], we see that the original coal (totalling 100%, of course) contains 34.22% of ash. This figure 34.22 has been obtained in the same manner as were obtained the calculated figures 13.53, 16.86 and 24.65. Of course, in large-scale cleaning successive cuts are not made, only one cut being made or, as will be seen later, in some cases two cuts, this latter practice resulting in three products.

It should be emphasized that this figure in column (n), representing the ash content of the original or "raw" coal (in this case 34.22%), is a calculated figure and not an ash content obtained by incinerating a representative sample of the coal by the standard procedure. Consequently, through the cumulative effect of small errors, it sometimes differs *slightly* from the actual ash content of the original coal.

Table III gives the more detailed results obtained by first screening the coal into different sizes and then submitting each of the "screen sizes" to the complete float-and-sink test. It is interpreted in the same manner as in Table II.

TABLE III

FLOAT-&-SINK TABLE

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
Over 2	3.72	11.72	23.85	14.72	19.74	20.30	2.92	24.50	2.62	29.10	1.64	38.55	59.49	18.15
2-1	3.18	13.82	8.92	16.80	6.66	20.60	1.80	25.80	1.93	28.55	1.18	42.40	23.08	20.19
1-½	1.59	12.65	3.13	15.65	2.82	20.65	0.84	25.20	0.62	28.50	0.69	36.65	9.49	19.64
¾-½	0.82	11.30	1.01	15.50	1.00	19.87	0.39	24.30	0.23	27.25	0.33	36.10	3.78	16.17
½-¼	0.66	8.30	0.29	15.50	0.26	19.35	0.19	23.70	0.09	28.70	0.25	42.25	1.74	18.76
¼-30-mesh	0.95	5.50	0.15	15.55	0.16	19.25	0.10	24.15	0.05	28.95	0.19	50.50	1.60	15.06
× 30-mesh	0.40	4.05	0.06	15.35	0.07	18.35	0.04	22.90	0.03	28.20	0.13	65.25	0.82	15.06
Total wts. & cum. ash contents	11.41	11.38	42.41	15.25	30.67	20.36	6.08	24.90	5.02	28.77	4.41	40.61	100	18.76
Cum. wts. % & Cum. ash %	11.41	11.38	53.82	14.43	84.49	16.58	90.57	17.14	95.59	17.75	100.00	18.76		

It has to be noted, however, that the proportional method of calculation for the ash contents has to be applied vertically as well as horizontally. For

example, the figure 11.41 at the foot of column (a) is a simple total of the figures vertically above it. The figure 11.38, representing the ash content of the material lighter than sp. gr. 1.40 obtainable from the complete coal (i.e. all screen sizes taken together), is calculated proportionately, and is obtained by adding the series (3.72×11.72) , (3.18×13.82) , (1.59×12.65) and dividing the total by 11.41 (the sum of 3.72, 3.18, 1.59.....).

As in the case of Table II, the figures 11.41, 53.82, 84.49, 90.57 and 95.59 (and, of course, 100) are simple progressive addition totals, whereas the figures 11.38, 14.43, 16.58, 17.14, 17.75 and 18.76 are proportional ash content figures, termed "cumulative ash contents". They may also be regarded as "weighted averages" of the ash contents of the screen fractions within each specific gravity range.

The tables presented in this report also furnish information regarding cleaning possibilities. Below the main tabulated statement of the results in each table is an additional statement of examples of clean coal outputs, with corresponding amounts of rejections, and of intermediate-quality coal or "middlings". These figures have been compiled partly from the tabulated statements and partly from the washability curves referred to below.

WASHABILITY CURVES

Washability curves are the most convenient form of showing the extent to which a coal can be treated so as to give the maximum economic yield of clean coal and at the same time minimize loss, among the discarded material, of potentially useful fuel substance. Plate II, relating to the treatment of a raw coal containing 18% of ash, illustrates the type of diagram most generally adopted at present. It comprises three curves A, B and C. Curve A indicates the ash content of the clean coal at any selected percentage yield, or conversely the yield of clean coal of any selected ash content. The percentage yield from zero to 100% is indicated vertically *downwards* on the left vertical axis or scale, and the ash content percentages are plotted on the horizontal scale from the origin towards the right. From the figure it will be seen, for example, that the coal represented in the diagram would give 70% of clean coal containing 11.5% of ash, or 95% of clean coal containing 16.4% of ash.

Curve B gives the complementary information, indicating the amount of material that has to be discarded, and its ash content. The amount of material to be discarded, from zero to 100%, is plotted vertically from the bottom *upwards* on the right-hand axis or scale. The ash percentage scale is the same as is used for the clean coal values. Thus by plotting the curves in the same diagram we are able to tell what amount of material has to be discarded, and its ash content, in order to obtain the specified recovery of clean coal. This is shown by drawing a horizontal line through curve A at the level of the figure representing the percentage recovery of clean coal (in this case 70%) and reading off the values where the line cuts the curve for discarded material, i.e. curve B. In the examples already quoted we find that in order to obtain a recovery of 70% of clean coal containing 11.5% of ash we have to discard 30% of material containing 33.17% of ash. Similarly we find that to recover 95% of clean coal containing 16.4% of ash we have to discard 5% of material containing 36.8% of ash.

A third curve, curve C in the diagram, is sometimes constructed. To some extent it indicates what is actually observed during the float-and-sink test and is termed the "Observed" curve. It shows the average ash content of the

material floated off between any two specific gravity cuts, e.g. between sp. gr. 1.45 and 1.50. In washery practice it can also show (a) the material highest in ash content that is included in the clean coal recovered at any specific gravity position indicated in the diagram and (b) the material lowest in ash content included in the corresponding rejected material or "dirt". As the *amount* of such material is not indicated, and may be relatively great or very small, it is perhaps doubtful whether curve C serves a useful purpose except for research workers.

Some workers indicate positions of the specific gravity cuts by drawing across the diagrams horizontal lines indicating the specific gravities used in the tests. These have been indicated by dotted lines in Plate II, and are used in the manner indicated by the following example: to obtain the recovery of 70% of clean coal containing 11.5% of ash it is necessary to make a cut at sp. gr. 1.50. Other values can be interpolated.

In those instances where a separate lot of the same sample has been crushed prior to making an additional test, the reference number for the additional table is followed by the letter (*a*) or, where two separate additional tests were done, the reference number of the third test is followed by the letter (*b*). As is explained below, however, many tables have, in the interests of economy, been omitted. Even in those cases, however, the corresponding curve has been retained, but in the interests of economy the curve for this additional test has been given in dotted lines, along with the first curve. This is actually a convenience as it clearly shows the advantage, if any, gained as a result of crushing.

In the paper by myself referred to above⁴ I added to the diagrams another curve indicating the relation between the specific gravity of any cut and the yield obtained by making a "cut" at that specific gravity. The same practice has been followed in this report, in a more useful form. The curve has been constructed within the same diagram, instead of separately, the specific gravities of the cuts being shown along the top scale and the percentage recoveries at the specific gravities indicated being those on the left-hand vertical scale used for the "floatings" curve A. By reference horizontally to the curve A it also, of course, shows the ash content of the product. It should be noted that these curves do not indicate the relation between the specific gravity of a piece of coal and its ash content, which is referred to later (p. 32).

An example of such a sp. gr./yield curve is given as curve D in Plate II. It is used as follows: Let us assume that we require to obtain clean coal containing 15% of ash. From curve A we find that a 90% yield could be obtained with that ash percentage. Referring to curve D we find that to obtain a 90% yield the plant must operate with a cut at sp. gr. 1.57.

The operation of coal-cleaning plants is not necessarily decided on specific gravity considerations, actual observed ash content of the output or of the discarded material being more likely to govern the position. Those in charge of plants operating on specific gravity principles are, however, likely to require the information in order to adjust the specific gravity of the heavy liquid used, though even in the operation of such plants the control is more likely ultimately to be decided by the same factors, namely output and ash content.

ASSESSING WASHABILITY FROM INSPECTION OF CURVES

Careful examination of each washability curve will, of course, provide practically all the information normally required for judging the cleaning possibilities. But such examination takes time. In examining a large selection of curves it is

soon obvious that there are broad principles that determine washability. The most important of these is the shape of the "floatings" curve, especially towards the foot. In Plate III two curves — A1 and A2 — are given to illustrate this point. Curve A1 represents the case of a coal containing, in the raw state, 20% of ash, curve A2 representing one with 20.5% of ash. Curve A1 shows that we could obtain 90% of relatively clean coal containing 15% of ash — a reduction of 5% in ash content, whereas from curve A2 we see that a 90% recovery would give us a coal containing 18.5% of ash, a reduction of only 2% in ash content. The well-curved portion of curve A1 is typical of a good recovery with satisfactory ash reduction, the steep shape of curve A2 being typical of a poor recovery or at least a low reduction in ash content for the same percentage recovery.

METHOD OF NUMBERING THE TABLES & CURVES

The reference numbers are generally preceded by the letter "G", which signifies that the table records the results of a *general* washability test with reference to ash contents. In a few instances the number is followed by the letter "(a)" or other subsidiary letter. This signifies that another lot of the same sample has been crushed to smaller size prior to making another test.

In place of the letter "G" some tables contain the letter "S". This refers to special tests for examining possible *sulphur* reduction.

EXAMPLES OF CLEANING POSSIBILITIES

In tabulating the results in this portion of the tables it was at first decided that an ash content of about 16% should be aimed at, keeping in view the demands of the coking industry. Whether that figure should be regarded as the desirable maximum ash content to be permitted in what will come to be known as "clean coal" is a matter for further examination. It is probable that the coking industry will have to be prepared in due course for a much higher ash in its coking coal. And, of course, the other industries are not likely to be able to look forward, in India, to a steady or unlimited supply of coal with less than 16% of ash. Consequently, although the figure has on the whole been retained in this report as a basis for the purpose of compiling this part of the tables, it should not be taken as representing a proposed standard for clean coal in this country. Judging by the results obtained in testing the lower seams, up to Seam VIII, it is more likely that an ash content of 18% may in due course have to satisfy the requirements of the coking industry.

LOCATIONS OF THE SAMPLES OF THE COALFIELDS

In the majority of cases the exact position in the coalfield from which each sample was obtained is of relatively little importance, its approximate geographical and geological position being the main consideration. Consequently, in giving the positions in the Jharia Coalfield from which samples have been received a system of nomenclature has been adopted based upon a division of the field into zones or areas, as shown in Plate IV which shows the main features of the Jharia Coalfield, and the names or numbers of the areas as designated in this report. The systematic numbering of the seams in this field has made the method of identifying the samples a simple matter. It is not quite so easy to adopt in the other fields, nor is it justifiable considering the small number of samples received from those areas.

SOURCES OF THE SAMPLES

As already explained (p. 1), the work has been confined more or less to the lower seams, and especially seams VII and IX, of the Jharia Coalfield. Most were obtained in accordance with the scheme of co-operation referred to. Some were received direct from the collieries or other authorities for special tests. The following statement shows where the samples tested were received from :

Seam or location	No. of sam- ples tested	Total No. of tests.
JHARIA COALFIELD : Seams II, III, IV, V, VI, VII (32 samples), VIII, IX (35 samples), IX-X, X, XI, XII, XIII, XIII-B, XIV, XIV-A, XV, XVI, XVI-A, XVII ...	109	131
RANIGANJ COALFIELD	7	14
BOKARO COALFIELD	6	9
ASSAM	5	16
CENTRAL PROVINCES	10	20
BALUCHISTAN	2	4
SIND	1	1
MADRAS	1	1
	141	196

It was intended to include tables and curves for all the tests done. In the general interests of economy and owing more particularly to the great paper shortage, only those tables indicating some promise of economic cleaning, or otherwise of some significance (for example, to include representatives from all areas sampled) have been retained in the report as printed. Where samples were submitted to additional tests after crushing to smaller sizes, the curves for the additional tests have been incorporated within the same diagram (in dotted lines) even where the additional table has, in the interests of economy, been omitted.

It is hoped that by this means the maximum amount of useful information has been provided, and the bulk of the report has been somewhat curtailed without detracting from its practical value.

NOTES ON THE WASHABILITY TABLES & CURVES

JHARIA COALFIELD

FOR THE PURPOSE OF discussing the results, the seams in the Jharia Coalfield are here taken seam by seam, beginning with the lowest or oldest and proceeding upwards in the geological sequence. The lowest seam is numbered I, those above it being numbered II, III, IV, etc.

SEAM I. None received for test.

SEAM II. "Special Seam". No. G. 167. Only one sample was received for test, the coal being obtained from a colliery situated on the northern edge of the centre of the field. (But see also No. G. 157 under seam III.) Being known to contain over 34% of ash, it was first crushed to pass a $\frac{1}{2}$ -inch screen, disappointing results with tests on similar coals from this field having shown that this treatment was necessary. It differed from nearly all the other coals of the field in that the larger screen sizes of the raw coal were of somewhat better quality than the smaller sizes, as is shown in the screen analysis given in the table. Whereas the "over $\frac{1}{2}$ -inch" size has only 32% of ash, the $\frac{1}{2}$ -in. to $\frac{3}{4}$ -in. and $\frac{3}{4}$ -in. to $1\frac{1}{2}$ -in. sizes give over 40% of ash.

In cleaning the crushed coal, by making a cut at sp. gr. 1.58 (approx.), we should obtain only about 50% of output with 24% of ash. This means, of course, rejecting about 50% of the input as "dirt" which, as is seen from the curve, contains only about 44% of ash (representing about 48% of incombustible mineral matter) and, therefore, somewhat more than 50% of combustible matter—probably too serious a fuel loss to be considered for such a poor "clean" product.

If this one sample of what has generally been regarded in the past as useless coal is representative of these very low seams (I & II), and if it is ultimately thought necessary to mine them, we should have to consider the alternative of making a cut at a much lower specific gravity, say 1.47, to obtain only say a 15% output of coal containing about 15% of ash, the rejected material, containing only about 37.5% of ash, being fit to burn on a specially designed firegrate, or being itself also submitted to another specific gravity cut at say 1.7, to obtain a further 65% of coal containing about 31% of ash, the remaining 15% of "dirt" containing 55% of ash. Obviously many samples of these very low seams will have to be tested before reliable opinions can be offered.

SEAM III. Nos. G. 157 & 161. Two samples were received for test, both from the same area as that from seam II. (Some doubt exists as to the exact horizon of No. G. 157, it being assigned also possibly to seam II.)

Both samples are of somewhat better quality than No. G. 167, but No. G. 157 gives a less satisfactory result than No. G. 161 as will be readily seen from the shapes

of the washability curves. The same general remarks apply to No. G. 157 as to No. G. 167 (seam II), so far as recovery possibilities are concerned. The difference in screen analysis is important, No. G. 157 behaving in the more or less orthodox manner noticed throughout the Jharia field, the smaller sizes — down to about $\frac{1}{8}$ in. — being of better quality than the larger sizes, the "through 30-mesh" size showing a rise in ash content.

From No. G. 161, by making a cut at sp. gr. 1.58, we should get about 56% of 23% ash coal, rejecting about 44% of 41.4% ash material, which means that more than half of this rejected material (actually about 55%) is valuable combustible matter — again a serious loss of potential fuel.

SEAM IV. Nos. G. 159 & 168. These samples were also from the northern edge of the field, the first (No. G. 159) being a sample of the bottom 8 ft. of coal, the other being a sample of the complete seam. There is little difference between them in the matter of quality, and both give poor results, especially No. G. 159 which, by making a cut at sp. gr. 1.58, gives under 40% of relatively clean coal, though that coal is much cleaner with only 21% of ash. The "dirt" at that sp. gr. is much too valuable to be rejected, containing, as it does, only about 35% of ash probably representing about 61.5% of fuel substance. No. G. 168, with a higher yield, gives a similar result in the rejected material, which also contains 35% of ash. It is obvious that the tests must be continued into the higher specific gravity range with these coals. On account of the practical difficulty in working with higher specific gravities, necessitating the use of sulphuric acid as a heavy liquid, and the importance in the earlier stages of the work of trying to obtain figures relating to recovery of coal containing about 16% of ash, these low seams were not tested at higher specific gravities, except in one or two special cases.

SEAM V. Nos. G. 110 & 136. In respect of both ash content and washability No. G. 110 is a better coal than No. G. 136. Containing about 26% of ash, it yields, by making a cut at sp. gr. 1.58, about 63% of coal containing only 17.2% of ash, the rejected material containing just over 40% of ash. By raising the specific gravity of the cut (probably to about 1.62) we could obtain 70% of 18% ash coal, the dirt containing over 49% of ash.

No. G. 136, with 33% of original ash, gives very poor results, as is to be expected from the shape of the curve. Making a cut at the relatively high specific gravity of 1.58 we should have to reject over 80% of the input.

SEAM VI. No. G. 155. This sample, taken from the same area as the samples from Seams II and III, is of much poorer quality, as regards both ash content (nearly 39%) and washability. It hardly merits serious consideration.

SEAM VII. Thirty-two samples were received from this seam, two (Nos. G. 77 & 87) being re-tested after crushing, making 34 tests in all. Six of these (Nos. G. 95, 97, 103, 106, 119, 132 & 185), differ from the remainder in giving some promise of economic cleaning. All contained from 20 to 23% of ash and gave over 70% of clean output with about 16% of ash. The remainder bear a close resemblance to the samples obtained from the lower seams.

Nos. G. 119 and 132 were submitted to a larger range of specific gravity tests than were the others, sulphuric acid of sp. gr. 1.70 being used for one test beyond the normal limit of 1.58. Each gave over 85% of 18% ash material, the "sinks" containing about 49% of ash.

No. G. 87, submitted to an additional test, after further crushing to $\frac{1}{4}$ -inch size, is interesting. (See table No. G. 87(a).) Containing only about 21.5% of ash the raw coal gave poorer results than did the above five samples. Crushing to $\frac{1}{4}$ -inch size before the second test, instead of giving a higher yield of low-ash coal gave a lower yield at the same specific gravity, but of coal of better quality, the productions of clean coal at sp. gr. 1.58 being as follows:

	Yield of clean coal	Ash content
RAW COAL	75.55%	17.12%
CRUSHED TO $\frac{1}{4}$ -INCH	65.28%	13.29%
do. (at undetermined sp. gr.)	82.0%	17.12%)

The figures in respect of recovery of coal with the same percentage of ash, viz. 17.12%, as that obtained from the uncrushed coal at sp. gr. 1.58, are also given. It will be seen that there is a higher recovery — as is to be expected. The specific gravity at which this would be obtained is not known, the figure 82% being obtained by extrapolation on the "floatings" curve.

It will be noticed that the specific gravity/yield curve D in this case is somewhat erratic, perhaps due to the sample taken for the test being too small to provide adequate representation of all screen sizes.

No. G. 185, with just over 24% of ash, gives a 72% yield of 18% ash clean coal, which is also promising.

The curve of No. G. 114 has been specially included as an example of a curve of poor shape, rising in an almost straight line and bending backwards only towards the top. It may be compared with curves for samples Nos. C2 and C8 in the report on the earlier work referred to.⁴ No. G. 114, of course, is an example of a poor-quality raw coal, with nearly 30% of ash. It gives only 55% of 20% ash material. It should be compared with curve No. G. 145 (seam IX), of similar character.

SEAM VIII. Of nine samples tested, four — Nos. G. 59, 134, 163 and 144 — gave results of sufficient interest to bear examination. Three of them gave over 60% output of 18% ash coal and the fourth (No. G. 144), while not giving such a good product, is an example of a reduction of 7% in the original ash content, for a 65% output, i.e. from 27% ash to 20%.

SEAMS IX & Special below X. Thirty-five samples of No. IX seam were received for test, and three from a seam between Nos. IX and X, the ash contents varying from about 23% to about 32%, except for one only, No. G. 80, whose ash contents were 18.76%. Eight were submitted to two tests, the first on the coal as received and the second after crushing to $\frac{1}{4}$ -inch size before the test, this making 46 tests in all for these two seams.

No. G. 80, the sample referred to above containing only 18.76% of ash, was run-of-mine coal, nearly 60% being of over 2-inch size. In the uncrushed state the possible ash reductions were not very satisfactory, a 10% rejection of 34% ash material giving 90% of clean coal with 17.2% ash, which represents an improvement of only 1.5% out of the total 18.76%. But on crushing to $\frac{1}{4}$ -inch size prior to the test we obtain a 90% yield with only 16.5% ash, a reduction of over 2%, and the corresponding reductions of ash content for smaller productions of clean coal are still greater. The striking difference in the slopes of the two curves clearly shows the advantage of crushing in this case.

For the other tests an ash content of 18% has been considered a more reasonable criterion to apply. The following samples gave somewhat promising results, viz. 70(a), 71(a), 72(a), 80, 91, 129, 147 and 150, the output of clean coal containing about 18% of ash being well above 70%. All these coals (except No. G. 80 already referred to) contained about 23 or 24% of ash in the untreated state. This represents a reduction of about 5 or 6% in ash content, which may be considered satisfactory if it liberates for coke production a much greater tonnage of coal hitherto considered unsuitable for that purpose. The number thus giving an encouragingly satisfactory result is, in the case of this seam, about one-fourth of those tested. A complete survey of the coalfield would, of course, have to be made before even this approximate figure could be considered as even an indication of the possibilities.

No. G. 71, with about 24% of ash, is specially interesting. In the uncrushed state it gave only about 6% of 18% ash coal. After crushing, the production rose to 70%. Samples Nos. G. 78 and 79 gave similar contrasting results, except for the ultimate output which was only of the order of 45%; but they also illustrate the effect, in some instances, of crushing prior to the test.

In the other cases the output of 18% ash coal was in the neighbourhood of 50 to 60%.

The unsatisfactory feature of all the tests is that the "dirt" is always of much better quality than that of the average British coals, where dirt is extremely stony material with ash contents well above 60%. The washability curves for the "sinkings" of these lower Gondwana coals seldom continue into the 50% ash range. (See "Discussion of Results", pp. 31, 32.)

Curves for Nos. G. 62, 73, 91, 112, 117, 118, 121, 125, 129, 145, 147 and 150 have been included as a selection of the less satisfactory type. Reference has already been made (p. 17) to curve No. G. 145, similar in shape to that of No. G. 114. With nearly 27% of ash in the untreated state this coal would give only 35% of 16% ash product or 55% of 19% ash product, both, of course, quite unsatisfactory results.

SEAM X. Nos. G. 40 & 181. The programme of work under the scheme has not yet made it possible to start on a survey of this important seam. One of the thickest and most easily recognized of all the seams in the field, used for the manufacture of hard coke, especially in open "country ovens" and beehive ovens, as well as for soft coke making on a large scale, and also for steam raising, in certain areas and certain sections attaining a relatively high quality as measured in terms of ash content, it merits special attention which it will receive in due course.

One sample was examined in some detail before the receipt of the grant and its results are included in this report (ref. No. G. 40). Another, No. G. 181, has been tested under the scheme.

No. G. 40. The test was applied to the 6-inch screened coal, i.e. to the run-of-mine coal from which the 6-inch over-size had been removed. Coal of this size, while not being truly representative of run-of-mine coal, contains sufficient coal up to 6-inch size as to approximate to it and the test throws some light on the amenability of this seam to cleaning, at least after removal of what is designated "steam coal". Containing over 21% of ash, it gave 72% of 16% ash product, which may be considered satisfactory from the point of view of giving a good quality metallurgical coking coal. But the rejected "dirt" contained only 34% of ash, which must be considered too low a figure for complete rejection.

No. G. 181. This was a coal of higher ash content — 24% — and the result was somewhat disappointing. With the higher original ash content the yield of 16% ash clean coal is naturally much less than with No. G. 40 — only 54% — and even after crushing to $\frac{1}{2}$ -inch size this rises to only 66%, which cannot be considered satisfactory. The ash contents of the "dirt" was under 33% with the uncrushed coal and about 38% with the crushed coal.

Owing to the great importance of this seam and its greatly varying quality throughout the field, it would be unwise to assign importance to these two tests. The results may be compared with those recorded in the earlier work⁴ where the results of three tests on this seam are recorded. These tests dealt with coal crushed to 10-mesh size. Two of them (of lower ash content than No. G. 40) gave about 90% of 16% ash clean product. The third, with originally only 15% ash, gave a poor result judged by the amount of ash reduction.

In an investigation into the methods of manufacture of soft coke made in 1932-36, it was discovered that although on the whole this seam produced excellent coke, there were certain areas in which the coking properties were found to be poor. The relative absence of coking properties did not seem to be related to proximity to the surface or with weathering. This point will no doubt also receive special attention when this seam is surveyed at the Fuel Research Institute.

SEAM XI. Nos. G. 137, 137 (a), 138, 138 (a), 139, 139 (a). Only three samples were received, each of which was tested as run-of-mine coal, a separate sample of each being also crushed to $\frac{1}{2}$ -inch for a further test, this making six tests in all.

All three gave promising results, with from 73% to 85% output of 16% ash coal.

In contrast with the seams below No. X, crushing these three samples of No. XI seam gave no special advantage, especially as regards high output. In fact, crushing No. G. 138 resulted in a lower output of coal with ash content about 17%, the curves crossing each other at that figure. This suggests the liberation, on crushing, of less vitrain than in the cases of the other two samples, but the crossing of the curve is a matter of special interest worthy of special investigation in the course of future work.

Again, in contrast with the seams below No. X, the ash content of the dirt in these three samples is relatively high (from 34.2% to 50%), considering the ash content of the untreated coals. As will be seen below, this is an even stronger feature, of the seams still higher up in the series.

The higher percentage of ash in the dirt from the crushed sample in each case than from the uncrushed sample is also well illustrated, as the following figures show:

Percentage of ash in dirt corresponding to same ash content (16%) in clean product.

	No. G. 137	No. G. 138	No. G. 139
UNCRUSHED	41.8	34.2	37.2
CRUSHED	50	39.2	39.6

Nevertheless, it is doubtful whether the advantage achieved by crushing would, in these three cases, offset the disadvantages inherent in crushing.

SEAM XII. Nos. G. 128 & 148. Only two samples were received. They were submitted to tests using a specific gravity range extending to 1.70. No. G. 128, with 21.67% of ash, gave 75% output of 16% ash coal. No. G. 148, with 15.46% ash, gave 90% output with 12.4% ash.

These two samples were tested partly to obtain information regarding the distribution of ash among the different screen sizes. No. G. 148 shows a progressive lowering of ash content from about 16% to 12.41%.

SEAMS XIII & XIII-B. Nos. G. 53, 53 (a), 53 (b), 84, 93 (XIII-B). Three samples of these two seams were tested, separate samples of the first being further specially treated by crushing (a) to 2-inch size and (b) to 1-inch size, making five tests in all.

The first three tests are interesting as furnishing information about the extent to which crushing affects the possibility of obtaining better yields of clean coal. In this case the improvement in the 90% production range is so small as to be negligible, as shown below :

Ash contents in 90% output clean coal from raw coal (seam XIII)
originally containing 16.35% ash.

RUN-OF-MINE	...	...	13.8%
CRUSHED TO 2-INCH	...	...	13.6%
CRUSHED TO 1-INCH	...	...	13.4%

The reduction in ash content, of course, in this case may perhaps not be considered worth while in dealing with a coal containing only 16.35% of ash.

The other two samples give 90% outputs of clean coal with 15.5% and 14% of ash respectively, which, with 22% and nearly 19% of ash in the original coals, may be considered attractive. No. G. 84 is specially interesting in that the ash percentage in the coal is lowered by 6.5, i.e. from 22 to 15.5, the dirt containing 70% of ash, which is in line with what is experienced with British coals.

SEAM XIV. Nos. G. 107, 108, 141, 142. Only four samples of this seam were received. Each of these was given two tests, one as received and one after crushing to 2-inch size. The ash contents in the raw coal varied from 20% to 25%. In the uncrushed state they gave from 60% to 70% of 16% ash clean product, these productions rising, after crushing, to from 70% to 78%. Similarly productions of 18% ash clean product rose from about 85% in all cases to 85% in two cases and 90% in the other two.

The curves show little improvement at about 90% production, which is disappointing. That is, in fact, a disappointing general feature of most of the coals of the field. The consequence of course is that the dirt contains too high a percentage of combustible matter to be entirely satisfactory. In these cases the ash content of 10% rejections from the uncrushed coals ranged from 39% to 62%. These figures rose, on crushing, to 45-66%.

SEAM XIV-A. No. G. 184 Only one sample was tested. With 15.62% ash in the raw coal a 75% yield of clean product still contains nearly 12% of ash.

SEAM XV. Only one somewhat unpromising sample of this seam was received (No. G. 116.) It also was submitted to two tests — as received and crushed. It was not obtained under the co-operation scheme referred to on page 2 of this report, being tested with a view to see the extent to which very pure coal might be obtained for special purposes, e.g. manufacture of carbide or of electrode carbon. Containing 13.63% of ash in the untreated state it gave the following amounts of low-ash products :

PERCENTAGE YIELD	...	8%	14%	23%	32%
ASH CONTENT	...	3%	4%	5%	6%

The sample crushed prior to the test had a slightly higher ash content — viz. 14.1% — and gave the following outputs of the same clean products respectively :

18%, 25%, 36% and 48%.

90% yields of 11.5% and 10.6% ash clean products were obtained from the uncrushed and crushed coals respectively..

SEAM XVI. Nos. G. 52, 54 & 55. Three samples from this seam were examined, No. G. 52 being treated as received and then another sample being crushed to 2-inch size, a third sample being crushed to 1-inch size, for separate tests.

No. G. 52. The run-of-mine sample, containing 18.23% of ash, gave 74% of 13% ash clean product, 83% with 14% of ash and 93% with 18% of ash. Crushing to 2-inch size gave no advantage except to produce a clean coal with less than 13% ash. Crushing to the 1-inch size resulted in a 75% output of 12% ash clean coal, the yields at other ash percentages being : 82% with 13% ash ; 87% with 14% ash, 95% with 16% ash ; but it should be noted that the portion taken for crushing had somewhat less ash than the first portion, namely 18.09% as against 18.23%.

No. G. 54. This was a sample from the top section. Containing 24.45% of ash it gave 64% yield of 14% ash clean product, 73% with 16% ash and 81% with 18% ash.

No. G. 55 was a sample from the bottom section from the same colliery. With only 18.4% ash in the raw coal we get a yield of 78% with 14% ash and 90% with 16% ash.

SEAM XVI-A. Nos. G. 51 & 169. Two samples were received. No. G. 51, being the first treated under the scheme, was submitted to only three specific gravity cuts and No. G. 169 to five. The 1.50 sp. gr. cut with No. G. 51 gave a 70% output — with 14% ash, from an original 24.33% ash content, which is satisfactory. It is unfortunate that at this early stage the higher specific gravity cut could not be made. The curve shows, however, that at least 90% of 18% ash coal could be obtained, and 80% with 16% ash.

No. G. 169, with 22.52% of ash in the untreated state, gave 82% of 16% ash clean product, which was improved to only 84% on crushing. The other productions on crushing show that crushing gave no advantage commensurate with the expense involved.

SEAM XVII. No. G. 130. Only one sample was received. Being already a high quality of coal, with only 10.84% ash, it was specially treated to obtain very low-ash material, being crushed to ½-inch size prior to the test. In this case, as with No. G. 116 (seam XV), there was little improvement in the 90% production range, and reference to the curve will show that cuts at sp. grs. 1.50, 1.55 and 1.58 covered a range of only a little over 5% in output, i.e. from 96.62 to 99.47%, the ash contents ranging from 10.19 to 10.84%, as compared with the original 10.84%. At the other end of the specific gravity range the production was encouraging as compared with No. G. 116, the productions of low-ash coal being as follows :

YIELD	...	16%	25%	35%	46%
ASH CONTENT	...	3%	4%	5%	6%

OTHER COALFIELDS

As has already been made clear, attention has been largely concentrated on the high-ash coking coals of the Jharia Coalfield. Even the work that has been completed in that connection can only be regarded as a beginning. The samples that have been received from other fields have been received for special tests or have been brought spontaneously by industrialists whose interest has been aroused in the work. Their number is relatively small; consequently, although the results are recorded here, the fact must be emphasized that they cannot be regarded as being representative of the fields or even of the seams from which they have been taken. The notes regarding these are given according to the coalfields from which samples were obtained.

RANIGANJ COALFIELD

Nos. G. 146, 172, 173 & 187. Samples were received from four sources, namely Kajora Top Seam, Samla Seam, Ghusick Seam and Bharatchak Seam (above the Dishergarh Seam).

KAJORA TOP SEAM. No. G. 172. With only 11.5% of ash, a great reduction in ash content is not to be expected. This is borne out by the curve, from which it will be seen that no economic advantage is achieved by washing, nor does crushing to 2-inch [Report G. 172 (*a*)] materially improve the result.

SAMLA SEAM. No. G. 173. This was divided into two subsidiary screen samples, namely (i) under 4-inch and (ii) over 4-inch, for which reports G. 173SNA and 173SNB respectively are given. (The letters SN represent the word 'screen' to indicate screening into these two sizes.)

No. G. 173SNA. With 16.5% of ash in the raw coal, an 80% production of 13% ash product may be of economic value owing to the present grading and price-fixing system. It will be noticed that an 88% production of 14% ash coal would also be possible. Crushing to 2-inch prior to the test [No. G. 173SNA (*a*)] gives a slight advantage, an additional 8% of 13% ash product resulting, making a total of 88% of this product as compared with only 80% from the uncrushed sample.

No. G. 173SNB (over 4-inch). As is to be expected with large coal, the result is not so satisfactory and cleaning would not be economically worth while. Crushing to 2-inch prior to the test [No. G. 173SNB (*a*)] improves the position, but still gives unsatisfactory results.

GHUSICK SEAM. No. G. 187. A 70% yield of clean coal containing only 3% less ash than the original coal may hardly be considered satisfactory. Crushing to $\frac{1}{2}$ -inch size gave an 82% yield of the same quality. The advantage would hardly be considered commensurate with the trouble and expense of crushing.

It is interesting to note the low ash content of 8.46% in the $\frac{1}{2}$ -inch to 30-mesh size, more than 6% less than in the raw coal.

BHARATCHAK SEAM. No. G. 146. This was received in a number of foot-by-foot samples. As the result of preliminary tests these samples were arranged into three groups: A, B and C, for which reports Nos. G. 146A, 146B and 146C were compiled. The details regarding the groups are as follows:

- A: two sections making up about 8 ft. from the seam;
- B: one section 1-ft. thick plus another 8-inch thick; and
- C: one section 2-ft. thick.

The ash contents of A, B and C were approximately 14%, 21% and 26% respectively.

In each case, the run-of-mine coal was tested and then another representative sample was tested after crushing to $\frac{1}{2}$ -inch size.

No. G. 146A. As is to be expected from the experience with the Jharia field coals, no special advantage accrues from cleaning this relatively low-ash sample, nor did crushing greatly improve the result.

No. G. 146B. With 21% (approx.) of ash in the original sample an 83% product of 16% coal or a 90% product of 18% ash coal may be considered to offer promise of economic treatment. In this case also crushing prior to cleaning did not give any material advantage.

No. G. 146C. This was a disappointing sample, a rejection of nearly 60% being necessary to obtain a 16% ash product. The shape of the curve is typical of the worst type of coal considered with regard to cleaning. Crushing somewhat improves the output, but the advantage gained is not sufficient.

BOKARO COALFIELD

KEDLA SEAM. No. G. 41. As will be seen from the shape of the curve, this is not a very promising case, only 70% of 18% ash product being obtained from a 24.8% ash raw coal.

LEIYO SEAM. No. G. 42. This case is similar to the preceding (G. 41).

X SEAM of West Bokaro Field. No. G. 43. This case is slightly better than the two preceding, an 86% output of 18% ash product being obtained from a 21% ash raw coal.

KARO SEAM. Nos. G. 88, 89 & 90. One sample with 16.6% of ash (G. 88), gave very unsatisfactory results as judged from the washability table and the interpolation on the curve. The maximum specific gravity (1.58) available at the time of the test (April 1945) leaves too great a gap between the recovery of 45.11% (at 1.58) and the 100% position on the curve. It has not been possible to obtain another sample to repeat the test with a larger specific gravity range of test liquids.

The other two samples gave similar disappointing results and, if this seam is to be more reliably reported on, liquids of higher specific gravity, up to 1.65 or 1.7, will be necessary.

CENTRAL PROVINCES

Ten samples were received from various collieries in the Central Provinces. (Ref. Nos. G. 65, 67, 81, 143, 151, 152, 158, 162, 170 & 171.) Three were from Rewa State, two from Korea State, two from Ballarpur District, two from Chhindwara and one from Chanda.

CHIRIMIRI (Korea State). No. G. 65: This gave an excellent example of a well-shaped curve suggesting possibilities of economic cleaning. With 18.4% of ash in the raw coal, we could obtain 80% of 12% ash or 90% of 14% ash product.

NEWTON CHIKLI (Pench Valley, Chhindwara). No. G. 67. This also gives a good curve. With 20·5% of ash, we could obtain an 84% output of 16% ash coal.

Neither of these two samples was crushed for further tests.

MAJRI (Chanda, Central Provinces). No. G. 81. From the table it will be seen that there is not much hope of economic cleaning, a 15% rejection giving a reduction in ash content of only 3% — i.e. a 16% ash product from a 19·2% ash raw coal.

BIRSINGHPUR (Rewa State). No. G. 143. The curve shows that there is some promise of economic cleaning. Containing 18% of ash in the untreated state, it would give a 90% product containing only 14% of ash, or an 84% product with only 13% of ash.

From the report and curve G. 143 (a) it will be seen that although there is a substantial improvement in the upper portions of the curve on crushing prior to treatment, there is practically no improvement in the essential or useful range, i.e. between 80 and 100%.

KURASIA (Korea State). No. G. 151. The curve for this sample is one of the best obtained. It is, in a sense, unfortunate that the original coal is relatively clean. It will be seen that rejecting only 9% of the coal reduces the ash to 10%, as compared with nearly 14% in the original coal. This result may be compared with that for No. G. 171.

As in the case of sample G. 143, little improvement is effected in the essential range as a result of crushing.

HIDRAGARH RAKHIKOL (Chhindwara). No. G. 152. The curve is a very poor one indeed and even crushing does not result in a satisfactory curve. This is a case where economic cleaning would not be possible even with crushing.

UMARIA (Rewa State). No. G. 158. The original coal, containing 15·5% of ash, gives a 90% product containing 12·5% of ash. Crushing effects some slight improvement, but probably not sufficient to justify it.

BURHAR (Rewa State). No. G. 162. The curve for this sample gives only moderate promise and crushing does not greatly improve the position. With 16% of ash in the raw coal, we could obtain a 90% product containing 14% of ash.

BALLARPUR TOP SEAM. No. G. 170. The 90% product contains 14·5% of ash as compared with 16·9% in the raw coal. This may justify examination of other samples from the same area. Crushing confers no advantage.

BALLARPUR BOTTOM: No. G. 171. This is a lower ash coal, containing only 13·78% of ash. Presumably it would not normally be cleaned in present conditions. A 92% production of 12% ash coal would be possible. Crushing gives little advantage.

ASSAM COALFIELDS

Five samples from the province (Nos. G. 96, 98, 188, 189 & 190) were examined. No. G. 98 was from the Nazira area, Nos. G. 96 and 188 from Margherita, and the other two from Dilli and Cherra-Chhatak.

MARGHERITA, No. G. 96, containing only 10·28% of ash, would give an 89% yield of 2·5% ash clean coal, but the reduction in sulphur content—from 2·54%

to 2.3% — is negligible. This sample was interesting, however, on account of the remarkable reduction in ash content possible simply by screening. The original or over-all ash content was 10.28%, whereas that of the over-2-inch size is almost half, viz. 5.18%. Similarly the sulphur content, 3.35% in the run-of-mine coal, is only 1.78% in the over-2-inch size. This is an interesting example of improvement of quality by screening only. Another sample, No. G. 188, was obtained from the same source. This gave a substantial reduction in ash content (from 8.08% to 4.94%), but the sulphur reduction (from 4.89% to 3.98%) was not so useful. The amount of sulphur remaining in both of these samples after cleaning is still too high to be considered satisfactory. It is clear that this aspect of improving the quality of the coal of this area (i.e. by screening) is worth further examination.

Certain of these tests, particularly No. S. 96, illustrate an interesting point, namely the irregular distribution of sulphur throughout the specific gravity fractions. The sulphur content of No. 96 rises from 2.10% to 4.63% (at sp. gr. 1.45), falls to 4.30%, rises again to 4.51%, falls again and then rises again to 4.34%. This suggests a gradual increase of pyrites brought down in the "sinks", along with varying proportions of the sulphur-containing compounds — an interesting line of research in respect of the forms of sulphur occurring in coal.

NAZIRA. No. G. 98. The raw coal contains 13.7% of ash and gives an 85% yield of 6.2% ash clean coal, but the sulphur reduction is disappointing (from 3.45% to 3%).

DILLI. No. G. 189. With only 6.21% of ash in the raw coal, little advantage accrues from cleaning, from 91% to 95% yield of clean coal containing from 4% to 4.6% of ash being possible. The sulphur reduction, from 4.69% to 3.6-3.87%, is not very satisfactory.

Screening over a 2-inch screen gives a slight reduction in ash content. This sample contrasts with No. G. 96 (Margherita) in that the larger screen sizes contain *more* sulphur than the smaller sizes.

CHERRA-CHHATAK. No. G. 190. This sample of higher ash coal contrasts with the other Assam samples tested. Containing 17.27% of ash in the untreated state, it yields about 80% of 13% ash clean coal, but the sulphur content, originally 5.33%, is still high (5%). In this case screening is of little advantage either for ash reduction or for lowering sulphur content.

S I N D .

One sample of lignituous coal (No. G. 86) was received from Sind. With 20% ash in the raw coal, a 65% yield of 6.5% ash clean coal is possible. For adequate investigation of this coal a wider specific gravity range would have been necessary, and in order to determine, from the results of the test, the yields with higher ash contents it is necessary to interpolate. From a careful study of the curve it appears that a 90% yield of 13.5% ash coal would be possible. Further investigations with liquids of specific gravities up to 1.70 are required in this case.

The sample was examined in respect of sulphur reduction also. With 7.8% of sulphur in the original coal the above-mentioned 65% product would still contain 3.5% of sulphur and the 90% product would contain 6%. These results are disappointing so far as sulphur is concerned.

BALUCHISTAN

Samples Nos. G. 56 and 57. As with the Sind coal, these two samples were also tested in respect of both ash reduction and sulphur reduction.

NAKAS. No. G. 56. The original coal contains 32.4% of ash. A 60% production containing 14% of ash might be possible and this would be found to contain 7% of sulphur as compared with 7.74% in the original coal.

HARNAI. No. G. 57. This is a good-quality coal containing 12% of ash. Presumably it would not normally be cleaned for ash reduction. An 85% product of 8% ash coal might be possible. This would contain 5.7% of sulphur as compared with 7.26% in the original coal.

It is clear that in these two cases also, as with the Sind coal, further investigation in the higher specific gravity range is desirable.

MADRAS

No. G. 140. One sample of coal from the recently discovered hidden coalfield was examined. This is a very good quality lignite containing only 5.5% of ash. As will be seen from the curve, there would be no point in trying to lower the ash content.

DISCUSSION OF RESULTS

GENERAL ASPECTS OF THE PROBLEM

THE RESULTS have already been to some extent discussed and certain conclusions recorded in their appropriate places. We are here concerned with the broader aspects of the subject and the more general conclusions, if any, that we can form, especially with regard to future coal-cleaning policy in India.

It has already been emphasized that attention has been concentrated largely on the high-ash coking coals of the Jharia Coalfield. Such conclusions as can be formed are, therefore, subject to modification in the light of further experience gained as the scope of the work expands. The greatest numbers of specimens tested were 35 from No. IX seam and 31 from No. VII seam. This was in accordance with the earlier policy dictated by the assumed shortage of better class (i.e. lower ash) coking coals and the universal interest shown by the coal-mining industry in these high-ash coals in recent years. From other investigations made in earlier years it is probable that the conclusions then formed with regard to these seams will apply with little significant change to the immediately higher seams, e.g. those of seams X and XI, and perhaps even XII. There appears to be a difference in structure and quality as we proceed from seam XIII upwards. It is probably unwise to assume, at the present stage, that any tentative conclusions we may arrive at should apply to those upper seams. In any case these seams are almost universally of better quality and the nature of the problem is different.

For the purpose of seeing what general conclusions may be formed, these lower Jharia field (Barakar) coals have here been classified according to the over-all ash content of the original coal. Accordingly the samples tested have

been tabulated in increasing order of ash content. Table IV gives particulars of the seams below No. IX, excluding No. VII, table V those of seam VII and table VI those of seam IX. These tables show the ash content of the raw coal and the percentage of lower-ash ("clean coal") product obtainable in each case, several possible products being indicated, i.e. with 12%, 16%, 18% ash, etc. From discussions with those concerned at present in the production of metallurgical coke in this country the figure of 16% was selected as a provisional standard of ash content to be aimed at, the assumption being that on the whole a 16% ash Barakar coal from this field would be suitable for the production of good-quality metallurgical coke, under the conditions of present blast-furnace practice in this country. But that figure may, after consideration of all the relevant factors, have to be considered as too stringent a standard. For that reason the production figures for 18% ash "clean coal" are also given. In all probability a radical change of blast furnace policy may have to be faced, in which event India's coal-cleaning problem may assume a totally different aspect.

TABLE IV

YIELDS (%) OF CLEAN COAL FROM
LOWEST SEAMS, JHARIA COALFIELD
(EXCLUDING SEAMS VII & IX), AT
ASH CONTENTS SHOWN

Ref. No.	Over-all ash %	Ash contents (%) of clean product Yields per cent.						SEAM
		8%	10%	12%	14%	16%	18%	
59	23·96	...	22	34	45	58	73	VIII
134	25·57	23	30	37	45	55	67	do.
110	25·88	...	21	31	42	54	69	V
69	26·16	...	...	27	40	58	63·5	VIII
102	27·27	...	...	18	36	48	53	do.
163	27·66	23	30	38	47	57	67	do.
156	28·31	8	12	...	20·5	...	50	do.
168	28·90	...	7	10	15	22	29	IV
159	29·58	...	4	6	10	15	23	do.
82	29·93	...	20	27	...	38	46	VIII
161	31·16	...	7·5	11	15	20	27	III
157	32·87	...	8	11	15	19	25	do.
136	33·0	...	2	2	4	5	8	do.
167	34·22	...	6	9	13	17	23	II
120	34·58	6	7	10	15	16·3	23·7	VIII
155	38·90	...	2	3	4	6	9	VI

TABLE V

YIELDS (%) OF CLEAN COAL FROM
SEAM VII (JHARIA COALFIELD) AT
ASH CONTENTS SHOWN

Ref. No.	Over-all ash %	Ash percentages in clean coal product Yields per cent					
		8%	10%	12%	14%	16%	18%
92	18.97	24	30	50	65	80	95
103	19.31	26	40	50	67	83	94
95	20.86	28	40	50	65	75	89
97	20.86	19	30	40	60	74	88
87	21.49	18	29	41	55	70	82
132	21.64	20	35	45	60	77	88
119	21.89	25	35	50	60	75	85
106	22.45	25	30	46	60	70	83
100	22.78	18	25	36	50	65	75
127	23.06	10	15	30	45	60	75
77	23.64	...	...	27	40	52	65
185	24.33	13	22	35	48	60	72
160	24.83	8	10	15	22	30	40
166	25.09	10	13	18	25	32	45
126	26.88	10	15	25	35	45	53
104	27.16	13	20	27	37	45	55
174	28.19	8	13	17	23	31	42
85	28.53	...	20	25	35	40	50
165	29.04	7	10	14	18	26	34
114	29.46	12	15	20	25	35	40
154	29.54	6	9	13	18	25	30
135	30.15	8	10	15	20	30	40
115	30.20	4	5	10	15	20	25
83	30.22	...	12	18	25	33	40
164	30.32	17	22	26	35	45	50
61	32.06	...	10	21	25	30	35
149	32.09	3	5	8	14	18	25
60	32.46	...	...	17	20	26	31
94	34.33	...	12	17	23	29	35
153	34.54	5	7	10	12	15	20
58	36.69	...	...	11	15	20	23

TABLE VI

YIELDS (%) OF CLEAN COAL FROM
SEAM IX (JHARIA COALFIELD) AT
ASH CONTENTS SHOWN

Ref. No.	Over-all ash %	Ash contents (%) of clean product Yields per cent					
		8%	10%	12%	14%	16%	18%
80	18.76	...	...	25	55	80	96
129	22.65	16	22	32	45	58	73
121	23.06	8	12	15	28	40	61
70	23.06	...	...	7	20	37	55
70	crushed	...	22	35	48	62	77
112	23.46	15	18	27	36	49	64
147	23.53	23	32	42	53	55	78
150	23.55	...	31	41	53	64	76
71	23.85	...	...	...	...	10	25
71	crushed	...	...	20	32	45	62
73	24.00	...	...	10	20	32	50
73	crushed	...	20	28	38	51	65
72	24.60	...	...	...	10	21	37
72	crushed	...	...	...	40	52	65
125	24.75	10	14	19	29	37	51
117	24.90	18	25	32	41	52	65
123	25.00	12	17	23	32	43	56
118	25.07	14	15	25	35	45	55
76	26.36	...	...	...	10	26	46
76	crushed	...	...	30	40	50	62
62	26.53	10	14	19	25	35	50
145	26.55	10	14	19	25	35	50
79	27.38	...	...	...	...	4	12
79	crushed	...	16	22	28	36	44
122	27.42	10	13	18	23	31	40
78	27.46	...	16	22	28	37	46
113	27.57	9	12	17	23	31	45
177	27.64	10	13	17	22	31	42
186	27.64	10	13	16	22	30	40
68	27.65	...	16	22	28	36	46
133	27.80	12	16	21	28	37	49
131	28.62	10	14	19	24	30	40
63	29.32	...	4	15	28	35	50
124	29.61	8	10	13	17	24	32
101	29.63	10	14	18	24	32	41
105	30.18	13	18	23	31	40	48
180	30.52	...	11	...	21	...	...
109	30.56	8	11	13	17	22	29
99	31.53	8	11	14	19	24	32
111	31.68	2	5	8	13	23	32

Naturally enough, the better quality lower-ash raw coal gives in general a higher output of low-ash clean product, but the tables show that the output at a particular ash content does not necessarily bear a direct relation to the ash

content of the raw coal. There are exceptions to what might be expected to be the rule, especially among the samples from seam IX. Among the samples from seams below No. IX, containing originally up to 24% of ash, many yield well over 70% of 16% ash clean product. If the ash in the original coal is appreciably above 24%, then the yield of clean (16% ash) coal falls off rapidly. Even taking the high-ash figure (i.e. 18%) as our standard we should still have to be content with only about 50% of clean product, which output presumably cannot at present be considered as economically satisfactory. *There is a case, then, for cleaning these seams if the raw coal contains not more than 24% of ash.*

When we come to examine seam No. IX we find that some samples with less than 24% of ash give disappointing results. Of the 35 tested, only four gave over 60% of 16% ash clean product. Of these, only six gave over 70% of 18% ash clean product. One of these contained only 18.76% in the raw state.

It was originally intended to investigate the reasons for these irregularities by means of X-ray shadowgraphs, as was done in the earlier work referred to.⁴ Unfortunately, however, that has not been possible on account of the difficulty of obtaining supplies of X-ray film in war-time, a difficulty that has continued up to the time of writing this report. From comparison of these results with those obtained in the earlier work there can be little doubt that this irregularity is due to the greater or less degree of segregation of the stony coal among the better coal in the seam. Where the high-ash material occurs in more or less segregated, or at least concentrated, zones, i.e. in a form approaching shale in nature, its separation is more complete than when more uniformly distributed throughout the coal. X-ray photographs illustrating this point are given as Plates V to VIII, reproduced by kind permission of the Council of the Mining, Geological & Metallurgical Institute of India. These are illustrations from the same paper above referred to.⁴ Plate V illustrates the uniform distribution of high-ash material in a typical low-grade coal of this area which would not be amenable to cleaning (in some respects somewhat similar to what is known as bone coal). Crushing to a small size might liberate a substantial proportion of this high-ash material, but it is doubtful whether cleaning would be a practicable proposition. Plate VI illustrates the distribution of high-ash material (dark areas) that could be fairly readily separated by a cleaning operation. Some of the pieces would have to be further broken up to liberate the high-ash portions, but fine crushing would not be necessary.

Plates VII and VIII illustrate both points. The sample at the top of Plate VII, for example, is highly contaminated with small high-ash particles that would not be liberated without very fine crushing. Piece No. 9 in Plate VIII would, upon being moderately crushed, liberate some pieces of low-ash coal. The narrow band near the centre was a bright band of vitrain. Other pieces in this Plate were hard high-ash, bony coal not amenable to cleaning.

From a study of the results obtained with the remaining samples from the field we see that some would respond to cleaning on a large scale. The number of samples of each seam tested, however, is too small to justify enlarging on the point at this stage. A similar attitude must be adopted in respect of the very few samples received from the other fields. The results are retained in this report for purpose of record. Special reference to the high-sulphur coals of Assam is justified. The question of lowering the ash content of these coals is quite subordinate to that of lowering the sulphur content. The original ash content of these coals is almost always low, as compared with that of the Barakar and Raniganj coals — usually of the order of 5%. Some of them possess good coking properties

and were it not for the sulphur present would be invaluable for metallurgical purposes, either by themselves or blended with other higher-ash coals. Unfortunately too high a proportion of the sulphur present is organic in nature and persists in all the specific gravity fractions. Some, it is true, is pyritic, and so can be removed by washing. But too much still remains to pass the requirements of the metallurgical coke specification.

SCREEN SIZE & ASH CONTENT OF INDIAN COALS

One of the most significant points that emerge from these investigations is one to which attention has been drawn from time to time in recent years, namely, the essential difference between the Gondwana coals and the bituminous coals of Britain. In general the high-ash portions of British coals are less intimately mixed with the rest of the coal substance than is the case with the Gondwana coals, occurring, as they often do (in the British coals), as separate lenticular masses, or layers or bands of varying thicknesses, of what the miner calls shale and containing upwards of 65% of ash-forming minerals. As the coal breaks up in the ordinary course of mining and subsequent handling, many of these pieces of "shale" separate out and accumulate among the smaller screen sizes. These latter are, in consequence, of much poorer quality (as measured by ash content) than is the run-of-mine coal, and much more so, in consequence, than coal of the intermediate screen sizes.

On the other hand, it is the exception, rather than the rule, to find isolated lenticular masses or even smaller pieces of very high-ash "shale" intercalated in the Gondwana coals of India. The counterpart, in India, of the "shale" of British coals is the relatively high-ash stony coal. As there is, in most cases, a gradation from low-ash to high-ash coal and *vice versa* throughout the seams, there cannot be such a hard and fast differentiation between the "clean coal" and the "dirt". As a further consequence, the dirt or shale separable from these Indian coals is not of such a high ash content as is its counterpart in the British bituminous coals. That means, of course, that in the dirt in the Indian coals there is a much greater amount of carbonaceous substance — potential fuel — than in the dirt of the British coals. Much of the "dirt" of the Indian coals would, therefore, be too valuable to throw away.

In referring to the difference between the British bituminous coals and the Jharia Coalfield coals attention has been drawn to the differences between the ash contents of the run-of-mine coals and the smaller screen sizes. Many instances will be seen on referring to the tables. It is due to the accumulation in the smaller screen sizes of low-ash vitrain and vitrain-containing pieces of coal. Most of the samples from the lower seams were crushed prior to the tests. Even their results illustrate the point, but reference may better be made to the results of tests Nos. G. 53, 84, 107, 137, 138 and 139, and many others on uncrushed samples, which show that the ash content of the over-2-inch screen size is in many instances 5% to 6% higher than that of the smaller screen sizes. In some cases there are even greater differences. Some of the seams in the Durham Coalfield break down in the same manner and their smaller screen sizes are of better quality than is the run-of-mine coal. But they are somewhat exceptional among British coals. In some of the tables further screen analyses are given of the 30-mesh material, from which it will be seen that in many cases the 60-mesh material is of higher ash content. In another screen test done on a sample from this field it was found

that the 90-mesh material had a still higher ash content. [See also *op. cit.*,
p. 207, where the following figures are quoted :

10-mesh to 30-mesh	...	ash	14.04%
30-mesh to 60-mesh	...	"	13.45%
60-mesh to 90-mesh	...	"	14.50%
90-mesh	...	"	17.35%]

(See also Nos. G. 128, 145 — seam XII, and G. 187, pp. 20, 22.)

It is clear that in such cases de-dusting would remove high-ash dust and leave
smalls of still better quality. This is a matter for consideration when deciding
cleaning procedure. It is suggested that in using these dense-medium cleaning
plants for the Jharia coals it may be advantageous to de-dust (as well as screen
off smalls below $\frac{1}{8}$ inch) prior to cleaning.

The point is of great practical importance, particularly in the selection of
coal for industrial purposes, where individual preference for, or prejudice in favour
of, coal of particular sizes often leads to anomalous power plant performance. It
very materially affects the set-up of organizations for buying and selling coal
according to specifications, because of the serious errors that inadvertently occur
in the course of sampling. And of course it vitally affects coal-cleaning policy.

DISTRIBUTION OF ASH AMONG SPECIFIC GRAVITY FRACTIONS

As a further consequence of this difference between British bituminous
coals and those of India we see that it is much more difficult, in general, to effect
a separation of clean coal and dirt because of the smaller range of specific gravities
over which the whole of the coal is, so to speak, distributed. The lowest specific
gravity we are generally concerned with in these tests is 1.35. In only a few
instances has liquid of sp. gr. 1.30 or 1.25 been required. And at the other end of
the scale it has only in a few instances been found necessary to extend the range
beyond 1.58 (or approx. 1.60). This is a matter of great technical importance
in the selection of coal-cleaning plant. If it be agreed (as suggested below) that
a heavy-medium process is the most efficient type to use, we have still to decide
which heavy mineral (sand, barytes, magnetite, etc.) to use. This is referred to
below. The technical point involved here is that if we are confined to a short
specific gravity range in the treatment of these coals, then the heavy mineral used
as a suspension in water to produce the medium of the desired specific gravity
should be one of relatively low specific gravity and need not be ground to a small
size. That would appear to favour the use of sand, as against heavier minerals
such as magnetite or barytes. On the other hand, it is stated to be easier to
maintain the specific gravity of the medium at a fixed value when using a fine
mineral in suspension. An interesting recent development in the design of these
heavy-medium separation processes is the use of the fines from the coal itself,
the finest material produced from the stony portions and that normally contributed
to slurry problems, acting in suspension as a heavy medium of the required
specific gravity. In other words the coal produces its own heavy medium.

SPECIFIC GRAVITY VERSUS ASH CONTENT

It is frequently stated that the specific gravity of impure coals is more or
less directly related to the ash content. That statement is true only within

certain limits. It is more or less true in respect of one and the same seam, but there are discrepancies. Table VII gives the average ash contents of the fractions obtained in 92 tests on Jharia coals. The specific gravities are those assumed for the fractions obtained in the tests; the figure 1.475, for example, being allotted to the fraction sinking in liquid of sp. gr. 1.45 and floating on liquid of sp. gr. 1.50.

TABLE VII

RELATIONS BETWEEN AVERAGE SPECIFIC GRAVITY OF FLOAT-&SINK "FRACTIONS" OF JHARIA COALS & ASH CONTENTS

Sp. gr.	1.375	1.425	1.475	1.525	1.575	over 1.58	
SEAM			ASH	CONTENTS (%)			NO.
V	...	13.97	18.73	22.78	26.50	38.15	2
VII	...	15.14	19.50	23.99	27.77	29.24	...
VIII	...	16.44	20.26	24.78	28.71	41.38	26
IX	...	16.44	20.28	25.01	29.13	40.15	6
XI	12.88	17.30	21.66	27.00	31.04	44.68	37
XII	14.38	19.59	24.44	29.39	34.13	50.83	6
XIII	...	17.45	23.30	30.39	31.39	53.84	1
XIV	...	17.65	21.85	27.05	30.22	44.68	4
XIV-A	10.85	14.53	17.94	21.52	25.77	...	1
XV	11.13	16.38	21.78	25.95	30.14	40.61	2
XVI	...	19.37	24.66	...	...	...	4
XVII	...	17.67	21.84	26.24	28.05	44.41	1

It will be seen that although there is a progressive rise in the ash percentage of each specific gravity fraction, as we proceed from the lower seams upwards that progression is interrupted at seam XII, after which there are fluctuations. Until a very much larger number of samples from the upper seams is tested, it would be unwise to generalize on this aspect. And it should be emphasized that the ash contents shown in the table are not necessarily those of raw (uncrushed) coals of those specific gravities. One must, therefore, guard against drawing conclusions from these figures regarding the specific gravity and the ash content of coal in the seam.

Another interesting point that came to light in the course of the work may have a considerable influence on coal-cleaning policy. Some samples were divided into two portions, one being tested without prior crushing and the other after crushing. In all cases the ash content of each specific gravity fraction obtained from the crushed sample was lower than that obtained from the uncrushed fraction. This point is referred to also by Griffiths in his paper¹¹ on the cleaning of South Wales small coal. A high yield of low-ash coal at any particular specific gravity cut is, of course, normally to be expected from a crushed coal, but this difference between the ash contents of the same specific gravity fractions obtained from one and the same sample is not such an obvious result and it is not easy to suggest a satisfactory explanation. The fact can, however, be noted as of importance in coal-cleaning problems. Crushing prior to cleaning not merely liberates the low-ash vitrain-containing portions of the coal but also provides, within the same intermediate specific gravity ranges, products of lower ash contents.

COAL-CLEANING POLICY — THE SELECTION OF PLANT

IT WOULD BE UNWISE to attempt to generalize on this aspect of the problem without having before us the results of a vast number of tests, and especially of tests on seams higher up in the Jharia Coalfield and seams from other fields. It is, however, clear in my opinion that in general a more efficient separation of low-ash coal and high-ash stony coal can be effected by a method depending upon differences in specific gravity than upon other physical properties such as are involved in the operation of jigs and other cleaning processes. The operation of coal-cleaning plants using upward currents of water and other expedients involving buoyancy in addition to differences in specific gravity, depends upon the shapes and sizes of the coal pieces being cleaned. Stratification, for example, of high-ash and low-ash material is much more easily effected with British bituminous coals than would be the case with these Gondwana Indian coals. It is significant that this same aspect has been brought forcibly before the British coal-mining and preparation industry in recent years because of the gradual depletion of the better-quality coals and the increasing necessity to mine and use lower-grade coals that were formerly largely neglected. The problem is being increasingly solved in Britain by the adoption of specific gravity processes and in my opinion a simple specific gravity floatation system using a dense liquid medium will be the most efficient one to apply to these Indian coals. There are, of course, several dense-medium cleaning processes now in use, such as the Barvoys, Chance, Tromp, Simon-Carves and Ridley-Scholes, of proved efficiency, using suspensions (in water) of minerals (barytes, sand, magnetite, etc.), the selection of which for our purpose is a matter for very careful study. From 10% to 15% of all the coal cleaned in Britain at present is cleaned by one or other of these processes, and their number is tending to rise. A combination of a dense-medium process and one of the Rheolaveur type (to deal with smalls), or the more recently introduced Diessen Cyclone Washer¹² may also be worth considering.

If it be accepted, as a result of this work and the additional work now in progress under the Director of the Fuel Research Institute, that one of these dense-medium cleaning processes is the best for the purpose, the matter of selection of the particular type best suited has still to be settled. I have suggested (p. 32) that for technical reasons relating specific gravity of the heavy mineral used to the range of specific gravities in question, sand may prove to be a better mineral to use than one of the heavier ones. There are other considerations, such as removal of the last traces of the heavy mineral from the clean product (whether by washing, or using magnetic separation also), recovery of the heavy mineral for further use and so on. These are perhaps matters not primarily our concern in this report, or at least at this stage.

Apart from the question of the selection of plant, we have also in due course to consider the policy to be adopted in using it. The question arises: "Are we

to aim simply at producing the maximum quantity of low-ash coal and reject the dirt, or is the problem a more complicated one?" There can be no doubt that such a simple policy cannot, in the interests of India's coal reserves, be adopted. In almost all instances, as has been shown, too much valuable combustible material, i.e. fuel, remains in the high-ash coal that has to be discarded. Reference to the tables shows that even in order to attain the modest standard of 18% ash in the clean coal for the metallurgical purposes we have to discard material with as little as 35% to 40% of ash, which implies discarding coaly material containing as much as 56% to 62% of possibly useful fuel. We cannot afford that waste. Coal of such a quality is, of course, being used nowadays for raising steam, and future developments will probably allow of coals of still higher ash content to be used with efficiency. Their use by gasification has also to be considered. Steam raising and the manufacture of metallurgical coke are not our only concerns.

The other alternative is to aim at three products, one of specially good quality (low-ash), a second of intermediate quality — the "middlings" — and a third of definitely high-ash content and of such poor quality as possibly to justify complete rejection. Certain of the heavy-medium cleaning processes are designed to give these products. Alternatively the cleaning can be done in two stages, the specially low-ash product being first floated off and the material rejected at this stage being treated in a second "bath" using liquid of higher specific gravity, to float off the middlings.

Yet another aspect of the problem may in due course have to be considered, namely the advisability or otherwise of installing central or co-operative cleaning stations to which would be sent the output from a number of collieries each too small to justify the expense of a separate washery. The advantage of keeping these washing or cleaning plants worked as nearly as possible to maximum capacity cannot be over-emphasized. In too many cases in other countries has it been found that the plants are comparatively idle. A centrally organized cleaning lay-out would undoubtedly contribute greatly to the solution of the problem that is usually accorded highest priority in industry, namely cost of installing and operating, which has to be added to the selling price of the clean coal. Working nearly to capacity is probably the most important economic factor. Against the proposal it will, of course, be urged (a) that transport difficulties would outweigh the advantages and (b) that it would be difficult, if not impracticable, to clean coals from different seams and different collieries at one and the same time. The former argument is undoubtedly valid to some extent and requires careful examination, but railways are not the only form of transport available. The latter argument is probably less valid, especially if we have to deal with coals mainly from a comparatively small range of seams all from the same field. Admittedly the specific gravity at which clean coal containing say 16% of ash would be separated is not the same for all coals, and intelligent selection of the coals to be included in each batch to be treated would be necessary. That is simply a matter for proper organization. A laboratory would, of course, be attached to the washery and all incoming consignments of coal would be rapidly tested in the float-and-sink machine and treated along with other consignments of similar washability characteristics. Furthermore, rejections from all the consignments would, under such a scheme, be subsequently re-treated, probably after further crushing.

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FLOAT & SINK TABLES

JHARIA CENTRAL I NORTH

SPECIAL SEAM
(PERHAPS NO. II SEAM)

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1-1/2 ...	1.47	12.90	2.73	19.00	4.26	22.35	13.57	28.55	7.96	33.15	27.59	44.95	57.58	35.74
1-1 ...	1.14	11.25	1.23	17.80	1.69	22.55	3.43	26.75	2.58	31.60	9.24	44.60	19.31	34.09
1/2-30-mesh	2.20	8.30	1.30	16.00	1.29	20.65	2.17	25.45	1.56	29.15	6.78	44.75	15.30	30.71
x 30-mesh ...	1.39	7.05	0.77	14.40	0.50	18.35	0.97	24.35	0.59	27.20	3.59	45.80	7.81	29.93
Totals & Averages	6.20	9.65	6.03	17.52	7.74	22.13	20.14	27.71	12.69	32.07	47.20	44.92	100	34.22
Cum. ash %	9.65		13.53		16.86		22.31		24.65		34.22			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30-60 ...	0.72	85.15	3.75	29.40
x 60 ...	0.87	37.45	4.06	30.40

Over-all ash : 34.22%.

Not a promising result.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.40	6.20	9.65	46.60	26.65	1.58	47.20	44.92	Over 2 ...	61.48	32.10
1.45	12.23	13.53	40.57	28.00	"	"	"	2-1 ...	18.50	35.00
1.50	19.97	16.86	32.83	29.40	"	"	"	1-1/2 ...	8.10	38.05
1.55	40.11	22.31	12.69	32.07	"	"	"	1-1 ...	5.20	40.15
1.58	52.80	24.65	nil	nil	"	"	"	1/2-30-mesh	2.69	35.95
								x 30-mesh ...	1.59	36.45
								Total ...	100	

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JHARIA CENTRAL I NORTH

III SEAM?
(PERHAPS NO. II SEAM)

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	1.52	12.10	1.88	17.00	2.67	21.70	9.11	26.00	8.74	31.30	36.79	40.05	60.71	34.62
1/2 - 1/8 ...	1.10	10.30	0.78	16.10	1.42	19.00	3.04	25.20	2.17	29.80	10.83	40.70	19.40	32.72
1/2 - 30-mesh	2.13	7.20	0.86	14.40	0.70	18.00	1.81	22.80	0.88	27.80	5.83	41.50	12.30	28.42
x 30-mesh ...	1.82	6.40	0.56	13.30	0.07	17.00	0.70	21.00	0.49	27.00	3.26	42.95	7.59	26.46
Totals & Averages	6.63	8.65	4.08	16.10	5.55	20.25	14.75	25.73	12.28	30.61	56.71	40.49	100	32.87
Cum. ash %	8.65		11.52		14.50		19.84		22.00		32.87			

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RESULT OF SCREENING THE 30-MESH MATERIAL				
Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	0.74	25.20	3.64	26.65
x 60 ...	0.80	30.10	3.95	27.90

Weight of coal treated : 176 lb.

Over-all ash : 32.87%.

Not a promising result.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.40	6.63	8.65	36.06	25.47	1.58	56.71	40.40	Over 2 ...	55.13	32.30
1.45	10.71	11.52	32.58	26.64	"	"	"	2 - 1 ...	25.57	33.30
1.50	10.26	14.50	27.03	27.95	"	"	"	1 - 1/2 ...	8.24	34.00
1.55	31.01	19.84	12.28	30.61	"	"	"	1/2 - 1/8 ...	5.11	34.40
1.58	43.29	22.90	nil	nil	"	"	"	1/2 - 30-mesh ...	2.09	26.95
								x 30-mesh ...	1.54	28.40
								Total ...	100	

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JHARIA CENTRAL I, NORTH

SPECIAL SEAM

(PERHAPS NO. III SEAM)

Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	1.14	12.25	3.25	18.85	6.53	21.50	14.00	26.20	8.05	30.20	28.58	41.10	62.45	32.30
1/4 - 1/8 ...	0.78	10.65	1.25	16.15	2.10	20.50	4.00	25.00	2.24	29.00	8.17	41.20	18.54	31.15
1/4 - 03-mesh ...	1.65	6.90	1.00	15.20	1.30	19.25	1.94	24.00	1.21	29.50	4.94	42.55	12.04	28.67
x 30-mesh ...	1.94	6.10	0.07	14.80	0.64	18.55	0.63	24.70	0.58	28.00	2.51	43.75	6.07	25.22
Totals & Averages	5.51	8.25	6.17	16.22	10.57	20.85	21.47	25.90	12.08	30.10	44.20	41.42	100	31.16
Cum. ash %	8.25		12.46		16.44		21.09		23.02		31.16			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 00 ...	0.33	20.60	3.28	25.05
x 00 ...	0.41	23.00	3.60	24.50

Weight of coal treated: 183 lb.

Over-all ash: 31.16%.

Not a promising result.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.40	5.51	8.25	50.20	24.64	1.58	44.20	41.42	Over 2 ...	68.01	30.35
1.45	11.68	12.46	44.12	25.82	"	"	"	2 - 1 ...	18.50	32.85
1.50	22.25	16.44	33.55	27.38	"	"	"	1 - 1/2 ...	6.15	32.15
1.55	43.72	21.09	12.08	30.10	"	"	"	1/4 - 1/8 ...	3.24	30.90
1.58	55.80	23.02	nil	nil	"	"	"	1/4 - 1/8 ...	1.32	30.20
								1/4 - 30-mesh	1.05	25.30
								x 30-mesh ...	0.74	21.80
								Total ...	100	

G. 159

JHARIA CENTRAL I, NORTH

IV SEAM (Bottom 8'-0")

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	1/2 - 1/4 ...	0.35	9.90	0.69	14.20	1.38	17.70	9.46	22.00	7.73	26.00	38.07	34.55	57.68	30.55
1/4 - 1/8 ...	0.21	8.70	0.41	12.90	1.31	17.30	4.37	21.60	2.51	25.60	11.83	35.50	20.64	29.48
1/8 - 30-mesh	0.75	6.90	0.80	12.00	0.88	16.36	2.59	19.60	1.65	25.30	6.82	35.65	13.49	27.10
x 30-mesh ...	0.82	7.00	0.70	11.90	0.74	16.80	1.47	19.60	0.82	23.80	3.64	40.30	8.19	27.05
Totals & Averages	2.13	7.61	2.60	12.98	4.31	17.15	17.89	21.36	12.71	25.69	60.36	35.21	100	29.58
Cum. ash %	7.61		10.56		13.70		18.79		21.00		29.58			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	0.72	25.80	3.77	26.85
x 60 ...	1.22	27.50	4.42	27.60

Weight of coal treated : 175 lb.

Over-all ash : 29.58%.

Not a promising result.

CLEAN COAL			MIDDINGS		REJECTIONS			SCREEN ANALYSIS OF THE RAW COAL		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	Size (inches)	Wt. %	Ash %
1.40	2.13	7.61	37.51	21.76	1.58	60.36	35.21	Over 2 ...	30.39	29.20
1.45	4.73	10.56	34.91	22.41	"	"	"	2 - 1 ...	31.39	31.90
1.50	9.04	13.70	30.60	23.16	"	"	"	1 - 1/2 ...	13.41	29.40
1.55	26.03	18.79	12.71	25.69	"	"	"	1/2 - 1/4 ...	7.71	27.90
1.58	39.64	21.00	nil	nil	"	"	"	1/4 - 1/8 ...	3.51	27.50
								1/8 - 30-mesh	2.65	25.65
								x 30-mesh ...	1.94	26.80
								Total ...	100	

G. 168

**JHARIA CENTRAL I, NORTH
IV SEAM**

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	0.01	10.00	2.00	14.80	2.95	18.65	7.36	22.65	7.35	26.55	36.58	34.05	57.15	29.78
3/4 - 1/2 ...	0.64	9.35	1.14	14.50	1.17	17.75	3.00	22.55	2.14	26.10	10.63	35.00	18.72	28.78
1/2 - 30-mesh	1.53	7.50	1.20	14.00	1.21	17.65	2.20	21.65	1.86	25.55	7.68	37.15	15.77	27.40
x 30-mesh ...	1.34	7.75	0.78	13.10	1.02	18.75	1.17	21.55	0.77	25.60	3.28	40.50	8.36	26.02
Totals & Averages	4.42	8.54	5.12	14.29	6.35	18.31	13.82	22.37	12.12	26.26	58.17	35.00	100	28.90
Cum. ash %	8.54		11.03		14.30		18.05		20.43		28.00			

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RESULT OF SCREENING THE 30-MESH MATERIAL				
Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	0.83	25.45	4.26	27.05
x 60 ...	1.25	26.85	4.10	27.35

Weight of coal treated : 146 lb.

Over-all ash : 28.90%.

Not a promising result.

EXAMPLES OF CLEANING POSSIBILITIES									SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %	
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %				
1.40	4.42	8.54	37.41	21.83	1.58	58.17	35.00	Over 2 ...	51.08	29.60	
1.45	9.54	11.63	32.29	23.02	"	"	"	2 - 1 ...	26.74	28.15	
1.50	15.89	14.30	25.04	24.19	"	"	"	1 - 1/2 ...	8.01	27.95	
1.55	20.71	18.05	12.12	26.26	"	"	"	3/4 - 1/2 ...	5.48	28.90	
1.58	41.83	20.43	nil	nil	"	"	"	1/2 - 1/4 ...	2.97	27.00	
								3/4 - 30-mesh	2.74	25.60	
								x 30-mesh ...	2.08	26.30	
								Total ...	100		

G. 110

JHARIA CENTRAL II, NORTH V SEAM (Top)

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr.		Float at 1.50 sp. gr.		Float at 1.55 sp. gr.		Float at 1.58 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	6.27	9.58	8.80	14.52	11.10	19.18	8.73	23.08	4.47	26.46	26.30	40.20	65.67	27.07
3/4 - 1/2 ...	2.73	8.70	2.22	14.48	2.52	18.80	2.36	23.14	1.18	26.64	5.83	40.26	16.84	25.12
1/2 - 30-mesh ...	3.12	7.68	1.50	13.74	1.05	18.32	1.20	22.04	0.40	25.88	3.50	40.44	11.46	22.35
x 30-mesh ...	1.03	5.70	0.07	13.06	0.81	17.58	0.51	22.52	0.24	27.18	1.57	46.50	6.03	21.52
Totals & Averages	14.05	8.43	13.49	14.38	16.08	18.95	12.80	23.05	6.38	26.47	37.20	40.41	100	25.83
Cum. ash %	8.33		11.34		14.15		16.17		17.21		25.88			

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RESULT OF SCREENING THE 30-MESH MATERIAL				
Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
80 - 60 ...	0.30	21.08	3.05	21.06
x 60 ...	0.40	23.68	2.08	22.08

Weight of coal treated : 182 lb.

Over-all ash : 25.83%.

Gives some promise of useful reduction
in ash content.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.40	14.05	8.43	48.75	19.75	1.58	37.20	40.50	Over 2 ...	53.42	26.58
1.45	27.54	11.34	35.26	21.80	"	"	"	2 - 1 ...	29.74	26.20
1.50	43.02	14.15	19.18	24.10	"	"	"	1 - 1/2 ...	10.60	24.02
1.55	56.42	16.17	6.38	26.47	"	"	"	3/4 - 1/2 ...	3.30	25.42
1.58	62.80	17.21	nil	nil	"	"	"	1/2 - 1/4 ...	1.10	23.72
								1/2 - 30-mesh	0.06	19.34
								x 30-mesh ...	0.88	21.70
								Total ...	100	

G. 155

**JHARIA CENTRAL I, NORTH
VI SEAM (Bottom 8'-0")**

Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	nil	nil	0.40	15.50	0.80	20.30	4.00	23.00	4.80	27.00	56.67	43.10	66.07	40.30
1/4 - 1/8 ...	0.17	9.75	0.33	15.00	0.33	18.00	1.39	23.20	1.39	26.45	13.06	41.40	16.07	37.84
1/4 - 30-mesh	0.49	6.80	0.18	15.30	0.33	18.00	0.71	22.20	1.27	26.50	7.51	42.55	10.40	36.05
x 30-mesh ...	0.06	6.80	0.30	16.10	0.30	18.50	0.60	22.05	0.53	27.70	3.48	45.50	6.17	32.04
Totals & Averages	1.02	6.00	1.21	15.47	1.76	19.30	6.70	22.37	7.00	20.55	80.72	42.88	100	38.00
Cum. ash %	6.00		10.82		13.05		19.24		22.27		38.00			

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**RESULT OF SCREENING THE 30-MESH
MATERIAL**

Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	0.40	25.10	3.085	31.70
x 60 ...	0.68	28.00	3.085	33.05

Weight of coal treated : 171 lb.

Over-all ash : 38.00%.

No. a promising result.

EXAMPLES OF CLEANING POSSIBILITIES

CLEAN COAL			MIDDINGS		REJECTIONS			SCREEN ANALYSIS OF THE RAW COAL			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	Size (inches)	Wt. %	Ash %	
1.40	1.62	6.00	17.66	23.67	1.58	80.72	42.88	Over 2	...	58.90	38.00
1.45	2.83	10.02	16.45	24.28	"	"	"	2 - 1	...	23.33	39.10
1.50	4.50	13.95	14.60	24.87	"	"	"	1 - 1/2	...	8.75	37.90
1.55	11.20	19.24	7.90	20.55	"	"	"	1/2 - 1/4	...	4.66	37.30
1.58	10.28	22.27	nil	nil	"	"	"	1/4 - 1/8	...	1.84	30.50
								1/4 - 30-mesh	...	1.35	32.85
								x 30-mesh	...	1.17	27.30
								Total	...	100	

G. 85

**JHARIA FIELD WEST II
VII SEAM (4th Section)**

Size (inches)	Float at 1.45 sp. gr.		Float at 1.50 sp. gr.		Float at 1.55 sp. gr.		Float at 1.58 sp. gr.		Sink at 1.58 sp. gr.				RAW COAL CRUSHED TO 1/4"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	7.25	12.60	4.59	20.10	4.18	23.82	3.78	26.02	31.24	38.40	...	...	51.04	31.05
1/2 - 30-mesh	8.50	9.00	2.75	18.85	2.50	22.40	2.12	26.55	15.38	38.10	...	...	31.25	26.70
x 30-mesh ...	6.01	8.35	1.77	18.00	1.33	24.15	0.97	27.85	6.73	42.40	...	...	17.71	24.50
Totals & Averages	22.66	10.20	9.11	19.31	8.01	23.43	6.87	26.94	53.35	38.82	100	23.53
Cum. ash %	10.20		12.88		15.00		16.76		23.53					

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RESULT OF SCREENING THE 30-MESH MATERIAL				
Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	0.31	13.10	8.855	24.00
x 60 ...	0.20	14.40	8.855	23.50

Weight of coal treated: 105 lb.

Over-all ash: 23.53%.

As a result of preliminary test it was decided to crush to 1/4" size, prior to making full test. Presumably not amenable to economic cleaning even after crushing.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.45	22.66	10.29	23.00	23.20	1.58	53.35	38.82	Over 2 ...	74.11	30.20
1.50	31.77	12.88	14.88	25.05	"	"	"	2 - 1 ...	15.84	26.90
1.55	39.78	15.00	6.87	26.94	"	"	"	1 - 1/2 ...	4.55	24.85
1.58	46.65	16.76	nil	nil	"	"	"	1/2 - 1/4 ...	2.30	25.85
								1/4 - 1/8 ...	1.54	20.05
								1/8 - 30-mesh	1.15	13.90
								x 30-mesh ...	0.51	13.70
								Total ...	100	

G. 87

**JHARIA, WEST II
VII SEAM (Top Sec.)**

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr.		Float at 1.50 sp. gr.		Float at 1.55 sp. gr.		Float at 1.58 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	4.80	13.00	12.14	15.45	13.43	20.15	3.19	25.45	7.33	28.05	17.46	33.90	58.44	24.08
2—1 ...	4.83	9.35	4.91	15.45	3.18	19.50	1.51	24.10	1.23	28.00	3.91	35.45	19.57	20.05
1—1/2 ...	2.61	9.95	1.83	16.00	1.09	19.78	0.42	24.20	0.44	28.15	1.24	39.62	7.63	19.46
1/2—1/2 ...	2.13	9.10	0.79	16.00	0.57	20.30	0.33	24.20	0.19	27.75	0.75	40.00	4.76	18.24
1/2—1/4 ...	2.33	4.75	0.52	15.40	0.32	19.33	0.19	23.25	0.12	27.35	0.56	40.12	4.04	13.72
1/2—30-mesh	2.50	3.80	0.29	15.20	0.17	19.40	0.13	23.60	0.08	27.25	0.35	41.50	3.52	10.51
× 30-mesh ...	1.47	3.85	0.10	15.65	0.16	18.38	0.08	23.00	0.05	27.35	0.18	47.22	2.04	10.74
Totals & Averages	20.76	8.68	20.58	15.51	13.92	20.00	5.85	24.80	9.44	28.72	24.45	34.98	100	21.49
Cum. ash %	8.68		12.08		14.57		15.47		17.12		21.49			

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Size (mesh)	Amount %	Ash %
30—60 ...	1.12	10.50
× 60 ...	0.92	11.80

Weight of coal treated: 191 lb.

Over-all ash: 21.49%.

Recovery of clean coal at 1.58 is fairly high, but the ash reduction is low. See also CFRG. 87(a)

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	20.76	8.68	54.79	20.33	1.58	24.45	34.98
1.45	41.34	12.08	34.21	23.22	"	"	"
1.50	60.26	14.57	15.29	27.22	"	"	"
1.55	66.11	15.47	9.44	28.72	"	"	"
1.58	75.55	17.12	nil	nil	"	"	"

G. 87(a)

JHARIA, WEST II VII SEAM (Top Section)

SPECIAL TREATMENT OF NO. G. 87
CRUSHED TO $\frac{1}{4}$ " PRIOR TO TEST.

Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL CRUSHED TO $\frac{1}{4}$ "	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
$\frac{1}{4}$ -- $\frac{1}{2}$...	7.75	7.50	4.69	14.95	4.77	19.70	3.56	23.45	2.60	20.85	18.50	40.05	41.87	20.66
$\frac{1}{4}$ -- 30-mesh	13.11	6.10	4.34	14.80	4.05	18.85	2.80	23.38	1.10	20.60	11.42	30.35	30.82	20.77
x 30-mesh...	0.91	5.35	2.13	14.52	2.34	17.60	1.49	26.10	0.64	27.00	4.80	42.30	21.31	17.82
Totals & Averages	30.77	6.21	11.16	14.81	11.16	18.95	7.85	23.30	4.34	20.81	34.72	40.13	100	22.00
Cum. ash %	6.21		8.50		10.60		12.32		13.29		22.60			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30 -- 60 ...	10.44	17.80
x 60 ...	10.87	17.30

Over-all ash : 21.49%.

Crushing to $\frac{1}{4}$ " prior to test decreases the recovery of clean coal from 75.55% to 95.28%, but the ash reduction is fairly high. See also CFRG. 87.
There is some hope of economic cleaning.

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	30.77	6.21	34.51	10.60	1.58	34.72	40.13
1.45	41.03	8.50	23.35	21.80	"	"	"
1.50	53.09	10.69	12.19	24.58	"	"	"
1.55	60.04	12.32	4.34	26.81	"	"	"
1.58	65.28	13.29	nil	nil	"	"	"

G. 97

JHARIA FIELD WEST I, NORTH

VII SEAM
(4th Section)

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO 1/4"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	8.275	0.86	8.275	13.34	15.81	18.08	9.76	22.50	3.71	25.18	15.93	34.10	61.76	21.60
1/4 - 1/8 ...	3.04	8.36	3.18	14.80	3.14	18.68	2.40	23.04	0.95	25.42	4.94	34.74	17.65	20.77
1/4 - 30-mesh	4.63	6.14	2.21	13.80	1.86	17.22	1.44	21.78	0.59	24.78	3.39	37.98	14.12	18.81
x 30-mesh ...	2.33	4.74	1.03	13.30	0.81	17.22	0.52	20.06	0.26	25.04	1.52	41.60	6.47	18.44
Totals & Averages	18.875	8.02	14.695	13.73	21.62	18.06	14.12	22.46	5.51	25.17	25.18	35.18	100	20.86
Cum. ash %	8.02		10.52		13.47		15.31		16.03		20.86			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	0.35	15.40	3.43	18.50
x 60 ...	0.25	16.68	3.04	18.00

Weight of coal treated : 107 lb.

Over-all ash : 20.86%.

Recovery of clean coal at sp. gr. 1.58 is fairly high, but the ash reduction is low even after crushing.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.40	18.875	8.02	55.045	18.74	1.58	25.18	35.18	Over 2 ...	61.73	22.82
1.45	33.57	10.52	41.25	20.50	"	"	"	2 - 1 ...	22.77	19.82
1.50	55.10	13.47	19.63	23.22	"	"	"	1 - 1/2 ...	8.60	20.90
1.55	69.31	15.31	5.51	25.17	"	"	"	1/2 - 1/4 ...	3.59	19.02
1.58	74.82	16.03	nil	nil	"	"	"	1/4 - 1/8 ...	1.50	17.86
								1/4 - 30-mesh	1.12	14.84
								x 30-mesh ...	0.60	16.32
								Total ...	100	

G. 103

JHARIA WEST I, NORTH

VII SEAM (4th Section)

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1-1/2 ...	0.49	0.78	14.87	14.50	12.37	10.46	0.15	23.54	4.43	27.08	12.15	33.22	62.46	20.64
1-1/4 ...	5.05	7.76	3.98	14.60	2.91	10.64	2.06	23.62	1.00	26.56	2.77	34.80	17.77	18.35
1/2 - 30-mesh	6.85	5.80	2.25	14.62	1.63	10.26	1.18	23.60	0.38	27.44	1.82	40.05	13.11	16.00
x 30-mesh ...	3.43	4.92	0.92	13.26	0.68	13.26	0.43	23.04	0.10	27.02	1.10	47.62	6.66	16.02
Totals & Averages	23.82	7.67	22.02	14.52	17.59	10.42	12.82	23.56	5.91	27.01	17.84	35.06	100	19.31
Cum. ash %	7.67		10.96		13.31		15.03		15.89		19.31			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	0.43	14.22	3.53	16.76
x 60 ...	0.81	18.52	3.13	17.68

Weight of coal treated : 180 lb.

Over-all ash : 19.31%.

There is some hope of economic cleaning.

EXAMPLES OF CLEANING POSSIBILITIES									SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %	
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %				
1.40	23.82	7.67	58.34	19.25	1.58	17.84	35.06	Over 2 ...	66.53	21.06	
1.45	46.84	10.96	36.32	22.12	"	"	"	2-1 ..	19.68	19.04	
1.50	63.43	13.31	13.73	24.65	"	"	"	1-1/2 ...	6.90	17.38	
1.55	76.25	15.03	5.91	27.01	"	"	"	1/2 - 1/4 ...	3.09	15.38	
1.58	82.16	15.89	nil	nil	"	"	"	1/4 - 1/8 ...	1.53	14.56	
								1/8 - 30-mesh	1.63	12.14	
								x 30-mesh ...	0.74	15.78	
								Total ...	100		

G. 106

JHARIA WEST I, NORTH

VII SEAM
(4th Section)

Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	9.66	9.88	8.64	15.16	11.32	19.70	8.34	24.34	8.93	27.92	17.71	38.48	59.60	24.22
3/4 - 1/2 ...	6.47	7.58	3.03	16.20	3.77	19.74	2.33	24.40	0.86	27.94	5.02	38.84	20.48	21.52
1/2 - 80-mesh	5.56	5.54	1.71	15.16	1.89	19.56	1.17	24.04	0.51	27.32	2.62	40.00	18.46	17.87
x 30-mesh ...	2.91	5.62	0.68	13.86	0.87	18.84	0.48	24.14	0.19	27.74	1.33	45.60	6.46	18.52
Totals & Averages	23.60	7.79	14.06	15.32	17.85	10.65	12.32	24.31	5.49	27.86	26.88	39.05	100	22.45
Cum. ash %	7.79		10.60		13.51		15.47		16.40		22.45			

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RESULT OF SCREENING THE 30-MESH MATERIAL				
Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	0.55	14.68	3.29	17.72
x 60 ...	0.52	18.00	3.17	10.14

Weight of coal treated; 163 lb.

Over-all ash: 22.45%.

There is hope of economic cleaning.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.40	23.60	7.79	49.72	20.48	1.58	26.68	39.05	Over 2 ...	60.83	20.60
1.45	37.66	10.80	35.66	22.52	"	"	"	2 - 1 ...	21.17	23.40
1.50	55.51	13.51	17.81	25.40	"	"	"	1 - 1/2 ...	8.48	23.80
1.55	67.83	15.47	5.49	27.86	"	"	"	3/4 - 1/2 ...	4.08	21.60
1.58	73.32	16.40	nil	nil	"	"	"	1/2 - 1/4 ...	2.33	17.80
								3/4 - 30-mesh	2.14	13.80
								x 30-mesh ...	1.07	16.50
								Total ...	100	

G. 114

JHARIA CENTRAL, NORTH

VII SEAM (Mid. Section)

Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	0.88	12.22	3.89	17.14	8.54	21.70	10.57	25.54	6.09	28.60	30.21	39.88	60.78	31.73
1/4 - 1/8 ...	1.00	8.20	1.54	16.18	2.13	20.98	2.94	25.34	1.48	28.78	7.80	41.00	17.07	30.41
1/8 - 30-mesh	4.44	5.00	0.95	15.48	1.54	21.22	0.08	25.30	0.84	28.76	4.80	44.14	18.55	24.38
x 30-mesh ...	4.30	5.42	0.77	15.18	0.82	19.50	0.30	26.88	0.34	28.88	1.08	48.56	8.60	19.46
Totals & Averages ...	10.71	6.08	7.15	16.50	13.03	21.38	14.88	25.51	9.35	28.65	44.88	40.91	100	29.46
Cum. ash %	6.08		10.25		14.95		18.38		20.12		20.46			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	1.42	14.80	4.04	20.76
x 60 ...	1.01	15.80	4.56	19.42

Weight of coal treated : 157 lb.

Over-all ash : 29.46%.

Very slight hope of economic cleaning.
Slightly better than G. 115.

EXAMPLES OF CLEANING POSSIBILITIES									SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %	
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %				
1.40	10.71	6.08	44.41	23.51	1.58	44.88	40.91	Over 2 ...	47.30	30.10	
1.45	17.86	10.25	37.26	24.86	"	"	"	2 - 1 ...	24.56	30.72	
1.50	30.30	14.05	24.23	20.72	"	"	"	1 - 1/2 ...	11.65	29.58	
1.55	45.77	18.38	0.35	28.65	"	"	"	1/2 - 1/4 ...	6.03	28.84	
1.58	55.12	20.12	nil	nil	"	"	"	1/4 - 1/8 ...	3.10	25.72	
								1/8 - 30-mesh	4.15	17.90	
								x 30-mesh ...	3.03	15.68	
								Total ...	100		

G. 132

**JHARIA CENTRAL II
NORTH**

**VII SEAM
(Mld. Section)**

Size (inches)	Float at 1·40 sp. gr.		Float at 1·45 sp. gr.		Float at 1·50 sp. gr.		Float at 1·55 sp. gr.		Float at 1·58 sp. gr.		Float at 1·70 sp. gr.		Sink at 1·70 sp. gr.		RAW COAL CRUSHED TO 1"			
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %		
1/2 - 1/4 ...	9·71	10·00	7·80	15·10	9·23	18·75	10·02	22·12	5·13	26·30	5·60	31·30	8·07	40·15			55·56	23·55
1/4 - 1/8 ...	5·67	8·35	2·96	14·75	4·26	18·30	2·92	22·50	1·70	26·15	2·49	31·50	2·14	48·70			22·14	20·62
1/8 - 30-mesh ...	5·46	6·90	1·30	14·35	1·85	17·90	1·66	22·10	0·99	26·25	1·25	31·75	1·45	45·70			14·55	18·18
x 30-mesh ...	3·40	6·30	1·18	14·30	0·84	10·25	0·64	22·72	0·31	26·70	0·49	33·40	0·80	40·60			7·66	17·35
Totals & Averages	24·24	8·40	13·02	14·86	16·18	18·56	15·24	22·22	8·13	26·28	9·83	31·51	12·46	48·70			100	21·64
Cum. ash %	8·40		10·75		13·08		15·08		16·25		17·96		21·64					

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	0·93	14·75	3·45	18·75
x 60 ...	1·05	15·10	4·21	18·05

Weight of coal treated: 154 lb.

Over-all ash: 21·64%.

A promising result. Making one cut at 1·58 we get 77·71% of clean (16·25% ash) coal and 22·29% of rejection with 40·44% ash. Owing to the satisfactory recovery at 1·58 an additional test at sp. gr. 1·70 has been done in this case.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	sp. gr. of cut	Amount %	Ash %			
1·40	24·24	8·40	63·30	21·63	1·70	12·46	43·70	Over 2 ...	46·01	22·20
1·45	38·16	10·75	40·38	23·54	"	"	"	2 - 1 ...	23·97	21·10
1·50	54·34	13·08	33·30	25·86	"	"	"	1 - 1/2 ...	11·66	22·20
1·55	69·58	15·08	17·96	20·14	"	"	"	1/2 - 1/4 ...	8·10	10·75
1·58	77·71	16·25	9·83	31·51	"	"	"	1/4 - 1/8 ...	4·54	17·40
1·70	87·54	17·96	nil	nil	"	"	"	1/8 - 30-mesh	3·74	14·40
								x 30-mesh	1·93	14·65
								Total ...	100	

G. 185

JHARIA FIELD N.E. I, NORTH

VII SEAM

PERHAPS LOWER

Size (inches)	Float at 1·40 sp. gr.		Float at 1·45 sp. gr.		Float at 1·50 sp. gr.		Float at 1·55 sp. gr.		Float at 1·58 sp. gr.		Float at 1·62 sp. gr.		Sink at 1·62 sp. gr.		Raw Coal CRUSHED to 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	5·07	10·10	9·02	14·62	7·56	18·35	7·44	22·87	4·14	26·78	3·00	29·23	17·09	38·50	55·12	25·18
1/4 - 1/8 ...	2·80	9·42	3·29	13·87	3·31	17·97	2·80	23·02	1·58	26·92	1·21	29·30	5·49	40·15	20·47	24·14
1/4 - 80-mesh	3·98	7·26	2·67	14·46	1·58	18·75	1·74	22·50	1·07	26·55	0·70	29·46	4·43	44·05	16·17	23·53
x 30-mesh ...	3·00	3·84	1·30	13·80	0·69	18·30	0·82	23·32	0·45	25·40	0·12	30·68	1·86	46·90	8·24	20·58
Totals & Averages	14·65	8·35	17·17	14·39	13·14	18·38	12·80	22·88	7·24	26·74	5·93	29·30	28·87	40·21	100	24·33
Cum. ash %	8·35		11·59		13·54		15·60		16·84		17·88		24·33			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
80 - 60 ...	0·48	19·79	4·53	21·32
x 60 ...	0·46	22·84	3·71	20·74

Weight of coal treated : 151 lb.
Over-all ash : 24·33%.

There is some hope of economic cleaning, over 71% of 18% ash clean coal being obtainable, but the recovery at lower ash percentage value is disappointing.

CLEAN COAL			MIDDINGS		REJECTIONS			SCREEN ANALYSIS OF THE RAW COAL		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	Size (inches)	Wt. %	Ash %
1·40	14·85	8·35	56·28	20·39	1·62	28·87	40·21	Over 2 ...	40·61	26·44
1·45	32·02	11·59	39·11	23·03	"	"	"	2 - 1 ...	30·70	24·54
1·50	45·16	13·54	25·97	25·42	"	"	"	1 - 1/2 ...	15·85	22·59
1·55	57·96	16·60	13·17	27·89	"	"	"	1/2 - 1/4 ...	7·43	20·77
1·58	65·20	16·84	5·93	29·30	"	"	"	1/4 - 1/8 ...	2·41	20·84
1·62	71·13	17·88	nil	nil	"	"	"	1/4 - 80-mesh	1·88	21·04
								x 30-mesh	1·12	21·00
								Total ...	100	24·83

G. 59

JHARIA WEST I, NORTH

VIII SEAM

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		RAW COAL CRUSHED TO 1/2"			
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %		
1/2 - 1 ...	10.10	14.28	0.53	20.33	10.96	24.95	3.72	29.15	13.34	39.00			47.65	26.03
1/2 - 30-mesh	11.64	11.25	6.32	20.17	5.26	24.85	1.97	28.50	7.70	44.80			32.89	24.03
x 30-mesh ...	12.42	11.03	8.24	20.68	1.43	25.80	1.04	31.36	2.33	44.45			19.46	18.81
Totals & Averages	33.16	12.09	19.09	20.33	17.65	24.93	6.73	29.30	23.37	41.45			100	23.96
Cum. ash %	12.09		15.11		17.60		18.63		23.96					

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Size (mesh)	RAW COAL	
	Amount %	Ash %
30 - 60 ...	0.64	14.80
x 60 ...	0.59	17.95

Over-all ash: 23.96%.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.45	33.16	12.09	43.47	23.61	1.57	23.37	41.45	Over 2 ...	62.00	23.00
1.50	52.25	15.11	24.38	26.15	"	"	"	2 - 1 ...	23.38	23.66
1.55	69.90	17.60	6.73	29.30	"	"	"	1 - 1/2 ...	4.67	23.70
1.57	76.63	18.63	nil	nil	"	"	"	1/2 - 1 ...	4.57	23.25
								1/2 - 1/2 ...	2.33	25.90
								1/2 - 30-mesh	1.87	20.60
								x 30-mesh ...	1.23	15.88
								Total ...	100	

G. 134

JHARIA CENTRAL I, NORTH
VIII SEAM

Size (Inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Float at 1'70 sp. gr. Sink at 1'58 sp. gr.		Sink at 1'70 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	4.00	11.70	5.03	16.30	7.43	21.40	0.81	25.67	5.80	20.70	11.45	30.60	8.11	52.15	52.23	20.37
3/4 - 1/2 ...	3.85	8.75	1.85	16.05	2.02	20.70	3.32	24.20	2.29	27.05	3.95	35.20	2.84	50.55	21.02	26.27
1/2 - 30-mesh	7.49	4.95	1.37	15.55	1.53	19.50	2.98	24.85	2.25	28.00	0.84	33.60	1.37	45.45	17.83	17.96
x - 30-mesh	4.72	4.60	0.67	15.80	0.66	17.95	0.67	24.12	0.45	20.10	0.47	33.60	1.28	45.20	8.92	10.84
Totals & Averages	20.00	7.08	8.92	16.23	12.54	20.82	16.78	25.17	10.70	28.75	16.71	36.17	13.60	50.40	100	
Cum. ash %	7.08		9.85		13.12		16.55		18.44		21.87		25.57		25.57	

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	1.07	12.10	4.04	10.65
x - 60 ...	1.68	16.05	4.28	18.00

Weight of coal treated 108 lb.

Over-all ash: 28.93%.

As this showed some promise, the test was extended to sp. gr. 1.70. Making one cut at 1.58 we get 60.60% of clean (18.44% ash) coal and 30.31% rejection with 41.06% ash.

CLEAN COAL			MIDDINGS		REJECTIONS			SCREEN ANALYSIS OF THE RAW COAL		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	Size (inches)	Wt. %	Ash %
1.40	20.66	7.08	65.74	26.52	1.70	13.60	50.40	Over 2 ...	31.33	26.35
1.45	20.53	9.85	56.82	28.13	"	"	"	2 - 1 ...	21.07	26.17
1.50	42.12	13.12	44.28	30.17	"	"	"	1 - 1/2 ...	16.92	27.10
1.55	58.90	16.55	27.50	33.27	"	"	"	3/4 - 1/2 ...	12.47	27.15
1.58	69.60	18.44	10.71	36.17	"	"	"	1/2 - 1/4 ...	6.53	23.15
1.70	86.40	21.87	nil	nil	"	"	"	1/4 - 30-mesh	7.13	13.50
								x - 30-mesh ...	3.65	13.85
								Total ...	100	

G. 144

JHARIA CENTRAL I, NORTH

VIII SEAM

SIZE (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	2.07	10.45	0.58	10.58	0.61	20.00	13.57	25.05	0.22	23.08	23.70	30.03	64.75	23.80
1/4 - 1/8 ...	1.85	8.29	1.00	10.30	2.54	20.80	3.05	25.05	1.84	23.77	0.03	30.48	17.27	27.07
1/2 - 30-mesh	3.94	4.58	1.16	15.46	1.05	20.85	1.38	24.40	0.78	23.47	3.20	40.05	11.51	21.02
x - 30-mesh	2.85	4.10	0.46	15.00	0.62	17.08	0.48	23.30	0.40	20.35	1.66	43.27	6.47	18.97
Totals & Averages	10.71	0.27	10.16	10.33	13.82	20.70	18.48	24.06	12.24	23.83	34.50	30.41	100	
Cum. ash %	0.27		11.14		14.08		18.45		20.30		20.07		20.07	

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SIZE (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	1.06	15.10	2.07	18.50
x - 60 ...	1.07	10.70	2.43	10.08

Weight of coal treated 141 lb.

Over-all ash : 23.82%.

Not a promising result.

CLEAN COAL								MIDDINGS			REJECTIONS			SCREEN ANALYSIS OF THE RAW COAL		
Sp. gr. of cut		Amount %	Ash %	Amount %		Ash %	Sp. gr. of cut		Amount %	Ash %	Size (inches)		Wt. %	Ash %		
1.40	10.71	0.27	54.70	23.10	1.58	34.50	30.41	Over 2	...	35.54	27.12					
1.45	20.87	11.14	44.54	24.72	"	"	"	2 - 1	...	28.07	20.80					
1.50	34.00	14.08	30.72	20.50	"	"	"	1 - 1/2	...	10.70	27.30					
1.55	53.17	18.45	12.24	23.83	"	"	"	1/2 - 1/4	...	9.74	20.80					
1.58	65.41	20.30	nil	nil	"	"	"	1/4 - 1/8	...	4.27	24.00					
								1/2 - 30-mesh	...	3.55	10.00					
								x - 30-mesh	...	2.13	17.00					
								Total	...	100						

G. 163

JHARIA CENTRAL I, NORTH

VIII SEAM

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Float at 1.70 sp. gr. Sink at 1.58 sp. gr.		Sink at 1.70 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	3.07	10.15	6.05	15.10	5.71	20.10	8.24	24.75	4.32	28.05	12.04	34.05	0.30	55.05	40.63	31.22
1/4 - 1/8 ...	3.59	7.90	2.69	15.20	2.26	19.50	3.59	24.80	1.01	29.90	4.28	34.25	3.51	54.90	21.53	27.70
1/2 - 30-mesh	7.27	5.05	1.61	15.10	1.53	19.50	2.07	23.15	1.11	28.05	2.94	34.70	2.00	52.50	10.13	21.63
x 30-mesh ...	4.37	5.70	0.68	14.00	0.64	20.60	0.97	23.80	0.47	25.40	1.14	34.80	1.44	54.10	9.71	21.24
Totals & Averages	19.20	6.79	11.03	15.06	10.14	19.91	14.87	24.53	7.51	28.30	20.40	34.76	16.85	54.54	100	
Cum. ash %	6.79		9.80		12.34		15.02		17.20		1.51		27.66		27.66	

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30-60 ...	2.15	17.80	4.8555	20.20
x 60 ...	2.42	22.80	4.855	22.35

Weight of coal treated: 164 lb.

Over-all ash: 27.00%.

There is some slight hope of economic cleaning. Float-and-sink analysis has been extended up to sp. gr. 1.70.

EXAMPLES OF CLEANING POSSIBILITIES									SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %	
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %				
1.40	19.20	6.79	63.05	25.93	1.70	16.85	54.54	Over 2 ...	28.00	28.70	
1.45	30.23	9.80	52.92	28.19	"	"	"	2-1 ...	22.26	29.05	
1.50	40.37	12.34	42.78	30.16	"	"	"	1-1/2 ...	16.86	28.15	
1.55	55.24	15.62	27.91	33.15	"	"	"	1/2 - 1/4 ...	12.50	26.35	
1.58	62.75	17.20	20.40	34.76	"	"	"	1/4 - 1/8 ...	7.62	24.20	
1.70	83.15	21.51	nil	nil	"	"	"	1/2 - 30-mesh	8.23	18.20	
								x 30-mesh ...	4.57	20.50	
								Total ...	100		

G. 70

JHARIA FIELD, WEST II

IX SEAM

SIZE (inches)	Float at 1'45 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL.	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	Over 2 ...	5.42	15.35	17.36	19.75	6.11	24.60	4.72	27.35	9.72	29.75	43.33
2 — 1 ...	9.20	14.70	10.55	20.20	6.11	24.85	1.67	28.20	4.30	35.30	25.83	23.65
1 — ½ ...	2.08	14.80	5.28	20.00	3.33	24.65	1.25	28.00	1.05	34.45	13.89	23.09
½ — ¼ ...	1.23	13.75	2.07	18.85	2.12	22.80	0.95	26.70	1.55	37.60	7.02	23.73
¼ — ⅛ ...	1.01	11.70	0.82	19.00	0.70	24.10	0.34	28.00	0.88	46.80	3.75	25.46
⅛ — 30-mesh ...	1.87	7.75	0.45	19.00	0.43	23.80	0.24	27.90	0.48	49.50	3.47	18.48
x 30-mesh ...	1.18	7.70	0.18	21.50	0.13	24.20	0.09	30.00	0.23	59.20	1.81	17.91
Totals & Averages	15.99	13.34	36.71	19.87	18.93	24.45	9.26	27.59	19.11	33.75	100	23.06
Cum. ash % ...	13.34		17.89		19.62		20.53		23.06			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
SIZE (mesh)	Amount %	Ash %
30 — 00 ...	0.905	15.80
x 00 ...	0.903	20.10

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.45	15.99	13.34	64.90	22.31	1.58	19.11	33.75
1.50	52.70	17.89	28.19	25.48	"	"	"
1.55	71.63	19.62	9.26	27.59	"	"	"
1.58	80.80	20.53	nil	nil	"	"	"

Over-all ash: 23.06%.

A promisingly high recovery of clean coal but the ash reduction is not great, so another test was made after crushing to ½" size; for results see report G. 70(a).

G. 70(a)

JHARIA FIELD, WEST II

IX SEAM

SPECIAL TREATMENT CRUSHED TO $\frac{1}{4}$ " PRIOR TO TEST

Size (inches)	Float at 1.45 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO $\frac{1}{4}$ "	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
$\frac{1}{2}$ - $\frac{1}{4}$...	10.19	13.48	11.46	10.50	10.63	24.10	5.17	28.50	11.76	41.10	40.21	25.35
$\frac{1}{2}$ - 30-mesh ...	11.80	10.56	6.30	10.30	6.30	23.66	3.20	28.52	5.01	43.32	33.51	22.16
x 30-mesh ...	8.04	9.33	3.02	18.00	2.12	23.70	1.25	28.10	2.85	40.70	17.28	19.14
Totals & Averages	30.03	11.22	20.78	10.22	10.05	23.01	9.62	28.45	20.52	41.70	100	23.21
Cum. ash % ...		11.22		14.40		17.06		18.44		23.21		

09

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30 - 60 ...	8.20	18.84
x 60 ...	8.00	10.20

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.45	30.03	11.22	40.45	22.82	1.58	20.52	41.70
1.50	50.81	14.49	28.67	25.44	"	"	"
1.55	69.86	17.06	9.02	28.45	"	"	"
1.58	79.48	18.44	nil	nil	"	"	"

Over-all ash: 23.21%.

More promising result by crushing than as received.

G. 80

JHARIA FIELD WEST I, NORTH

IX SEAM

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	9.72	11.72	28.85	14.72	10.74	20.30	2.02	24.50	2.02	20.10	1.04	38.55	50.49	18.15
2-1 ...	3.18	13.82	0.02	16.80	6.02	20.60	1.80	25.80	1.38	28.55	1.18	42.40	23.08	20.10
1-1/2 ...	1.50	12.65	3.13	15.65	2.82	20.05	0.64	25.20	0.62	28.50	0.60	30.65	9.40	10.04
1-1/4 ...	0.82	11.30	1.01	15.50	1.00	19.87	0.30	24.30	0.23	27.25	0.33	36.10	3.78	10.17
1-1/8 ...	0.66	8.30	0.29	15.50	0.26	19.35	0.10	23.70	0.09	28.70	0.25	42.25	1.74	18.76
1/2-30-mesh ...	0.05	0.50	0.15	15.55	0.16	19.25	0.10	24.15	0.05	28.95	0.19	50.50	1.60	15.06
x 30-mesh ...	0.40	4.05	0.06	15.35	0.07	18.35	0.04	22.00	0.03	28.20	0.13	65.25	0.82	17.96
Totals & Averages	11.41	11.38	42.41	15.25	30.67	20.3	6.08	24.90	5.02	28.77	4.41	40.61	100	18.76
Cum, ash % ...	11.38		14.43		16.58		17.14		17.75		18.76			

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Size (mesh)	Amount %	Ash %
30-60 ...	0.38	15.05
x 60 ...	0.44	18.65

CLEAN COAL		MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	11.41	11.38	84.18	18.02	1.58	4.41	40.61
1.45	53.82	14.49	41.77	22.04	"	"	"
1.50	84.40	16.58	11.10	26.66	"	"	"
1.55	90.57	17.14	5.02	28.77	"	"	"
1.58	95.59	17.75	nil	nil	"	"	"

Weight of coal treated : 195 lb.

Over-all ash : 18.70%.

A promisingly high recovery of clean coal but the ash reduction is not great, so another test was made after crushing to 1/2" size. For results see G. 80(a).

G. 91

JHARIA EXTREME, WEST II

HAZARIBAGH I

IX SEAM

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1-1 ...	4.35	10.80	6.50	14.64	7.80	10.80	7.05	22.70	4.00	28.80	10.70	39.05	50.00	27.16
1-1/2 ...	3.70	7.84	3.15	15.00	2.19	10.50	3.03	22.60	1.30	26.80	7.48	30.80	21.03	24.80
1/2-30-mesh	7.50	5.20	2.21	14.74	1.20	10.15	1.64	23.10	0.07	26.30	5.08	40.25	18.69	19.42
x 30-mesh...	5.19	3.00	1.20	12.60	0.51	17.85	0.41	22.40	0.46	24.85	2.42	43.50	10.28	10.68
Totals & Averages	20.20	6.52	13.15	14.54	11.70	10.00	12.13	22.72	7.42	27.85	34.68	30.60	100	24.14
Cum. ash %	0.52		0.62		12.16		14.37		15.90		24.14			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30-60 ...	0.30	10.10	5.76	15.00
x 60 ...	0.31	12.05	4.52	16.75

Weight of coal treated : 103 lb.

Over-all ash : 24.14%.

Recovery of clean coal is low, but the ash reduction is fairly high.

EXAMPLES OF CLEANING POSSIBILITIES									SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %	
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %				
1.40	20.92	6.52	44.40	20.33	1.58	34.68	30.66	Over 2 ...	77.61	26.54	
1.45	34.07	0.62	31.25	22.77	"	"	"	2-1 ...	15.90	22.20	
1.50	45.77	12.16	10.55	24.07	"	"	"	1-1/2 ...	3.21	21.85	
1.55	57.90	14.37	7.42	27.85	"	"	"	1/2-1 ...	1.04	20.00	
1.58	65.32	15.90	nil	nil	"	"	"	1/2-1/2 ...	0.72	15.35	
								1/2-30-mesh	0.92	9.90	
								x 30-mesh ...	0.70	12.30	
								Total ...	100		

G. 129

JHARIA CENTRAL II, NORTH

IX SEAM

Size (inches)	Float at 1.40 sp. gr.		Float at 1.46 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	5.58	11.75	9.77	17.00	13.57	20.50	15.22	25.90	6.76	30.75	9.44	38.00	60.34	24.37
3/4 - 1/2 ...	3.28	9.70	3.04	16.55	3.83	20.95	3.38	25.65	2.12	30.05	2.02	37.67	18.57	22.77
1/2 - 30-mesh ...	5.53	5.70	1.42	15.80	1.90	19.70	1.75	24.50	1.03	29.55	2.20	30.60	18.92	18.22
x 30-mesh ...	3.67	5.30	0.60	16.10	0.72	19.60	0.64	24.00	0.36	28.85	1.09	43.10	7.17	16.45
Totals & Averages	18.06	8.21	14.92	16.75	20.11	20.47	20.99	25.71	10.27	30.42	15.05	38.52	100	22.65
Cum. ash %	8.21		12.08		15.26		18.22		19.71		22.65			

63

Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 -- 60 ...	0.68	11.85	3.80	15.80
x 60 ...	0.48	12.30	3.37	15.00

Weight of coal treated : 182 lb.

Over-all ash: 22.65%.

There is some slight hope of economic cleaning.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.40	18.06	8.21	66.92	22.84	1.58	15.65	38.52	Over 2" ...	64.72	22.10
1.45	32.98	12.08	51.97	24.60	"	"	"	2 - 1" ...	20.02	23.10
1.50	53.09	15.20	31.26	27.28	"	"	"	1 - 1/2" ...	7.68	22.90
1.55	74.08	18.22	10.27	30.42	"	"	"	3/4 - 1/2" ...	3.12	23.90
1.58	84.35	19.17	nil	nil	"	"	"	1/2 - 1/4" ...	1.42	19.45
								1/2 - 30-mesh ...	1.88	13.85
								x 30-mesh ...	1.10	12.40
								Total ...	100	

G. 131

JHARIA CENTRAL II, NORTH

IX SEAM (Bottom)

Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1-1/2 ...	1'24	12'75	2'62	17'50	0'33	22'80	14'42	25'15	7'50	30'45	17'20	42'27	52'30	30'46
1-1/4 ...	1'55	8'00	1'52	16'00	3'45	21'00	5'31	26'00	3'27	30'55	7'77	41'00	22'87	29'23
1/2 - 30-mesh	3'40	5'65	1'28	14'05	1'79	20'00	2'76	25'45	2'11	30'15	4'80	42'77	10'23	25'50
x 30-mesh ...	3'32	5'55	0'71	16'05	0'85	21'10	0'94	25'95	0'65	30'35	2'04	45'17	8'51	21'02
Totals & Averages	9'60	7'06	6'13	10'65	15'41	21'98	23'43	25'41	13'53	30'42	31'00	42'22	100	28'62
Cum. ash %	7'06		10'80		16'33		20'23		22'25		28'62			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	0'63	15'00	4'00	21'25
x 60 ...	0'42	17'35	4'51	21'67

Weight of coal treated : 100 lb.

Over-all ash : 28'62%.

Not a promising result, except perhaps for production of clean coal plus middlings.

EXAMPLES OF CLEANING POSSIBILITIES									SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %	
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %				
1'40	9'60	7'06	58'50	24'75	1'58	31'00	42'22	Over 2 ...	40'75	28'40	
1'45	15'73	10'80	52'37	25'70	"	"	"	2 - 1 ...	32'05	28'00	
1'50	31'14	16'33	36'06	27'25	"	"	"	1 - 1/2 ...	10'77	29'20	
1'55	54'57	20'23	13'53	30'42	"	"	"	1/2 - 1/4 ...	5'52	26'75	
1'58	68'10	22'25	nil	nil	"	"	"	1/4 - 1/8 ...	1'06	27'20	
								1/8 - 30-mesh	1'90	17'35	
								x 30-mesh ...	1'05	17'05	
								Total ...	100		

G. 147

JHARIA N.E. I, NORTH

IX SEAM
(Special)

SIZE (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.68 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	3.85	10.25	0.21	15.90	10.07	20.55	12.30	25.80	4.82	20.00	12.51	43.55	53.45	28.37
1/4 - 1/8 ...	3.71	7.05	3.64	14.60	3.28	19.80	3.59	24.65	1.06	20.40	4.68	41.30	20.80	23.20
1/4 - 30-mesh	6.71	5.00	2.20	14.85	1.75	10.10	1.95	23.90	1.03	28.25	3.31	41.85	16.05	18.52
x 30-mesh ...	4.41	5.20	1.03	12.50	0.73	18.85	0.70	24.50	0.35	27.10	1.52	44.85	8.74	16.62
Totals & Averages	18.68	6.06	16.80	15.24	16.34	20.17	18.63	25.33	8.10	28.02	22.02	42.86	100	23.53
Cum. ash %	6.06		10.62		13.00		16.80		18.00		23.53			

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RESULT OF SCREENING THE 30-MESH MATERIAL				
SIZE (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	1.34	12.70	4.02	16.50
x 60 ...	1.57	16.85	7.72	17.00

Weight of coal treated : 172 lb.

Over-all ash : 23.53%.

There is some hope of economic cleaning.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			SIZE (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.40	18.68	6.66	59.30	21.66	1.58	22.02	42.86	Over 2 ...	43.00	22.70
1.45	34.76	10.62	43.22	24.04	"	"	"	2 - 1 ...	22.07	25.45
1.50	51.19	13.69	20.70	26.42	"	"	"	1 - 1/2 ...	13.05	24.40
1.55	69.82	16.80	8.16	28.02	"	"	"	1/2 - 1/4 ...	7.12	25.00
1.58	77.08	18.06	nil	nil	"	"	"	1/4 - 1/8 ...	4.80	21.05
								1/4 - 30-mesh	4.65	14.85
								x 30-mesh ...	2.91	14.85
								Total ...	100	

G. 150

JHARIA NORTH EAST I, NORTH

SPECIAL SEAM

IMMEDIATELY BELOW X SEAM

Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL CRUSHED to 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	4.87	10.00	9.70	16.31	9.09	16.88	14.03	24.73	7.12	20.73	14.24	42.47	30.65	26.30
1/4 - 1/8 ...	4.26	7.02	2.04	10.00	2.55	10.08	3.18	24.04	1.06	20.17	3.82	41.04	18.41	22.58
1/8 - 30-mesh	6.82	4.40	1.00	15.44	1.21	19.17	1.84	24.05	1.00	28.82	2.53	41.83	15.09	17.11
x 30-mesh ...	3.20	3.75	0.73	13.12	0.47	10.87	0.06	21.90	0.38	20.05	1.32	43.50	0.85	16.33
Totals & Averages	10.24	6.44	14.76	15.99	13.32	10.73	20.31	24.77	10.46	20.44	21.91	42.31	100	23.55
Cum. ash %	6.44		10.50		13.16		16.56		18.28		23.55			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
80 - 60 ...	1.00	13.05	3.42	15.45
x 60 ...	1.10	16.40	3.43	17.03

Weight of coal treated : 137 lb.

Over-all ash : 23.55%.

There is some hope of economic cleaning.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.40	10.24	6.44	58.85	22.15	1.58	21.01	42.31	Over 2 ...	42.34	23.35
1.45	34.00	10.59	44.00	24.22	"	"	"	2 - 1 ...	21.54	25.85
1.50	47.32	13.16	30.77	20.16	"	"	"	1 - 1/2 ...	13.87	24.00
1.55	67.03	16.56	10.46	20.44	"	"	"	1/2 - 1/4 ...	9.40	25.05
1.58	78.00	18.28	nil	nil	"	"	"	1/4 - 1/8 ...	5.33	20.00
								1/8 - 30-mesh	5.15	13.20
								x 30-mesh ...	2.28	14.35
								Total ...	100	

G. 176

JHARIA FIELD N.E. I, NORTH

SPECIAL SEAM

IMMEDIATELY BELOW X SEAM

(IX-X)

Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Float at 1'62 sp. gr. Sink at 1'58 sp. gr.		Sink at 1'62 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1-1/2 ...	4.48	10.68	8.63	15.90	11.86	10.68	10.03	24.46	7.04	28.87	3.04	32.34	2.67	38.35	56.75	22.60
1-1/4 ...	3.48	7.83	3.43	15.97	3.00	20.51	3.07	24.07	1.86	29.00	0.88	31.00	1.51	38.25	18.82	20.97
1/2 - 30-mesh	7.28	4.32	2.11	15.63	1.77	19.89	2.33	24.23	1.20	28.95	0.65	31.95	1.32	39.00	16.66	15.84
x 30-mesh ...	3.70	3.95	0.65	14.08	0.81	17.09	0.03	22.38	0.41	26.03	0.20	30.31	0.98	42.54	7.77	15.08
Totals & Averages	19.03	6.39	14.82	15.76	18.13	19.75	20.26	24.40	10.51	28.79	4.77	32.12	6.48	39.22	100	20.64
Cum. ash %	6.39		10.46		13.72		17.30		18.06		19.35		20.64			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	1.38	11.51	4.12	14.37
x 60 ...	0.92	14.63	3.65	15.83

Weight of coal treated : 165 lb.

Over-all ash : 20.46%.

There is some hope of economic cleaning. 63% of 10% ash coal and 85% of 18% ash coal being recoverable.

EXAMPLES OF CLEANING POSSIBILITIES									SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %	
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %				
1.40	19.03	6.39	74.49	22.66	1.62	6.48	39.22	Over 2	...	41.26	21.70
1.45	33.85	10.46	59.67	24.38	"	"	"	2 - 1	...	24.58	20.65
1.50	51.98	13.72	41.54	26.42	"	"	"	1 - 1/2	...	13.35	21.25
1.55	78.24	17.30	15.28	29.83	"	"	"	1/2 - 1/4	...	8.80	21.70
1.58	88.75	18.66	4.77	2.12	"	"	"	1/4 - 1/8	...	4.55	18.17
1.62	93.52	19.35	nil	nil	"	"	"	1/8 - 30-mesh	...	5.16	12.05
								x 30-mesh	...	2.30	12.35
								Total	...	100	

G. 178

JHARIA FIELD N.E. I NORTH

SPECIAL SEAM

IMMEDIATELY BELOW X SEAM

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Float at 1.62 sp. gr. Sink at 1.58 sp. gr.		Sink at 1.62 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/2 - 1/4 ...	4.82	10.64	12.21	10.41	12.57	21.44	8.88	25.31	3.28	20.67	1.71	32.03	12.05	53.30	55.52	27.76
1/4 - 1/8 ...	4.50	6.83	4.08	10.12	3.00	21.63	2.64	25.39	1.17	20.24	0.68	32.11	3.18	52.23	19.31	23.40
1/4 - 30-mesh	8.75	4.54	2.20	16.26	1.52	21.36	1.15	25.08	0.90	28.07	0.42	32.22	1.36	51.04	16.90	16.30
x 30-mesh ...	4.70	4.29	0.09	15.49	0.50	20.01	0.50	24.36	0.25	27.92	0.16	31.42	1.17	51.16	8.27	15.68
Totals & Averages	22.77	6.28	19.48	16.20	17.65	21.43	13.17	25.27	5.60	20.30	2.97	32.04	18.36	52.80	100	23.99
Cum. ash %	6.23		10.87		13.08		16.01		16.07		17.52		23.90			

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Size (mesh)	RAW COAL		CRUSHED COAL	
	Amount %	Ash %	Amount %	Ash %
30 - 60 ...	2.61	13.05	4.71	15.05
x 60 ...	1.07	16.00	3.56	17.00

Weight of coal treated : 420 lb.

Over-all ash : 23.90%.

A promising result, giving 80% of 17.2% ash coal, and 85% of 18% ash coal. Even the 73% recovery of 16% ash clean coal may be attractive.

EXAMPLES OF CLEANING POSSIBILITIES								SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %			
1.40	22.77	0.23	58.87	21.88	1.62	18.36	52.80	Over 2 ...	22.21	24.83
1.45	42.25	10.87	30.30	24.64	"	"	"	2 - 1 ...	26.72	25.78
1.50	59.00	13.98	21.74	27.26	"	"	"	1 - 1/2 ...	17.70	26.18
1.55	73.07	16.01	8.57	30.31	"	"	"	1/2 - 1/4 ...	12.06	25.28
1.58	78.67	16.97	2.97	32.04	"	"	"	1/4 - 1/8 ...	7.46	20.43
1.62	81.04	17.52	nil	nil	"	"	"	1/4 - 30-mesh ...	8.67	14.03
								x 30-mesh ...	4.58	13.94
								Total ...	100	

G. 40

JHARIA CENTRAL I, NORTH

X SEAM

Size (inches)	Float at 1.35 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.53 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
0-2 ...	...	...	...	...	12.02	14.70	0.65	17.80	5.98	23.00	6.32	30.00	...	...	33.97	20.00
2-1 ...	...	...	1.52	8.10	0.09	14.15	11.51	18.20	8.08	28.85	4.12	25.45	7.60	40.35	43.42	22.61
1-1/2 ...	0.63	6.75	0.67	8.10	1.70	13.50	1.41	18.05	0.69	23.65	0.37	28.05	1.81	44.30	7.28	22.66
1/2-1/4 ...	2.70	5.20	1.20	8.50	2.07	13.40	1.30	18.70	0.80	23.00	0.53	27.60	2.42	48.70	11.11	20.58
x 1/4 ...	1.02	4.80	0.53	8.05	0.53	13.50	0.36	19.30	0.21	24.20	0.13	20.30	0.84	53.30	4.22	10.00
Totals & Averages	4.95	5.27	4.01	8.30	26.31	14.29	24.23	18.08	10.36	23.54	11.47	28.51	12.67	43.37	100	21.36
Cum. ash %	5.27		6.62		12.34		14.68		16.60		18.18		21.36			

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EXAMPLES OF CLEANING POSSIBILITIES									SCREEN ANALYSIS OF THE RAW COAL		
CLEAN COAL			MIDDINGS		REJECTIONS			Size (inches)	Wt. %	Ash %	
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %				
1.35	4.95	5.27	82.38	13.93	1.58	12.67	43.37	0-2 ...	33.97	22.00	
1.40	8.06	6.62	78.37	19.47	"	"	"	2-1 ...	43.42	22.64	
1.45	35.27	12.34	52.06	22.09	"	"	"	1-1/2 ...	7.28	22.60	
1.50	50.50	14.68	27.83	25.59	"	"	"	1/2-1/4 ...	11.11	20.60	
1.55	75.80	16.60	11.47	28.51	"	"	"	x 1/4 ...	4.22	19.00	
1.58	87.33	18.18	nil	nil	"	"	"	Total ...	100		

Weight of coal : 2 cart loads (approx. 1 1/2 tons).

Oyer-all ash : 21.36%.

The above results show the washability of the coal below 6" in size. Coal over 6" in size was not treated.

G. 181

JHARIA EAST I

X SEAM

Size (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Float at 1'62 sp. gr. Sink at 1'58 sp. gr.		Sink at 1'62 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	2-1 ...	0.47	7.74	6.43	13.50	15.95	15.57	17.79	21.00	11.47	25.70	5.61	30.05	3.39	33.04	10.95	42.51	72.06	24.33
1-1/2 ...	0.41	8.20	1.41	11.58	3.60	16.62	2.82	20.73	1.84	26.35	1.13	29.52	0.53	32.94	2.36	46.25	14.10	24.57
1-1/4 ...	0.42	7.10	0.82	11.40	1.41	16.55	1.09	21.30	0.70	25.95	0.48	28.55	0.30	32.32	1.07	45.43	6.29	23.76
1-1/8 ...	0.49	5.27	0.60	11.98	0.40	17.21	0.31	21.14	0.32	25.04	0.17	29.11	0.10	32.30	0.47	45.56	2.86	21.26
1-30-mesh ...	1.39	3.57	0.45	11.81	0.19	17.08	0.21	21.48	0.18	24.96	0.09	29.24	0.06	31.44	0.43	54.77	3.09	16.86
x 30-mesh ...	0.88	3.20	0.21	10.61	0.11	15.41	0.09	19.43	0.07	23.10	0.03	27.30	0.02	29.78	0.28	61.04	1.69	16.93
...																		
Totals & Averages	4.06	5.01	0.92	12.82	21.66	15.85	22.31	20.98	14.58	25.76	7.51	29.86	4.40	32.93	15.56	44.05	100	23.89
Cum. ash %	5.01		10.55		13.77		16.55		18.40		19.47		20.17		23.89			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30-60 ...	0.76	16.00
x 60 ...	0.98	17.81

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1.35	4.06	5.01	80.38	20.04	1.62	15.56	44.05	
1.40	13.98	10.55	70.46	22.08	"	"	"	
1.45	35.64	13.77	48.80	24.85	"	"	"	
1.50	57.95	16.55	26.49	28.10	"	"	"	
1.55	72.53	18.40	11.91	30.97	"	"	"	
1.58	80.04	19.47	4.40	32.98	"	"	"	
1.62	84.44	20.17	nil	nil	"	"	"	

Weight of coal treated: 708 lb.

Over-all ash: 23.89%.

A somewhat disappointing result and further crushing does not materially improve the position. See also G. 181 (a).

G. 137

**JHARIA FIELD
SOUTH-EAST**

**XI SEAM
(Bottom)**

SIZE (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	0.25	8.70	5.10	13.75	5.10	16.30	7.84	22.45	2.11	29.10	1.05	30.40	1.39	41.20	22.84	21.10
2—1 ...	0.46	8.85	6.91	12.60	5.31	17.45	6.58	21.80	1.31	27.95	0.51	20.70	2.27	41.97	23.35	20.31
1—½ ...	0.72	8.01	5.14	18.65	3.29	17.89	4.05	22.80	0.84	28.74	0.50	30.04	1.85	43.81	16.39	21.23
½—¼ ...	1.73	7.90	3.17	13.15	2.68	17.00	2.20	20.90	1.22	26.20	0.64	31.10	1.51	42.40	18.15	19.70
¼—⅛ ...	1.73	5.85	1.65	12.60	0.88	16.65	0.96	20.80	0.66	25.80	0.21	31.30	0.02	45.15	7.01	18.64
⅛—30-mesh ...	4.42	3.70	1.27	12.30	0.65	17.10	0.57	21.20	0.52	25.85	0.18	30.70	2.30	56.25	9.91	20.54
× 30-mesh ...	4.34	2.76	0.85	10.49	0.51	15.46	0.40	16.40	0.26	23.37	0.18	25.91	0.81	54.65	7.35	12.29
Totals & Averages	13.65	4.75	24.09	13.05	18.42	17.04	22.60	21.80	6.92	27.55	3.27	30.20	11.05	46.40	100	19.88
Cum. ash % ...	4.75		10.05		12.34		15.05		16.06		16.58		19.88			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
SIZE (mesh)	Amount %	Ash %
30—60 ...	3.45	14.20
× 60 ...	3.90	11.46

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1.35	13.65	4.75	75.30	13.73	1.58	11.05	46.40	
1.40	37.74	10.05	51.21	21.40	"	"	"	
1.45	56.16	12.34	32.79	23.85	"	"	"	
1.50	78.76	15.05	10.19	23.40	"	"	"	
1.55	85.68	16.06	3.27	30.20	"	"	"	
1.58	88.95	16.58	nil	nil	"	"	"	

Weight of coal treated : 593 lb.

Over-all ash : 19.88%.

A promising result. See G. 138 (Top Sect.)

G. 138

JHARIA FIELD
SOUTH-EAST

XI SEAM
(Top)

Size (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	nil	...	6'55	14'57	9'13	16'71	8'42	20'65	2'08	26'94	1'12	31'60	2'12	40'54	29'42	20'37
2—1 ...	0'07	9'42	4'78	14'71	6'98	17'35	6'91	20'64	2'34	25'90	0'79	30'24	1'73	39'24	23'60	20'64
1—½ ...	0'07	8'80	4'07	13'46	4'07	17'09	4'17	21'36	1'22	27'00	0'50	31'44	1'22	40'71	15'32	20'39
¾—¼ ...	0'25	8'17	2'17	13'91	3'31	16'65	2'19	21'24	1'40	26'00	0'54	30'94	1'22	41'54	11'08	21'56
¾—½ ...	0'57	7'40	1'50	13'06	1'55	17'20	1'16	20'96	0'74	26'40	0'28	30'37	0'82	43'11	6'62	20'89
¾—80-mesh ...	2'05	3'06	0'97	12'75	0'87	16'71	0'64	21'04	0'45	24'75	0'15	30'56	2'07	55'59	7'20	24'90
x 30-mesh ...	3'75	3'25	0'72	10'04	0'54	15'60	0'51	22'04	0'26	24'34	0'15	28'21	0'83	56'06	0'76	14'23
Totals & Averages	6'76	4'12	20'76	13'96	26'45	16'94	24'00	20'88	8'40	26'41	3'53	30'88	10'01	45'07	100	20'51
Cum. ash % ...	4'12		11'55		14'10		16'25		17'25		17'78		20'51			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30—60 ...	3'45	16'56
x 60 ...	3'31	12'38

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDLINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1'35	6'76	4'12	83'23	18'80	1'58	10'01	45'07
1'40	27'52	11'55	62'47	20'53	"	"	"
1'45	53'07	14'19	36'02	23'16	"	"	"
1'50	77'07	16'25	12'02	27'73	"	"	"
1'55	86'46	17'25	3'53	30'88	"	"	"
1'58	89'90	17'78	nil	nil	"	"	"

Weight of coal treated: 695 lb.

Over-all ash: 20'51%.

A promising result, but inferior to G. 137
(Bottom Section).

G. 139

JHARIA FIELD
CENTRAL II, NORTH

XI SEAM

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Size (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	0'07	10'00	5'17	14'26	1'39	18'60	5'45	23'77	2'17	30'21	0'08	32'79	3'01	39'23	18'74	24'27
2—1 ...	0'45	9'31	8'25	18'07	3'02	19'87	6'43	23'15	2'70	29'26	1'33	34'09	4'33	41'06	27'41	23'48
1— $\frac{1}{2}$...	0'60	8'00	6'36	18'07	2'57	20'71	3'07	24'25	1'60	30'34	0'84	33'00	2'45	41'34	17'49	22'84
$\frac{1}{2}$ — $\frac{1}{4}$...	0'82	8'04	3'46	18'60	2'09	18'94	1'71	23'34	1'56	28'80	0'64	33'10	2'00	42'80	12'37	23'36
$\frac{1}{4}$ — $\frac{1}{8}$...	1'68	6'16	1'61	18'60	0'97	18'77	0'82	28'71	0'73	28'25	0'40	33'34	1'11	43'40	7'32	20'77
$\frac{1}{8}$ —30-mesh ...	5'05	3'94	1'29	18'44	0'73	18'51	0'61	22'66	0'56	27'49	0'27	31'16	1'09	45'20	0'60	14'34
x 30-mesh ...	4'31	3'10	0'74	14'49	0'35	18'14	0'32	23'54	0'28	25'72	0'18	29'48	0'89	52'05	0'07	13'75
Totals & Averages	12'08	4'68	20'88	13'67	12'52	19'48	18'41	23'55	9'60	29'30	4'64	33'03	14'97	42'30	100	21'74
Cum. ash % ...	4'68		10'75		12'83		16'62		17'25		18'12		21'74			

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30—60 ...	3'61	13'02
x 60 ...	3'46	13'30

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1'35	12'98	4'68	72'05	20'53	1'58	14'97	42'30
1'40	39'86	10'75	45'17	24'62	"	"	"
1'45	52'38	12'83	32'65	26'60	"	"	"
1'50	70'79	15'62	14'24	30'53	"	"	"
1'55	80'39	17'25	4'64	38'03	"	"	"
1'58	85'03	18'12	nil	nil	"	"	"

Weight of coal treated: 357 lb.

Over-all ash: 21'74%.

A promising result.

G. 128

JHARIA SOUTH-EAST CENTRAL

XII SEAM

Size (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. g r. Sink at 1'55 sp. gr.		Float at 1'70 sp. gr. Sink at 1'58 sp. gr.		Sink at 1'70 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
$\frac{1}{2}$...	5.70	11.00	12.32	14.55	15.71	19.95	12.03	24.55	4.01	20.40	1.70	34.10	2.37	35.00	2.60	48.40	56.50	21.91
$\frac{1}{2}-\frac{1}{4}$...	1.23	9.90	2.40	14.45	2.63	19.80	1.61	25.40	0.46	31.00	0.30	33.95	0.31	37.10	0.77	52.80	9.80	22.40
$\frac{1}{4}-\frac{1}{8}$...	2.52	8.25	3.94	14.45	3.00	19.25	2.44	24.00	1.16	29.25	0.49	33.40	0.41	39.15	1.15	50.50	15.20	21.32
$\frac{1}{8}-1/25$...	3.90	5.45	2.28	14.20	1.98	17.50	1.30	23.65	0.77	29.30	0.27	33.75	0.15	37.90	1.16	67.25	11.00	19.88
1/25 ...	2.97	4.00	0.98	12.10	0.46	17.20	0.51	23.30	0.28	27.40	0.16	37.80	0.20	56.00	1.04	74.30	6.60	22.11
Totals & Averages	16.38	7.90	21.92	14.38	23.87	19.59	17.98	24.44	6.68	29.39	3.01	34.13	3.44	37.70	6.72	57.35	100	21.67
Cum. ash % ...	7.90		11.61		14.67		16.86		17.83		18.37		19.09		21.67			

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CLEAN COAL			MIDDINGS*		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	16.38	7.90	76.90	21.47	1.70	6.72	57.55
1.40	38.30	11.61	54.98	24.30	"	"	"
1.45	62.17	14.67	31.11	27.91	"	"	"
1.50	80.15	16.86	13.13	32.65	"	"	"
1.55	80.88	17.83	6.45	36.04	"	"	"
1.68	80.34	18.37	3.44	37.70	"	"	"
1.70	93.28	19.00	nil	nil	"	"	"

Weight of coal treated:
(a) for screen test, 3 tons;
(b) for f.-&-s. test, 50 lb.

Over-all ash: 21.67%.

Not a very promising result as judged by the above figures, but the quantity of over $\frac{1}{2}$ " coal used for the float-and-sink test was insufficient to form an entirely reliable opinion.

G. 148

JHARIA FIELD
S.E. CENTRAL

XII SEAM

SIZE (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr.		Float at 1'45 sp. gr.		Float at 1'50 sp. gr.		Float at 1'55 sp. gr.		Float at 1'58 sp. gr.		Float at 1'70 sp. gr.		Sink at 1'70 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
7/8 ...	7.00	9.17	20.95	12.90	5.74	17.84	3.72	20.40	1.94	25.00	1.18	29.10	0.22	32.00	1.96	47.38	42.80	16.27
3/4 - 7/8 ...	2.19	8.90	5.54	13.10	1.41	17.40	0.78	19.82	0.02	25.55	0.27	28.30	0.16	31.12	0.63	48.10	11.60	16.44
1/2 - 3/4 ...	3.19	7.50	5.31	11.60	3.21	15.00	0.80	20.30	0.51	24.90	0.46	28.80	0.16	31.20	0.87	53.00	14.60	15.71
3/8 - 1/25 ...	7.61	3.00	5.30	10.80	3.04	15.40	1.22	18.80	0.79	23.00	0.28	28.10	0.35	34.00	1.71	59.42	20.30	14.02
1/25 ...	0.21	3.40	1.71	10.04	1.07	15.00	0.51	19.65	0.21	24.02	0.09	28.89	0.26	53.90	0.64	71.32	10.70	12.41
Totals & Averages	26.20	6.06	38.81	12.36	14.48	16.44	7.12	19.99	4.08	24.53	2.28	28.82	1.13	37.74	5.81	54.54	100	15.46
Cum ash % ...		6.06	9.82		11.02		11.76		12.35		12.75		13.05		15.46			

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CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	20.20	6.06	07.90	15.76	1.70	5.81	54.54
1.40	65.10	9.82	20.09	20.28	"	"	"
1.45	79.58	11.02	14.61	24.09	"	"	"
1.50	86.70	11.76	7.49	27.09	"	"	"
1.55	90.78	12.35	3.41	31.77	"	"	"
1.58	93.00	12.75	1.13	37.74	"	"	"
1.70	94.19	13.05	nil	nil	"	"	"

The finest fraction (1/25" x 0) was further screened through 60-mesh screen with the following result.

Size (mesh)	Amount %	Ash %
1/25" x 60-mesh ...	7.70	11.40
x 60-mesh ...	3.00	13.08

NOTE: This sample may be compared with No. G.128 from the same source.

ASH PERCENTAGES OF THE SCREEN FRACTIONS

SIZE (inches)	Ash %
x 7/8 ...	16.22
3/4 x 3/4 ...	17.44
1/2 x 1/2 ...	14.90
3/8 x 1/25 ...	16.31
1/25 x 0 ...	11.88

Weight of coal treated : 214 lb.

Over-all ash : 15.46%.

G. 53

JHARIA FIELD, NORTH

XIII SEAM

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Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Sink at 1'50 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	13.63	12.00	9.36	10.72	4.27	22.80	5.50	31.31	32.76	18.00
2—1 ...	10.46	11.15	4.54	10.87	2.48	22.50	3.44	35.33	20.02	17.71
1—½ ...	7.16	10.66	3.44	15.90	1.79	21.14	2.20	34.40	14.59	16.76
½—¼ ...	5.22	9.14	3.20	10.00	0.93	21.42	1.73	34.47	11.08	16.11
¼—⅛ ...	4.20	7.50	1.27	15.53	0.47	21.13	0.94	34.48	6.88	13.56
⅛—30-mesh ...	5.37	4.44	0.90	14.88	0.41	20.80	1.33	42.63	6.60	12.33
× 30-mesh ...	3.03	4.22	0.47	13.80	0.23	21.06	0.54	45.00	5.17	10.10
Totals & Averages	50.47	9.48	23.27	16.31	10.58	22.14	15.68	34.62	100	16.35
Cum. ash % ...		9.48		11.63		12.05		16.35		

RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH.		
Size (mesh)	Amount %	Ash %
30—60 ...	3.23	9.72
× 60 ...	1.04	10.82
Cum. ash % ...	10.13	...

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	50.47	9.48	33.85	18.14	1.50	15.68	34.63
1.45	73.74	11.03	10.53	22.14	"	"	"
1.50	84.32	12.95	nil	nil	"	"	"

Over-all ash : 16.35 %.

G. 84

JHARIA
EAST I

XIII SEAM

Size (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr.		Float at 1'45 sp. gr.		Float at 1'50 sp. gr.		Float at 1'55 sp. gr.		Float at 1'58 sp. gr.		Float at 1'70 sp. gr.		Sink at 1'70 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
3/4 ...	3.05	8.02	18.79	12.82	10.18	17.00	6.25	23.30	2.28	27.60	1.11	30.10	2.54	36.10	6.60	64.20	50.78	23.79
3/4 - 1/2 ...	1.18	7.74	3.70	12.64	2.32	17.50	1.42	22.70	0.63	29.10	0.27	32.70	0.58	36.22	1.23	62.37	11.33	22.30
1/2 - 3/4 ...	3.01	6.66	3.01	12.83	2.40	17.57	1.90	22.42	0.77	28.16	0.45	32.54	0.36	36.93	1.88	70.55	14.38	23.83
1/2 - 1/25 ...	6.13	3.33	2.77	12.58	1.53	17.03	1.24	21.67	0.66	27.23	0.20	32.06	0.58	38.86	1.38	66.56	14.58	17.35
1/25 ...	4.65	3.51	1.25	12.42	0.77	16.80	0.54	20.03	0.30	25.00	0.19	28.80	0.50	38.00	0.73	76.31	8.03	10.13
Totals & Averages	18.02	5.34	30.12	12.76	17.18	17.68	11.35	22.70	4.04	27.73	2.31	31.02	4.56	36.74	11.82	66.10	100	21.92
Cum. ash % ...		5.34		9.98		12.01		13.60		14.41		14.87		16.00		21.02		

EXAMPLES OF CLEANING POSSIBILITIES

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	18.02	5.34	70.16	18.73	1.70	11.82	66.10
1.40	48.14	9.98	40.04	23.23	"	"	"
1.45	65.32	12.01	22.80	27.41	"	"	"
1.50	76.67	13.60	11.51	31.06	"	"	"
1.55	81.31	14.41	6.87	34.81	"	"	"
1.58	83.62	14.87	4.50	36.74	"	"	"
1.70	88.18	16.00	nil	nil	"	"	"

Weight of coal treated: 260 lb.

Over-all ash: 21.92%.

A very promising result.

G. 93

JHARIA EAST I,

XIII-B SEAM
(Mixed)

Size (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Float at 1'70 sp. gr. Sink at 1'58 sp. gr.		Sink at 1'70 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	1/2 ...	17.31	9.79	18.32	13.01	0.24	18.33	3.26	25.56	2.02	20.03	2.02	31.77	3.03	38.63	4.00	51.47	56.20
1/2 - 1/4 ...	4.09	8.44	3.20	12.23	0.97	18.01	0.49	23.81	0.40	28.57	0.30	32.54	0.58	44.92	0.60	44.10	10.90	17.75
1/4 - 1/8 ...	5.61	7.50	2.07	13.27	1.01	18.00	0.50	24.46	0.50	20.60	0.12	33.38	0.68	30.57	1.11	57.16	13.10	17.79
1/8 - 1/25 ...	7.48	5.27	1.85	11.48	1.16	18.46	0.43	23.72	0.34	28.36	0.22	29.89	0.47	33.04	0.95	61.80	12.90	14.16
1/25 ...	3.80	3.82	1.00	12.44	0.41	17.47	0.21	22.28	0.21	26.20	0.07	29.62	0.20	48.00	0.04	72.58	0.90	17.99
Totals & Averages	38.35	7.82	27.34	12.82	10.30	18.36	4.80	24.06	3.56	28.82	2.82	31.75	4.06	39.34	7.60	56.47	100	17.85
Cum. ash % ...	7.82		9.90		11.06		11.00		12.60		13.23		14.63		17.85			

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EXAMPLES OF CLEANING POSSIBILITIES

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.85	38.30	7.82	53.06	19.47	1.70	7.68	56.47
1.40	65.70	9.90	26.02	26.30	"	"	"
1.45	76.09	11.06	10.23	31.88	"	"	"
1.50	80.98	11.90	11.34	34.15	"	"	"
1.55	84.54	12.60	7.78	36.50	"	"	"
1.58	87.96	13.23	4.96	39.34	"	"	"
1.70	92.32	14.63	nil	nil	"	"	"

Weight of coal treated : 260 lb.

Over-all ash : 17.85%.

A promising result.

G. 107

JHARIA EAST II

XIV SEAM
(Top Section)

79

Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	1'02	13'80	12'70	18'15	4'57	20'80	3'56	24'95	1'78	27'00	6'10	35'80	29'73	23'30
2—1 ...	2'79	14'20	13'72	16'40	4'19	20'65	1'52	25'70	1'40	27'00	3'83	37'80	27'45	20'91
1—½ ...	2'69	13'40	8'13	17'20	1'88	21'60	1'02	24'40	1'51	27'45	2'03	36'45	16'26	20'25
½—½ ...	2'73	12'55	3'98	17'05	1'00	22'00	0'69	25'40	0'32	28'20	1'37	38'75	10'42	20'57
¼—½ ...	1'82	11'70	1'92	16'60	0'90	20'80	0'40	25'70	0'16	28'85	0'80	39'10	6'00	10'67
¼—30-mesh ...	2'18	9'00	1'39	16'50	0'53	21'60	0'27	25'20	0'09	28'40	0'72	41'70	5'18	18'02
× 30-mesh ...	2'85	5'50	0'05	15'10	0'35	21'50	0'12	26'40	0'10	20'50	0'89	53'90	4'96	17'56
Totals & Averages	15'72	11'20	42'49	17'13	14'11	21'05	7'58	25'14	4'36	27'83	15'74	37'88	100	21'00
Cum. ash % ...	11'20		15'58		16'61		17'42		17'95		21'09			

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30—60 ...	2'23	18'90
× 60 ...	2'73	16'10

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1'40	15'72	11'20	08'54	19'50	1'58	15'74	27'88
1'45	58'21	15'53	26'05	23'37	"	"	"
1'50	72'32	16'61	11'94	26'12	"	"	"
1'55	79'90	17'42	4'36	27'83	"	"	"
1'58	84'26	17'05	nil	nil	"	"	"

Weight of coal treated : 197 lb.

Over-all ash : 21'00%.

G. 108

JHARIA EAST II

XIV SEAM (Bottom Section)

Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	4.57	12.05	11.08	18.90	3.49	20.46	1.83	28.40	0.63	31.60	7.54	38.00	29.14	24.05
2—1 ...	5.28	13.00	8.17	18.90	2.06	24.30	1.20	30.30	0.43	31.55	6.86	52.80	24.00	28.55
1—½ ...	3.60	13.15	4.00	19.60	1.71	24.30	0.86	28.80	0.40	32.80	3.43	50.95	14.00	27.13
½—¼ ...	3.12	12.65	1.82	10.05	1.68	24.30	0.70	30.00	0.24	33.05	2.44	52.20	10.00	27.15
¼—⅛ ...	3.13	9.85	0.95	18.90	0.83	23.55	0.34	28.80	0.13	32.05	1.10	51.40	6.57	21.85
⅛—30-mesh ...	5.77	6.50	0.92	18.15	0.60	23.70	0.34	29.10	0.10	32.40	1.70	50.55	0.43	18.84
× 30-mesh ...	4.73	5.60	0.52	15.65	0.34	23.50	0.21	26.00	0.17	31.70	0.89	50.65	0.86	15.14
Totals & Averages	30.20	10.11	27.46	18.92	10.71	22.91	5.48	29.06	2.10	32.20	24.05	48.45	100	24.63
Cum. ash % ...	10.11		14.31		15.65		16.05		17.08		24.63			

08

Size (mesh)	Amount %	Ash %
80—60 ...	3.22	13.05
× 60 ...	3.04	15.60

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	30.20	10.11	45.68	21.08	1.58	24.05	48.45
1.45	57.60	14.31	18.20	25.82	"	"	"
1.50	68.37	15.65	7.58	20.93	"	"	"
1.55	73.85	16.65	2.10	32.20	"	"	"
1.58	75.95	17.08	nil	nil	"	"	"

Weight of coal treated : 175 lb.

Over-all ash : 24.63%.

One of the most interesting cases dealt with, a 73% recovery of 16% ash coal being obtained and an even more interesting result being obtained on crushing. See G. 108(a).

G. 108(a)

JHARIA EAST II

XIV SEAM (Bottom Section)

SPECIAL TREATMENT, E.G.
CRUSHED TO $\frac{1}{4}$ " PRIOR TO TEST

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED To $\frac{1}{4}$ "	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
$\frac{1}{2}$ - $\frac{1}{4}$...	10.02	11.90	7.78	17.75	9.51	22.55	4.47	29.20	1.45	32.50	13.37	50.75	46.60	28.49
$\frac{1}{4}$ - $\frac{1}{8}$...	7.28	9.70	3.25	18.60	2.88	23.00	1.69	28.25	0.66	32.65	4.81	50.75	20.57	24.82
$\frac{1}{8}$ - 30-mesh ...	9.67	6.40	1.68	17.55	1.36	23.05	0.72	28.00	0.28	31.95	4.19	56.70	17.00	21.75
x 30-mesh ...	10.23	5.35	1.04	18.10	0.90	22.10	0.45	27.85	0.30	31.15	2.01	56.80	14.93	15.37
Totals & Averages	37.20	8.24	13.75	17.05	14.65	22.65	7.33	28.78	2.69	32.33	24.38	52.27	100	24.57
Cum. ash % ...	8.24		10.86		13.50		15.03		15.64		24.57			

18

Size (mesh)	Amount %	Ash %
80 - 60 ...	7.32	15.30
x 60 ...	7.01	14.50

CLEAN COAL			MIDLINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	37.20	8.24	38.42	22.82	1.58	24.38	52.27
1.45	50.95	10.86	24.67	25.53	"	"	"
1.50	65.60	13.50	10.02	20.73	"	"	"
1.55	72.98	15.03	2.69	32.33	"	"	"
1.58	75.62	15.64	nil	nil	"	"	"

Over-all ash : 24.63%.

Over 75% clean coal with 16% ash is obtainable. A very promising result. See also G. 108.

G. 141

JHARIA CENTRAL II
NORTH

XIV SEAM
(Bottom)

Size (inches)	Float at 1·35 sp. gr.		Float at 1·40 sp. gr. Sink at 1·35 sp. gr.		Float at 1·45 sp. gr. Sink at 1·40 sp. gr.		Float at 1·50 sp. gr. Sink at 1·45 sp. gr.		Float at 1·55 sp. gr. Sink at 1·50 sp. gr.		Float at 1·58 sp. gr. Sink at 1·55 sp. gr.		Sink at 1·58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 (3-2) ...	nil	...	4·21	14·08	5·33	10·65	7·38	21·88	1·85	28·13	nil	...	3·31	49·41	22·08	24·68
2—1 ...	nil	...	6·43	14·88	7·02	18·32	10·24	22·38	2·14	27·54	0·60	33·61	3·33	52·07	20·76	23·72
1—½ ...	0·48	10·13	3·57	14·45	3·71	19·20	5·38	22·08	1·55	27·78	0·36	32·42	2·09	53·01	17·14	24·32
½—¼ ...	0·07	8·55	1·85	13·20	4·49	18·09	1·52	22·30	1·84	25·81	0·46	31·33	1·73	50·07	12·80	23·04
¼—⅛ ...	1·54	6·86	0·97	12·08	1·79	17·66	0·66	21·80	0·79	25·78	0·25	31·29	0·85	50·80	6·85	20·47
⅛—30-mesh ...	2·14	4·00	1·25	11·99	0·67	16·19	0·76	20·29	0·50	24·99	0·17	29·64	0·76	51·13	6·25	16·99
x 30-mesh ...	2·27	3·60	0·86	12·00	0·47	16·56	0·33	20·94	0·23	24·84	0·12	32·48	0·78	59·74	5·06	17·81
Totals & Averages	7·40	5·40	10·14	14·29	23·48	18·57	20·27	22·26	8·90	26·98	1·96	32·15	12·85	51·59	100	23·00
Cum. ash % ...	5·40		11·83		14·99		17·50		18·49		18·79		23·00			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30—60 ...	2·33	17·70
x 60 ...	2·73	18·06

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1·35	7·40	5·40	79·75	20·03	1·58	12·85	51·59
1·40	26·54	11·83	60·61	21·85	"	"	"
1·45	50·02	14·99	37·13	23·02	"	"	"
1·50	76·20	17·50	10·86	27·91	"	"	"
1·55	85·10	18·49	1·96	32·15	"	"	"
1·58	87·15	18·79	nil	nil	"	"	"

Weight of coal treated : 420. lb.

Over-all ash : 23·00%.

A somewhat promising result. See also
G. 141(a).

G. 142

JHARIA CENTRAL II
NORTH

XIV SEAM
(Top)

Size (inches)	Float at 1.35 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	nil	...	3.50	14.30	4.44	19.82	8.06	21.22	2.20	27.15	1.00	30.10	1.60	35.53	21.40	21.93
2—1 ...	0.10	11.02	4.70	14.37	7.20	17.57	10.20	20.50	3.20	26.53	0.80	30.20	2.00	40.10	28.80	21.45
1—½ ...	0.34	9.34	3.00	13.52	4.40	10.03	8.20	20.00	1.73	25.89	0.70	20.01	1.83	41.35	20.80	20.69
½—¼ ...	0.55	7.09	1.44	12.07	4.05	15.71	3.07	10.39	1.83	22.75	0.55	29.00	1.31	41.60	12.80	20.07
¼—⅛ ...	0.01	5.85	0.97	11.70	2.31	10.00	0.95	10.60	0.84	23.40	0.27	20.05	0.75	42.87	7.00	18.86
⅛—30-mesh ...	1.54	4.00	0.00	11.55	1.44	15.43	0.78	10.73	0.44	24.04	0.16	20.20	0.58	45.57	5.60	10.80
× 30-mesh ...	1.56	4.50	0.38	10.51	0.01	15.11	0.23	10.33	0.17	23.80	0.09	20.87	0.51	53.04	3.60	16.47
Totals & Averages	5.00	5.03	15.25	13.07	24.45	17.17	32.14	20.40	10.41	25.49	8.57	29.76	9.18	41.06	100	20.61
Cum. ash % ...	5.03		11.68		14.68		17.08		18.08		18.54		20.61			

83

Size (mesh)	Amount %	Ash %
80—00 ...	1.80	10.92
× 00 ...	1.80	10.82

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	5.00	5.03	85.82	10.20	1.58	9.18	41.06
1.40	20.25	11.68	70.57	20.51	"	"	"
1.45	44.70	14.68	46.12	22.23	"	"	"
1.50	70.84	17.08	13.08	20.58	"	"	"
1.55	87.25	18.08	3.57	29.76	"	"	"
1.58	90.82	18.54	nil	nil	"	"	"

Weight of coal treated: 500 lb.

Over-all ash: 20.61%.

Although the recovery of clean at sp. gr. 1.58 is high, the ash reduction is not promising. See also G. 142(a).

G. 184

JHARIA EAST II

XIV-A SEAM

Size (inches)	Float at 1.35 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Float at 1.62 sp. gr. Sink at 1.58 sp. gr.		Sink at 1.62 sp. gr.		RAW COAL CRUSHED TO $\frac{1}{4}$ "	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
$\frac{1}{2}$ - $\frac{1}{4}$...	1.06	6.17	29.18	11.14	10.97	14.62	6.14	17.87	7.39	21.52	2.80	25.07	2.10	28.72	3.90	31.84	63.54	16.02
$\frac{3}{4}$ - $\frac{1}{2}$...	1.43	5.65	7.27	10.32	3.47	14.47	1.53	18.15	1.84	21.36	0.04	25.30	0.63	27.78	1.26	33.22	18.37	15.43
$\frac{1}{2}$ - 30-mesh ...	3.08	4.20	4.07	10.20	1.37	14.65	0.57	18.33	0.75	21.90	0.40	25.56	0.30	28.22	1.55	42.05	12.09	15.33
x 30-mesh ...	2.35	3.20	1.49	9.40	0.72	13.27	0.34	17.00	0.34	21.42	0.14	25.45	0.05	32.70	0.57	45.40	6.00	12.57
Totals & Averages	7.92	4.43	42.01	10.85	16.53	14.53	8.58	17.94	10.32	21.52	4.28	25.77	3.08	28.54	7.28	35.32	100	15.62
Cum. ash % ...		4.43		9.83		11.00		11.79		12.97		13.57		14.03		15.62		

84

Size (mesh)	Amount %	Ash %
30 - 60 ...	2.88	12.52
x 60 ...	3.12	12.88

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	7.92	4.43	84.80	14.98	1.62	7.28	35.32
1.40	49.93	9.83	42.79	19.03	"	"	"
1.45	66.46	11.00	26.26	21.86	"	"	"
1.50	75.04	11.79	17.68	23.77	"	"	"
1.55	85.36	12.97	7.36	26.93	"	"	"
1.58	89.64	13.57	3.08	28.54	"	"	"
1.62	92.72	14.03	nil	nil	"	"	"

Weight of coal treated : 10 lb.

Over-all ash : 15.62%.

No great advantage accrues from cleaning this sample.

G. 116

JHARIA FIELD
SOUTH-EAST

XV SEAM

85

SIZE (inches)	Float at 1.35 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	3.63	7.10	11.91	11.00	3.55	16.23	2.30	21.55	0.97	23.50	0.20	31.65	1.38	30.00	24.03	14.39
2-1 ...	5.53	7.35	10.52	12.00	3.88	16.75	1.47	22.10	1.10	25.60	0.17	30.00	1.45	32.80	24.12	14.31
1-1/2 ...	5.07	7.10	5.53	11.90	2.37	16.48	1.02	23.30	0.52	27.40	0.15	29.65	0.80	37.10	15.55	13.78
1/2-1/2 ...	4.21	5.83	5.01	10.90	1.93	16.15	0.96	21.80	0.50	26.05	0.21	31.30	0.77	38.55	13.64	13.31
1/4-1/2 ...	4.49	4.80	2.47	11.85	1.07	15.70	0.53	21.50	0.30	20.00	0.14	30.48	0.69	41.85	9.69	12.37
1/4-30-mesh ...	4.19	3.70	1.93	9.95	0.67	15.90	0.31	21.15	0.20	25.65	0.08	27.85	0.81	51.20	8.19	12.30
x 30-mesh ...	3.30	3.70	0.30	10.95	0.39	15.30	0.18	19.75	0.11	26.00	0.05	30.90	0.45	52.12	4.78	11.06
Totals & Averages	30.42	5.80	37.67	11.40	13.91	16.34	6.77	21.90	3.70	25.42	1.09	30.61	6.44	39.40	100	13.64
Cum. ash % ...	5.80		8.89		10.16		11.05		11.63		11.85		13.63			

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size mesh)	Amount %	Ash %
30-60 ...	2.53	10.12
x 60 ...	2.20	11.80

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDLINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	30.42	5.80	63.14	14.77	1.58	6.44	39.40
1.40	68.09	8.89	25.47	19.75	"	"	"
1.45	82.00	10.16	11.56	23.85	"	"	"
1.50	88.77	11.05	4.79	26.60	"	"	"
1.55	92.47	11.63	1.09	30.61	"	"	"
1.58	93.56	11.85	nil	nil	"	"	"

Weight of coal treated: 601 lb.

Over-all ash: 13.63%.

See remarks on G. 116(a). Crushing appears not to give any material advantage. Liquid of sp. gr. 1.30 not used, but note high recovery (30%) of low ash (5.8%) coal at sp. gr. 1.35.

Sp. gr. 1.30 used for testing crushed coal. See G. 116(a).

G. 116(a)

JHARIA FIELD SOUTH-EAST

XV SEAM

CRUSHED TO $\frac{1}{2}$ "
PRIOR TO TEST

Size (inches)	Float at 1'30 sp. gr.		Float at 1'35 sp.gr. Sink at 1'40 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
$\frac{1}{2}$ - $\frac{1}{4}$...	2.06	4.40	11.52	7.60	22.23	11.00	7.87	16.05	4.38	22.10	3.40	26.00	1.07	20.00	4.96	30.25	58.30	15.30
$\frac{3}{4}$ - $\frac{1}{2}$...	3.36	3.50	3.09	6.40	5.69	10.60	2.33	16.10	0.05	21.10	0.85	26.00	0.38	28.00	1.43	30.95	18.98	12.93
$\frac{1}{2}$ - 30-mesh ...	5.15	2.75	2.95	6.80	3.45	10.50	1.41	15.75	0.63	20.30	0.50	25.40	0.19	29.85	1.41	47.80	15.60	12.19
x 30-mesh ...	2.88	2.10	1.11	6.80	1.39	10.30	0.45	15.30	0.24	19.30	0.17	23.50	0.04	29.70	0.66	52.25	6.04	11.40
Totals & Averages	14.35	3.14	19.57	7.19	32.76	10.85	12.06	16.42	6.20	21.66	4.92	26.48	1.68	20.66	8.46	41.81	100	13.63
Cum. ash % ...	3.14		5.49		8.11		9.41		10.31		11.10		11.53		13.63			

98

Size (mesh)	Amount %	Ash %
80 - 60 ...	3.10	11.30
x 60 ...	3.75	11.80

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.30	14.35	3.14	77.19	13.00	1.58	8.46	41.81
1.35	33.92	5.49	57.62	15.00	"	"	"
1.40	66.68	8.11	24.86	20.60	"	"	"
1.45	78.74	9.41	12.80	24.56	"	"	"
1.50	84.04	10.31	6.60	27.20	"	"	"
1.55	89.86	11.10	1.68	20.66	"	"	"
1.58	91.54	11.53	nil	nil	"	"	"

Over-all ash : 13.63%.

Crushing does not materially increase the percentage of clean coal recovery and only moderately lowers the ash content of the clean coal. Liquid of sp. gr. 1.30 used.

G. 52

JHARIA CENTRAL II, SOUTH

XVI SEAM

87

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Sink at 1.50 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	54.52	12.05	9.02	20.06	7.70	27.46	10.90	41.42	83.10	18.01
2 — 1 ...	0.04	11.85	1.08	10.00	0.43	26.72	1.20	37.02	8.84	17.33
1 — ½ ...	2.15	11.00	0.22	10.87	0.11	25.82	0.32	37.85	2.80	15.33
½ — ¼ ...	1.48	0.07	0.11	10.46	0.04	24.50	0.00	40.07	1.72	12.43
¼ — ⅛ ...	1.09	7.67	0.08	18.52	0.04	23.07	0.08	41.00	1.20	10.79
⅛ — 30-mesh ...	1.32	4.83	0.07	16.68	0.04	21.43	0.08	30.38	1.51	7.50
× 30-mesh ...	0.52	3.78	0.04	14.21	0.02	23.40	0.07	54.22	0.65	10.24
Totals & Averages	67.12	12.41	11.52	10.90	8.44	27.33	12.02	41.00	100	18.23
Cum. ash % ...	12.41		13.51		14.85		18.23			

RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh)	Amount %	Ash %
30 — 60 ...	0.42	7.03
× 60 ...	0.23	14.28
Cum. ash ...	0.07	

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	67.12	12.41	10.06	23.10	1.50	12.02	40.00
1.45	78.04	13.51	8.44	27.33	"	"	"
1.50	87.08	14.85	nil	nil	"	"	"

Weight of coal treated : 232 lb.

Over-all ash : 18.23%.

G. 54

JHARIA CENTRAL II, NORTH

XVI SEAM
(Top Section)

88

Size (inches)	Float at 1·40 sp. gr.		Float at 1·45 sp. gr. Sink at 1·40 sp. gr.		Float at 1·50 sp. gr. Sink at 1·45 sp. gr.		Sink at 1·50 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	8·54	11·60	4·45	18·00	0·89	25·23	8·90	39·75	22·78	24·38
2 — 1 ...	6·76	11·85	2·31	18·50	1·96	24·23	9·61	42·15	20·64	27·88
1 — ½ ...	5·34	11·72	2·85	17·47	1·78	23·29	8·54	45·55	18·51	29·32
½ — ¼ ...	5·14	10·75	1·75	18·15	1·28	23·25	6·42	47·15	14·59	28·75
¼ — ⅛ ...	4·22	8·50	0·75	18·14	0·51	21·63	3·06	47·19	8·54	24·00
⅛ — 30-mesh ...	5·87	5·71	0·62	18·15	0·36	22·77	2·04	47·55	8·89	16·87
× 30-mesh ...	4·15	5·85	0·49	19·40	0·30	27·60	1·11	49·20	6·05	15·90
Totals & Averages	40·02	9·76	13·22	18·06	7·08	23·82	39·68	44·02	100	24·45
Cum. ash % ...	9·76		11·82		13·23		24·45			

RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh)	Amount %	Ash %
30 — 60 ...	8·00	13·70
× 60 ...	2·00	17·40
Cum. ash ...	15·61	

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1·40	40·02	9·76	20·30	20·08	1·50	39·68	41·50
1·45	53·24	11·82	7·08	23·84	"	"	"
1·50	60·32	13·23	nil	nil	"	"	"

Weight of coal treated : 140 'b.
Over-all ash : 24·45%.

G. 55

JHARIA CENTRAL II, NORTH

XVI SEAM (Bottom Section)

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Sink at 1.50 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	8.18	13.30	4.63	17.00	2.18	21.83	4.09	33.25	10.08	10.66
2 — 1 ...	12.26	13.25	5.18	18.25	3.64	22.60	3.82	34.03	24.80	18.83
1 — ½ ...	7.90	12.40	3.28	18.25	3.54	22.00	3.54	35.70	18.26	19.87
½ — ¼ ...	5.68	11.05	3.36	17.95	1.94	22.00	2.64	34.08	13.62	18.77
¼ — ⅛ ...	4.42	9.30	1.58	18.07	0.78	22.20	1.66	33.70	8.44	16.93
⅛ — 30-mesh ...	5.14	6.60	0.75	17.40	0.75	22.15	1.26	37.95	7.90	14.10
× 30-mesh ...	5.28	6.15	0.55	16.05	0.40	22.60	1.67	44.55	7.90	15.95
Totals & Averages	48.86	11.06	19.33	18.03	13.13	22.17	18.68	35.35	100	18.40
Cum. ash % ...	11.06		18.03		14.51		18.40			

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RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh)	Amount %	Ash %
30 — 60 ...	4.23	15.05
× 60 ...	3.67	17.05
Cum. ash ...	15.98	

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDLINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1.40	48.86	11.06	32.46	19.70	1.50	18.68	35.35	
1.45	68.10	13.03	13.13	22.16	"	"	"	
1.50	81.32	14.51	nil	nil	"	"	"	

Weight of coal treated : 183 lb.

Over-all ash : 18.40%.

G. 51

JHARIA CENTRAL II SOUTH

XVI-A SEAM

Size (inches)	Float at 1·40 sp. gr.		Float at 1·45 sp. gr. Sink at 1·40 sp. gr.		Float at 1·50 sp. gr. Sink at 1·45 sp. gr.		Sink at 1·50 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	Over 2 ...	2·64	14·08	0·82	22·82	0·32	24·55	2·82	48·25	6·60	30·28
2—1 ...	15·46	13·50	4·16	22·13	1·84	25·15	10·84	47·07	32·30	26·54
1—½ ...	12·26	13·28	2·50	21·31	1·13	25·35	6·81	52·08	22·70	26·41
½—½ ...	9·84	11·59	1·71	20·95	0·88	26·40	4·17	51·40	16·60	23·33
¼—½ ...	5·48	9·41	0·71	20·60	0·45	26·30	1·06	50·80	8·30	10·57
¼—30-mesh ...	5·18	6·50	0·58	19·57	0·29	24·95	1·15	52·77	7·20	15·75
× 30 mesh ...	4·10	5·65	0·28	19·23	0·28	22·50	1·04	48·51	6·30	18·16
Totals & Averages	54·06	11·49	10·76	21·40	5·19	25·32	29·09	49·50	100	24·33
Cum. ash % ...	11·49		13·11		14·01		24·33			

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RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh) -	Amount %	Ash %
30—60 ...	2·65	15·82
× 60 ...	3·65	20·01
Cum. ash ...	18·25	

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1·40	54·96	11·40	15·04	22·67	1·50	29·10	49·48
1·45	65·71	13·11	5·10	25·31	"	"	"
1·50	70·90	14·01	nil	nil	"	"	"

Weight of coal treated : 2 cwt.
Over-all ash : 24·33%.

G. 169

JHARIA CENTRAL IF SOUTH

XVI-A SEAM

16

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	4.72	13.50	4.29	20.40	2.20	24.80	1.17	29.00	0.39	36.05	4.53	47.30	17.39	27.10
2—1 ...	10.58	12.30	4.67	20.52	2.95	25.75	1.74	30.17	0.44	36.05	5.34	50.00	25.72	24.02
1—½ ...	9.96	12.87	3.58	20.15	1.19	25.65	0.73	30.75	0.41	35.52	3.41	51.70	19.28	23.04
½—½ ...	8.73	11.45	2.26	20.30	1.09	24.97	0.67	29.20	0.35	34.52	2.52	53.93	15.02	21.81
¼—½ ...	5.73	9.30	1.02	21.00	0.47	23.45	0.37	23.45	0.15	33.55	1.21	52.55	8.95	18.42
¼—30-mesh ...	6.47	6.05	0.58	19.00	0.35	22.75	0.32	23.35	0.12	32.80	0.97	54.90	8.81	14.12
× 30-mesh ...	2.86	4.90	0.25	17.90	0.23	21.75	0.17	22.85	0.00	27.15	0.63	57.35	4.23	15.50
Totals & Averages	49.05	10.77	16.65	20.32	8.57	25.03	5.17	29.59	1.95	35.06	18.61	51.00	100	22.52
Cum. ash % ...	10.77		13.19		14.56		15.54		16.00		22.52			

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30—60 ...	2.16	17.65
× 60 ...	2.07	12.70

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	49.05	10.77	32.34	23.94	1.58	18.61	51.00
1.45	65.70	13.19	15.69	27.78	"	"	"
1.50	74.27	14.56	7.12	31.09	"	"	"
1.55	79.44	15.54	1.95	35.06	"	"	"
1.58	81.39	16.00	nil	nil	"	"	"

Weight of coal treated : 176 lb.

Over-all ash : 22.52%.

See G. 169(a).
See also sample G. 51.

G. 169(a)

JHARIA CENTRAL II SOUTH

XVI-A SEAM COAL

CRUSHED TO $\frac{1}{2}$ "
PRIOR TO TEST

Size (inches)	Float at 1.35 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL CRUSHED TO $\frac{1}{2}$ "		
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	
$\frac{1}{2}$ - $\frac{1}{4}$...	8.66	8.35	15.50	13.85	9.46	19.55	4.74	24.35	4.80	20.15	1.35	34.80	12.48	52.55	56.09	25.09	
$\frac{1}{4}$ - $\frac{1}{8}$...	6.33	6.55	4.72	13.80	2.48	20.30	1.20	24.30	1.06	28.80	0.51	32.55	3.81	53.45	20.11	21.72	
$\frac{1}{8}$ - 30-mesh ...	7.93	4.90	2.40	13.80	1.26	18.85	0.67	23.25	0.67	28.15	0.28	30.25	2.16	54.85	15.36	16.76	
x 30-mesh ...	4.17	4.20	0.90	16.05	0.42	17.05	0.48	19.90	0.24	27.50	0.09	20.90	1.24	54.40	7.54	16.63	
Totals & Averages	27.09	6.28	23.52	13.92	13.62	29.54	7.09	23.94	6.77	28.94	2.23	33.89	19.68	53.09	100	22.50	
Cum. ash % ...		6.28		9.83		11.89		13.00		14.46		15.00		22.50			

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Size (mesh)	Amount %	Ash %
30 - 60 ...	3.02	14.85
x 60 ...	3.62	10.05

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	27.09	6.28	53.23	10.44	1.58	19.68	53.09
1.40	50.61	9.83	29.71	23.81	"	"	"
1.45	64.28	11.89	16.09	27.42	"	"	"
1.50	71.32	13.09	9.00	30.17	"	"	"
1.55	78.00	14.46	2.23	33.80	"	"	"
1.58	80.32	15.00	nil	nil	"	"	"

Over-all ash: 22.52%.

Some advantage accrues from crushing prior to washing.

G. 130

JHARIA
CENTRAL II

XVII SEAM

SIZE (inches)	Float at 1'30 sp. gr.		Float at 1'35 sp. gr. Sink at 1'30 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL CRUSHED TO 1/4"	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1/4 - 1/2 ...	2.73	4.15	25.79	8.30	24.97	12.80	7.64	17.00	2.46	22.30	1.32	26.60	0.66	28.10	0.13	33.30	65.70	12.00
1/2 - 3/4 ...	3.22	3.10	6.13	7.10	3.97	12.20	1.27	17.30	0.50	21.51	0.28	26.75	0.12	28.00	0.06	32.70	15.55	0.48
1/2 - 30-mesh ...	4.76	2.75	2.99	7.30	1.90	11.90	0.69	17.00	0.35	21.20	0.21	25.05	0.09	28.51	0.09	38.29	11.08	7.94
x 30-mesh ...	4.37	2.00	1.38	5.85	0.92	10.50	0.31	15.20	0.27	10.10	0.11	22.90	0.06	26.85	0.25	55.20	7.67	7.08
Totals & Averages	15.08	2.86	36.29	7.92	31.76	12.00	9.01	17.07	3.58	21.84	1.92	26.24	0.93	28.05	0.53	44.41	100	10.84
Cum. ash % ...	2.86		6.44		8.79		9.74		10.19		10.50		10.66		10.84			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
SIZE (mesh)	Amount %	Ash %
30 - 00 ...	3.68	0.80
x 00 ...	3.99	7.55

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.30	15.08	2.36	84.39	12.06	1.58	0.53	44.41
1.35	51.37	0.44	48.10	15.18	"	"	"
1.40	83.13	8.70	16.34	20.19	"	"	"
1.45	93.04	9.74	6.43	24.05	"	"	"
1.50	96.62	10.19	2.85	26.83	"	"	"
1.55	98.54	10.50	0.93	28.05	"	"	"
1.58	99.47	10.66	nil	nil	"	"	"

Weight of coal treated: 368 lb.

Over-all ash: 10.84%.

This coal is fairly low in ash content and free from bands. On treatment at sp. gr. 1.35 about 50% clean coal can be obtained with an ash of about 6%. This clean coal could be used for special purposes. The other 50% of the coal would have an ash content of about 15%. This can be used for the manufacture of metallurgical coke.

G. 172

RANIGANJ FIELD

KAJORA TOP SEAM

94

Size (inches)	Float at 1.35 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	19.91	9.22	18.29	15.00	1.47	22.40	0.76	27.16	0.10	31.35	0.02	37.22	0.10	39.00	40.65	12.77
2 — 1 ...	11.58	10.30	8.16	12.94	0.71	21.77	0.25	26.20	0.15	32.06	0.08	36.54	0.10	42.20	21.03	12.31
1 — ½ ...	7.78	8.50	4.70	15.15	0.38	21.32	0.11	26.68	0.08	30.76	0.03	35.39	0.12	42.80	13.20	11.90
½ — ¼ ...	7.87	6.38	2.13	14.92	0.63	19.28	0.27	23.92	0.10	29.15	0.03	32.66	0.09	43.18	11.12	9.89
¼ — ⅓ ...	5.24	4.40	0.90	14.21	0.24	19.18	0.13	22.52	0.08	26.44	0.02	31.00	0.06	43.00	6.67	7.30
⅓ — 30-mesh ...	3.97	2.86	0.75	13.60	0.21	17.72	0.15	20.54	0.07	24.70	0.03	27.06	0.08	45.58	5.26	6.57
× 30-mesh ...	1.20	3.30	0.51	11.40	0.12	13.50	0.06	17.50	0.05	22.30	0.02	25.45	0.11	57.06	2.07	9.83
Totals & Averages	57.55	7.98	35.44	14.44	3.76	20.90	1.73	25.23	0.63	29.02	0.23	33.26	0.66	44.02	100	11.49
Cum. ash % ...	7.98		10.44		10.85		11.10		11.21		11.26		11.49			

Size (mesh)	Amount %	Ash %
30 — 60 ...	1.08	8.00
× 60 ...	1.01	11.40

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	57.55	7.98	41.79	15.70	1.58	0.66	44.02
1.40	92.00	10.44	6.35	23.33	"	"	"
1.45	96.75	10.85	2.59	20.86	"	"	"
1.50	98.48	11.10	0.86	30.15	"	"	"
1.55	99.11	11.21	0.23	33.26	"	"	"
1.58	99.84	11.26	nil	nil	"	"	"

Over-all ash: 11.40%.

This being, in the untreated state, a low ash coal, there would appear to be no special advantage in cleaning.

G. 173 SNA

RANIGANJ FIELD

SAMLA SEAM

UNDER 4" COAL

Size (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
4-2 ...	11.08	11.32	26.72	16.72	3.47	23.10	1.52	28.80	1.36	33.43	0.68	40.00	0.00	44.57	45.82	17.74
2-1 ...	4.17	10.24	9.83	15.81	2.07	24.20	0.40	29.68	0.40	33.32	0.10	39.07	0.58	47.03	17.55	17.96
1-1/2 ...	3.17	10.10	4.57	16.06	0.97	23.08	0.33	28.73	0.23	33.59	0.05	38.17	0.35	48.13	9.67	17.41
1-1/4 ...	5.21	7.25	2.74	16.50	1.01	21.88	0.57	26.55	0.17	31.23	0.27	35.22	0.40	51.60	10.37	15.01
1-1/8 ...	5.00	4.47	1.17	16.16	0.35	20.27	0.46	24.07	0.18	28.55	0.19	31.88	0.36	48.31	7.62	11.17
1/2-30-mesh ...	3.77	3.15	0.97	12.50	0.48	17.95	0.44	21.95	0.34	26.40	0.12	30.57	0.40	40.88	6.52	11.50
x 30-mesh ...	0.41	4.60	0.51	10.00	0.44	14.53	0.46	20.50	0.33	22.80	0.07	25.33	0.23	59.51	2.45	18.70
Totals & Averages	32.81	8.35	46.51	16.37	8.70	22.40	4.18	26.42	3.01	31.02	1.30	36.80	3.31	48.31	100	16.47
Cum. ash % ...	8.35		13.05		14.00		14.55		15.07		15.38		16.47			

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RESULT OF SCREENING THE 30-MESH MATERIAL.		
Size (mesh)	Amount %	Ash %
30-60 ...	1.03	15.03
x 60 ...	1.42	21.06

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1'35	32.81	8.35	63.88	19.00	1'58	3.31	48.31	
1'40	70.32	13.05	17.37	26.02	"	"	"	
1'45	88.11	14.00	8.58	29.73	"	"	"	
1'50	92.29	14.55	4.40	32.87	"	"	"	
1'55	95.30	15.07	1.30	36.80	"	"	"	
1'58	96.60	15.38	nil	nil	"	"	"	

SCREEN ANALYSIS OF THE SAMPLE		
Size (inches)	Wt. %	Ash %
Over 4" ...	28.26	16.33
Below 4" ...	71.74	16.47

Over-all ash: 16.47%.

The 80% production of 13% ash coal may be of interest.

G. 173 SNB

RANIGANJ FIELD

SAMLA SEAM

OVER 4" COAL

Size (inches)	Float at 1.35 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 4	34.37	13.41	48.00	16.06	10.85	20.33	4.99	27.00	nil	nil	0.53	35.85	0.27	37.15	100.00	16.33
Cum. ash %	13.14		14.98		15.00		16.10		16.16		16.27		16.35			

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EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDLINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	34.37	13.41	65.30	17.77	1.58	0.27	37.15
1.40	83.30	14.93	16.37	23.05	"	"	"
1.45	94.21	15.66	5.52	28.39	"	"	"
1.50	99.20	16.16	0.53	35.85	"	"	"
1.55	"	"	"	"	"	"	"
1.58	99.73	16.27	nil	nil	"	"	"

Weight of coal treated : 931 lb.

Over-all ash : 16.33%.

See G. 173 SNA.

G. 187

RANIGANJ FIELD

GHUSICK SEAM

SIZE (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Float at 1'62 sp. gr. Sink at 1'58 sp. gr.		Sink at 1'62 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	2-1 ...	8.95	0.70	32.87	13.84	14.06	18.71	6.01	23.18	1.91	27.49	0.70	20.02	0.06	30.01	65.25
1-1/2 ...	3.48	8.01	8.04	14.11	2.03	10.47	0.83	22.07	0.42	25.41	0.18	31.17	0.13	31.36	0.18	36.80	15.20	15.00
1/2-1/2 ...	1.07	0.07	3.72	12.71	1.17	17.77	0.41	22.11	0.27	25.94	0.08	29.63	0.03	30.08	0.11	37.73	7.76	13.57
1/4-1/4 ...	1.85	5.40	1.40	12.41	0.55	17.22	0.29	21.00	0.12	25.59	0.04	31.17	0.04	28.39	0.00	38.85	4.47	11.86
1/4-30-mesh ...	3.50	3.40	0.91	11.48	0.43	16.11	0.20	18.76	0.16	22.80	0.06	26.77	0.03	28.72	0.15	43.82	5.44	8.46
x 30-mesh ...	1.06	2.06	0.26	9.25	0.12	15.16	0.08	18.09	0.06	21.28	...	...	0.02	24.58	0.19	50.27	1.70	10.71
Totals & Averages	20.81	7.49	47.20	13.68	18.36	18.61	7.82	22.76	2.04	25.59	1.15	20.26	0.01	30.10	0.72	42.20	100	14.02
Cum. ash % ...	7.40		11.70		13.24		14.03		14.41		14.58		14.72		14.02			

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EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1.35	20.81	7.40	78.47	16.64	1.62	0.72	42.22	
1.40	68.10	11.70	31.18	21.13	"	"	"	
1.45	80.46	13.24	12.82	24.74	"	"	"	
1.50	94.28	14.03	5.00	27.84	"	"	"	
1.55	97.22	14.41	2.06	29.63	"	"	"	
1.58	98.37	14.58	0.91	30.10	"	"	"	
1.62	99.28	14.72	nil	nil	"	"	"	

RESULT OF SCREENING THE 30-MESH MATERIAL		
SIZE (mesh)	Amount %	Ash %
30 - 60 ...	1.18	9.59
x 60 ...	0.61	13.00

Weight of coal treated : 67 lb.

Over-all ash : 14.02%:

The raw coal containing only 15% of ash, it may be questioned whether cleaning would be justified, though 70% recovery can be obtained with a reduction of 3% in the ash.

G. 146A

RANIGANJ FIELD

BHARATCHAK SEAM

Size (inches)	Float at 1.35 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	Over 2	3.61	10.20	13.43	15.25	2.88	20.10	0.90	25.00	0.51	30.00	21.31	15.31
2-1	9.88	10.80	26.26	14.00	6.09	18.80	0.69	24.90	0.35	30.40	0.03	31.20	0.14	40.85	43.44	15.35
1-1/2	5.64	10.14	7.43	15.05	2.68	18.61	0.41	23.90	0.13	26.32	0.07	27.66	0.09	33.71	16.45	14.41
1-1/4	4.05	8.00	2.90	14.90	0.94	10.50	0.23	23.10	0.16	26.75	0.06	30.20	0.11	37.50	3.50	13.30
1-1/8	2.73	5.85	1.20	14.50	0.51	18.70	0.16	23.05	0.07	25.60	0.04	29.10	0.11	36.55	4.82	11.11
1-30-mesh	2.40	4.20	0.63	14.20	0.34	18.75	0.12	21.70	0.10	24.40	0.06	28.40	0.12	38.30	3.66	9.62
x 30-mesh	0.00	2.90	0.20	12.50	0.12	15.25	0.06	18.80	0.07	21.00	0.04	23.50	0.17	48.10	1.62	11.62
Totals & Averages	20.36	9.02	52.05	14.54	13.54	10.05	2.62	24.18	1.39	28.30	0.30	29.30	0.74	40.10	100	14.20
Cum. ash %	9.02		12.53		13.47		13.76		13.96		14.00		14.20			

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Size (mesh)	Amount %	Ash %
30-60	0.87	9.50
x 60	0.75	14.56
Cum. ash	11.62	

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	20.36	9.02	60.90	16.10	1.58	0.74	40.10
1.40	81.41	12.53	17.85	20.68	"	"	"
1.45	94.05	13.47	4.31	25.80	"	"	"
1.50	97.57	13.76	1.60	28.30	"	"	"
1.55	98.96	13.96	0.30	28.30	"	"	"
1.58	99.26	14.00	nil	nil	"	"	"

Weight of coal treated : 145 lb.
 Over-all ash : 14.20%
 No special advantage accrues from cleaning.

G. 146B

RANIGANJ FIELD

BHARATCHAK SEAM

Size (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	Over 2 ...	0.69	10.80	6.45	13.30	2.17	20.60	0.96	26.15	0.71	31.85	2.47	35.20	1.79	44.30	15.24
2—1 ...	5.35	10.50	17.16	13.90	7.55	20.05	2.01	28.90	5.08	31.05	2.27	36.80	4.06	47.40	44.68	22.08
1—½ ...	3.43	7.74	6.18	15.15	3.06	20.61	1.10	27.70	0.82	32.32	0.62	35.06	1.54	40.11	16.75	20.19
½—¼ ...	2.81	7.40	3.53	15.06	1.52	19.85	0.58	25.05	0.52	29.70	0.15	33.15	1.18	49.06	10.29	19.14
¼—⅛ ...	2.67	5.53	1.39	14.62	0.61	19.77	0.36	25.20	0.23	28.96	0.11	32.73	0.60	51.52	5.97	16.32
⅛—30-mesh ...	2.61	3.94	0.82	13.58	0.41	18.84	0.26	23.76	0.17	27.06	0.07	30.06	0.53	50.85	4.87	14.16
× 30-mesh ...	1.14	3.54	0.25	13.25	0.17	17.01	0.11	22.50	0.10	23.92	0.08	29.16	0.37	54.91	2.20	16.95
Totals & Averages	18.70	7.40	35.78	14.14	15.49	20.15	5.98	27.31	7.03	31.32	5.75	35.69	10.07	47.97	100	20.77
Cum. ash. % ...	7.40		11.86		13.60		14.76		16.28		17.52		20.77			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30—00 ...	1.28	15.16
× 00 ...	0.92	19.40
Cum. ash ...	16.95	

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	18.70	7.40	70.03	20.18	1.58	10.67	47.07
1.40	54.48	11.86	34.85	26.30	"	"	"
1.45	60.07	13.69	19.36	31.38	"	"	"
1.50	75.95	14.76	13.33	33.20	"	"	"
1.55	83.53	16.28	5.75	35.60	"	"	"
1.58	89.33	17.52	nil	nil	"	"	"

Weight of coal treated : 73 lb.

Over-all ash : 20.77%.

An 83% production of 16% ash clean coal may be attractive. See also G. 146B(a) (curve).

G. 146C

RANIGANJ FIELD

BHARATCHAK SEAM

Size (inches)	Float at 1.35 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	nil	...	1.19	17.55	3.64	20.90	1.98	25.90	4.74	27.20	4.14	34.70	2.81	41.15	18.50	29.00
2 — 1 ...	nil	...	6.09	15.70	15.02	20.60	0.09	26.70	0.88	30.90	2.85	32.35	4.00	42.05	47.83	26.25
1 — ½ ...	0.47	0.15	2.01	14.86	4.09	20.56	2.80	24.05	1.30	30.72	0.79	34.77	2.77	45.19	14.23	26.58
½ — ¼ ...	1.12	5.15	0.96	14.15	1.37	10.75	1.22	24.16	0.95	20.38	0.41	32.58	1.80	48.10	7.83	26.02
¼ — ⅛ ...	1.90	3.70	0.50	14.23	0.46	19.53	0.47	23.85	0.38	28.59	0.14	32.71	0.97	48.42	4.82	20.10
⅛ — 30-mesh ...	2.60	2.06	0.36	13.90	0.26	19.09	0.25	22.90	0.27	27.03	0.13	31.21	0.78	49.57	4.74	15.54
× 30-mesh ...	1.03	2.44	0.16	11.92	0.09	15.96	0.10	19.32	0.14	24.15	0.08	27.08	0.45	51.88	2.05	17.89
Totals & Averages	7.21	3.84	11.27	15.44	24.03	20.54	15.01	25.75	17.66	20.65	8.54	33.65	14.48	44.07	100	25.81
Cum. ash % ...	3.84		10.91		16.44		18.94		21.39		22.62		25.81			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
80 — 60 ...	1.23	16.00
× 60 ...	0.82	20.64

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	7.21	3.84	78.31	24.35	1.58	14.48	44.07
1.40	18.48	10.91	67.04	25.85	"	"	"
1.45	43.41	16.44	42.11	28.09	"	"	"
1.50	50.32	18.94	26.20	30.06	"	"	"
1.55	76.98	21.39	8.54	33.66	"	"	"
1.58	85.52	22.62	nil	nil	"	"	"

Weight of coal treated : 63 lb.

Over-all ash : 25.81%.

Not a very promising result. See also G. 146C(a) (curve).

G. 41

BOKARO FIELD

XXI SEAM

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.57 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.57 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	6-3 ...	1.04	13.41	9.47	18.05	3.26	23.48	1.78	29.14	0.96	30.98	11.71	37.65	28.22	27.78
3-2 ...	1.53	13.22	4.20	17.72	2.27	23.30	0.98	27.83	0.35	30.04	4.21	40.32	13.63	26.10
2-1 ...	3.03	13.07	8.55	17.75	3.55	23.88	2.83	28.05	0.69	30.70	6.63	40.67	26.18	25.14
1-1/2 ...	2.13	12.52	3.26	17.63	1.35	22.85	1.52	26.53	0.26	30.93	2.72	41.53	11.24	24.58
1-1/4 ...	1.88	10.83	1.06	17.10	0.97	21.92	0.63	26.28	0.38	29.97	1.60	42.13	6.52	23.78
1/2-30-mesh ...	5.08	6.10	1.13	16.05	0.94	20.94	0.61	25.45	0.30	29.02	1.93	44.00	9.90	17.90
x 30-mesh ...	2.00	4.38	0.44	11.65	0.51	16.48	0.36	10.22	0.13	28.03	0.69	52.82	4.22	10.51
Totals & Averages	17.68	9.77	28.20	17.04	12.85	22.91	8.71	27.31	3.07	30.43	20.49	40.14	100	24.80
Cum. ash % ...	9.77		14.61		16.43		17.83		18.38		21.80			

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RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh)	Amount %	Ash %
30-60 ...	2.13	14.05
x 60 ...	2.07	17.20
Cum. ash ...	10.05	

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1.40	17.68	9.77	52.83	21.26	1.57	29.49	40.14	
1.45	45.88	14.61	24.63	25.41	"	"	"	
1.50	58.73	16.43	11.78	28.13	"	"	"	
1.55	67.44	17.83	3.07	30.43	"	"	"	
1.57	70.51	18.38	nil	nil	"	"	"	

Over-all ash: 24.80%.

G. 42

BOKARO FIELD

LEIYO SEAM

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.57 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.57 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
6—3 ...	2.90	14.78	14.19	10.43	6.68	25.87	3.24	29.52	0.88	32.82	5.33	38.08	33.22	24.70
3—2 ...	1.44	13.77	5.25	18.02	3.05	24.00	2.33	29.47	0.62	32.57	2.18	40.62	14.87	25.05
2—1 ...	3.74	13.72	8.10	18.68	5.22	25.00	3.31	28.97	1.09	32.08	4.57	42.40	26.12	23.33
1—1/2 ...	1.63	12.77	2.15	18.42	1.57	23.58	1.32	28.23	0.36	31.50	1.40	42.12	8.52	24.50
1/2—1 ...	1.74	9.87	1.68	18.07	0.98	23.55	0.82	28.42	0.28	30.97	1.16	41.90	6.64	22.68
1/2—30-mesh ...	3.78	6.03	0.73	17.58	0.55	22.48	0.70	26.55	0.22	29.70	1.33	44.28	7.31	18.05
× 30-mesh ...	1.00	5.90	0.25	16.15	0.24	19.70	0.18	24.95	0.13	27.30	0.53	47.25	3.32	16.14
Totals & Averages	17.22	10.83	32.44	18.95	18.20	22.22	11.88	28.90	3.58	31.88	16.50	41.31	100	23.51
Cum. ash % ...	10.83		16.14		17.77		19.43		19.00		23.51			

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RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh)	Amount %	Ash %
30—60 ...	1.40	14.65
× 60 ...	1.83	15.05
Cum. ash ...	15.87	

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	17.22	10.83	66.19	22.34	1.57	16.59	41.31
1.45	49.66	10.14	38.75	25.60	"	"	"
1.50	67.95	17.77	15.46	29.58	"	"	"
1.55	70.83	10.43	3.58	31.88	"	"	"
1.57	83.41	10.06	nil	nil	"	"	"

Over-all ash : 23.51%.

G. 43

BOKARO FIELD WEST

X SEAM

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.57 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.57 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	14.06	13.05	14.06	18.10	7.30	25.55	4.17	28.30	1.04	32.10	0.37	38.40	50.00	22.71
2-1 ...	12.50	12.80	9.38	18.36	3.01	24.55	1.30	28.90	0.78	32.75	3.38	30.15	31.25	10.63
1-1/2 ...	4.20	11.46	2.34	18.10	1.10	23.95	0.82	27.45	0.26	30.70	1.25	38.20	10.00	19.42
1/2-1/2 ...	2.34	10.35	0.78	18.30	0.52	22.50	0.52	27.00	0.04	31.85	0.40	30.00	4.00	17.71
1/2-1/4 ...	1.05	8.10	0.25	18.15	0.15	22.15	0.10	26.90	0.06	30.80	0.10	41.50	1.80	15.09
1/2-30-mesh ...	1.06	5.00	0.14	17.80	0.08	22.50	0.06	27.00	0.01	30.00	0.20	51.85	1.55	14.53
x 30-mesh ...	0.55	4.25	0.05	17.45	0.03	23.00	0.02	27.10	0.01	32.00	0.08	58.95	0.74	12.82
Totals & Averages	35.85	11.81	27.00	18.10	13.09	24.88	0.09	28.18	2.20	32.12	14.87	38.92	100	20.87
Cum ash % ...	11.81		14.55		10.33		17.33		17.71		20.87			

103

RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh)	Amount %	Ash %
30-60 ...	0.41	11.10
x 60 ...	0.33	12.55
Cum. ash ...	11.74	

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	35.85	11.81	49.28	22.01	1.57	14.87	38.92
1.45	62.85	14.55	22.28	26.03	"	"	"
1.50	75.94	16.33	9.10	20.12	"	"	"
1.55	82.93	17.33	2.20	32.12	"	"	"
1.57	85.13	17.71	nil	nil	"	"	"

Over-all ash - 20.87%.

G. 88

BOKARO FIELD

KARO SEAM

Size (inches)	Float at 1.45 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	nil	...	nil	...	0.08	11.40	0.66	15.80	12.66	21.60	14.30	20.63
2—1 ...	nil	...	nil	...	1.48	12.45	0.98	15.05	7.88	21.50	10.34	19.59
1— $\frac{1}{2}$...	nil	...	0.98	7.80	2.05	11.55	3.41	15.30	9.71	22.05	17.05	18.40
$\frac{1}{2}$ — $\frac{1}{4}$...	0.23	4.20	1.55	7.98	4.16	11.70	2.88	14.55	10.26	22.50	19.08	17.54
$\frac{1}{4}$ — $\frac{1}{8}$...	0.91	2.70	1.72	6.85	3.69	10.90	1.97	14.05	6.01	22.20	14.30	15.07
$\frac{1}{8}$ —30-mesh ...	3.72	2.35	1.95	5.70	3.03	9.15	1.77	12.40	4.55	21.30	15.02	11.08
x 30-mesh ...	1.54	2.85	1.58	5.53	1.93	7.67	1.04	10.30	3.82	24.65	9.91	13.40
Totals & Averages	6.40	2.50	7.78	6.64	18.22	10.70	12.71	14.13	54.80	22.20	100	16.61
Cum. ash % ...	2.50		4.81		8.12		9.82		16.61			

104

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30—60 ...	4.66	10.90
x 60 ...	5.25	15.30
Cum. ash ...	19.40	

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.45	6.40	2.50	38.71	11.00	1.58	54.80	22.20
1.50	14.18	4.81	30.93	12.11	"	"	"
1.55	32.40	8.12	12.71	14.13	"	"	"
1.58	45.11	9.82	nil	nil	"	"	"

Weight of coal treated: 152 lb.

Over-all ash: 16.61%.

G. 89

BOKARO FIELD

KARO SEAM

105

Size (inches)	Float at 1.45 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	nil	...	nil	...	0.25	13.15	0.31	16.72	8.40	23.10	9.05	22.00
2 — 1 ...	nil	...	0.08	11.50	1.23	12.92	2.97	17.10	12.40	23.20	16.68	21.30
1 — ½ ...	nil	...	0.31	9.00	2.16	12.40	4.76	16.48	15.32	25.00	22.55	21.80
½ — ¼ ...	0.08	5.80	0.32	9.15	2.67	11.12	3.61	15.00	20.03	25.20	26.71	22.10
¼ — ⅛ ...	0.21	3.50	0.41	7.72	1.37	10.92	1.53	14.30	7.01	24.15	11.43	20.28
⅛ — 30-mesh ...	1.43	3.35	0.70	6.40	1.20	10.38	1.07	13.10	4.15	23.80	8.64	15.64
× 30-mesh ...	0.40	3.25	0.60	5.40	0.67	9.28	0.57	10.70	2.52	24.85	4.94	16.25
Totals & Averages	2.21	3.43	2.00	7.15	9.55	11.44	14.82	15.56	70.82	24.34	100	20.90
Cum. ash % ...	3.43		5.44		9.43		12.54		20.90			

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30 — 60 ...	2.37	14.20
× 60 ...	2.57	19.00

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.45	2.21	3.43	26.97	13.29	1.58	70.82	24.34
1.50	4.81	5.44	24.37	13.95	"	"	"
1.55	14.36	9.43	14.82	15.56	"	"	"
1.58	20.18	12.54	nil	nil	"	"	"

Weight of coal treated : 162 lb.

Over-all ash : 20.90%.

G. 90

BOKARO FIELD

KARO SEAM

SIZE (Inches)	Float at 1.45 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	nil	...	1.06	10.90	1.18	12.70	0.34	14.12	3.09	22.00	5.62	17.56
2-1 ...	nil	...	0.32	10.55	1.12	12.00	1.61	15.70	7.27	22.18	10.32	19.70
1- $\frac{1}{2}$...	nil	...	1.16	9.30	2.58	12.60	5.41	15.50	17.28	23.72	26.43	20.32
$\frac{1}{2}$ - $\frac{1}{2}$...	0.06	6.10	0.77	10.40	4.34	11.72	6.68	14.35	21.53	23.25	33.88	19.64
$\frac{1}{2}$ - $\frac{1}{4}$...	0.18	3.95	0.35	7.15	1.61	11.18	2.06	13.60	8.38	22.90	12.58	19.03
$\frac{1}{2}$ -30-mesh ...	1.30	2.80	0.61	6.05	1.18	9.12	0.86	13.50	3.72	23.15	7.67	15.17
x 30-mesh ...	0.56	3.20	0.64	4.85	0.70	8.43	0.36	11.30	1.74	24.00	4.00	14.15
Totals & Averages	2.10	3.10	4.01	8.87	12.66	11.52	17.32	14.63	63.01	23.13	100	19.07
Cum. ash % ...	3.10		7.14		9.95		12.15		19.07			

901

RESULT OF SCREENING THE 30-MESH MATERIAL		
SIZE (mesh)	Amount %	Ash %
80-60 ...	2.00	12.60
x 60 ...	2.00	15.52
Cum. ash ...	14.16	

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1.45	2.10	3.10	34.89	12.60	1.58	63.01	23.13	
1.50	7.01	7.14	20.08	13.32	"	"	"	
1.55	19.67	9.95	17.32	14.63	"	"	"	
1.58	36.90	12.15	nil	nil	"	"	"	

Weight of coal treated : 77 lb.

Over-all ash : 19.07%.

G. 65

CENTRAL PROVINCES

CHIRIMIRI

Size (inches)	Float at 1'30 sp. gr.		Float at 1'35 sp. gr. Sink at 1'30 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	11'45	8'83	26'57	11'65	8'71	14'50	6'77	18'25	1'01	28'25	0'82	32'10	1'03	36'10	6'87	40'10	63'23	17'23
2—1 ...	2'11	6'55	6'78	10'85	2'06	15'28	1'88	21'05	0'73	20'00	0'55	29'35	0'46	34'90	2'38	47'70	16'95	19'06
1—½ ...	1'14	5'80	3'32	10'08	1'49	14'95	0'78	21'80	0'27	26'30	0'37	30'80	0'14	33'70	1'42	51'40	8'93	19'88
½—¼ ...	0'46	5'15	0'87	8'00	1'24	11'45	0'46	13'55	0'46	16'00	0'58	20'30	0'16	26'37	0'03	46'40	5'15	18'64
¼—⅛ ...	0'43	4'18	0'38	7'97	0'15	9'37	0'38	12'17	0'38	16'55	0'10	21'68	0'08	27'60	0'30	48'77	2'29	17'70
⅛—30-mesh ...	0'33	2'25	0'33	6'58	0'12	8'07	0'27	11'45	0'21	15'87	0'10	20'66	0'05	25'38	0'54	72'90	1'95	27'18
x 30-mesh ...	0'13	2'60	0'11	4'40	0'17	10'05	0'16	12'10	0'11	15'55	0'11	28'38	0'04	21'20	0'67	73'75	1'50	39'00
Totals & Averages	16'05	7'90	38'36	11'24	13'94	14'23	10'70	18'32	3'17	23'13	2'63	18'12	1'95	33'97	13'20	51'12	100	18'41
Cum. ash % ...	7'90		10'26		11'06		12'05		12'48		12'90		13'42		18'41			

107

RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh)	Amount %	Ash %
30—60 ...	0'72	40'05
x 60 ...	0'78	40'20

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1'30	16'05	7'90	70'75	14'68	1'57	13'20	51'12	
1'35	54'41	10'26	32'30	18'77	"	"	"	
1'40	68'35	11'06	18'45	22'20	"	"	"	
1'45	79'05	12'05	7'75	27'55	"	"	"	
1'50	82'22	12'48	4'58	30'60	"	"	"	
1'55	84'85	12'06	1'95	33'97	"	"	"	
1'58	86'80	13'42	nil	nil	"	"	"	

Over-all ash : 18'41%.

A very satisfactory result ; for example a 90% output of 14% ash product can be obtained.

G. 67

CENTRAL PROVINCES

PENCH VALLEY

NEWTON CHIKLI

Size (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	1'68	14'65	1'69	21'02	1'03	24'07	0'16	29'27	0'60	34'60	0'12	33'90	0'09	04'20	5'36	22'39
2—1 ...	7'46	13'15	8'03	18'80	3'75	24'30	0'69	30'00	0'60	32'50	0'92	33'75	1'28	53'85	23'72	21'09
1—½ ...	9'00	11'83	7'01	17'60	4'59	22'60	1'53	27'78	1'38	31'40	0'61	34'95	2'14	45'98	23'06	20'16
½—¼ ...	6'04	0'55	1'65	12'00	2'54	15'75	2'90	18'80	4'02	23'40	1'06	29'40	2'97	40'90	21'18	19'84
¼—⅓ ...	2'40	6'69	0'74	12'22	0'84	15'85	0'78	10'52	0'53	23'05	0'45	27'58	1'66	44'68	7'40	20'66
¼—30-mesh ...	4'34	8'05	0'78	10'65	0'65	18'68	0'65	18'23	0'52	22'30	0'17	26'70	1'56	61'19	8'67	15'95
x 30-mesh ...	1'32	3'10	0'48	6'35	0'48	10'30	0'34	16'35	0'73	18'40	0'24	23'75	2'02	56'78	5'61	27'00
Totals & Averages	33'14	0'98	22'17	17'32	13'88	20'66	7'05	22'00	8'47	25'77	3'57	30'83	11'72	48'06	100	20'40
Cum. ash % ...	9'98		12'92		14'48		15'17		16'23		16'83		20'49			

108

RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh)	Amount %	Ash %
30—60 ...	2'47	18'50
x 60 ...	3'14	32'00

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1'35	33'14	0'98	55'14	20'94	1'57	11'72	48'06
1'40	55'31	12'92	32'97	23'37	"	"	"
1'45	69'19	14'48	19'09	25'33	"	"	"
1'50	76'24	15'17	12'04	27'29	"	"	"
1'55	84'71	16'23	3'57	30'90	"	"	"
1'58	88'23	16'83	nil	nil	"	"	"

Over-all ash : 20'40%.
Some promise of economic treatment.

G. 81

CENTRAL PROVINCES

MAJRI (CHANDA DIST.)

SIZE (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	Over 1 ...	0.32	8.27	5.06	14.52	3.07	10.50	2.50	20.50	1.22	24.80	1.30	27.40	2.74	36.20	16.80	20.92
1 — ½ ...	3.04	9.50	11.01	13.40	9.06	15.80	8.42	21.30	1.22	22.80	1.75	27.82	5.50	37.67	40.00	19.50
½ — ¼ ...	2.46	8.30	4.57	11.65	5.13	14.85	1.64	17.55	2.40	22.55	1.33	26.65	3.51	30.20	21.04	18.78
¼ — ⅛ ...	1.43	0.10	2.07	10.40	1.62	14.10	2.20	17.02	0.81	22.22	0.73	25.40	1.73	36.00	10.68	18.07
⅛ — 30-mesh ...	0.71	4.00	1.40	8.35	1.00	11.40	1.74	15.85	0.99	19.70	0.59	23.50	1.34	35.40	7.77	17.37
× — 30-mesh ...	0.22	4.10	0.63	6.32	0.82	0.32	0.56	13.70	0.45	18.70	0.20	23.00	0.74	37.25	3.62	16.81
Totals & Averages	8.18	7.05	25.34	12.63	20.70	15.00	17.24	19.58	7.00	22.30	5.89	26.57	15.56	36.68	100	10.20
Cum. ash % ...	7.05		11.45		12.80		14.47		15.18		16.00		10.20			

601

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30 — 60 ...	1.83	10.40
× 60 ...	1.74	16.25

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1.35	8.18	7.05	76.26	16.34	1.58	15.56	36.08	
1.40	33.52	11.45	50.92	18.93	"	"	"	
1.45	54.22	12.80	30.22	21.51	"	"	"	
1.50	71.40	14.47	12.98	24.24	"	"	"	
1.55	78.55	15.18	5.80	26.57	"	"	"	
1.58	84.44	16.00	nil	nil	"	"	"	

Over-all ash : 10.20%.

A promising result. Without crushing we obtain 78% of clean coal with 15% of ash or 84% with 16% of ash.

G. 143

CENTRAL PROVINCES

REWA COALFIELD

BIRSINGHPUR

SIZE (inches)	Float at 1'30 sp. gr.		Float at 1'35 sp. gr. Sink at 1'30 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	13.88	11.95	8.01	15.30	9.45	18.20	2.09	22.55	0.30	23.35	1.25	27.70	0.42	32.00	2.40	47.80	37.80	17.92
2—1 ...	9.03	8.60	3.26	13.80	5.05	15.80	0.33	20.00	0.75	23.70	0.84	27.80	0.36	28.90	5.08	43.60	24.70	19.52
1—½ ...	4.18	7.75	2.33	11.90	2.75	17.10	0.02	18.50	0.09	22.60	0.21	25.50	0.12	27.45	2.08	46.00	11.78	18.16
½—½ ...	0.34	3.90	2.08	5.75	2.86	11.30	1.32	15.80	0.33	20.70	0.32	24.40	0.13	28.40	1.77	45.10	10.05	16.90
¼—½ ...	0.37	2.05	2.50	4.50	1.43	9.80	0.82	14.30	0.29	19.10	0.16	23.60	0.08	25.90	1.07	45.40	6.52	14.60
¼—30-mesh ...	0.05	3.10	2.08	5.70	1.22	6.40	0.80	9.70	0.45	14.10	0.26	19.70	0.06	23.50	1.03	50.50	6.04	15.45
× 30-mesh ...	0.02	2.90	0.72	4.10	0.77	7.20	0.37	9.70	0.30	13.00	0.19	16.80	0.07	22.10	0.67	60.70	3.11	10.76
Totals & Averages	27.87	10.00	21.88	10.90	23.53	15.24	5.64	17.03	2.51	10.72	3.23	25.77	1.24	28.01	14.10	46.31	100	17.93
Cum. ash % ...	10.00		10.39		11.95		12.31		12.45		13.04		13.27		17.93			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30—60 ...	1.43	19.18
× 60 ...	1.68	20.05

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1.30	27.87	10.00	58.03	14.85	1.58	14.10	46.31	
1.35	49.75	10.39	30.15	17.24	"	"	"	
1.40	73.28	11.95	12.62	20.07	"	"	"	
1.45	78.92	12.31	6.98	24.15	"	"	"	
1.50	81.43	12.54	4.47	26.64	"	"	"	
1.55	84.66	13.04	1.24	28.91	"	"	"	
1.58	85.90	13.27	nil	nil	"	"	"	

Weight of coal treated : 836 lb.

Over-all ash : 17.93%.

A somewhat promising result.

No advantage accrues from crushing.

G. 151

**CENTRAL PROVINCES
KOREA STATE, KURASIA
GORGHELA SEAM**

111

Size (inches)	Float at 1.35 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	20.30	8.64	1.97	16.35	nil	...	nil	...	nil	...	nil	...	nil	...	22.36	9.32
2—1 ...	15.75	8.81	0.90	12.10	0.70	15.12	nil	...	0.04	32.16	0.04	34.21	1.18	41.86	18.70	11.42
1—½ ...	15.06	7.85	5.90	12.35	2.17	14.86	1.18	17.58	0.50	21.05	0.39	24.90	1.28	38.50	26.57	11.87
½—½ ...	1.87	5.34	3.51	8.85	2.36	11.51	1.90	14.90	1.38	18.32	0.61	23.56	1.36	35.91	12.99	14.42
¼—½ ...	1.00	3.66	1.95	7.55	1.24	11.05	1.00	13.86	1.04	17.08	0.42	21.94	1.22	45.45	7.87	16.31
¼—30-mesh ...	1.34	2.18	1.25	5.94	1.00	10.15	0.74	12.01	0.62	16.90	0.30	21.32	1.15	59.30	6.40	18.00
× 30-mesh ...	0.64	3.01	0.43	6.90	0.20	10.82	0.13	11.36	0.21	14.21	0.41	15.86	3.09	67.55	5.11	44.40
Totals & Averages	56.05	8.06	15.91	10.82	7.76	12.55	4.95	14.94	3.88	18.10	2.17	21.91	9.28	51.72	100	13.93
Cum. ash % ...	8.06		8.67		9.05		9.30		9.77		10.06		13.93			

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30—60 ...	1.94	35.15
× 60 ...	3.17	50.76

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	50.05	8.06	34.67	13.30	1.58	9.28	51.72
1.40	71.06	8.67	18.76	15.41	"	"	"
1.45	79.72	9.05	11.00	17.43	"	"	"
1.50	84.67	9.30	6.05	19.47	"	"	"
1.55	88.55	9.77	2.17	21.91	"	"	"
1.58	90.72	10.06	nil	nil	"	"	"

Weight of coal treated : 51 lb.

Over-all ash : 13.93%.

A promising result.

G. 152

CENTRAL PROVINCES

CHHINDWARA

HIDRAGARH

Size (inches)	Float at 1.35 sp. gr.		Float at 1.40 sp. gr.		Float at 1.45 sp. gr.		Float at 1.50 sp. gr.		Float at 1.55 sp. gr.		Float at 1.58 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
			Sink at 1.35 sp. gr.		Sink at 1.40 sp. gr.		Sink at 1.45 sp. gr.		Sink at 1.50 sp. gr.		Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.			
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	3.20	13.46	33.91	17.10	40.84	20.70	9.24	25.78	nil	...	nil	...	nil	...	87.19	19.57
2-1 ...	...	...	2.34	16.22	3.74	20.33	0.70	27.01	nil	...	nil	...	nil	...	6.78	10.60
1-1/2 ...	0.25	10.31	1.43	15.24	0.87	20.00	0.35	24.78	0.18	20.03	nil	...	0.12	38.05	3.20	18.34
1/2-1/2 ...	0.20	8.66	0.32	14.26	0.20	19.46	0.12	23.04	0.07	26.79	0.01	29.45	0.05	38.46	0.97	17.57
1/4-1/2 ...	0.20	6.62	0.15	14.03	0.08	10.07	0.05	22.32	0.04	26.65	0.03	29.01	0.04	44.75	0.58	16.41
1/4-30-mesh ...	0.32	4.54	0.14	13.54	0.06	18.46	0.05	21.70	0.05	25.54	0.01	29.36	0.07	50.71	0.70	15.24
x 30-mesh ...	0.24	3.20	0.13	12.85	0.06	15.74	0.03	20.87	0.03	22.66	0.01	26.84	0.08	60.11	0.58	16.88
Totals & Averages	4.41	11.55	38.42	16.91	45.85	20.64	10.54	25.76	0.37	27.35	0.05	29.00	0.36	46.22	100	19.47
Cum. ash % ...	11.55		16.36		18.57		19.34		19.36		19.37		19.47			

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RESULT OF SCREENING THE 80 MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30-60 ...	0.27	14.30
x 60 ...	0.31	20.55

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	4.41	11.55	95.23	19.73	1.58	0.36	40.22
1.40	42.83	10.36	56.81	21.64	"	"	"
1.45	88.68	18.57	10.06	25.82	"	"	"
1.50	99.22	10.34	0.42	27.57	"	"	"
1.55	99.59	10.36	0.05	20.00	"	"	"
1.58	99.64	10.37	nil	nil	"	"	"

Weight of coal treated . 52 lb.

Over-all ash : 10.47%.

A very disappointing result. Although the recovery at sp. gr. 1.58 is high, the ash reduction is not promising.

G. 158

CENTRAL PROVINCES

UMARIA

SIZE (inches)	Float at 1·30 sp. gr.		Float at 1·35 sp. gr. Sink at 1·30 sp. gr.		Float at 1·40 sp. gr. Sink at 1·35 sp. gr.		Float at 1·45 sp. gr. Sink at 1·40 sp. gr.		Float at 1·50 sp. gr. Sink at 1·45 sp. gr.		Float at 1·55 sp. gr. Sink at 1·50 sp. gr.		Float at 1·58 sp. gr. Sink at 1·55 sp. gr.		Sink at 1·58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
2—1 ...	25·91	10·40	28·00	12·75	12·12	16·40	0·62	17·90	0·27	21·20	1·46	27·00	1·25	30·40	6·43	45·90	76·06	15·07
1—½ ...	2·51	7·20	3·34	10·00	2·80	13·10	1·25	17·30	0·25	20·50	0·33	24·25	0·13	28·20	1·00	45·80	11·70	15·09
½—¼ ...	0·55	3·30	1·33	7·95	1·74	12·30	0·84	16·10	0·24	19·10	0·15	22·30	0·06	27·60	0·52	45·60	5·43	14·84
¼—⅛ ...	0·32	2·80	0·82	6·60	0·76	10·90	0·48	14·80	0·20	19·00	0·07	21·75	0·04	27·10	0·23	46·10	2·02	13·25
⅛—30-mesh ...	0·26	2·20	0·91	5·10	0·55	10·50	0·37	13·00	0·21	17·30	0·09	21·85	0·03	25·70	0·21	47·80	2·63	12·24
× 30-mesh ...	0·13	2·00	0·34	4·40	0·28	8·60	0·24	10·90	0·09	16·50	0·06	19·30	0·02	25·20	0·10	54·00	1·26	12·24
Totals & Averages	29·68	9·81	34·74	11·96	18·34	14·06	3·80	16·00	1·26	19·32	2·16	25·66	1·53	29·86	8·40	46·02	100	15·58
Cum. ash % ...	9·81		10·97		11·85		12·04		12·14		12·47		12·76		15·58			

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RESULT OF SCREENING THE 30 MESH MATERIAL		
SIZE (mesh)	Amount %	Ash %
30—60 ...	0·63	11·80
× 60 ...	0·63	12·40

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1·30	29·68	9·81	61·83	14·17	1·58	8·49	46·02	
1·35	64·42	10·97	27·09	17·00	"	"	"	
1·40	82·76	11·85	8·75	21·28	"	"	"	
1·45	86·56	12·04	4·05	25·34	"	"	"	
1·50	87·82	12·14	3·09	27·40	"	"	"	
1·55	89·08	12·47	1·53	29·86	"	"	"	
1·58	91·51	12·76	nil	nil	"	"	"	

Weight of coal treated: 120 lb.

Over-all ash: 15·59%.

In the sample as received there were only 30 pieces, none of which was less than 4-in. in size. As this could not be considered truly representative, all were crushed to pass a 2-in. screen for the test.

Little advantage is gained from cleaning.

G. 162

CENTRAL
PROVINCES

REWA STATE

BURHAR

Size (inches)	Float at 1·30 sp. gr.		Float at 1·35 sp. gr. Sink at 1·30 sp. gr.		Float at 1·40 sp. gr. Sink at 1·35 sp. gr.		Float at 1·45 sp. gr. Sink at 1·40 sp. gr.		Float at 1·50 sp. gr. Sink at 1·45 sp. gr.		Float at 1·55 sp. gr. Sink at 1·50 sp. gr.		Float at 1·58 sp. gr. Sink at 1·55 sp. gr.		Sink at 1·58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
	Over 2 ...	2·07	11·20	3·30	15·90	2·51	20·90	0·31	22·80	0·16	31·55	0·47	32·70	0·35	36·60	0·09	40·05	9·26	18·58
2—1 ...	5·05	9·45	13·06	13·55	9·96	17·90	3·07	22·20	1·73	27·10	0·22	31·60	1·07	33·10	1·32	40·30	33·28	17·10
1—½ ...	3·02	7·55	5·97	11·80	5·18	16·00	2·20	20·15	1·20	25·55	0·38	28·85	0·47	32·00	1·00	41·30	20·41	16·20
½—¼ ...	1·09	4·56	3·16	7·10	5·83	11·50	4·18	17·15	1·20	21·05	0·82	25·45	0·42	28·90	1·48	38·20	18·21	15·48
¼—⅓ ...	0·60	2·50	2·08	5·00	2·46	10·90	2·15	17·45	0·53	10·60	0·42	23·00	0·22	28·50	0·65	40·85	9·11	14·34
¼—30-mesh ...	1·20	1·65	1·52	6·05	1·50	10·90	0·92	15·80	0·48	18·70	0·46	23·40	0·16	28·10	0·58	43·60	6·91	13·27
× 30-mesh ...	0·54	1·65	0·03	5·80	0·54	9·90	0·32	13·85	0·23	15·35	0·21	21·25	0·08	25·60	0·27	52·00	2·82	13·81
Totals & Averages	15·16	7·66	36·31	11·71	23·98	15·04	13·70	18·99	5·71	23·63	2·08	26·61	2·77	31·25	5·33	40·91	100	16·15
Cum ash % ...	7·66		10·36		11·98		13·13		13·81		14·23		14·74		16·15			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30—00 ...	1·44	13·30
× 60 ...	1·38	14·80

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1·30	15·10	7·06	79·45	10·00	1·58	5·30	40·91	
1·35	45·47	10·36	49·14	18·70	"	"	"	
1·40	60·45	11·93	25·16	22·38	"	"	"	
1·45	83·15	13·13	11·40	26·39	"	"	"	
1·50	88·80	13·81	5·75	20·11	"	"	"	
1·55	91·84	14·22	2·77	31·85	"	"	"	
1·58	94·81	14·74	nil	nil	"	"	"	

Weight of coal treated: 150 lb.

Over-all ash: 16·15%.

The coal is of comparatively low ash content. The reduction of 3% in ash content with a recovery of 83·15% of clean coal may be attractive.

G. 170

CENTRAL PROVINCES

BALLARPUR

TOP SEAM

Size (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
2-1 ...	3.00	10.00	0.67	13.01	5.50	10.95	1.61	24.02	0.77	28.07	0.43	32.80	2.52	40.11	21.58	10.51
1-1/2 ...	7.44	0.20	8.06	14.00	7.48	18.27	2.52	23.05	1.71	27.68	0.23	30.45	2.14	39.05	30.23	17.40
1-1/4 ...	0.17	7.74	0.76	12.72	4.10	17.40	1.99	20.97	1.75	24.47	0.72	27.61	1.80	37.82	23.44	16.27
1-1/8 ...	3.00	0.02	3.50	11.42	1.87	10.16	0.95	18.80	1.33	22.02	0.38	20.05	1.25	30.21	13.06	15.07
1/2 - 30-mesh ...	2.08	4.40	1.93	10.14	1.15	13.89	0.70	17.27	0.81	21.12	0.38	25.57	0.86	36.30	8.00	13.87
x 30-mesh ...	0.86	3.76	0.53	8.89	0.42	12.27	0.30	14.52	0.31	18.36	0.15	23.27	0.43	41.00	3.09	14.74
Totals & Averages	24.83	7.81	23.14	12.04	20.70	18.00	8.25	21.47	6.08	24.05	2.34	28.14	0.06	38.07	100	16.00
Cum. ash % ...	7.81		10.56		12.04		13.54		14.37		14.73		10.00			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30-60 ...	1.70	14.35
x 60 ...	1.30	17.50

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1'35	24.83	7.81	66.11	17.32	1'58	0.06	38.07	
1'40	52.07	10.56	37.97	20.54	"	"	"	
1'45	73.07	12.04	17.27	23.60	"	"	"	
1'50	81.02	13.54	0.02	25.55	"	"	"	
1'55	88.60	14.37	2.34	28.14	"	"	"	
1'58	90.04	14.73	nil	nil	"	"	"	

Weight of coal treated : 84 lb.

Over-all ash : 16.00%.

The quantity of coal received for the washability test is too small. However, the coal is of fairly low ash content. There is some hope of economic cleaning.

G. 171

CENTRAL PROVINCES

BALLARPUR

BOTTOM SEAM

Size (inches)	Float at 1'35 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
2—1 ...	1.88	0.43	0.04	13.30	2.20	15.88	0.25	22.75	nil	...	nil	...	0.36	50.95	10.82	14.65
1—½ ...	5.64	8.70	11.78	12.60	6.82	17.05	0.61	21.33	0.30	23.15	0.10	25.85	0.84	41.01	26.00	14.21
½—¼ ...	4.94	6.71	12.21	11.12	7.74	16.01	1.51	19.22	1.01	22.45	0.27	25.48	1.36	41.40	29.04	14.04
¼—⅛ ...	4.04	5.58	5.94	10.20	3.37	15.13	1.73	17.90	0.79	22.15	0.17	26.15	0.79	41.03	16.83	13.04
¼—30-mesh ...	3.90	4.75	3.77	0.40	2.59	14.02	1.24	17.43	0.86	21.28	0.16	25.75	0.80	41.95	13.47	12.68
× 30 mesh ...	0.90	3.02	1.03	8.10	0.58	12.75	0.40	14.42	0.19	10.92	0.08	24.15	0.39	46.90	3.75	13.44
Totals & Averages	21.48	6.75	40.77	11.50	23.39	15.87	5.83	18.42	3.15	21.97	0.78	25.59	4.60	42.58	100	13.78
Cum. ash % ...	6.75		9.86		11.50		11.04		12.23		12.39		13.78			

911

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30—60 ...	2.18	12.75
× 60 ...	1.57	14.35

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.35	21.48	6.75	73.02	14.02	1.58	4.60	42.58
1.40	02.25	9.86	33.15	17.13	"	"	"
1.45	85.64	11.50	0.76	20.14	"	"	"
1.50	91.47	11.04	3.03	22.09	"	"	"
1.55	94.62	12.28	0.78	25.59	"	"	"
1.58	05.40	12.30	nil	nil	"	"	"

Weight of coal treated: 50 lb.

Over-all ash: 13.78%.

The quantity of coal received for the washability tests was too small. The coal is of low ash content. Very little advantage accrues from washing.

Size (inches)	Float at 1.25 sp. gr.		Float at 1.30 sp. gr. Sink at 1.25 sp. gr.		Float at 1.35 sp. gr. Sink at 1.30 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	18.45	1.85	10.06	1.88	nil	...	0.14	10.20	nil	...	nil	...	0.06	33.45	0.07	35.85	1.75	74.00	37.43	5.18
2-1 ...	3.22	1.35	6.43	1.00	0.30	0.40	0.02	18.50	0.06	20.50	nil	...	0.06	33.55	nil	...	1.75	73.05	11.03	12.45
1-1/2 ...	3.23	1.28	5.85	1.70	0.58	8.70	0.07	17.95	0.05	19.10	0.02	23.00	0.02	24.10	nil	...	1.00	75.10	11.81	14.54
1/2-1/2 ...	8.41	1.20	2.27	2.05	0.55	7.85	0.12	13.90	0.12	16.50	0.08	20.85	0.06	20.20	0.06	27.10	2.48	72.00	14.15	14.87
1/4-1/4 ...	7.28	1.60	2.00	2.10	0.50	7.00	0.13	9.70	0.11	15.88	0.11	18.10	0.10	20.50	0.10	32.25	1.84	71.00	13.16	12.40
1/4-30-mesh ...	1.02	1.05	4.41	1.00	0.48	8.55	0.15	10.70	0.10	15.00	0.06	20.00	0.07	24.30	nil	...	1.02	63.08	7.81	11.56
x 30-mesh ...	0.21	1.20	2.02	2.50	0.84	0.25	0.10	13.90	0.08	17.80	0.14	10.70	0.10	23.05	0.03	28.30	0.60	57.00	4.21	13.04
Totals & Averages	41.82	1.37	40.03	1.92	3.34	7.40	0.82	13.50	0.52	17.11	0.41	19.75	0.47	27.08	0.26	31.58	11.43	71.55	100	10.28
Cum. ash % ...	1.37		1.64		1.87		1.98		2.06		2.15		2.28		2.37		10.28			

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Size (mesh)	Amount %	Ash %
30-00 ...	2.08	11.00
x 00 ...	2.13	10.04

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.25	41.82	1.37	40.75	3.26	1.58	11.43	71.55
1.30	82.75	1.04	5.82	12.72	"	"	"
1.35	80.09	1.87	2.48	19.76	"	"	"
1.40	80.91	1.98	1.66	22.85	"	"	"
1.45	87.43	2.06	1.14	25.47	"	"	"
1.50	87.84	2.15	0.73	28.68	"	"	"
1.55	88.31	2.28	0.26	31.58	"	"	"
1.58	88.57	2.37	nil	nil	"	"	"

Weight of coal treated: 86 lb.

Over-all ash: 10.28%.

The coal is caking. The recovery of clean coal with high reduction in ash is very promising; but practically no reduction in sulphur is effected by cleaning. For reduction of sulphur see S. 06.

Size (inches)	Float at 1.25 sp. gr.		Float at 1.30 sp. gr. Sink at 1.25 sp. gr.		Float at 1.35 sp. gr. Sink at 1.30 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %
Over 2 ...	18.45	1.88	16.06	1.49	nil	...	0.14	4.04	nil	...	nil	...	0.06	2.98	0.07	3.42	1.75	3.20	37.43	1.78
2—1 ...	3.22	1.44	6.43	2.26	0.39	6.11	0.02	3.02	0.06	6.26	nil	...	0.06	3.20	nil	...	1.75	3.08	11.93	2.44
1—½ ...	3.23	2.00	5.85	2.01	0.58	4.86	0.07	3.51	0.05	6.43	0.02	5.30	0.02	7.83	nil	...	1.99	4.50	11.31	3.08
½—¼ ...	8.41	2.53	2.27	3.16	0.55	4.15	0.12	5.66	0.12	4.81	0.08	4.81	0.06	5.33	0.06	5.82	2.48	4.31	14.15	3.08
¼—⅛ ...	7.28	2.36	2.99	3.13	0.50	3.03	0.13	4.67	0.11	4.81	0.11	4.28	0.10	5.16	0.10	4.42	1.84	4.80	13.16	3.04
⅛—30-mesh ...	1.02	2.01	4.41	2.72	0.48	3.71	0.15	3.87	0.10	3.64	0.06	4.68	0.07	4.72	nil	...	1.02	5.11	7.31	3.21
x 30-mesh ...	0.21	2.50	2.02	3.02	0.84	2.88	0.19	3.35	0.08	3.54	0.14	3.73	0.10	4.06	0.03	3.82	0.60	5.22	4.21	3.35
Totals & Averages	41.82	2.10	40.03	2.23	3.34	4.09	0.82	4.28	0.52	4.63	0.41	4.30	0.47	4.51	0.26	4.38	11.43	4.34	100	2.54
Cum. sulphur %	2.10		2.17		2.24		2.27		2.28		2.29		2.30		2.30		2.54			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Sul. %
80 x 60 ...	2.08	3.16
x 60 ...	2.13	2.90

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Sul. %	Amount %	Sul. %	Sp. gr. of cut	Amount %	Sul. %	
1.25	41.82	2.10	40.75	2.48	1.58	11.43	4.34	
1.30	82.75	2.17	5.82	4.22	"	"	"	
1.35	86.00	2.24	2.48	4.41	"	"	"	
1.40	66.01	2.27	1.66	4.48	"	"	"	
1.45	87.43	2.28	1.14	4.40	"	"	"	
1.50	87.84	2.29	0.73	4.46	"	"	"	
1.55	88.31	2.30	0.26	4.38	"	"	"	
1.58	88.57	2.30	nil	nil	"	"	"	

Weight of coal treated : 86 lb.

Over-all sulphur : 2.54%.

Practically no reduction in sulphur content possible.

See G. 96.

Size (inches)	Float at 1.25 sp. gr.		Float at 1.30 sp. gr. Sink at 1.25 sp. gr.		Float at 1.35 sp. gr. Sink at 1.30 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Float at 1.62 sp. gr. Sink at 1.58 sp. gr.		Sink at 1.62 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
2-1 ...	8.02	1.33	16.80	1.80	4.01	7.80	0.02	12.05	0.79	18.35	0.14	20.83	nil	...	0.37	21.74	0.06	24.38	0.01	34.74	26.72	4.04
1-1/2 ...	1.07	1.07	12.38	2.17	2.06	7.50	0.35	14.04	0.23	10.37	0.14	25.60	0.11	29.12	0.05	33.30	nil	...	0.45	49.34	17.40	5.14
1/2-1/2 ...	1.46	1.74	12.42	2.15	2.43	6.00	0.71	12.35	0.23	15.00	0.11	21.88	0.11	24.05	nil	...	0.06	31.70	0.60	50.30	18.27	5.40
1/2-1/2 ...	0.43	1.08	0.12	1.78	2.83	5.23	0.46	10.80	0.11	15.34	0.08	10.17	0.06	24.10	nil	...	0.06	28.84	0.46	48.42	13.61	4.81
1/2-30-mesh ...	0.17	2.08	12.21	2.20	2.03	5.80	0.22	10.12	0.23	12.84	0.06	18.12	0.12	18.22	nil	...	0.05	23.98	0.67	48.07	16.66	5.17
x 30-mesh ...	0.12	2.36	0.26	2.46	4.33	3.78	1.10	8.08	0.46	8.52	0.12	12.13	0.10	16.86	0.06	17.02	nil	...	0.61	37.43	7.25	8.08
Totals & Averages	6.27	1.60	63.10	2.02	10.10	6.02	3.46	10.88	2.15	15.32	0.65	10.97	0.59	21.63	0.48	22.36	0.23	27.37	3.70	43.77	100	5.32
Cum. ash % ...	1.60		1.08		2.85		3.15		3.43		3.55		3.66		3.75		3.81		5.32			

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Size (mesh)	Amount %	Ash %
30-60 ...	4.35	0.20
x 60 ...	2.00	11.92

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.25	0.27	1.60	80.94	3.96	1.02	3.70	43.77
1.30	69.40	1.08	26.75	8.55	"	"	"
1.35	88.65	2.85	7.56	14.00	"	"	"
1.40	92.11	3.15	4.10	18.46	"	"	"
1.45	94.26	3.43	1.95	21.03	"	"	"
1.50	94.91	3.55	1.30	22.91	"	"	"
1.55	95.30	3.66	0.71	23.98	"	"	"
1.58	95.98	3.75	0.23	27.37	"	"	"
1.62	96.21	3.81	nil	nil	"	"	"

Weight of coal treated : 47 lb.
Over-all ash : 5.32%.

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Size (inches)	Float at 1.25 sp. gr.		Float at 1.30 sp. gr. Sink at 1.25 sp. gr.		Float at 1.35 sp. gr. Sink at 1.30 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Float at 1.62 sp. gr. Sink at 1.58 sp. gr.		Sink at 1.62 sp. gr.		RAW COAL	
	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %
2-1 ...	3.02	2.90	10.80	3.05	4.01	2.57	0.62	6.06	0.79	6.12	0.14	5.11	nil	...	0.37	13.95	0.06	15.43	0.91	22.69	26.72	3.08
1-1/2 ...	1.07	2.51	12.38	3.01	2.66	3.22	0.35	4.45	0.23	4.51	0.14	3.45	0.11	4.09	0.05	4.20	nil	...	0.45	15.10	17.40	3.39
1-1/4 ...	1.40	2.16	12.42	2.91	2.43	3.15	0.71	3.83	0.28	5.43	0.11	5.37	0.11	6.19	nil	...	0.06	3.97	0.69	17.45	18.27	3.54
1-1/8 ...	0.43	3.00	0.12	3.53	2.83	3.87	0.46	2.22	0.11	5.86	0.08	6.98	0.06	7.28	nil	...	0.06	7.04	0.46	17.29	13.61	4.03
1/2-30-mesh ...	0.17	2.77	12.21	3.36	2.93	4.58	0.22	4.05	0.23	5.20	0.06	4.94	0.12	6.14	nil	...	0.05	6.50	0.67	18.18	16.66	4.24
x 30-mesh ...	0.12	3.00	0.26	3.50	4.33	3.82	1.10	4.98	0.46	4.70	0.12	4.49	0.19	6.77	0.06	5.88	nil	...	0.61	12.30	7.25	4.89
Totals & Averages	6.27	2.67	63.10	3.14	10.19	3.51	3.46	4.49	2.15	5.42	0.65	4.90	0.59	6.09	0.48	11.93	0.23	8.22	3.79	17.79	100	3.92
Cum. sulphur %	2.67		3.10		3.19		3.24		3.29		3.30		3.32		3.36		3.37		3.92			

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Sul. %
30-60 ...	4.35	4.71
x 60 ...	2.90	5.78

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Sul. %	Amount %	Sul. %	Sp. gr. of cut	Amount %	Sul. %	
1.25	6.27	2.67	89.94	3.42	1.62	3.79	17.97	
1.30	69.46	3.10	26.75	4.08	"	"	"	
1.35	88.65	3.19	7.56	5.50	"	"	"	
1.40	92.11	3.24	4.10	6.95	"	"	"	
1.45	94.20	3.29	1.95	7.38	"	"	"	
1.50	94.91	3.30	1.30	8.62	"	"	"	
1.55	95.50	3.32	0.71	10.73	"	"	"	
1.58	95.98	3.36	0.23	8.22	"	"	"	
1.62	96.21	3.37	nil	nil	"	"	"	

Weight of coal treated : 47 lb.
Over-all sulphur : 3.92%.

Size (inches)	Float at 1'25 sp. gr.		Float at 1'30 sp. gr. Sink at 1'25 sp. gr.		Float at 1'35 sp. gr. Sink at 1'30 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1 - 1/4 ...	1'42	3'20	20'37	4'08	0'47	5'10	1'57	0'65	0'88	14'50	0'61	10'10	0'42	20'65	0'26	25'15	3'33	53'20	38'33	0'50
1/2 - 1/4 ...	1'40	3'50	10'40	3'00	14'72	5'10	2'30	11'30	1'37	13'00	0'80	17'20	0'71	22'80	0'62	24'00	5'72	57'05	44'28	12'60
1/4 - 1/8 ...	0'05	3'35	1'40	4'70	2'34	5'00	0'41	0'15	0'30	13'00	0'16	16'55	0'18	20'50	0'08	30'75	1'06	50'85	6'88	22'12
1/4 - 30-mesh ...	nil	...	0'31	3'05	1'26	4'20	0'75	0'00	0'35	14'70	0'16	16'50	0'16	21'50	0'06	25'20	1'01	57'00	4'06	27'27
x 30-mesh ...	nil	...	0'13	4'30	0'60	4'80	0'01	7'85	0'67	12'45	0'38	18'45	0'35	20'35	0'17	23'85	2'25	50'95	5'55	27'42
Totals & Averages	2'03	3'35	38'70	4'00	28'48	5'04	5'04	10'00	3'57	13'78	2'20	17'85	1'82	21'40	1'10	24'74	15'17	55'05	100	13'00
Cum. ash % ...	3'35		3'05		4'30		4'83		5'23		5'57		5'02		6'18		13'00			

RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30 - 60 ...	2'55	24'15
x 60 ...	3'00	20'16

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1'25	2'03	3'35	81'00	0'28	1'58	15'17	55'05
1'30	41'03	3'05	43'20	8'34	"	"	"
1'35	70'11	4'30	14'72	14'70	"	"	"
1'40	70'05	4'83	8'78	17'88	"	"	"
1'45	70'62	5'23	5'21	20'60	"	"	"
1'50	81'82	5'57	3'01	22'77	"	"	"
1'55	83'04	5'02	1'10	24'74	"	"	"
1'58	84'83	0'18	nil	nil	"	"	"

Weight of coal treated : 76 lb.

Over-all ash : 13'00%.

The coal is non-caking. A very high recovery of clean coal with considerable reduction in ash is obtained; but the reduction of sulphur is not promising by the washing process. For sulphur reduction, see S. 98.

Size (inches)	Float at 1.25 sp. gr.		Float at 1.30 sp. gr. Sink at 1.25 sp. gr.		Float at 1.35 sp. gr. Sink at 1.30 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Sink at 1.58 sp. gr.		RAW COAL	
	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %
1 — ½ ...	1.42	1.87	20.37	2.01	9.47	3.18	1.57	5.74	0.88	6.89	0.61	7.03	0.42	0.05	0.26	8.55	3.33	8.40	38.33	3.03
½ — ¼ ...	1.46	1.62	16.49	1.87	14.72	2.88	2.90	4.48	1.37	5.71	0.89	7.03	0.71	6.89	0.62	8.65	5.72	5.68	44.28	3.22
¼ — ⅛ ...	0.05	1.62	1.40	1.02	2.34	2.66	0.41	4.14	0.30	5.60	0.16	6.23	0.18	6.45	0.08	6.10	1.06	5.46	6.88	3.74
¼ — 30-mesh ...	nil	...	0.31	1.76	1.26	2.28	0.75	2.00	0.35	4.28	0.16	3.08	0.16	4.42	0.06	4.22	1.91	4.37	4.06	3.45
x 30-mesh ...	nil	...	0.13	1.05	0.69	2.58	0.01	2.86	0.07	3.10	0.38	3.46	0.85	3.84	0.17	3.24	2.25	4.48	5.55	3.60
Totals & Averages	2.03	1.74	38.70	2.26	28.48	2.02	5.94	4.35	3.57	5.36	2.20	6.13	1.82	6.53	1.19	7.45	15.17	5.90	100	3.54
Cum. sulphur %	1.74		2.22		2.51		2.65		2.77		2.86		2.94		3.01		3.54			

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Size (mesh)	Amount %	Ash %
30 — 60 ...	2.55	3.65
x 60 ...	3.00	3.27

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Sul. %	Amount %	Sul. %	Sp. gr. of cut	Amount %	Sul. %
1.25	2.93	1.74	81.90	3.05	1.58	15.17	5.90
1.30	41.63	2.22	43.20	3.76	"	"	"
1.35	70.11	2.51	14.72	5.38	"	"	"
1.40	76.05	2.65	8.78	6.08	"	"	"
1.45	79.02	2.77	5.21	6.58	"	"	"
1.50	81.82	2.86	3.01	6.90	"	"	"
1.55	83.04	2.94	1.10	7.45	"	"	"
1.58	84.83	3.01	nil	nil	"	"	"

Weight of coal treated : 76 lb.

Over-all sulphur : 3.45%.

See G. 98.

Size (inches)	Float at 1'30 sp. gr.		Float at 1'35 sp. gr. Sink at 1'30 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Float at 1'62 sp. gr. Sink at 1'58 sp. gr.		Sink at 1'62 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
2-1 ...x	1.82	2.49	10.33	3.40	3.63	7.05	1.38	11.23	0.18	12.06	0.18	16.88	0.09	22.55	0.13	25.13	1.39	41.02	25.13	6.85
1-1/2 ...	0.70	2.63	11.00	3.38	1.51	7.01	0.66	11.50	0.30	13.36	0.25	17.62	0.09	18.76	0.07	24.00	0.66	30.36	15.33	5.82
1/2-1/2 ...	1.48	2.04	11.71	2.01	2.06	6.82	0.51	11.46	0.34	14.51	0.34	17.58	0.12	20.25	0.05	21.24	0.51	37.30	17.12	5.28
1/4-1/4 ...	1.01	1.83	0.05	2.25	2.33	5.49	0.61	10.54	0.31	13.80	0.23	17.53	0.09	18.95	0.08	21.16	0.70	33.23	15.31	5.12
1/4-30-mesh ...	0.81	1.80	10.36	2.21	3.70	5.13	0.70	10.24	0.30	13.20	0.17	17.23	0.21	20.14	0.07	21.89	1.09	34.71	17.50	5.84
x 30-mesh ...	nil	...	0.57	3.53	7.10	6.88	0.77	9.21	0.24	10.90	0.14	12.00	nil	...	nil	...	0.67	38.63	9.55	0.27
Totals & Averages	5.91	2.20	59.92	2.01	20.45	6.50	4.63	10.72	1.76	13.24	1.31	16.84	0.60	20.15	0.40	23.08	5.02	36.47	100	6.21
Cum. ash % ...	2.20		2.84		3.73		4.09		4.26		4.44		4.54		4.61		6.21			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
30-60 ...	5.63	7.00
x 60 ...	3.92	13.81

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %	
1'30	5.91	2.20	89.07	4.77	1'62	5.02	36.47	
1'35	65.83	2.84	29.15	8.42	"	"	"	
1'40	86.28	3.73	8.70	13.37	"	"	"	
1'45	90.01	4.09	4.07	16.39	"	"	"	
1'50	92.67	4.26	2.31	18.78	"	"	"	
1'55	93.98	4.44	1.00	21.32	"	"	"	
1'58	94.58	4.54	0.40	23.08	"	"	"	
1'62	94.98	4.61	nil	nil	"	"	"	

Weight of coal treated : 56 lb.
Over-all ash : 6.21%.

Size (inches)	Float at 1.30 sp. gr.		Float at 1.35 sp. gr. Sink at 1.30 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Float at 1.58 sp. gr. Sink at 1.55 sp. gr.		Float at 1.62 sp. gr. Sink at 1.58 sp. gr.		Sink at 1.62 sp. gr.		RAW COAL	
	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %
2-1 ...	1.82	2.84	16.33	3.47	3.03	7.12	1.38	9.18	0.18	11.10	0.18	12.06	0.09	11.77	0.13	7.83	1.39	30.35	25.13	5.03
1-1/2 ...	0.79	2.70	11.00	3.16	1.51	6.43	0.66	9.19	0.30	11.23	0.25	11.24	0.09	13.36	0.07	11.03	0.66	22.10	15.33	4.93
1-1/4 ...	1.48	2.00	11.71	2.65	2.06	5.08	0.51	9.03	0.34	10.18	0.34	11.57	0.12	12.86	0.05	13.76	0.51	18.76	17.12	4.15
1-1/8 ...	1.01	2.42	9.05	2.65	2.33	4.42	0.61	7.02	0.31	9.65	0.23	10.70	0.09	11.87	0.08	13.42	0.70	17.55	15.31	4.17
1/2-1/4 ...	0.81	2.43	10.36	2.60	3.76	3.66	0.70	6.94	0.39	8.07	0.17	9.69	0.21	10.80	0.07	11.05	1.09	15.29	17.56	4.10
1/2-30-mesh ...	nil	...	0.57	2.87	7.16	3.47	0.77	3.04	0.24	4.53	0.14	4.74	nil	...	nil	...	0.67	9.91	9.55	3.97
x 30-mesh ...																				
Totals & Averages	5.91	2.64	50.92	2.96	20.46	4.73	4.03	7.70	1.76	9.13	1.31	10.59	0.60	11.93	0.40	11.13	5.02	20.30	100	4.60
Cum. sulphur %	2.64		2.93		3.36		3.58		3.60		3.79		3.84		3.87		4.60			

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EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Sul. %	Amount %	Sul. %	Sp. gr. of cut	Amount %	Sul. %
1.30	5.01	2.64	80.07	3.05	1.62	5.02	20.30
1.35	65.83	2.93	20.15	5.08	"	"	"
1.40	86.28	3.36	8.70	8.91	"	"	"
1.45	90.91	3.58	4.07	10.21	"	"	"
1.50	92.67	3.60	2.31	11.03	"	"	"
1.55	93.98	3.79	1.00	11.61	"	"	"
1.58	94.58	3.84	0.40	11.13	"	"	"
1.62	94.98	3.87	nil	nil	"	"	"

Weight of coal treated: 56 lb.

Over-all sulphur: 4.60%.

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SIZE (inches)	Float at 1'30 sp. gr.		Float at 1'35 sp. gr. Sink at 1'30 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Float at 1'62 sp. gr. Sink at 1'58 sp. gr.		Sink at 1'62 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	0.34	0.14	10.10	10.18	14.47	14.40	9.40	17.44	3.83	25.25	1.43	28.00	0.40	31.34	nil	...	2.77	44.62	48.83	16.00
2-1 ...	0.83	4.40	5.18	7.09	0.04	19.40	5.36	10.56	1.35	23.83	1.55	20.64	0.23	34.53	0.33	35.22	1.87	51.10	22.74	17.75
1-1/2 ...	0.88	4.10	2.98	7.01	2.99	14.10	1.53	17.26	0.63	23.50	0.43	28.20	0.22	30.54	0.12	35.17	1.19	50.65	10.97	17.60
1/2-1/4 ...	0.97	4.47	1.92	7.70	1.03	14.00	0.84	13.15	0.44	23.96	0.20	26.00	0.16	27.27	0.04	34.96	0.67	45.15	7.25	15.92
1/4-1/8 ...	0.47	3.86	1.06	7.57	0.97	14.13	0.52	19.02	0.24	23.00	0.22	26.00	0.04	30.58	0.06	30.90	0.57	50.42	4.15	18.44
1/8-30-mesh ...	0.49	4.10	1.00	7.50	0.70	13.74	0.45	18.85	0.20	22.40	0.18	24.86	0.09	27.97	0.04	29.13	0.63	50.95	3.87	10.02
x 30-mesh ...	0.12	4.74	0.45	7.72	0.44	11.02	0.22	17.14	0.15	20.63	0.13	22.49	0.06	25.47	0.04	26.70	0.58	49.43	2.10	22.00
Totals & Averages	4.10	4.42	28.78	8.97	27.03	14.10	18.32	17.28	0.84	24.46	4.23	28.43	1.10	30.72	0.63	33.86	8.28	48.23	100	17.27
Cum. ash % ...	4.42		8.40		11.00		12.46		13.42		14.13		14.34		14.48		17.27			

SIZE (mesh)	Amount %	Ash %
30-60 ...	1.34	21.02
x 60 ...	0.85	20.78

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1'30	4'10	4'42	87'62	14'05	1'62	8'23	48'23
1'35	32'88	8'40	58'84	17'87	"	"	"
1'40	60'51	11'00	31'21	21'21	"	"	"
1'45	78'83	12'46	12'80	26'80	"	"	"
1'50	85'67	13'42	6'05	29'45	"	"	"
1'55	89'00	14'13	1'82	31'31	"	"	"
1'58	91'00	14'34	0'63	33'86	"	"	"
1'62	91'72	14'48	nil	nil	"	"	"

Weight of coal treated : 54 lb.
Over-all ash : 17.27%.

Size (inches)	Float at 1'30 sp. gr.		Float at 1'35 sp. gr. Sink at 1'30 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Float at 1'62 sp. gr. Sink at 1'58 sp. gr.		Sink at 1'62 sp. gr.		RAW COAL	
	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %
Over 2 ...	0'34	3'34	16'19	3'80	14'47	5'88	0'40	5'57	3'83	4'10	1'43	3'04	0'40	6'20	nil	...	2'77	6'60	48'83	5'00
2—1 ...	0'83	3'71	5'18	3'09	6'04	5'74	5'36	6'40	1'35	5'64	1'55	4'40	0'23	3'02	0'33	5'48	1'87	7'23	22'74	5'44
1—½ ...	0'88	3'81	2'08	4'03	2'00	5'49	1'53	6'44	0'63	5'09	0'43	5'80	0'22	6'74	0'12	4'82	1'10	7'00	10'07	5'38
¾—½ ...	0'07	3'86	1'02	4'15	1'93	5'23	0'84	5'86	0'44	5'57	0'29	7'38	0'15	8'18	0'04	5'11	0'67	8'80	7'25	5'34
⅔—½ ...	0'47	3'00	1'06	4'17	0'97	5'07	0'52	5'70	0'24	5'70	0'22	6'70	0'04	6'18	0'06	6'88	0'57	14'80	4'15	6'31
½—30-mesh ...	0'40	3'08	1'00	4'12	0'70	4'56	0'45	5'18	0'20	0'32	0'18	5'83	0'09	6'46	0'04	7'33	0'63	16'80	3'87	6'62
× 30-mesh ...	0'12	4'19	0'45	4'62	0'44	4'84	0'22	5'22	0'15	5'67	0'13	5'72	0'06	6'18	0'04	6'02	0'58	13'65	2'19	7'30
Totals & Averages	4'10	3'81	28'78	3'97	27'63	5'68	18'32	5'92	6'84	4'80	4'23	4'81	1'10	6'10	0'63	5'62	8'28	8'04	100	5'33
Cum. sulphur %	3'81		3'95		4'73		5'01		5'00		4'99		5'00		5'01		5'33			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (-mesh)	Amount %	Sul. %
30—60 ...	1'34	7'15
× 60 ...	0'85	8'77

EXAMPLES OF CLEANING POSSIBILITIES								
CLEAN COAL			MIDDINGS		REJECTIONS			
Sp. gr. of cut	Amount %	Sul. %	Amount %	Sul. %	Sp. gr. of cut	Amount %	Sul. %	
1'30	4'10	3'81	87'62	5'06	1'62	8'28	8'94	
1'35	32'88	3'95	58'84	5'60	"	"	"	
1'40	60'51	4'73	31'21	5'52	"	"	"	
1'45	78'83	5'01	12'89	4'96	"	"	"	
1'50	85'67	5'00	6'05	5'15	"	"	"	
1'55	89'90	4'99	1'82	5'93	"	"	"	
1'58	91'09	5'00	0'63	5'62	"	"	"	
1'62	91'72	5'01	nil	nil	"	"	"	

Weight of coal treated : 54 lb.

Over-all sulphur : 5'33%.

G. 86

SIND

JHIMPIR MINES

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Size (Inches)	Float at 1'30 sp. gr.		Float at 1'35 sp. gr. • Sink at 1'30 sp. gr.		Float at 1'40 sp. gr. Sink at 1'35 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Float at 1'58 sp. gr. Sink at 1'55 sp. gr.		Sink at 1'58 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
Over 2 ...	1.27	5.00	2.06	5.40	1.67	6.15	0.11	12.55	nil	...	0.10	20.80	nil	...	6.07	36.05	18.08	21.96
2—1 ...	2.38	4.40	5.65	5.04	2.87	6.00	0.61	10.30	0.06	12.80	0.06	18.35	0.03	21.50	5.40	48.90	17.06	19.44
1—½ ...	2.40	4.00	9.67	5.30	2.70	8.65	0.66	10.40	0.23	13.85	0.09	15.80	0.18	25.40	5.60	48.30	21.62	17.35
½—½ ...	3.07	3.00	4.32	4.25	5.51	6.00	1.64	8.95	0.01	11.90	0.15	17.40	0.15	20.60	5.87	48.70	21.62	17.60
¼—½ ...	0.01	3.50	2.44	4.50	3.65	6.00	0.97	9.00	0.41	10.90	0.60	14.75	0.05	18.70	4.70	46.15	13.82	20.07
¼—30-mesh ...	0.18	3.80	0.67	4.50	2.54	5.60	0.46	8.70	0.48	10.60	0.32	13.80	0.30	17.55	3.78	45.20	8.82	24.41
× 30-mesh ...	0.04	3.00	0.16	5.05	0.64	5.60	0.40	8.35	0.12	10.40	0.22	13.90	0.06	17.60	2.34	48.70	3.98	31.96
Totals & Averages	10.25	4.74	25.87	4.98	10.58	6.44	4.85	9.33	2.21	11.58	1.63	15.25	0.86	10.94	34.75	45.40	100	19.94
Cum. ash % ...	4.74		4.91		5.45		5.76		5.97		6.20		6.40		10.94			

Size (mesh)	Amount %	Ash %
30 — 60 ...	1.00	27.32
× 60 ...	1.00	33.37

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.30	10.25	4.74	55.00	6.69	1.58	34.75	45.40
1.35	36.12	4.91	20.18	8.21	"	"	"
1.40	55.70	5.45	9.55	11.82	"	"	"
1.45	60.55	5.76	4.70	14.40	"	"	"
1.50	62.76	5.07	2.40	16.87	"	"	"
1.55	64.30	6.20	0.86	19.94	"	"	"
1.58	65.25	6.40	nil	nil	"	"	"

Weight of coal treated : 88 lb.
Over-all ash : 10.04%.

G. 56

BALUCHISTAN

NAKAS

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Sink at 1.55 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1 — ½ ...	26.83	8.75	11.75	15.00	7.15	22.60	3.58	27.85	37.11	57.20	89.42	31.76
½ — 30-mesh ...	3.24	7.35	0.53	15.20	0.43	20.55	0.25	23.70	4.02	62.60	8.47	35.21
× 30-mesh ...	0.71	22.10	0.09	29.04	0.07	35.70	0.05	36.40	1.19	65.05	2.11	47.43
Totals & Averages	30.78	8.01	15.37	15.10	7.65	22.61	3.88	27.60	42.32	57.93	100	32.38
Cum. ash % ...	8.01		10.97		12.62		13.04		32.38			

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RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh)	Amount %	Ash %
30 — 60 ...	1.08	45.05
× 60 ...	1.03	49.70
Cum. ash ...	47.31	

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	30.78	8.01	26.90	19.05	1.55	42.32	57.92
1.45	46.15	10.97	11.53	24.32	"	"	"
1.50	53.80	12.62	3.88	27.60	"	"	"
1.55	57.68	13.04	nil	nil	"	"	"

Over-all ash : 32.38%.

S. 56

BALUCHISTAN

NAKAS

[SULPHUR REDUCTION]

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Sink at 1.55 sp. gr.		RAW COAL	
	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %
1 — ½ ...	26.83	6.18	14.75	7.80	7.15	7.72	3.58	7.01	37.11	9.03	89.42	7.82
½ — 30-mesh ...	3.24	6.43	0.53	8.13	0.43	8.13	0.25	7.91	4.02	7.22	8.47	7.04
× 30-mesh ...	0.71	6.59	0.09	6.73	0.07	7.25	0.05	6.92	1.19	7.08	2.11	6.91
Totals & Averages	30.78	6.21	15.37	7.81	7.65	7.74	3.88	7.90	42.32	8.20	100	7.74
Cum. sulphur %	6.21		6.75		6.88		6.95		7.74			

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Size (mesh)	Amount %	Sul. %
30 — 60 ...	1.08	6.95
× 60 ...	1.03	6.87
Cum. sulphur ...	6.91	

CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Sul. %	Amount %	Sul. %	Sp. gr. of cut	Amount %	Sul. %
1.40	30.78	6.21	26.90	7.80	1.55	42.32	8.80
1.45	46.15	6.75	11.53	7.79	"	"	"
1.50	53.80	6.88	3.88	7.90	"	"	"
1.55	57.68	6.95	nil	nil	"	"	"

Over-all sulphur : 7.74%.

G. 57

BALUCHISTAN

HARNAI

Size (inches)	Float at 1.40 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Float at 1.50 sp. gr. Sink at 1.45 sp. gr.		Float at 1.55 sp. gr. Sink at 1.50 sp. gr.		Sink at 1.55 sp. gr.		RAW COAL	
	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %	Wt. %	Ash %
1 — ½ ...	60.24	6.30	9.58	12.45	4.75	14.75	2.74	19.08	13.06	33.57	91.27	11.94
½ — 30-mesh ...	5.37	4.75	0.58	11.62	0.33	16.20	0.15	18.70	1.04	43.80	7.42	11.51
× 30-mesh ...	0.02	6.70	0.04	14.70	0.06	26.40	0.04	35.40	0.25	56.55	1.31	18.23
Totals & Averages	66.53	6.18	10.15	12.41	5.14	14.08	2.93	19.30	15.25	34.64	100	11.99
Cum. ash % ...	6.18		7.01		7.50		7.91		11.99			

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RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh)	Amount %	Ash %
30 — 60 ...	0.75	15.20
× 60 ...	0.50	20.80
Cum. ash ...	17.00	

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.40	66.53	6.18	18.22	14.24	1.55	15.25	34.64
1.45	76.68	7.01	3.07	16.54	"	"	"
1.50	81.82	7.50	2.93	19.28	"	"	"
1.55	84.75	7.91	nil	nil	"	"	"

Over-all ash : 11.99%.

S. 57

BALUCHISTAN

HARNAI

[SULPHUR REDUCTION]

Size (inches)	Float at 1'40 sp. gr.		Float at 1'45 sp. gr. Sink at 1'40 sp. gr.		Float at 1'50 sp. gr. Sink at 1'45 sp. gr.		Float at 1'55 sp. gr. Sink at 1'50 sp. gr.		Sink at 1'55 sp. gr.		RAW COAL	
	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %	Wt. %	Sul. %
1 — ¼ ...	00·24	4·80	0·58	8·35	4·75	0·61	2·74	10·41	13·06	16·01	01·27	7·37
¼ — 30-mesh ...	5·37	4·39	0·53	7·61	0·33	8·76	0·15	9·09	1·04	11·07	7·42	5·07
× 30-mesh ...	0·92	4·04	0·04	6·97	0·06	7·72	0·04	8·20	0·25	10·68	1·31	6·11
Totals & Averages	66·53	4·86	10·15	8·30	5·14	9·53	2·03	10·31	15·25	15·65	100	7·26
Cum. sulphur %	4·86		5·32		5·58		5·74		7·26			

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RESULT OF SCREENING THE 30-MESH MATERIAL THROUGH 60-MESH		
Size (mesh)	Amount %	Sul. %
30 — 60 ...	0·75	5·88
× 60 ...	0·56	5·71
Cum. sulphur ...	7·26	

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Sul. %	Amount %	Sul. %	Sp. gr. of cut	Amount %	Sul. %
1·40	66·53	4·86	18·22	8·07	1·55	15·25	15·68
1·45	76·63	5·32	8·07	9·81	"	"	"
1·50	81·82	5·58	2·93	10·31	"	"	"
1·55	84·75	5·74	nil	nil	"	"	"

Over-all sulphur : 7·26%.

G. 140

MADRAS, LIGNITE

Size (inches)	Float at 1.25 sp. gr.		Float at 1.30 sp. gr. Sink at 1.25 sp. gr.		Float at 1.35 sp. gr. Sink at 1.30 sp. gr.		Float at 1.40 sp. gr. Sink at 1.35 sp. gr.		Float at 1.45 sp. gr. Sink at 1.40 sp. gr.		Sink at 1.45 sp. gr.		RAW COAL CRUSHED TO 1"	
	Wt.	Ash	Wt.	Ash	Wt.	Ash	Wt.	Ash	Wt.	Ash	Wt.	Ash	Wt.	Ash
1/2 - 1/4 ...	3.27	4.14	15.22	4.75	30.94	5.40	10.72	6.22	0.27	8.00	0.02	26.00	60.51	5.33
3/4 - 1/2 ...	0.36	3.55	0.53	3.00	11.95	5.00	4.33	6.10	0.76	7.40	0.07	28.72	13.05	5.39
1/2 - 30-mesh ...	0.12	3.40	0.48	3.64	2.67	4.40	7.13	5.40	4.16	6.20	0.30	29.20	14.86	5.85
x 30-mesh ...	0.16	3.10	0.29	4.40	0.68	5.20	2.26	5.42	2.61	5.70	0.58	10.90	6.58	6.68
Totals & Averages	3.91	4.02	16.64	4.68	40.24	5.24	24.44	5.90	7.80	6.21	0.97	23.54	100	5.51
Cum. ash % ...	4.02		4.55		5.03		5.25		5.33		5.51			

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RESULT OF SCREENING THE 30-MESH MATERIAL		
Size (mesh)	Amount %	Ash %
80 - 60 ...	3.29	6.78
x 60 ...	3.29	7.30

EXAMPLES OF CLEANING POSSIBILITIES							
CLEAN COAL			MIDDINGS		REJECTIONS		
Sp. gr. of cut	Amount %	Ash %	Amount %	Ash %	Sp. gr. of cut	Amount %	Ash %
1.25	3.91	4.02	95.12	5.33	1.45	0.97	23.54
1.30	20.55	4.55	78.43	5.54	"	"	"
1.35	66.79	5.03	32.21	5.97	"	"	"
1.40	91.23	5.25	7.80	6.21	"	"	"
1.45	99.03	5.33	nil	nil	"	"	"

Over-all ash : 5.51%.

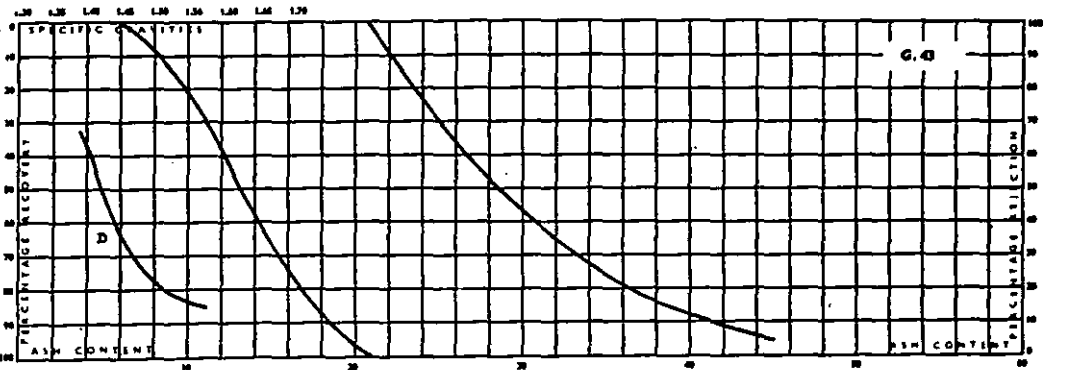
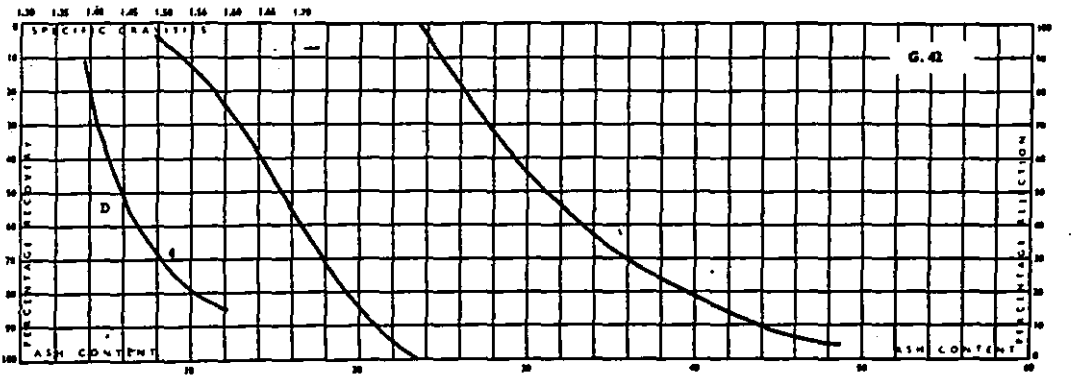
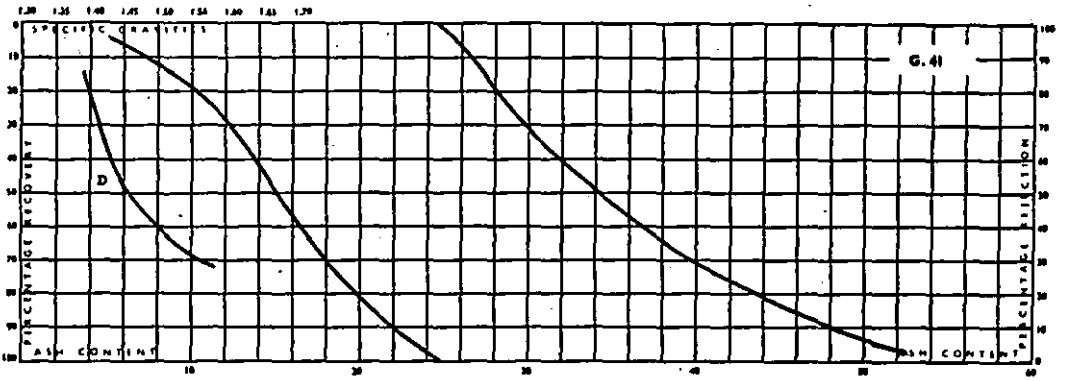
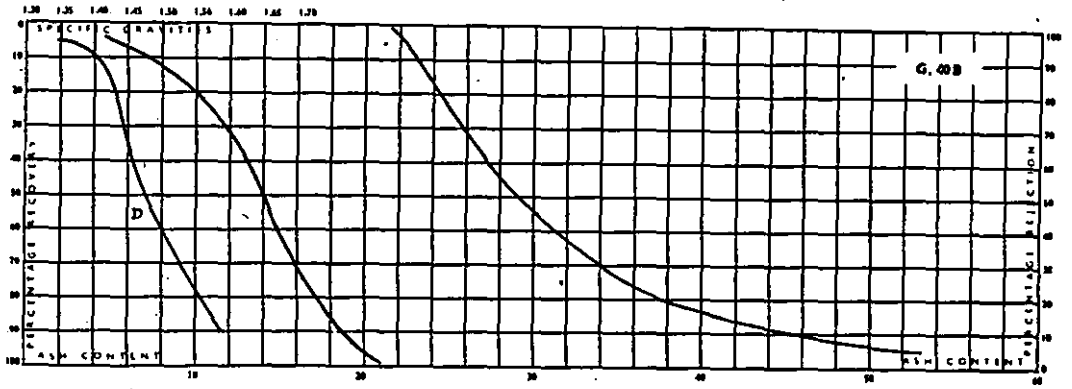
The original coal having only 5.51% of ash and very little reduction being effected, no advantage accrues from washing.

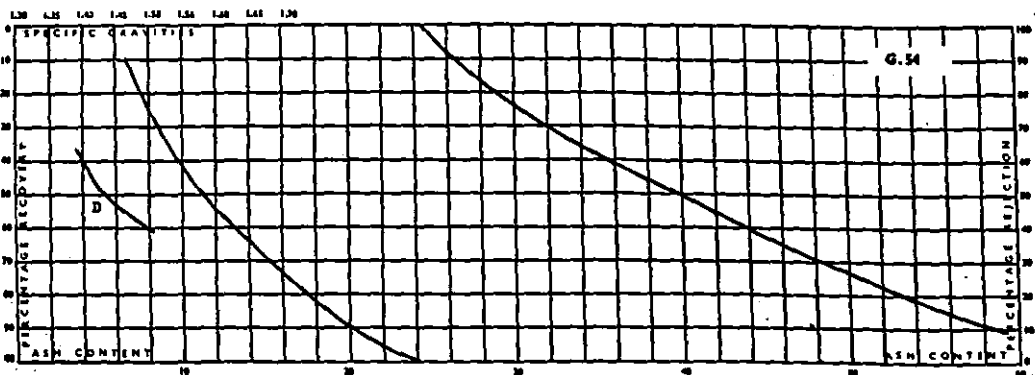
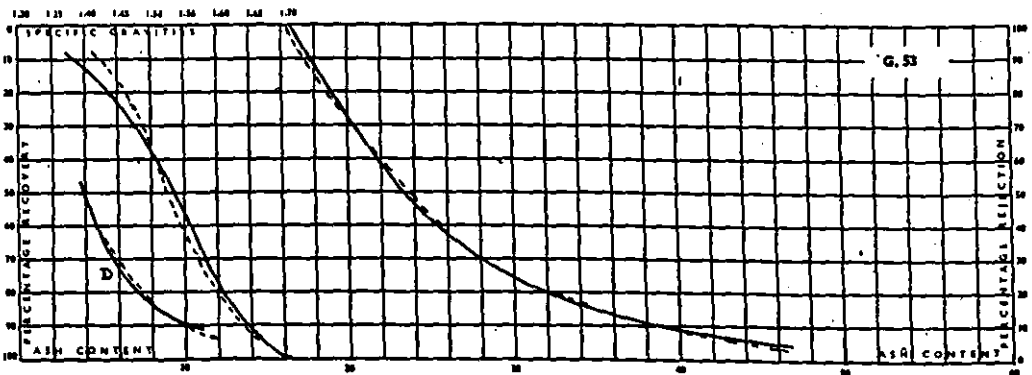
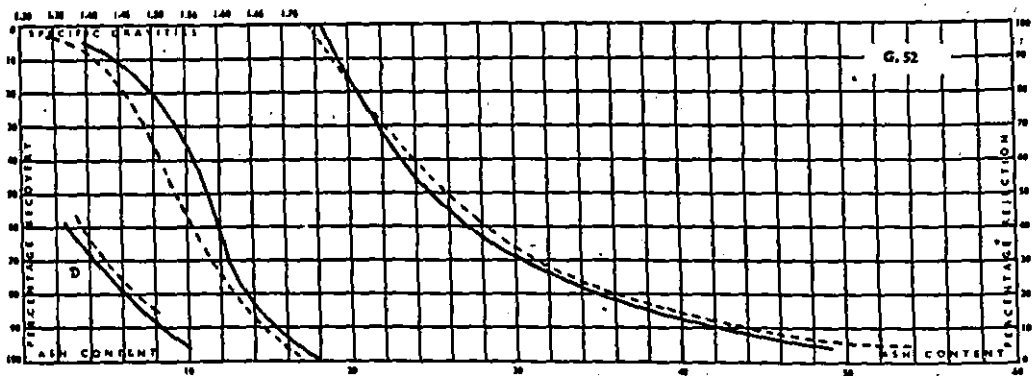
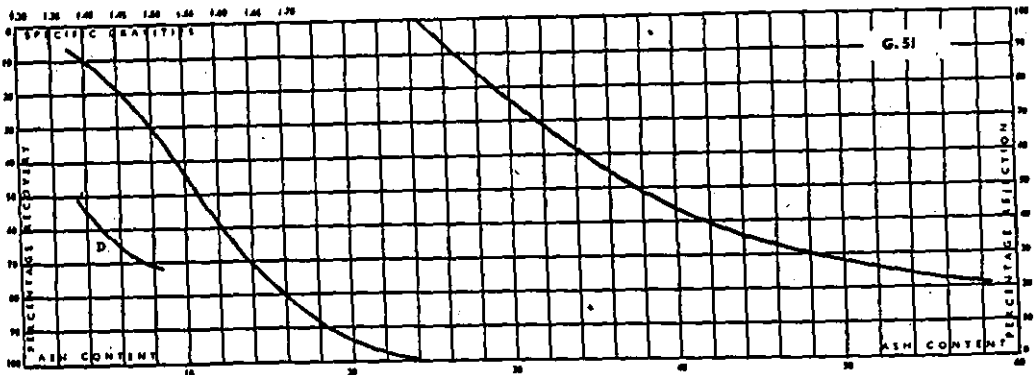
The total quantity of the sample received was only 14 lb. of which after sampling 9 lb. have been used for washability test. The sample was crushed to 1/2" prior to test.

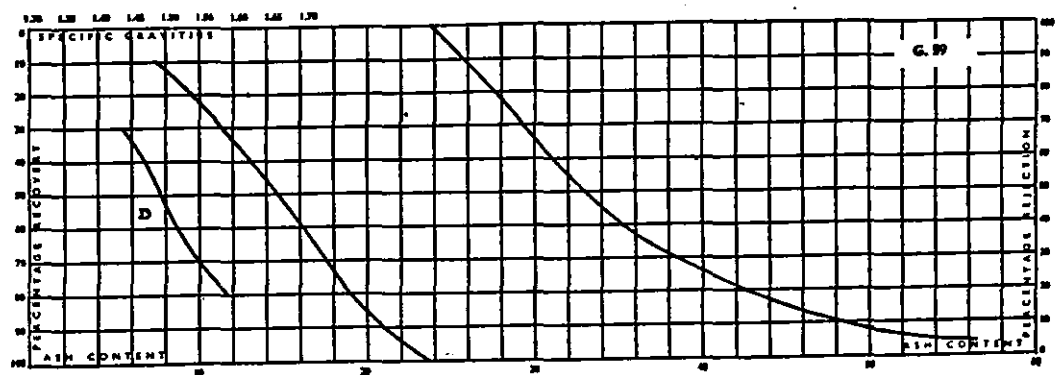
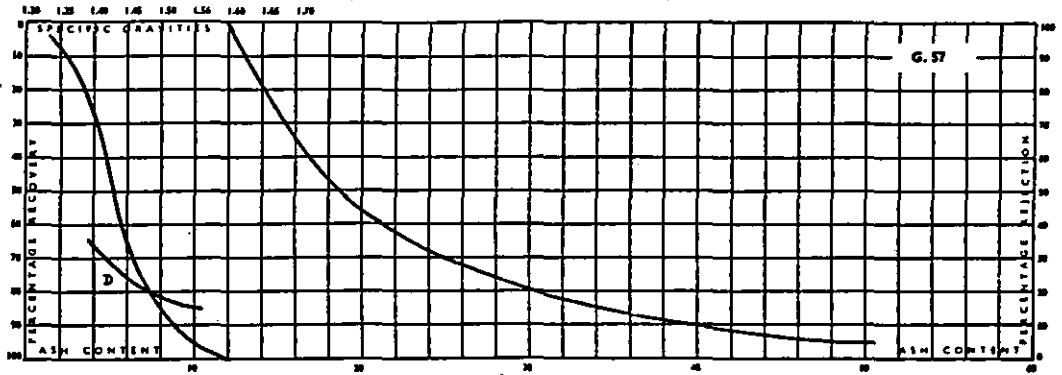
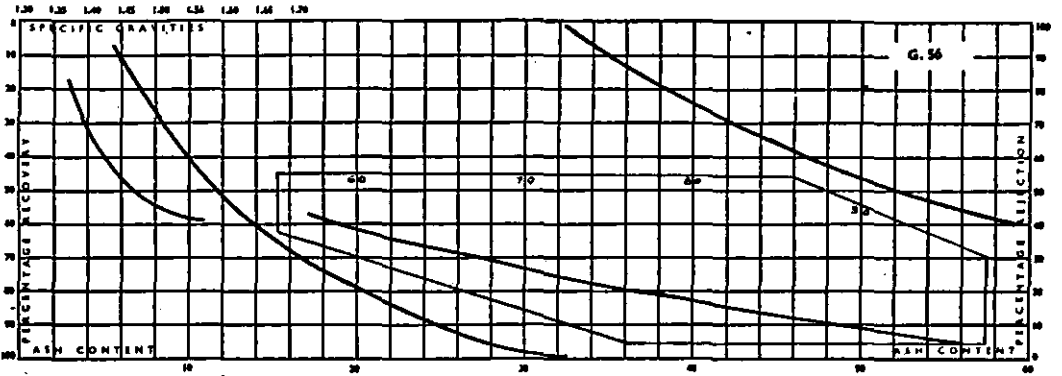
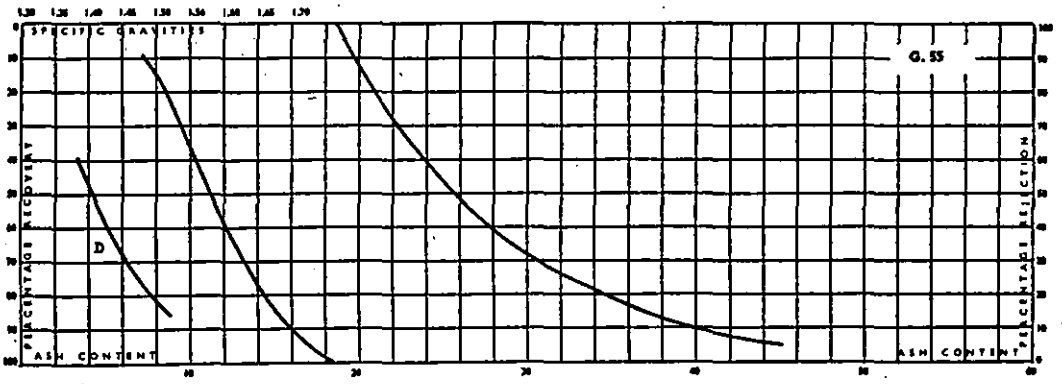
WASHABILITY CURVES

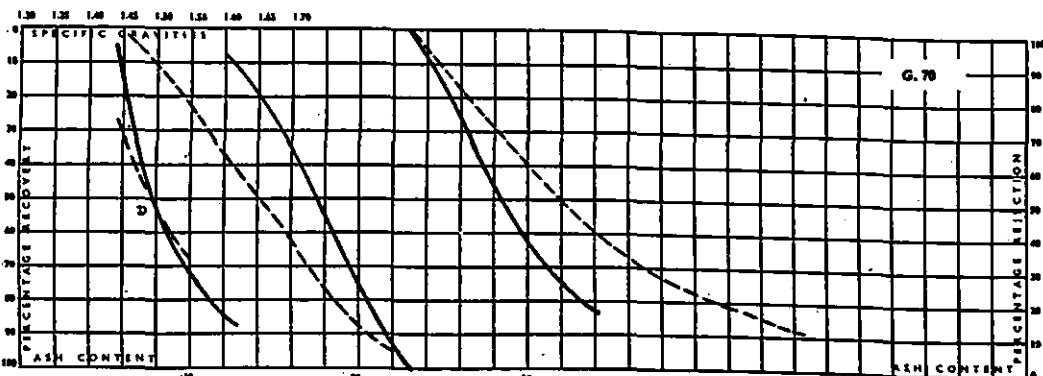
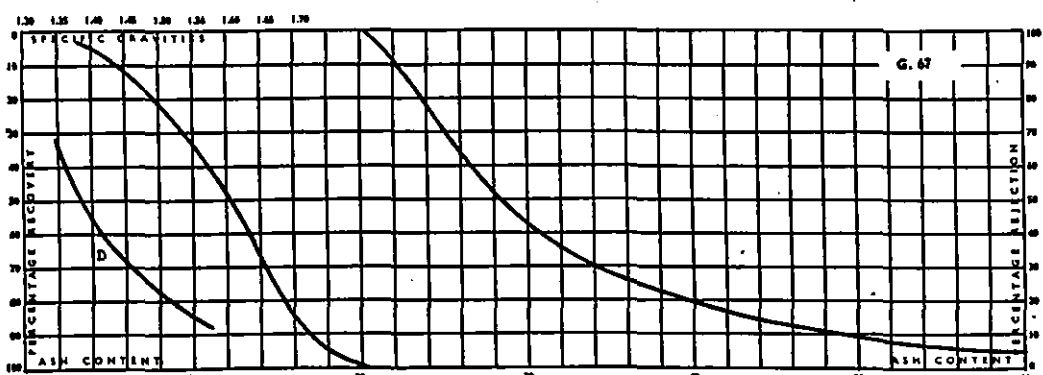
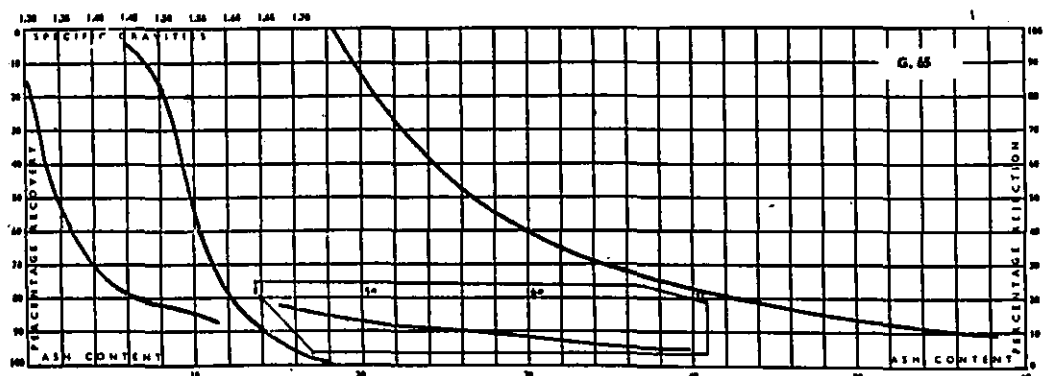
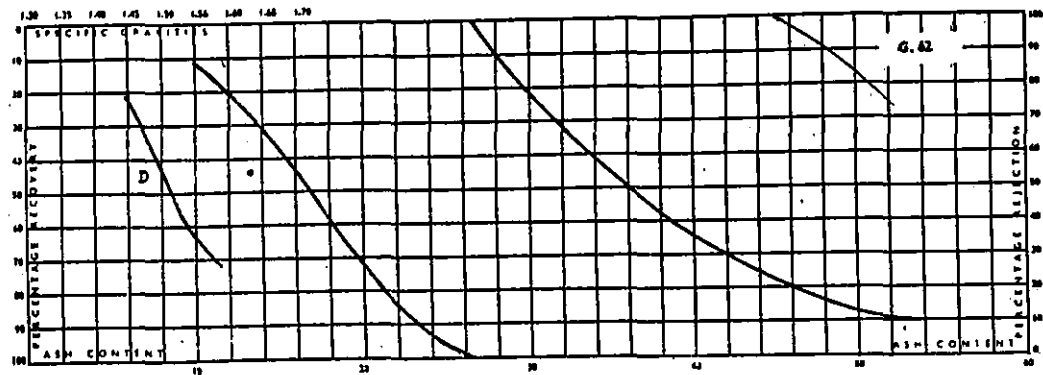
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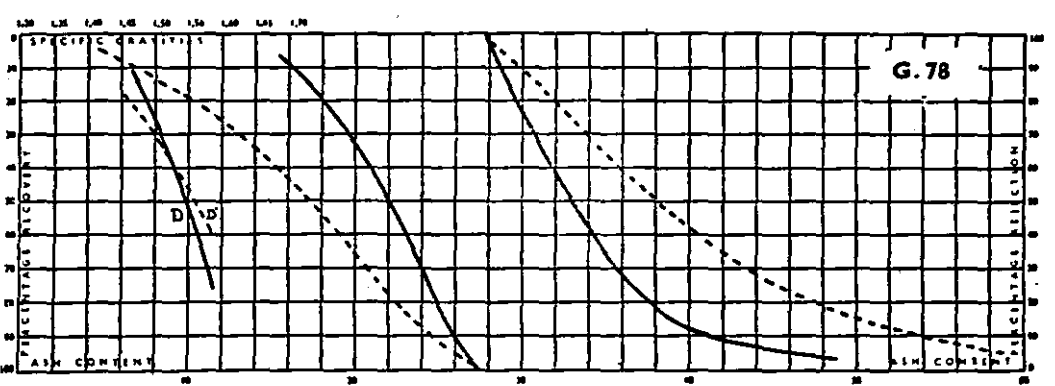
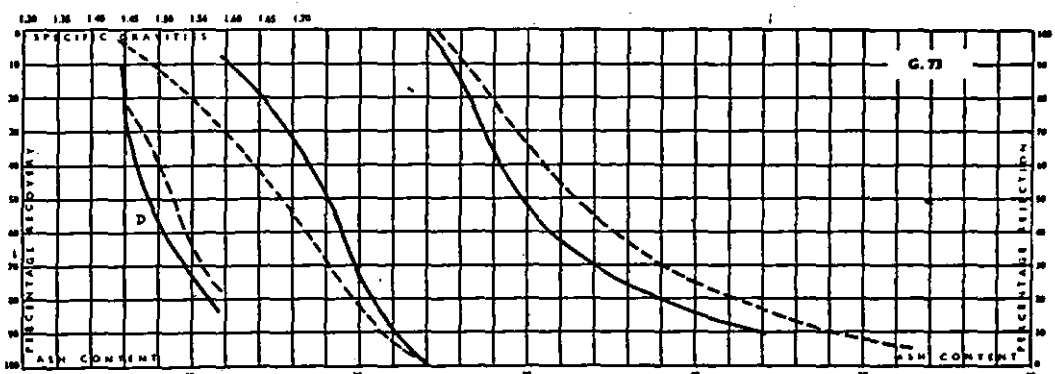
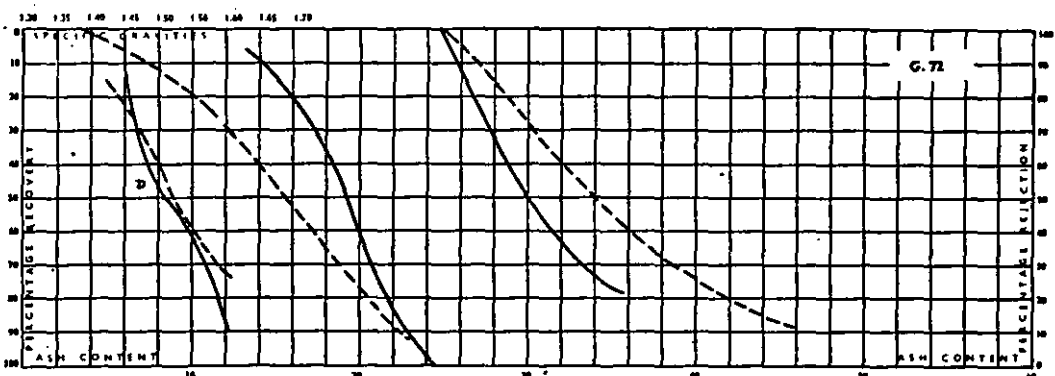
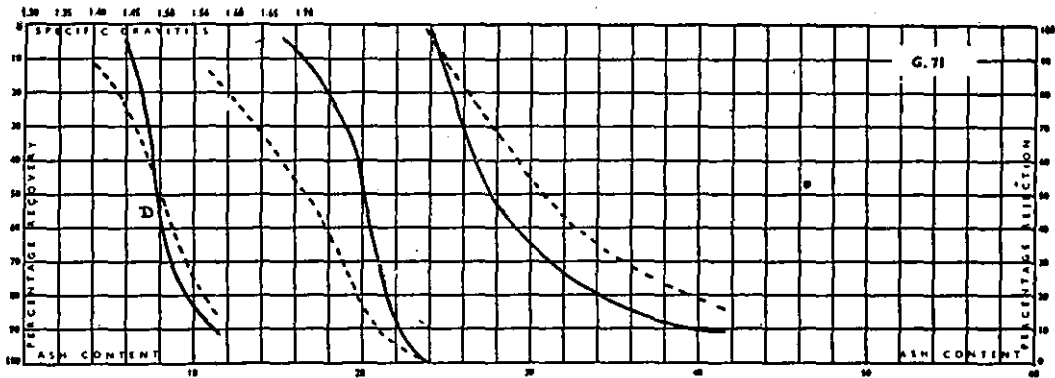
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 G. 41 BOKARO FIELD—XXI SEAM
 G. 42 BOKARO FIELD—LEIYO SEAM
 G. 43 BOKARO FIELD—WEST X SEAM
 G. 51 JHARIA, CEN. II—S. XVI-A SEAM
 G. 52 JHARIA, CEN. II—S. XVI SEAM
 G. 53 JHARIA, NORTH—XIII SEAM
 G. 54 JHARIA, CEN. II—N. XVI S. (Top)
 G. 55 JHARIA, CENTRAL II—NORTH XVI SEAM (Bottom)
 G. 56 BALUCHISTAN—NAKAS
 G. 57 BALUCHISTAN—HARNAI
 G. 59 JHARIA, NORTH—VIII SEAM
 G. 62 JHARIA, WEST I, NORTH—IX SEAM
 G. 65 CENTRAL PROVINCES—CHIRIMIRI
 G. 67 CENTRAL PROVINCES, PENCH VALLEY—NEWTON CHIKLI
 G. 70 JHARIA, WEST II—IX SEAM
 G. 71 JHARIA, WEST I, NORTH—IX SEAM
 G. 72 JHARIA, WEST II—IX SEAM
 G. 73 JHARIA, WEST II—IX SEAM
 G. 78 JHARIA, WEST I, NORTH—IX SEAM
 G. 79 JHARIA, WEST I, NORTH—IX SEAM
 G. 80 JHARIA, WEST I, NORTH—IX SEAM
 G. 81 CEN. PROV.—MAJRI (Chanda Dist.)
 G. 84 JHARIA, S.E., CENTRAL—XIII SEAM
 G. 85 JHARIA, WEST II—VII SEAM
 G. 86 SIND—JHIMPIR MINES
 G. 87 JHARIA, WEST II—VII SEAM (Top)
 G. 88 BOKARO FIELD—KARO SEAM
 G. 89 BOKARO FIELD—KARO SEAM
 G. 90 BOKARO FIELD—KARO SEAM
 G. 91 JHARIA, EXTREME WEST I.—IX SEAM
 G. 93 JHARIA, S.E., CEN.—XIII-B SEAM
 G. 95 JHARIA, WEST I, N.—VII SEAM (Sec.)
 G. 96 ASSAM—MARGHERITA
 G. 97 JHARIA, WEST I, N.—VII SEAM (Sec.)
 G. 98 ASSAM—NAZIRA
 G. 100 JHARIA, WEST I, N.—VII SEAM (Sec.)
 G. 103 JHARIA, WEST I, NORTH—VII SEAM
 G. 106 JHARIA, WEST I, NORTH—VII SEAM
 G. 107 JHARIA, S.E.—XIV SEAM (Top)
 G. 108 JHARIA, E. II—XIV SEAM (Bottom)
 G. 110 JHARIA, CEN. II, N.—V SEAM (Top)
 G. 112 JHARIA, CEN. II, NORTH—IX SEAM
 G. 114 JHARIA, CEN., NORTH—VII SEAM
 G. 116 JHARIA FIELD, S.E.—XV SEAM
 G. 117 JHARIA, CENTRAL, NORTH—IX SEAM
 G. 118 JHARIA, CEN. II, NORTH—IX SEAM
 G. 119 JHARIA, C. II, N.—VII SEAM (Special)
 G. 121 JHARIA, CEN. II, NORTH—IX SEAM
 G. 125 JHARIA, CEN. II, NORTH—IX SEAM
 G. 127 JHARIA, CEN. II, NORTH—VII SEAM
 G. 128 JHARIA, S.E., CENTRAL—XII SEAM
 G. 129 JHARIA, CEN. II, NORTH—IX SEAM
 G. 130 JHARIA, CENTRAL, II—XVII SEAM
 G. 132 JHARIA, CEN. II, N.—VII SEAM (Sec.)
 G. 134 JHARIA, CEN. I, NORTH—VIII SEAM
 G. 136 JHARIA, CENTRAL I, NORTH—V SEAM
 G. 137 JHARIA, S.E.—XI SEAM (Bottom)
 G. 138 JHARIA, S.E.—XI SEAM (Top)
 G. 139 JHARIA, CEN. II, NORTH—XI SEAM
 G. 140 MADRAS, LIGNITE
 G. 141 JHARIA, CENTRAL II, NORTH—XIV SEAM (Bottom)
 G. 142 JHARIA, CEN. II, N.—XIV SEAM (Top)
 G. 143 CENTRAL PROVINCES, REWA COAL-FIELD—BIRSINGHPUR
 G. 144 JHARIA, CEN. I, NORTH—VIII SEAM
 G. 145 JHARIA, N.E. I, N.—IX SEAM (Top)
 G. 146A RANIGANJ FIELD—BHARATCHAK SEAM
 G. 146B RANIGANJ FIELD—BHARATCHAK SEAM
 G. 146C RANIGANJ FIELD—BHARATCHAK SEAM
 G. 147 JHARIA, N.E. I, NORTH—IX SEAM? (just below X Seam)
 G. 148 JHARIA, S.E., CENTRAL—XII SEAM
 G. 149 JHARIA, N.E. I, NORTH—VII SEAM
 G. 150 JHARIA, N.E. I, NORTH—IX SEAM? (just below X Seam)
 G. 151 CENTRAL PROVINCES, KOREA STATE, KURASIA—GORGHELA SEAM
 G. 152 CENTRAL PROVINCES, CHHINDWARA—HIDRAGARH
 G. 155 JHARIA, CENTRAL I, NORTH—VI SEAM (Bottom)
 G. 157 JHARIA, CENTRAL I, NORTH—III (or II?) SEAM
 G. 158 CENTRAL PROVINCES—UMARIA
 G. 159 JHARIA, CENTRAL I, NORTH—IV SEAM (Bottom)
 G. 161 JHARIA, CEN. I, NORTH—III SEAM
 G. 162 CENTRAL PROVINCES, REWA STATE—BURHAR
 G. 163 JHARIA, CEN. I, NORTH—VIII SEAM
 G. 167 JHARIA, CEN. I, NORTH—II SEAM (?)
 G. 168 JHARIA, CEN. I, NORTH—IV SEAM
 G. 169 JHARIA, CEN. II, SOUTH—XVI-A SEAM
 G. 170 CENTRAL PROVINCES—BALLARPUR, TOP SEAM
 G. 171 CENTRAL PROVINCES—BALLARPUR, BOTTOM SEAM
 G. 172 RANIGANJ FIELD—KAJORA, TOP SEAM
 G. 173SNA RANIGANJ FIELD—SAMLA SEAM
 G. 181 JHARIA, N.E. I, CENTRAL—X SEAM
 G. 184 JHARIA, EAST II—XIV-A SEAM
 G. 188 ASSAM—MARGHERITA
 G. 189 UPPER ASSAM—DILLI
 G. 190 ASSAM—CHERRA-CHHATAK
 S. 56 BALUCH.—NAKAS (Sulph. Reduction)
 S. 57 BALUCHISTAN—HARNAI
 S. 86 SIND—JHIMPIR
 S. 96 ASSAM—MARGHERITA

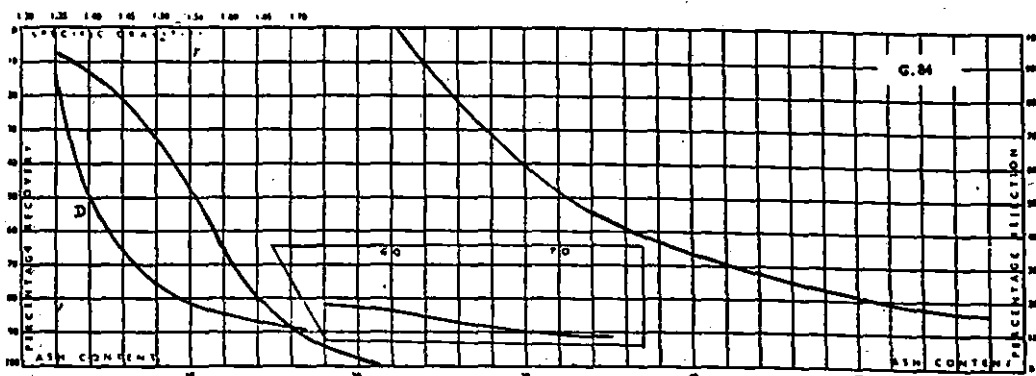
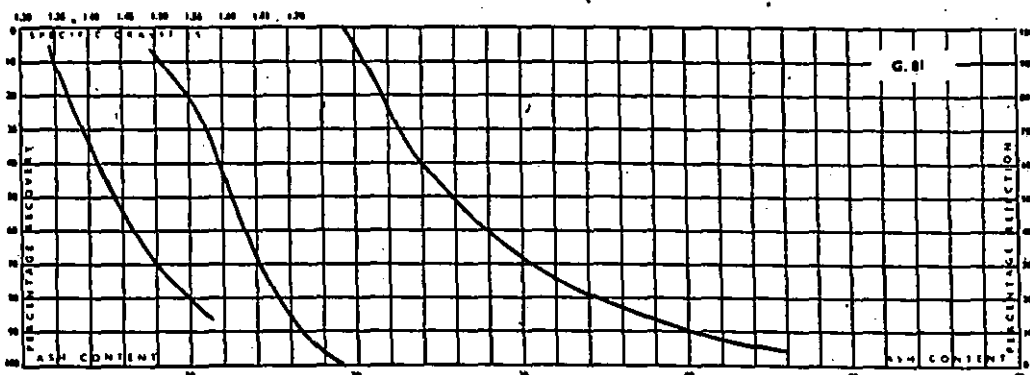
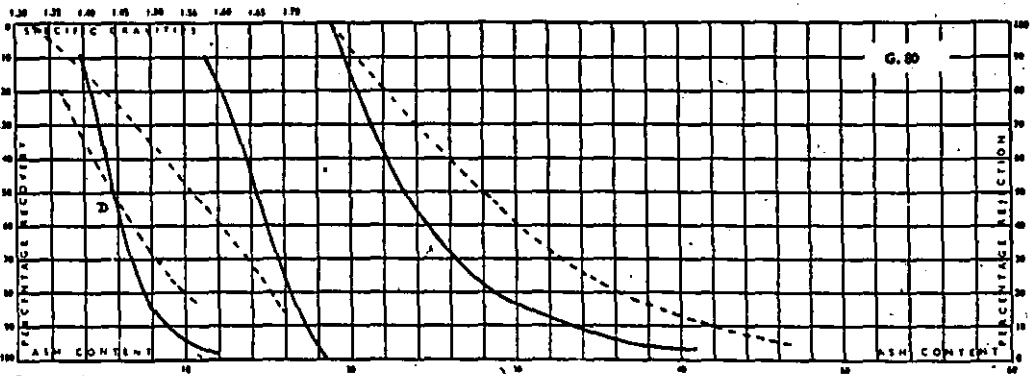
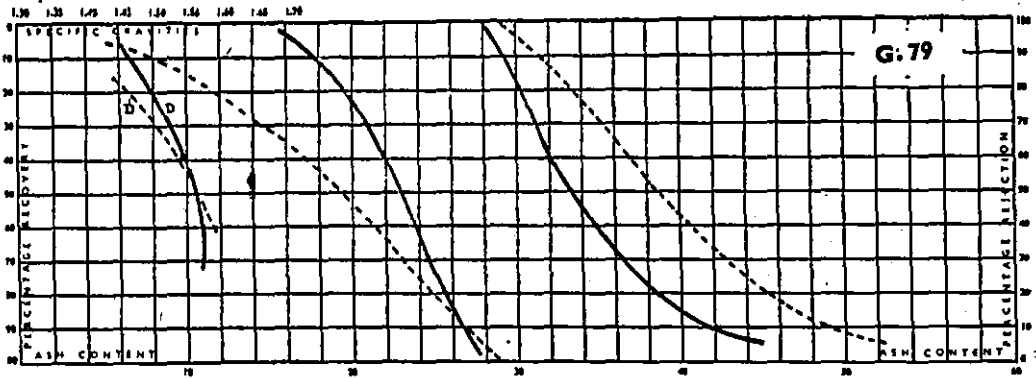


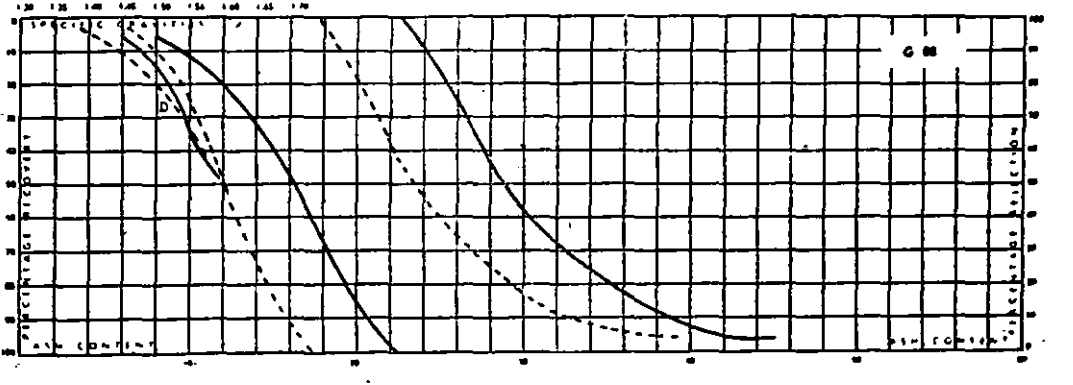
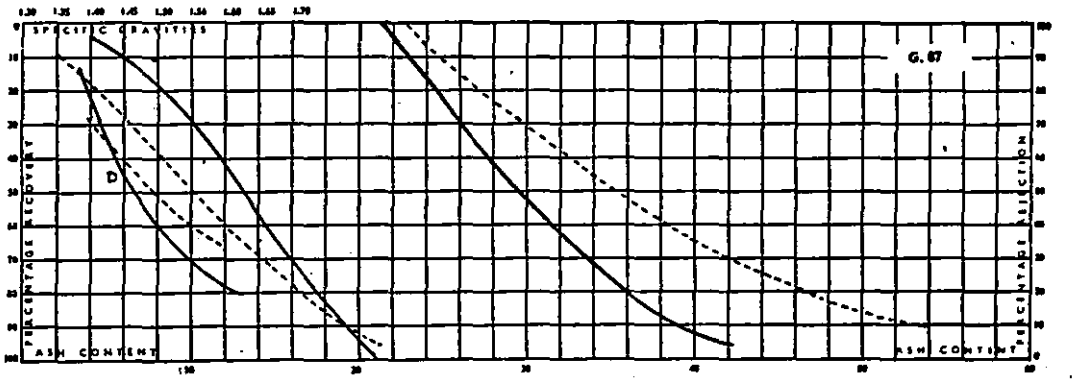
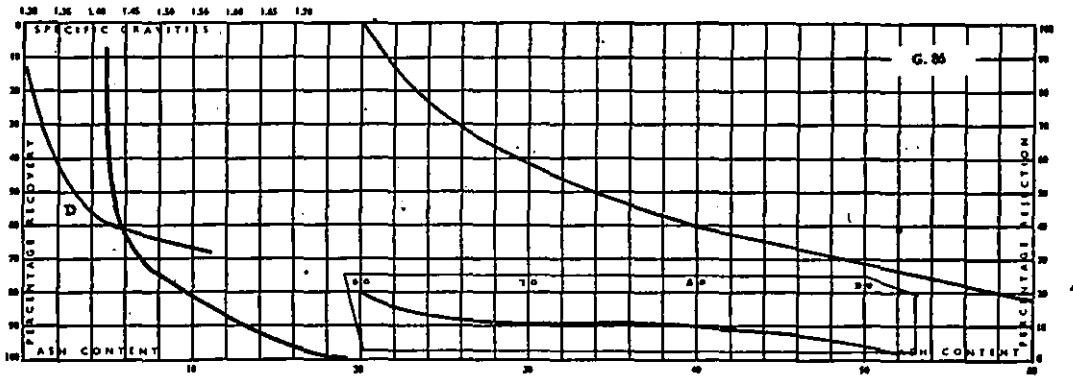
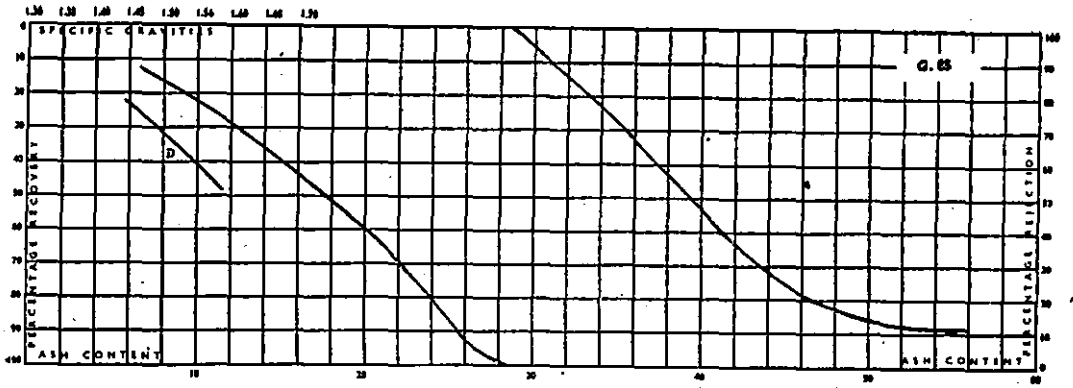


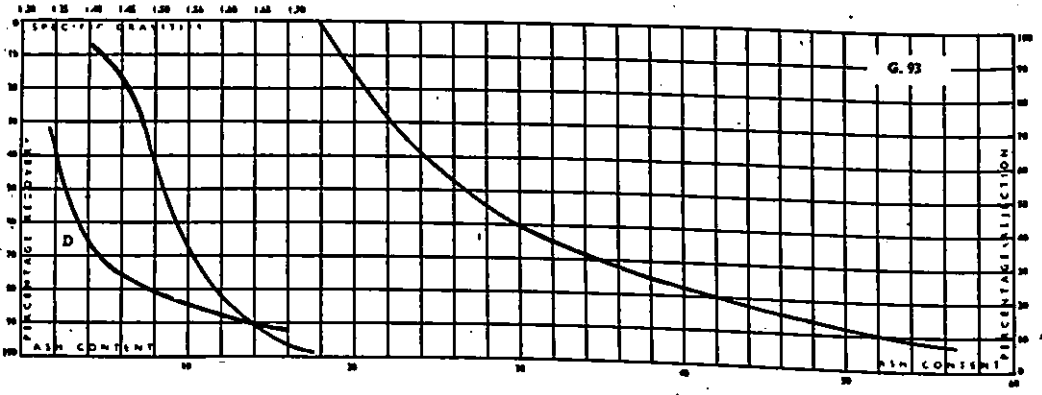
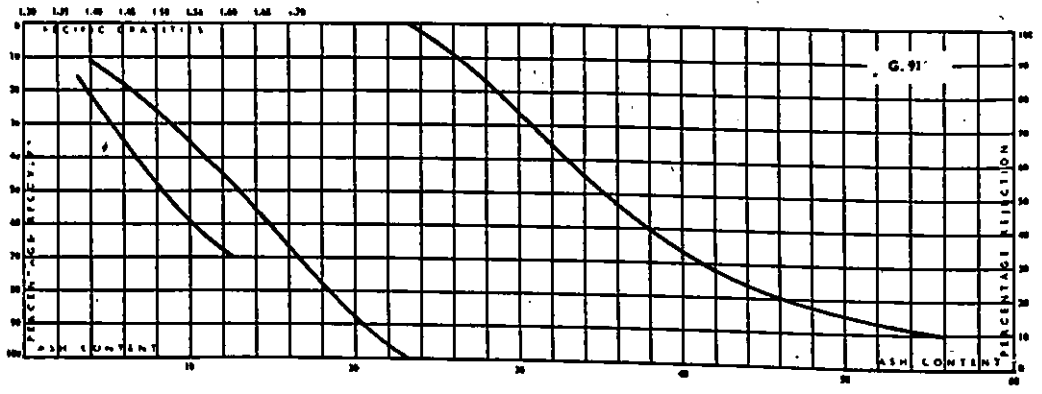
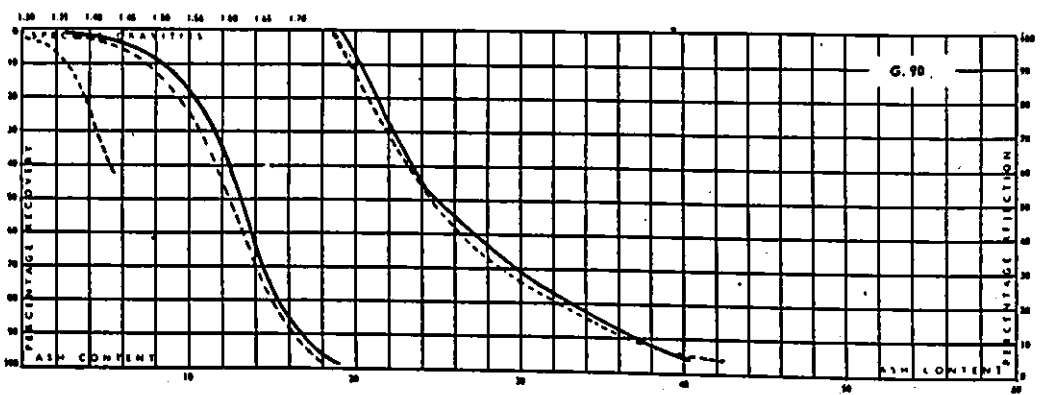
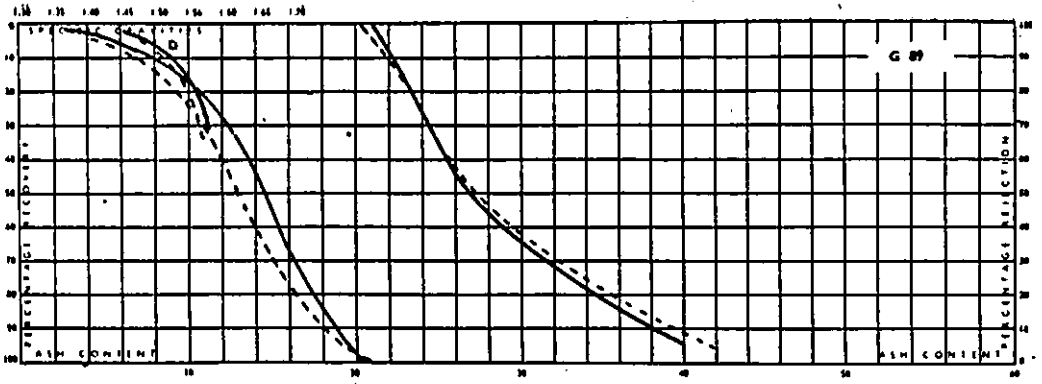


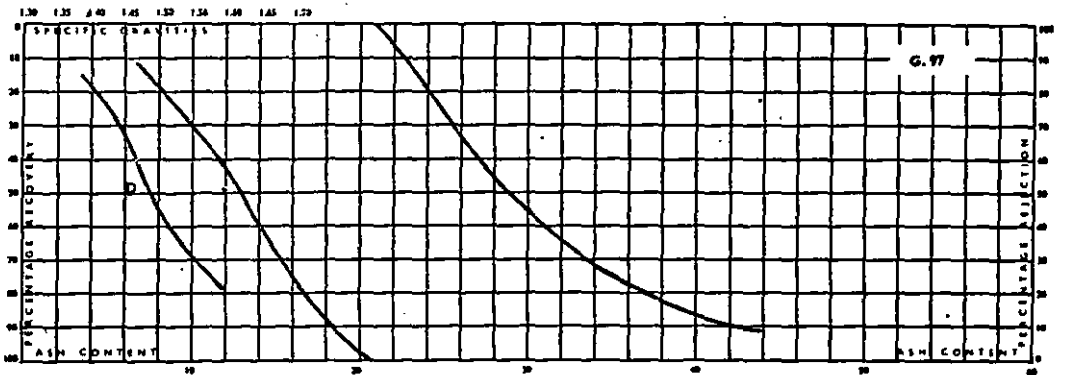
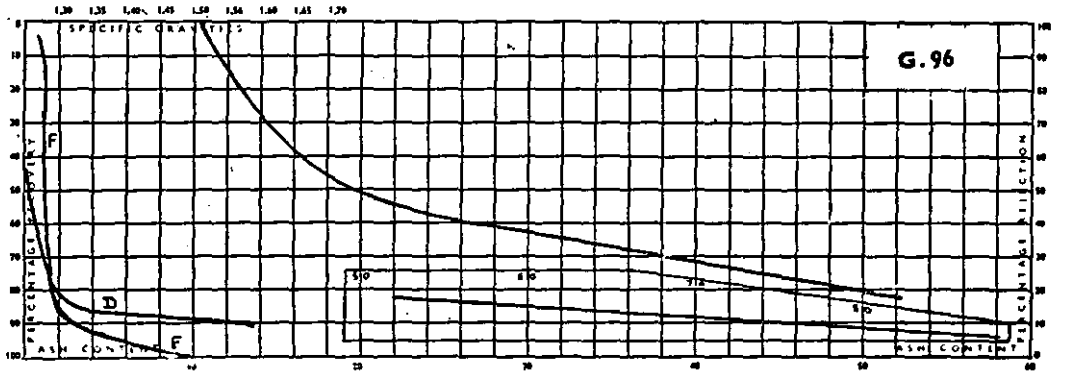
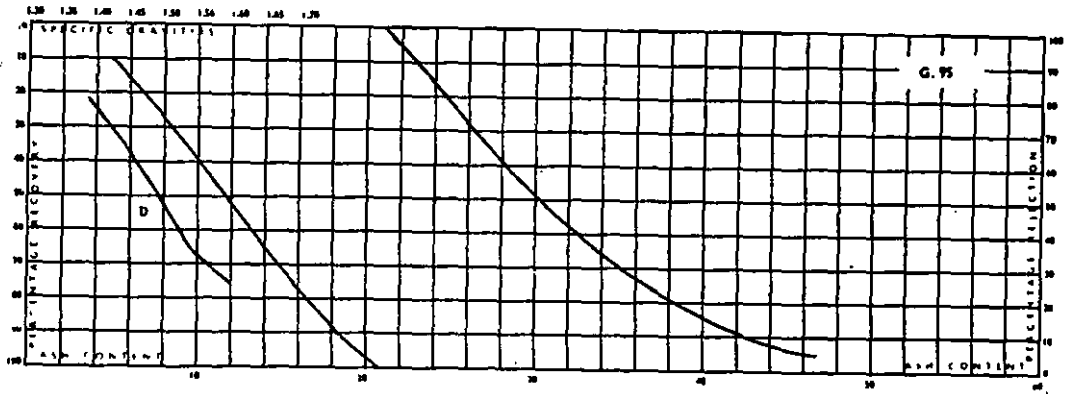


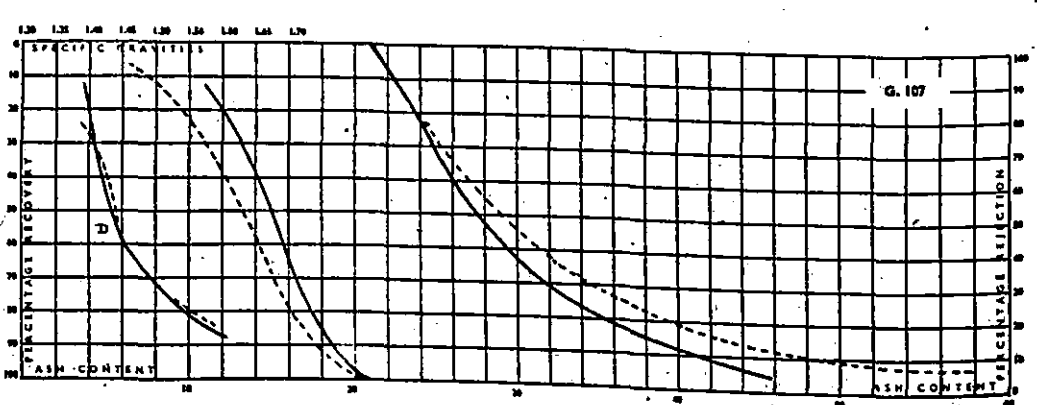
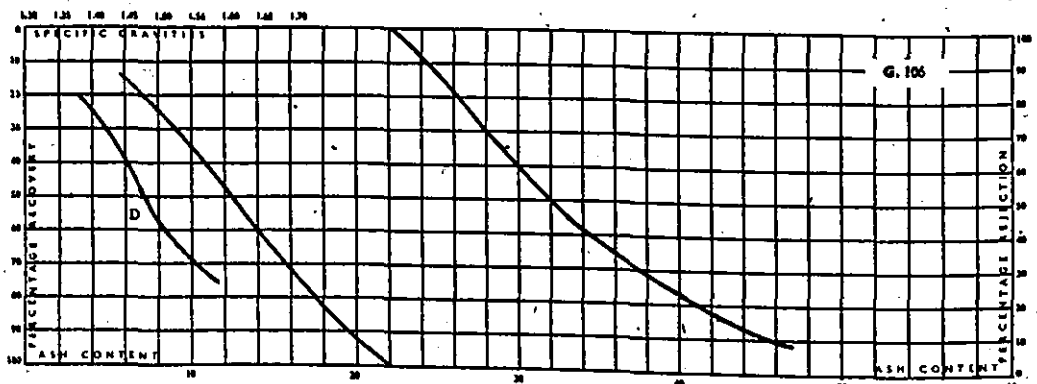
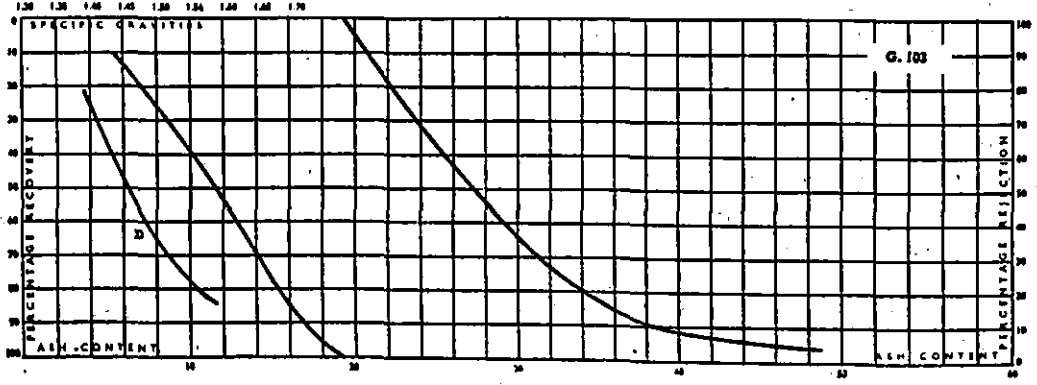
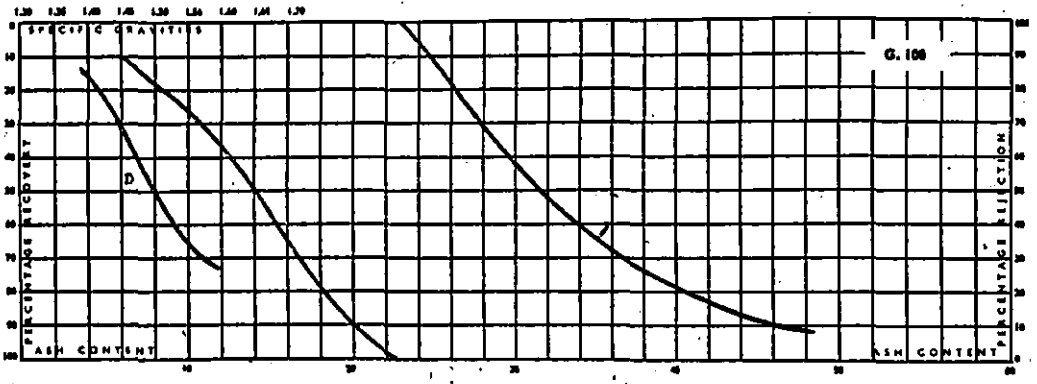


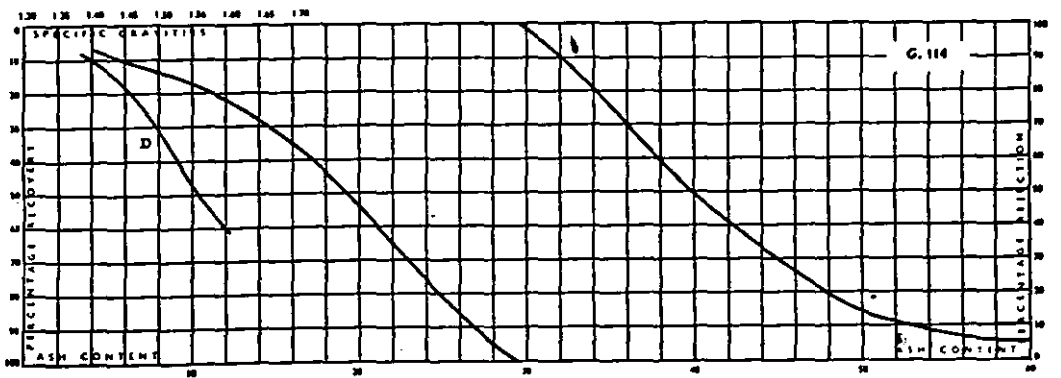
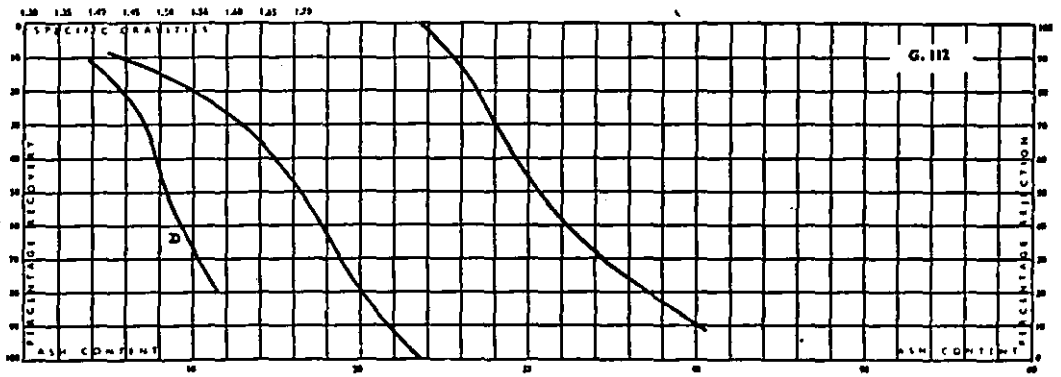
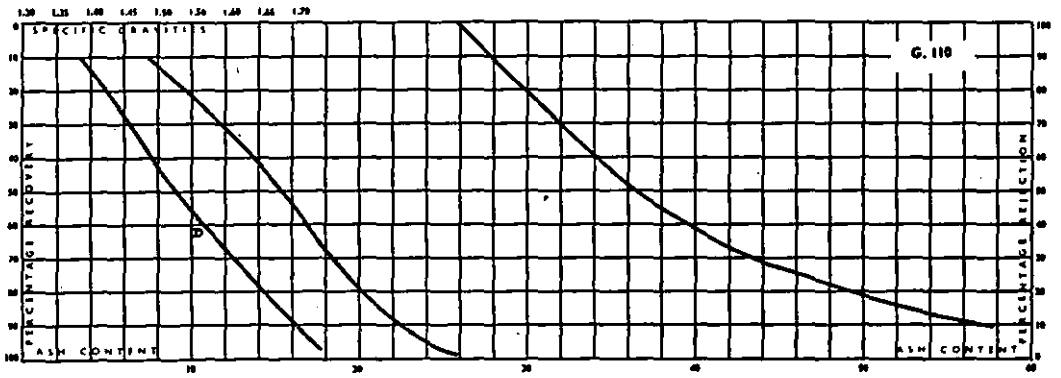
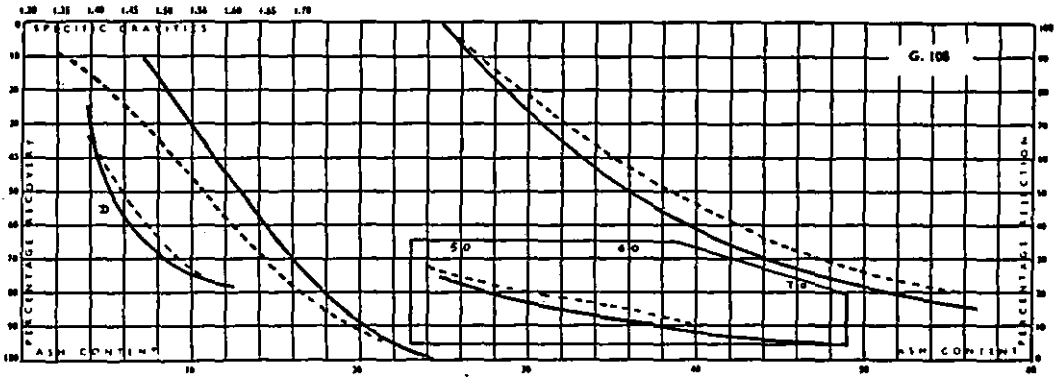


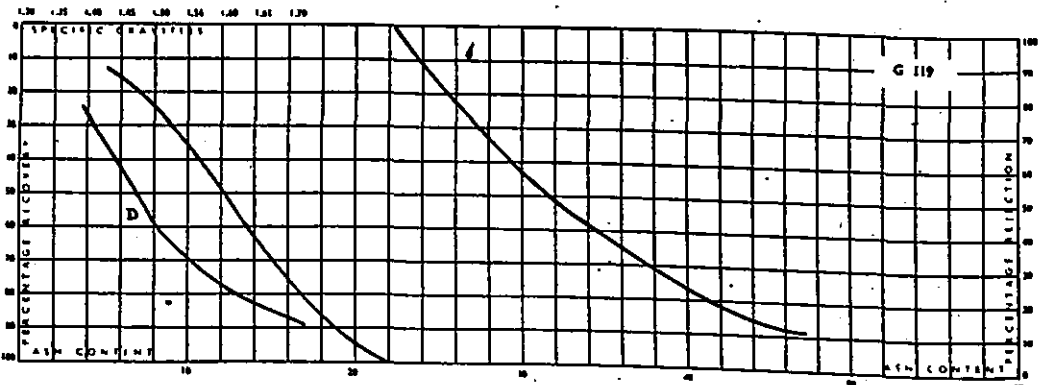
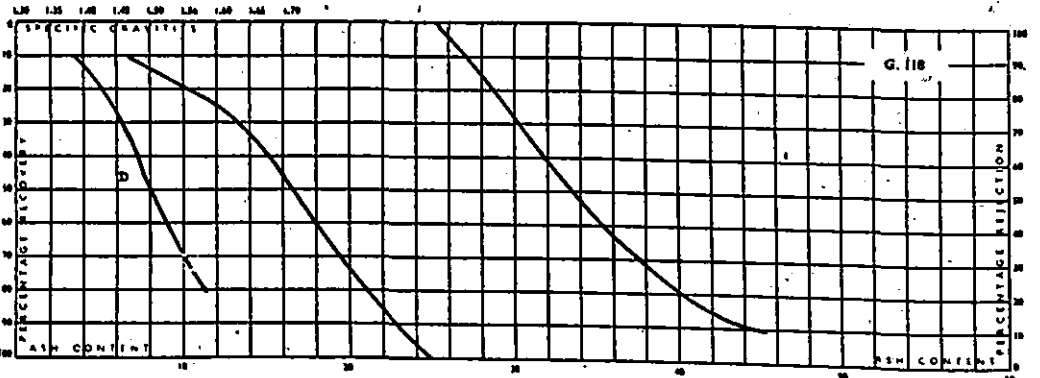
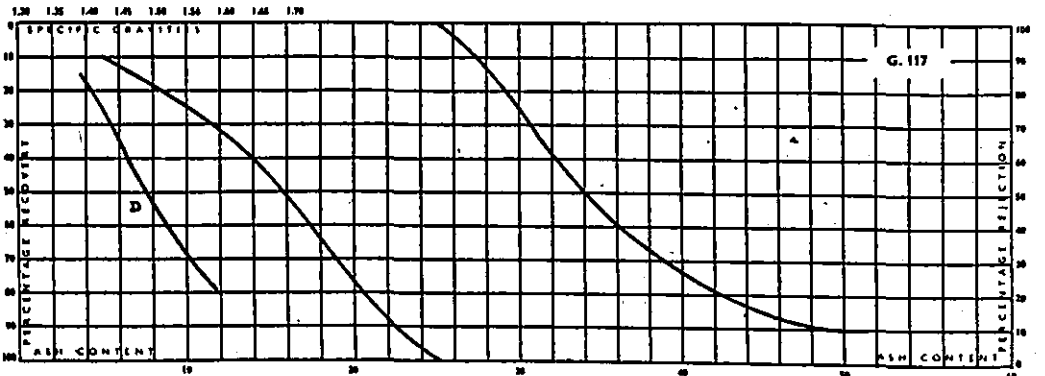
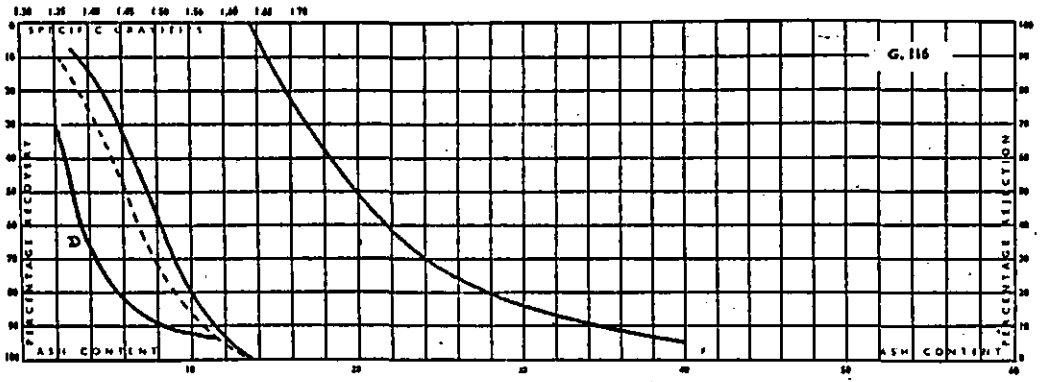


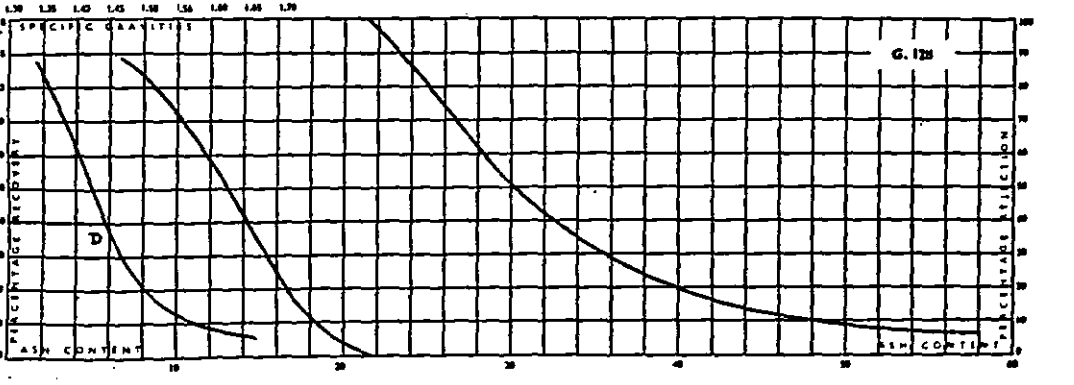
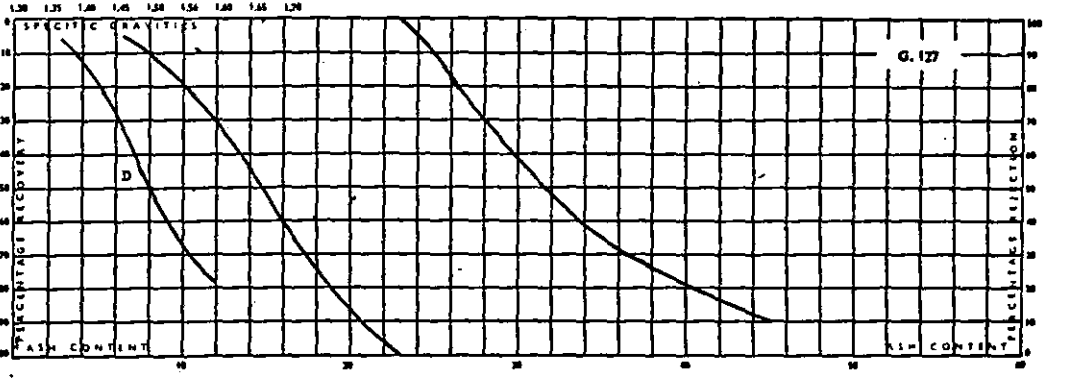
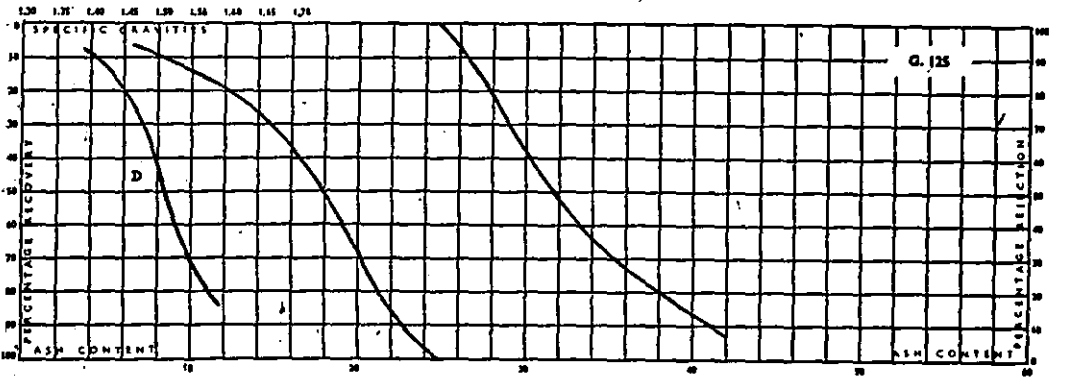
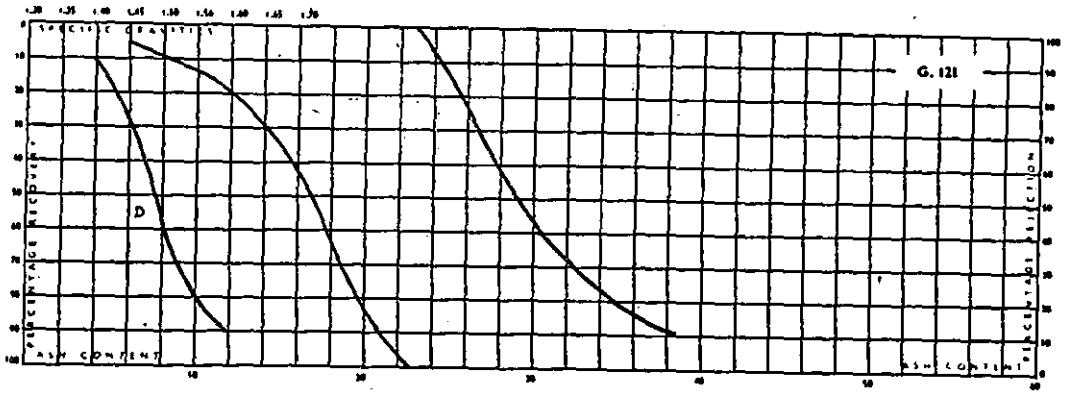


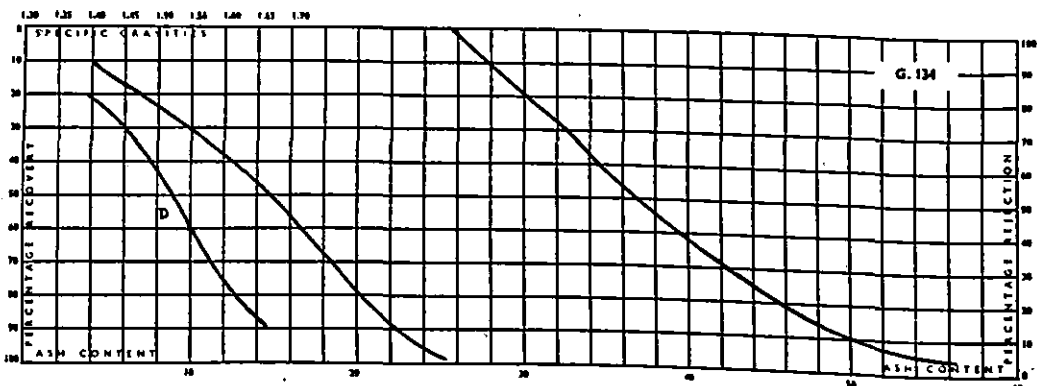
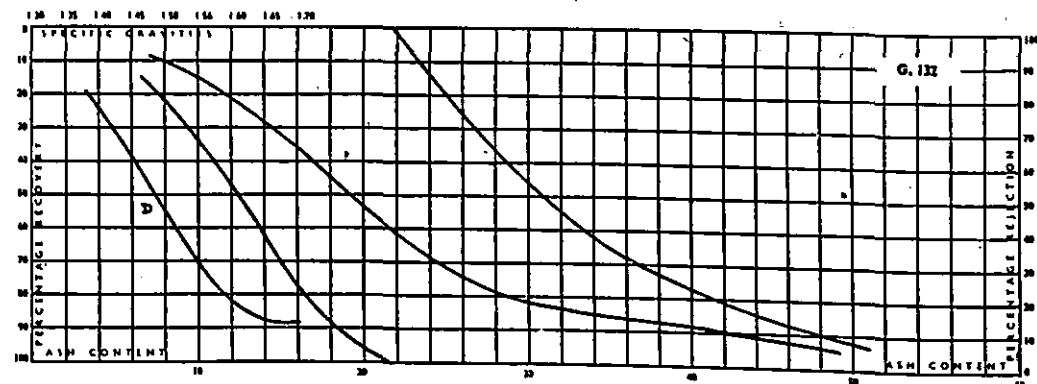
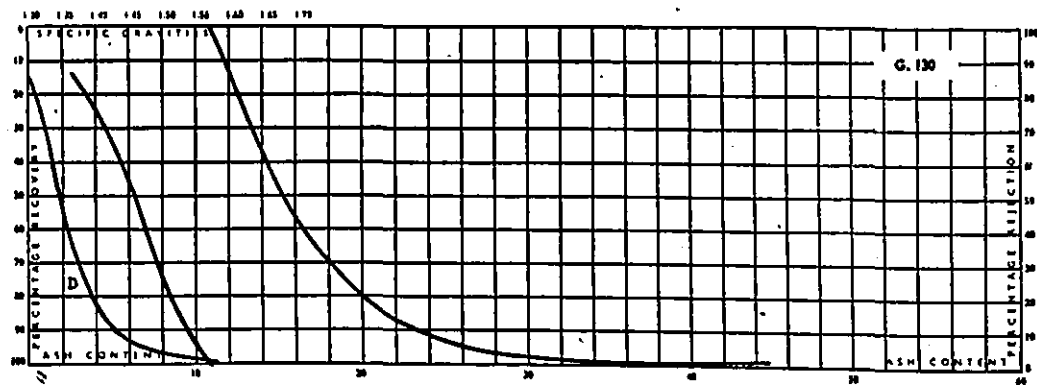
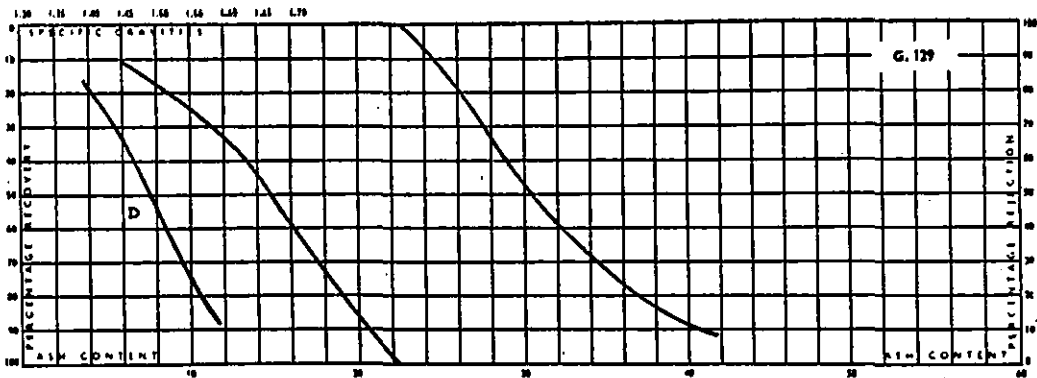


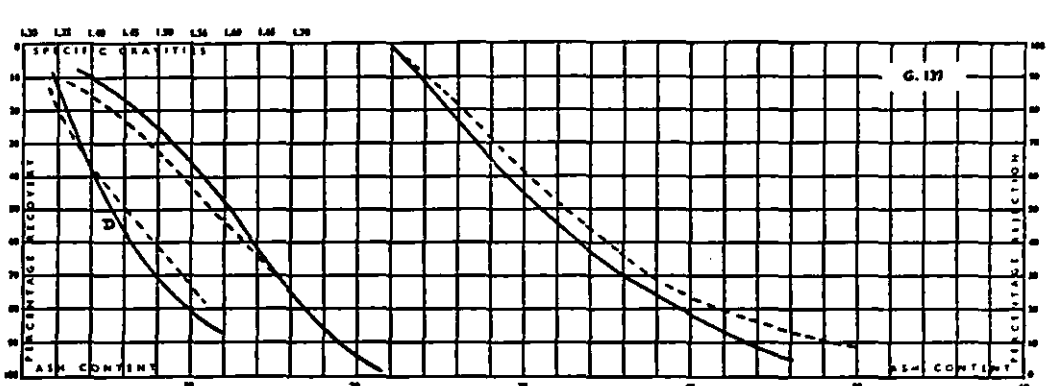
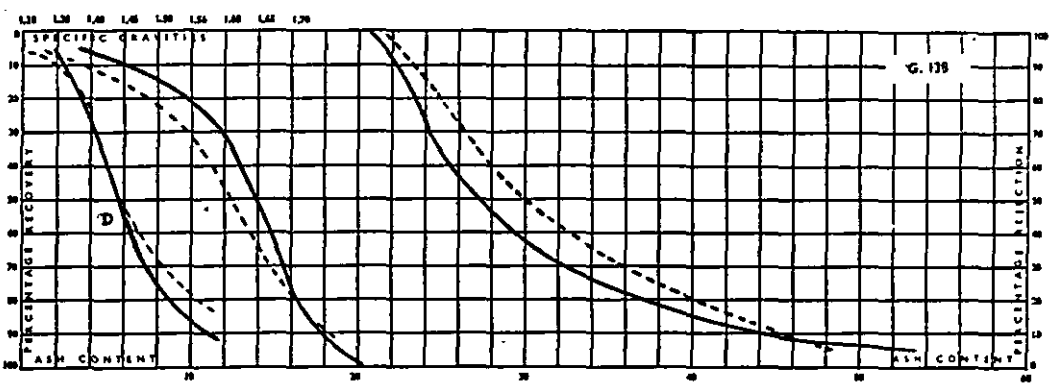
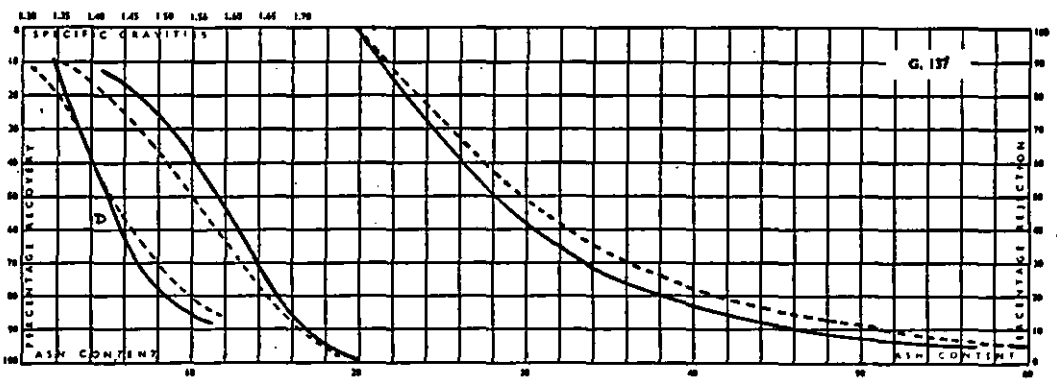
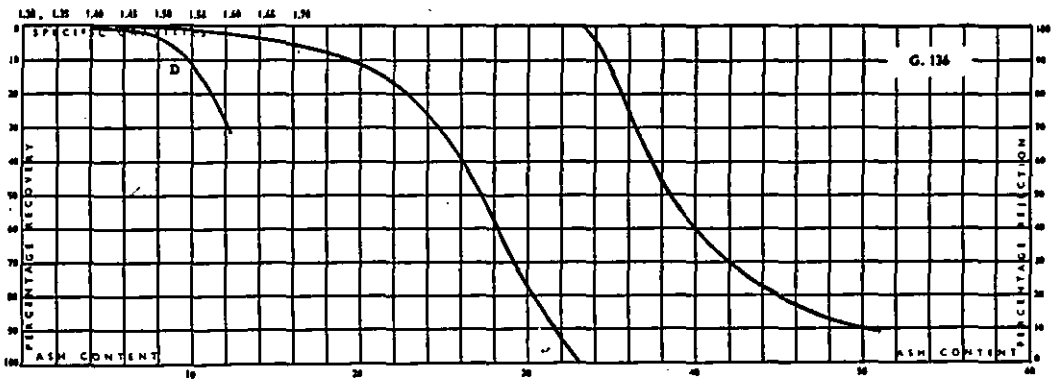


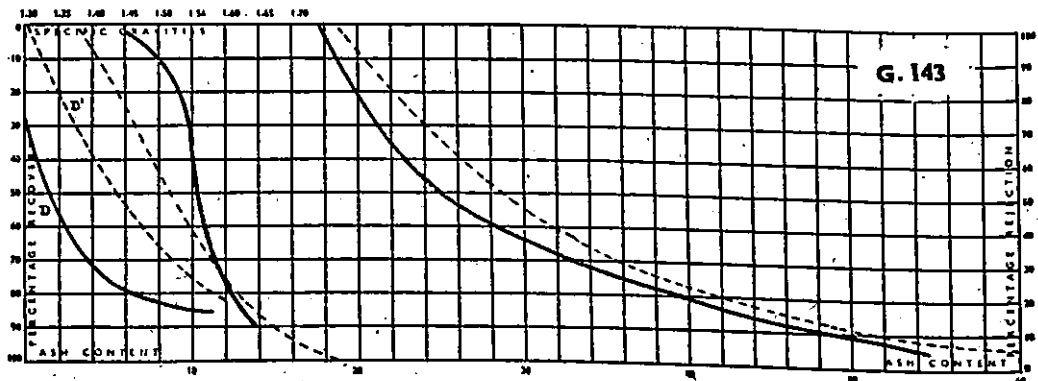
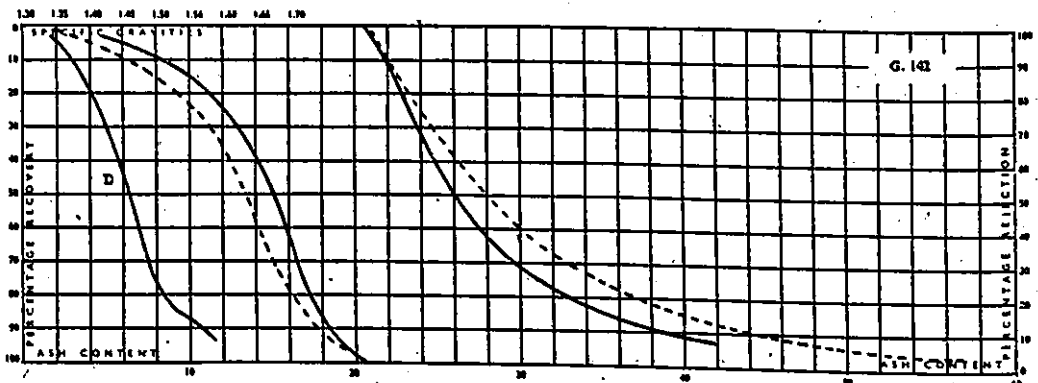
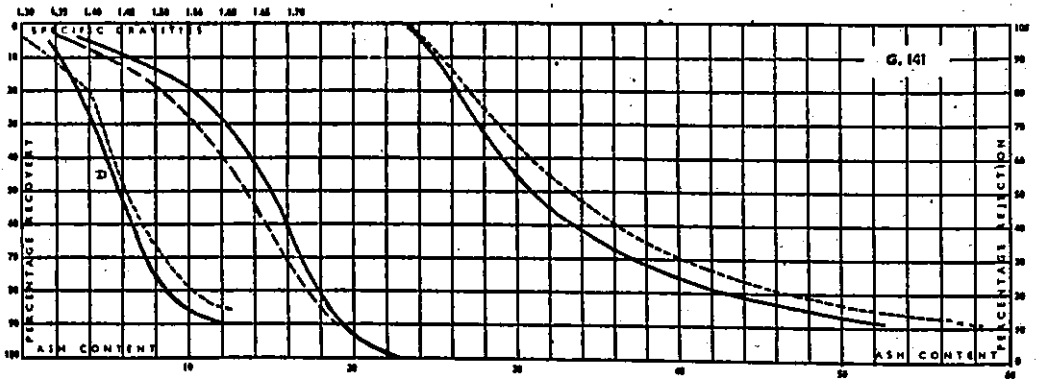
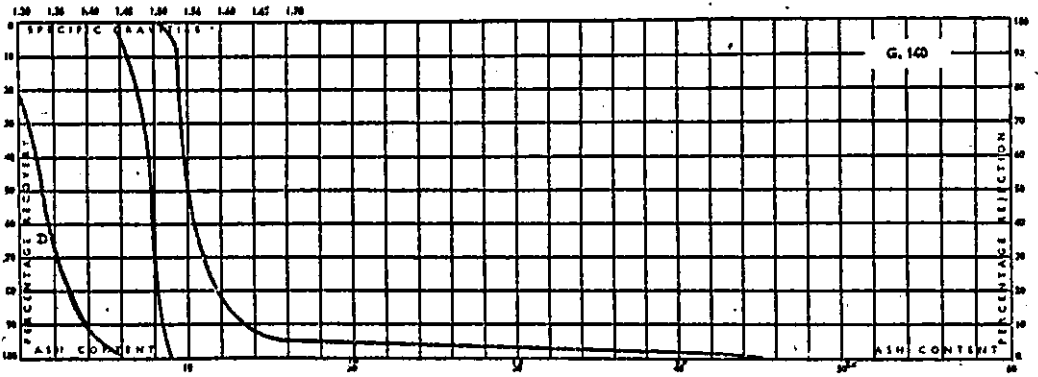


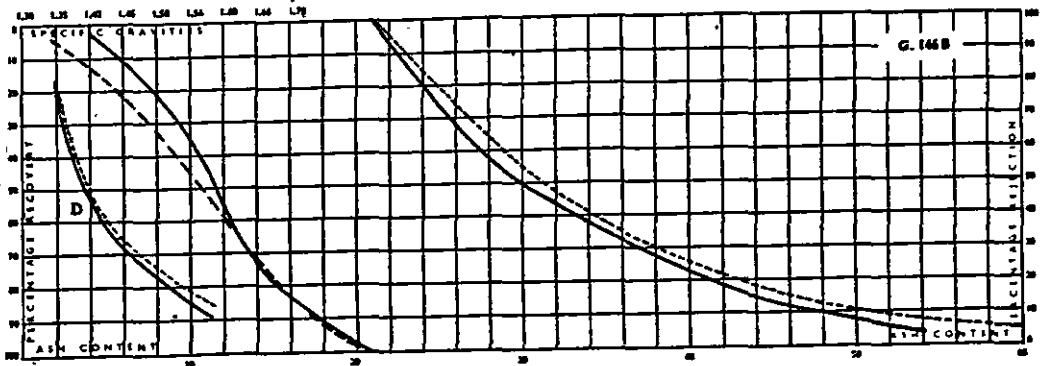
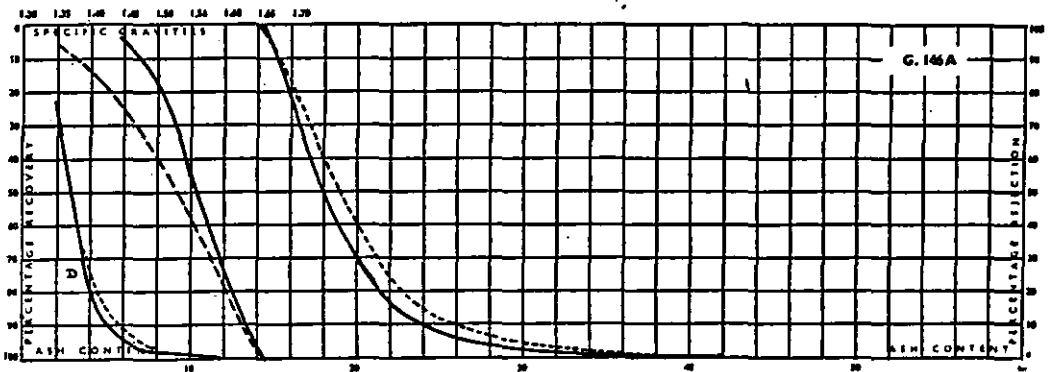
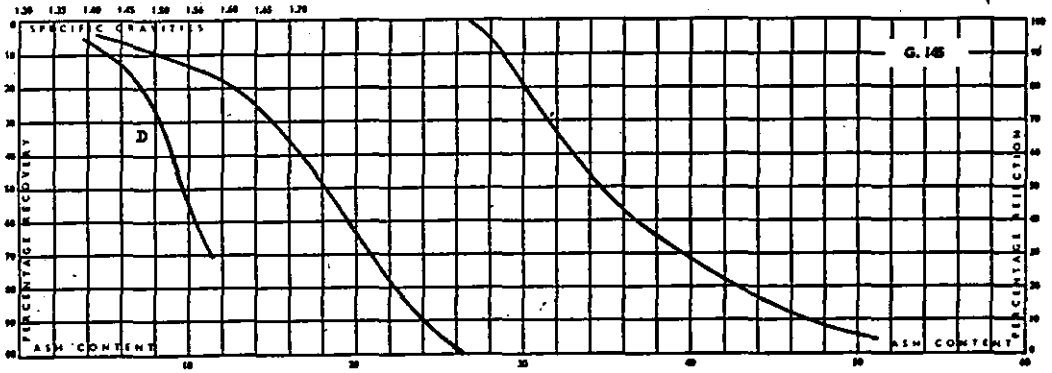
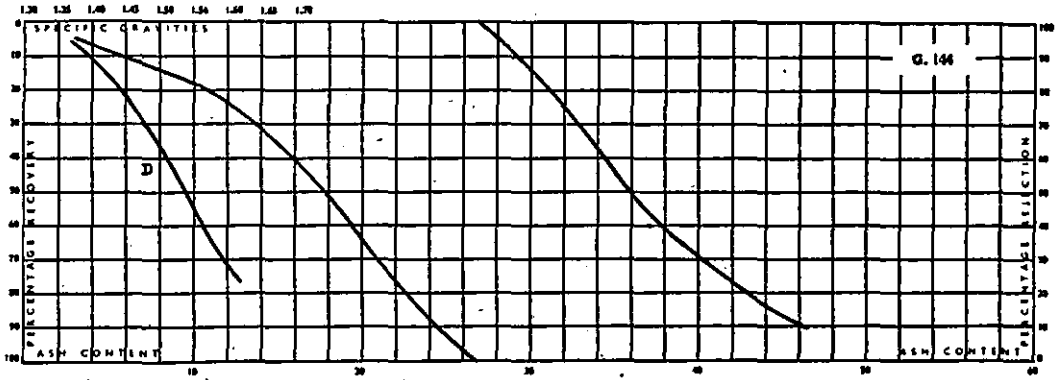


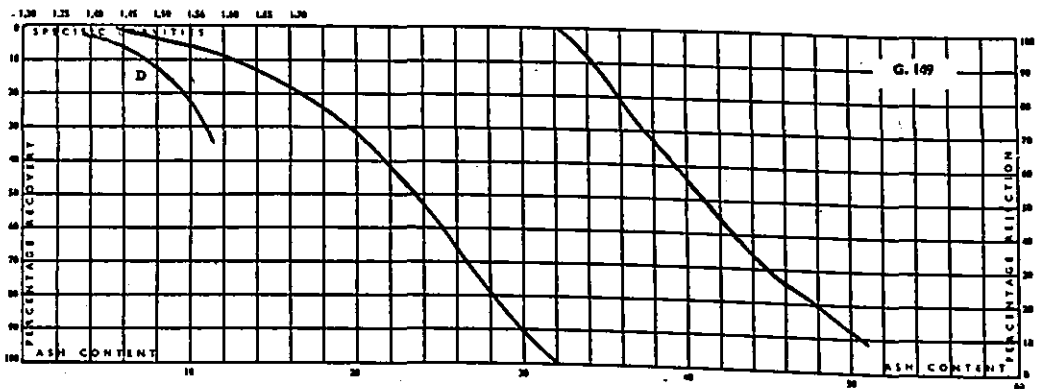
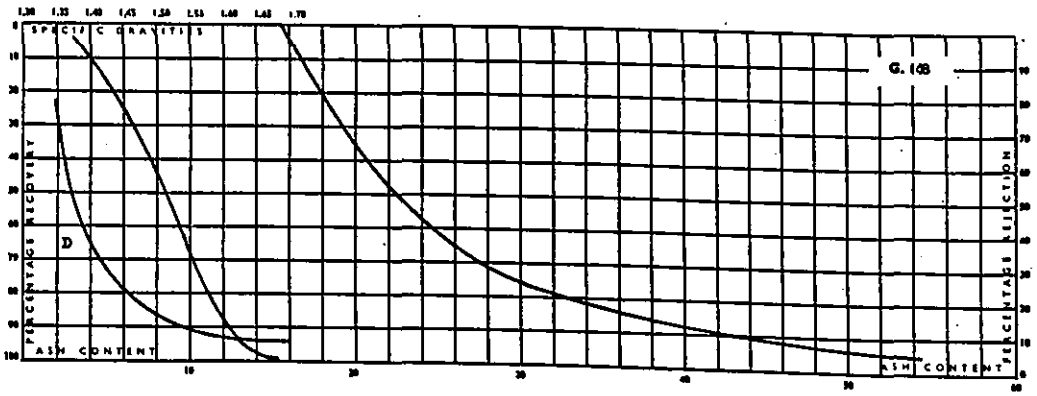
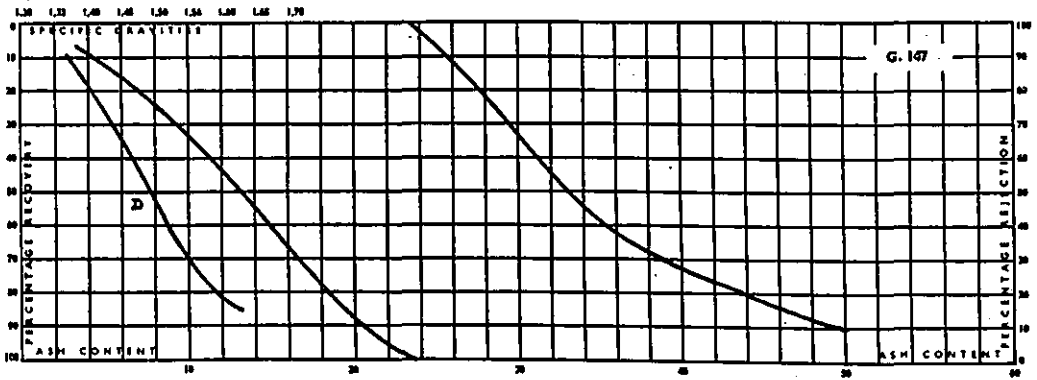
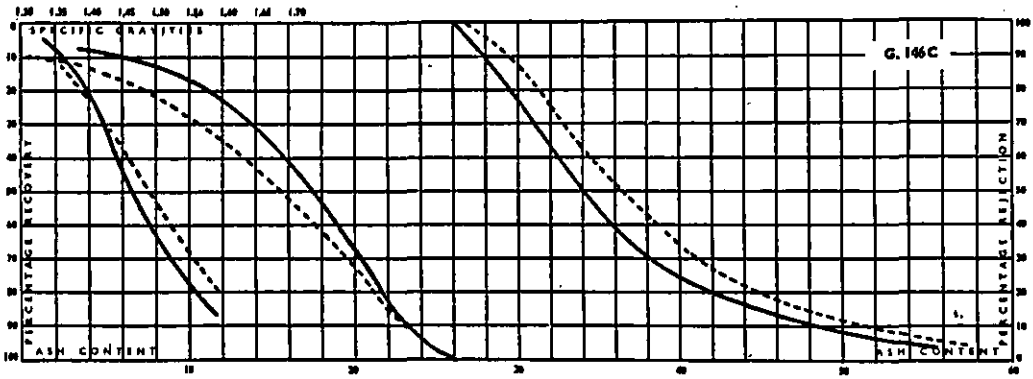


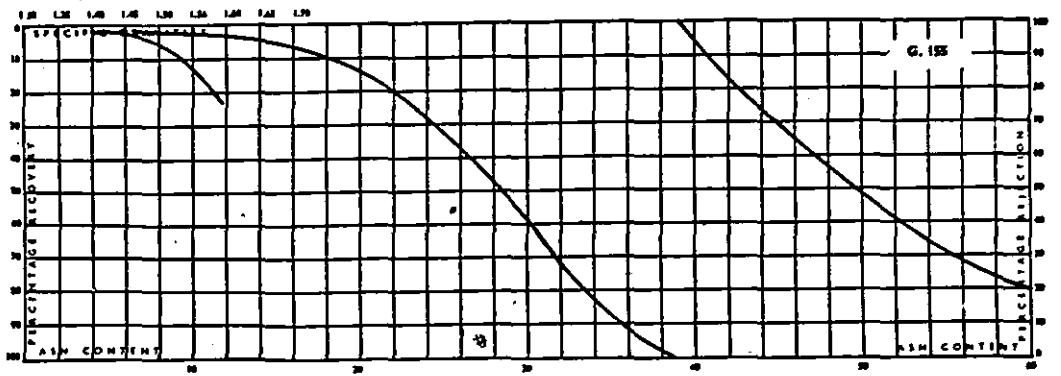
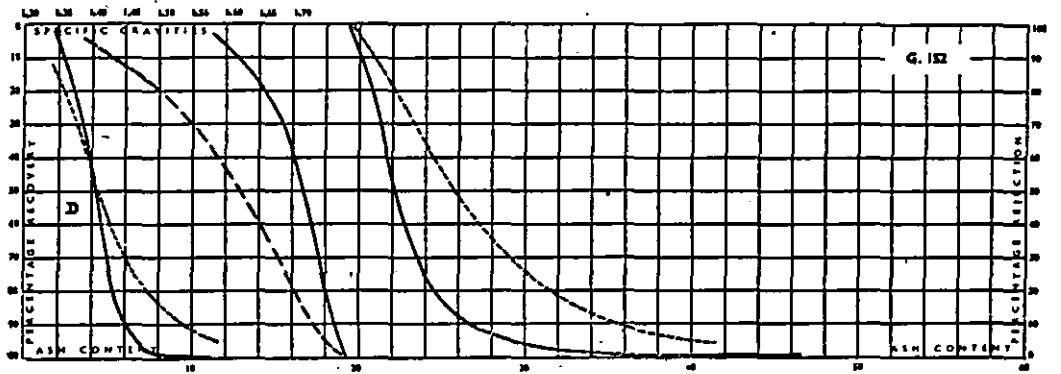
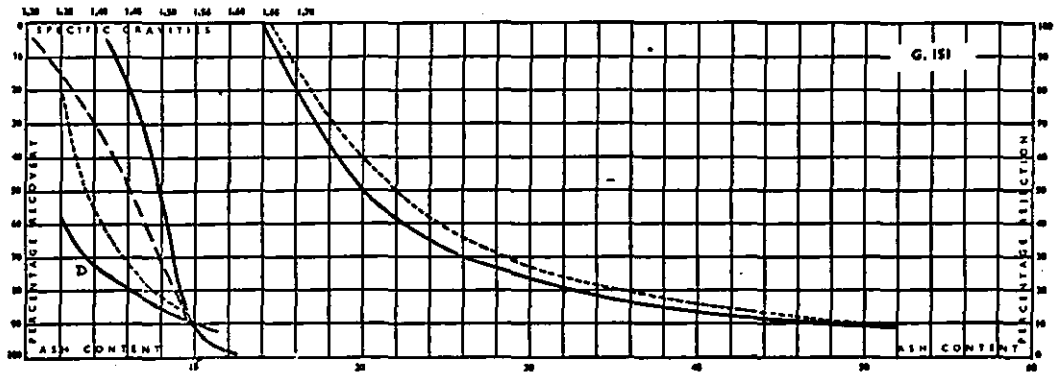
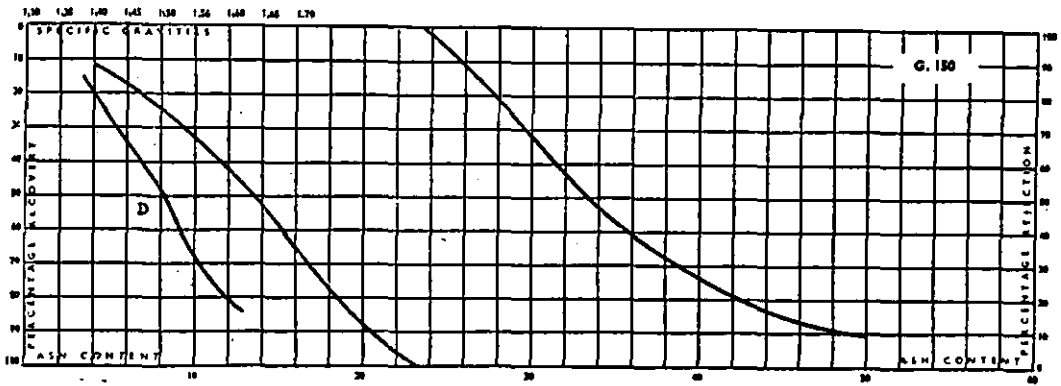


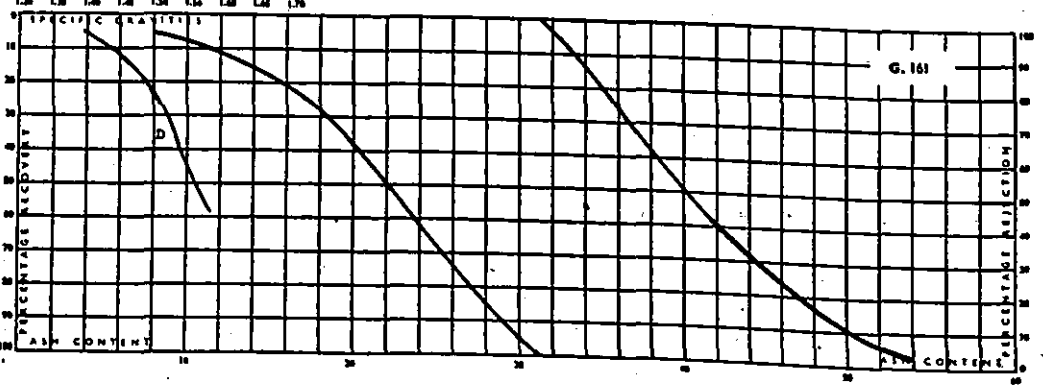
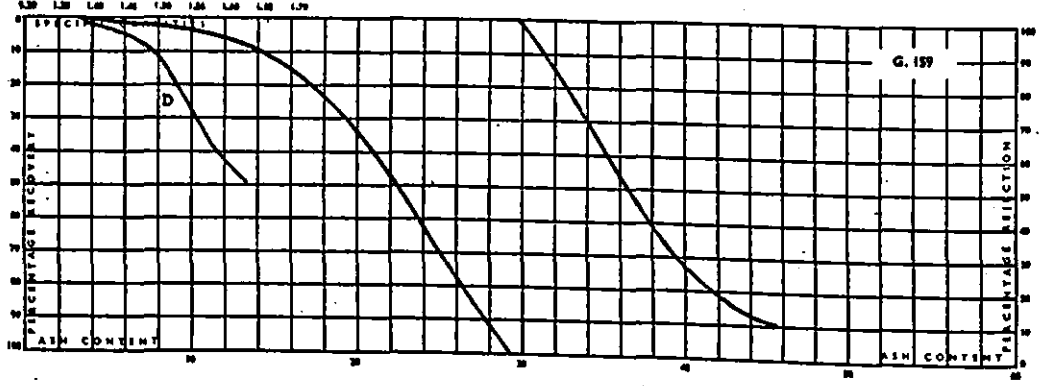
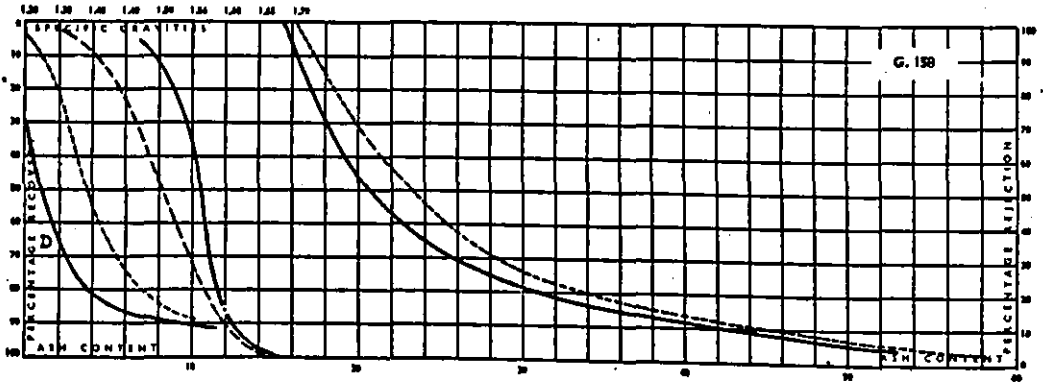
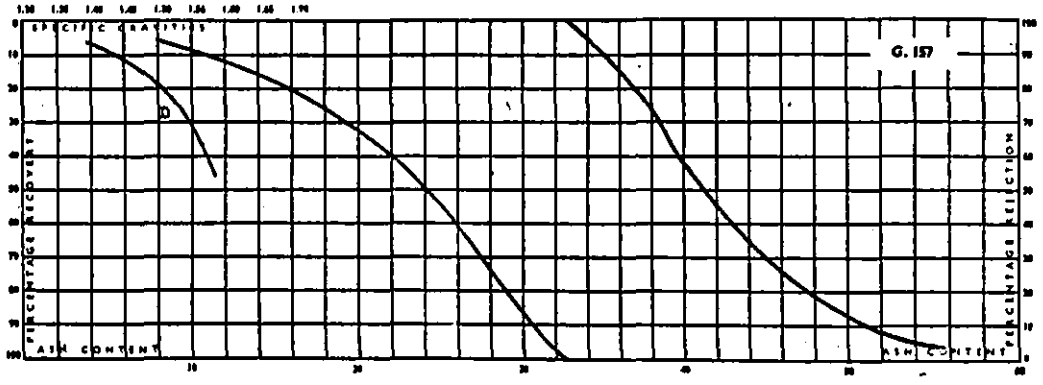


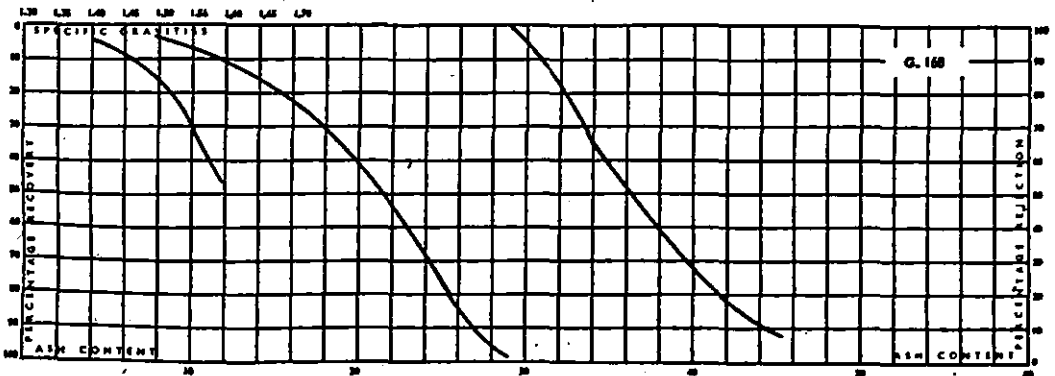
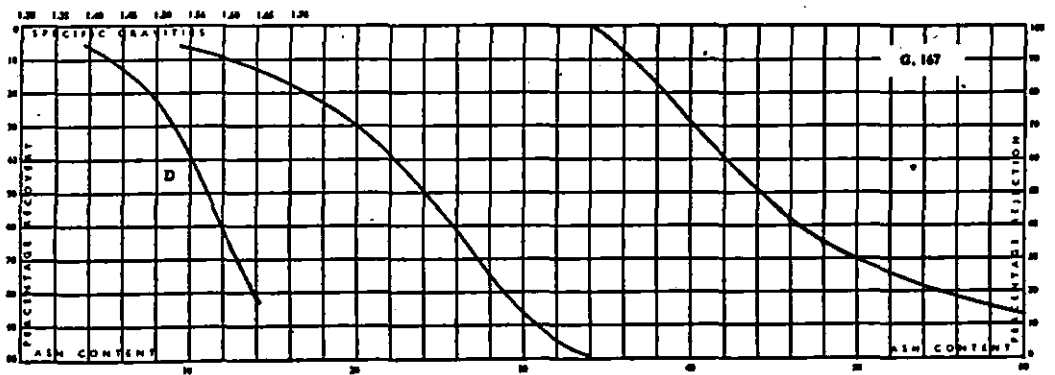
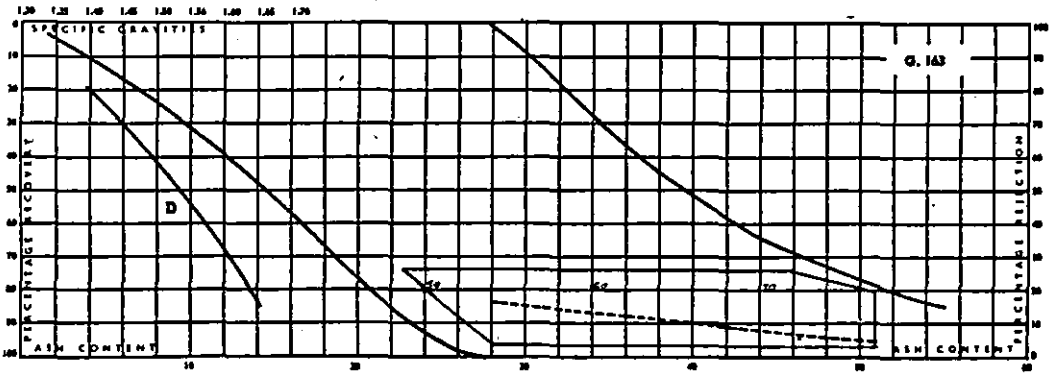
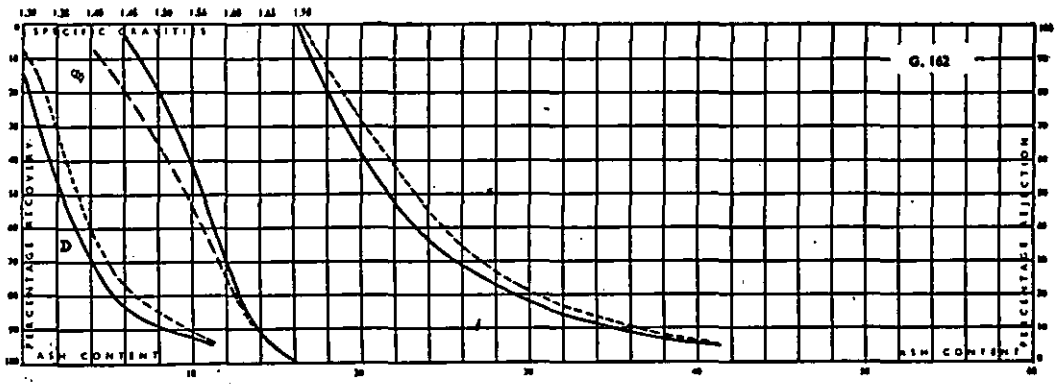


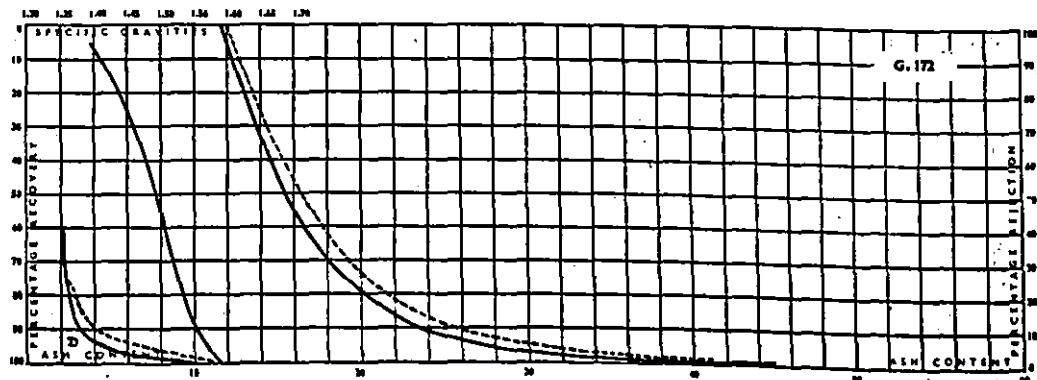
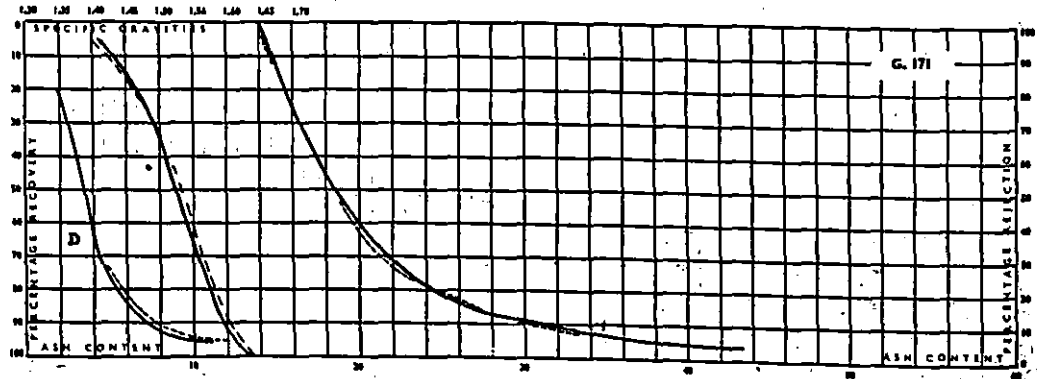
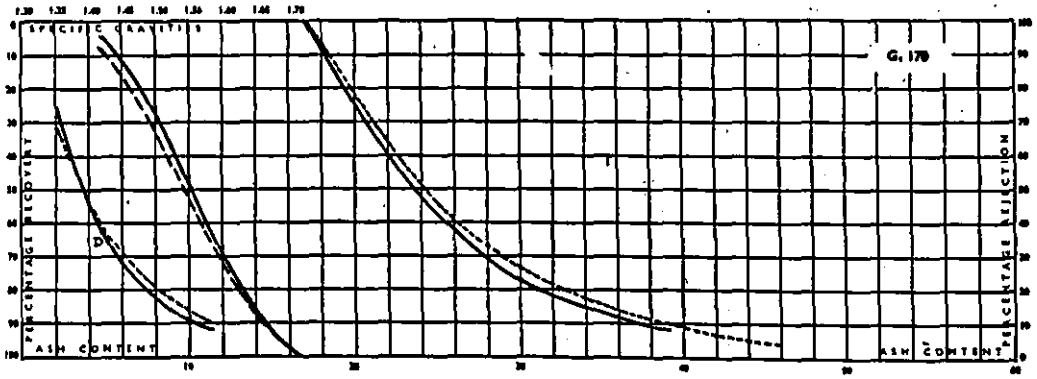
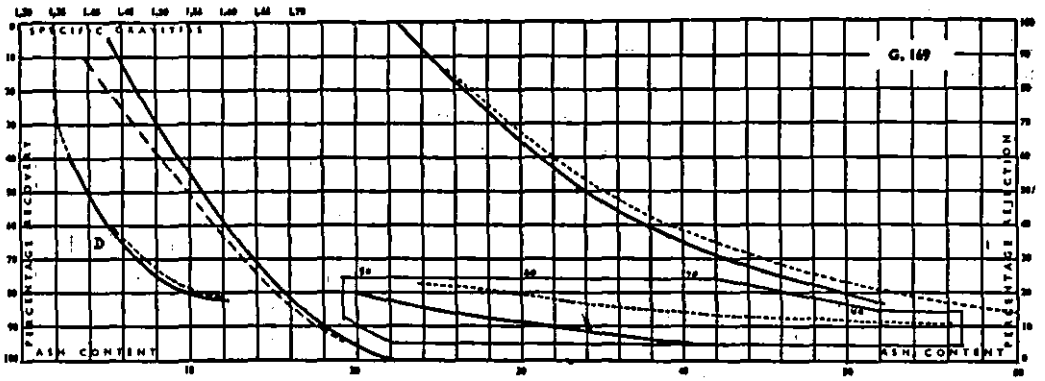


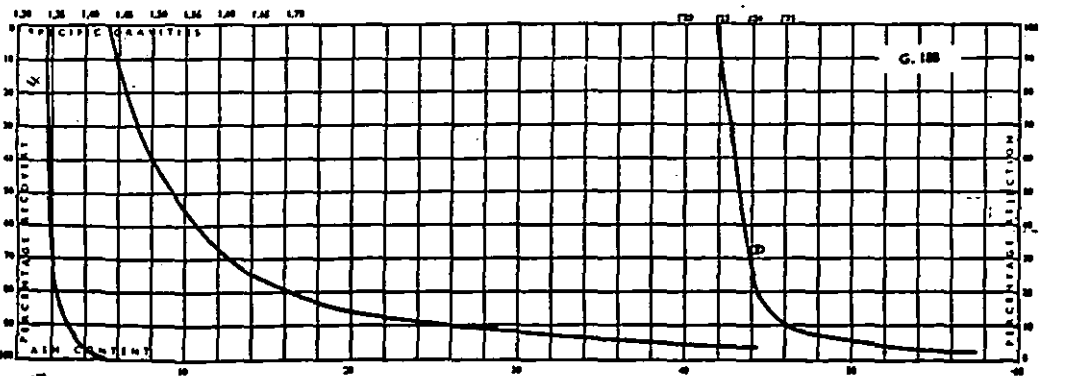
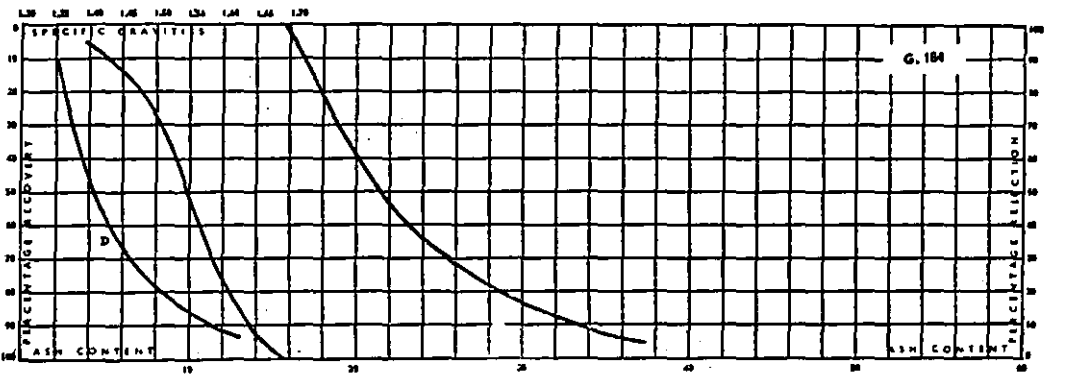
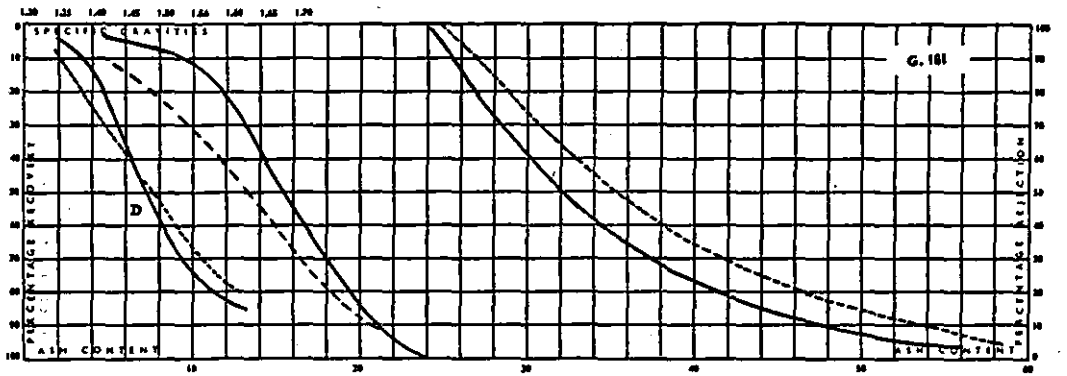
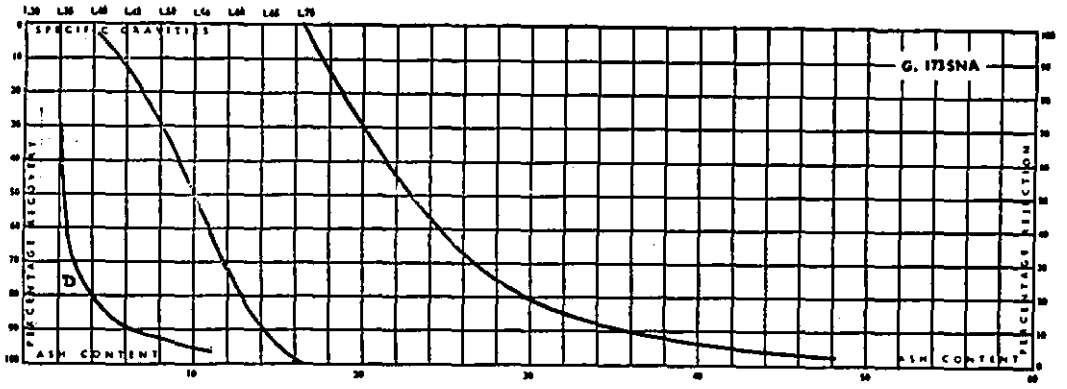


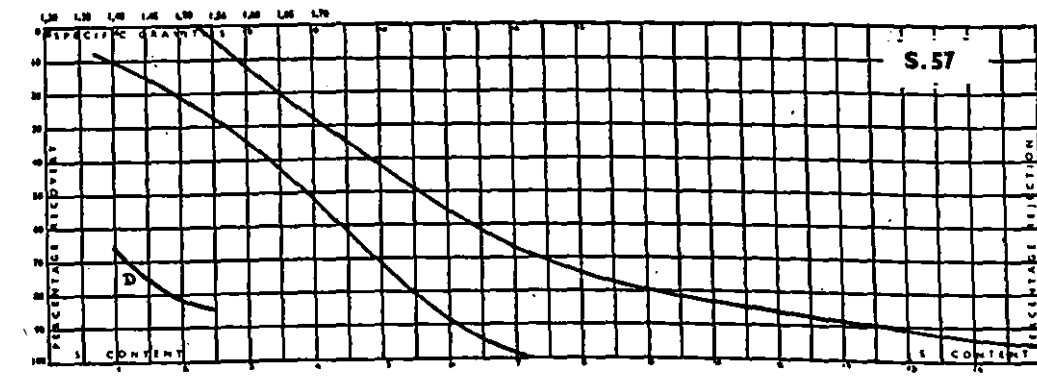
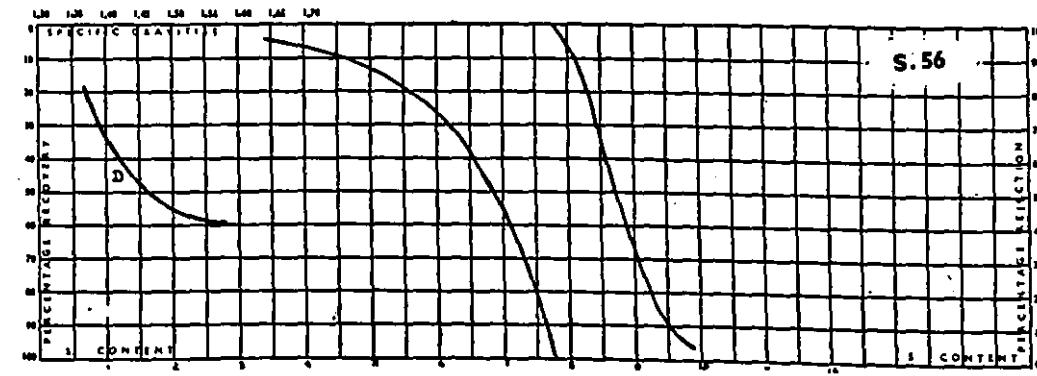
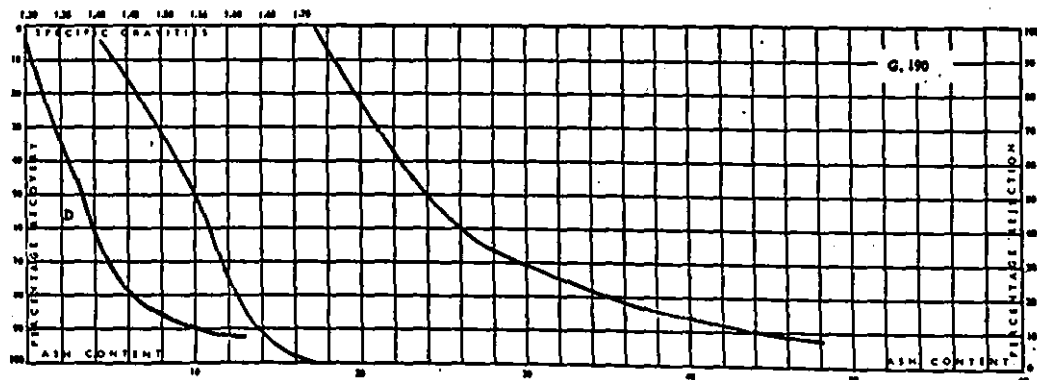
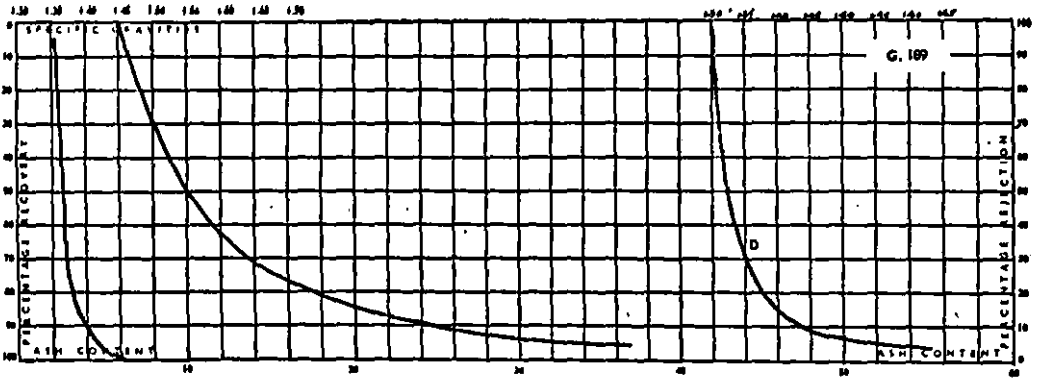


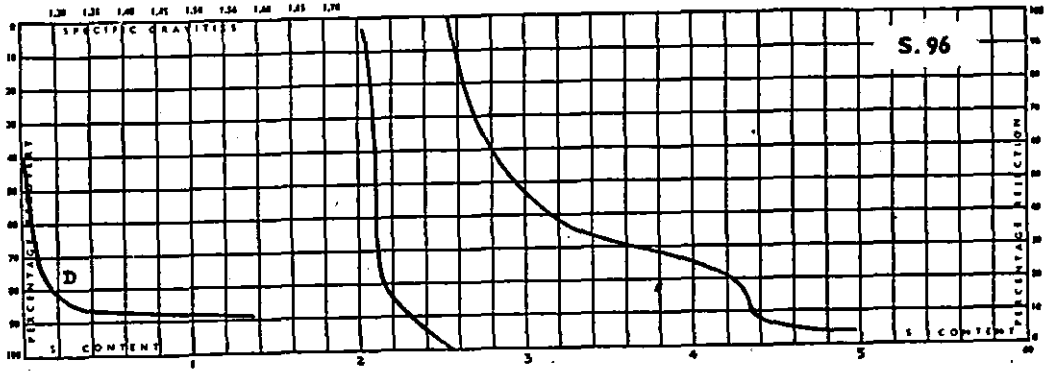
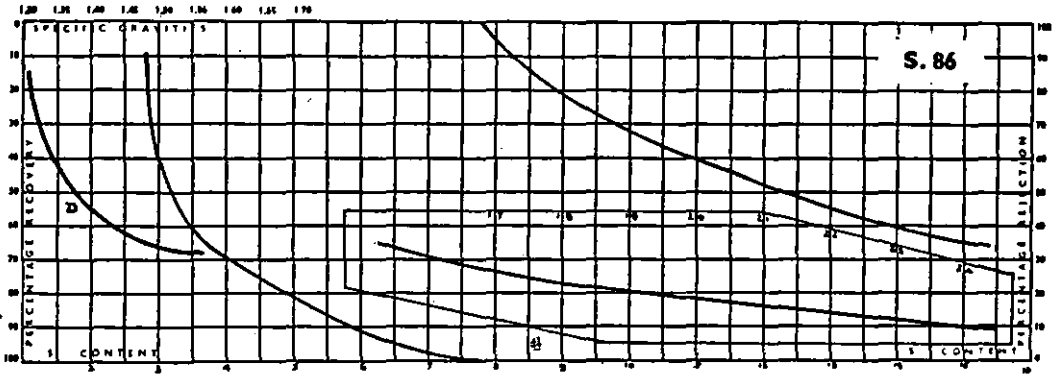












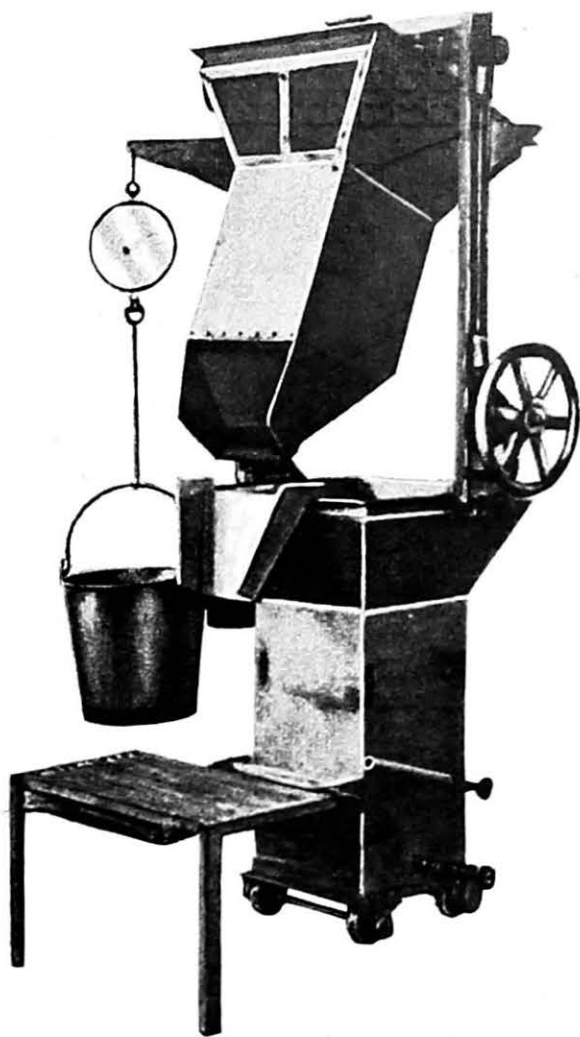


PLATE I

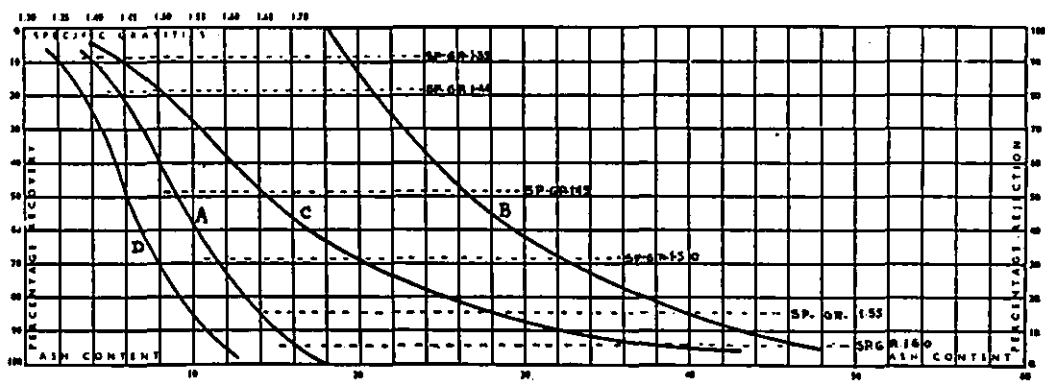


PLATE II

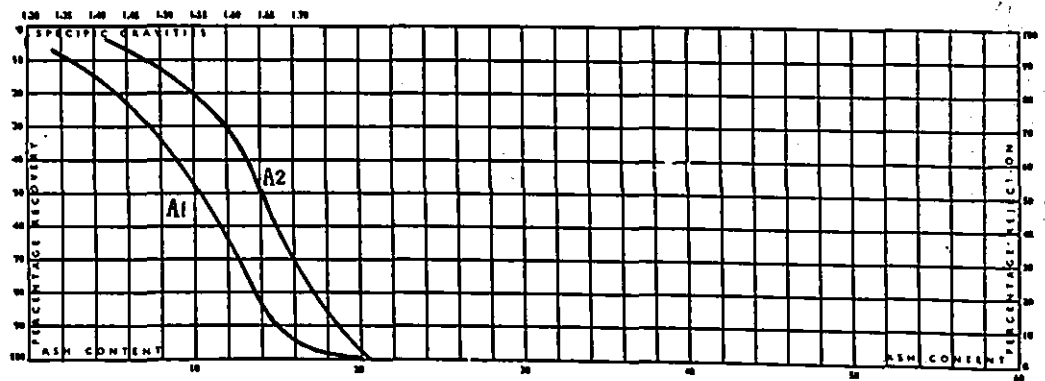


PLATE III

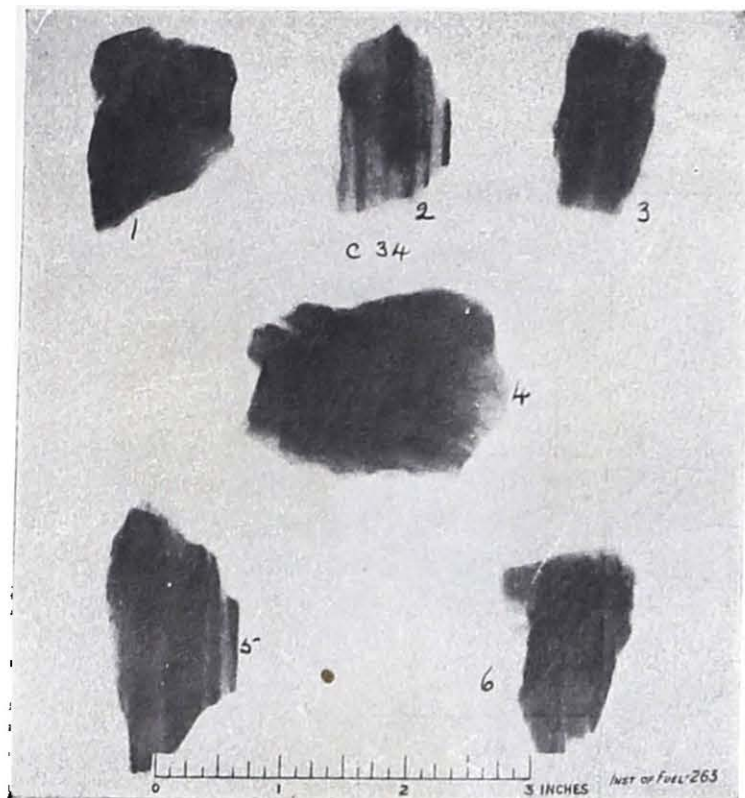


PLATE V

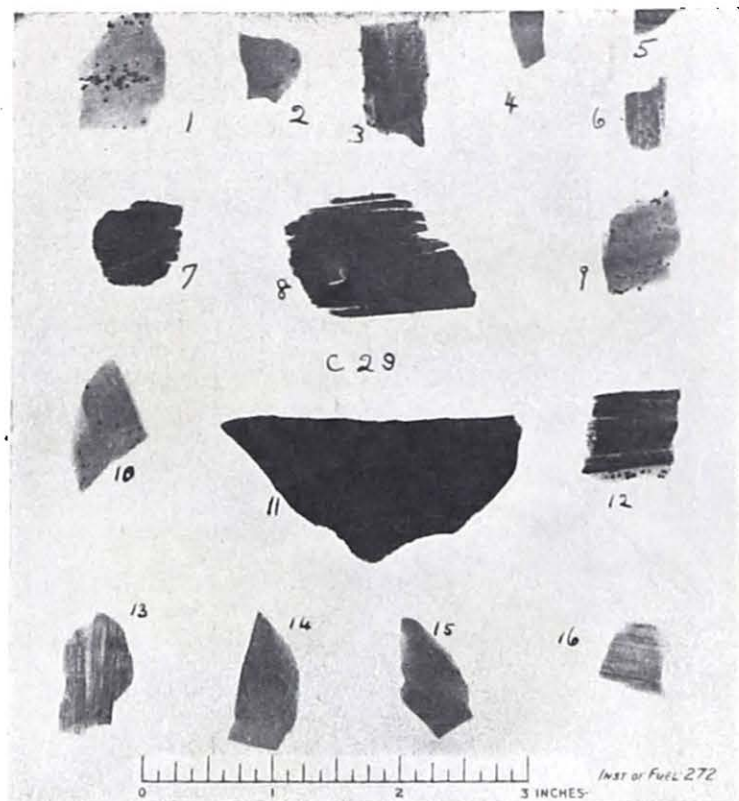


PLATE VI

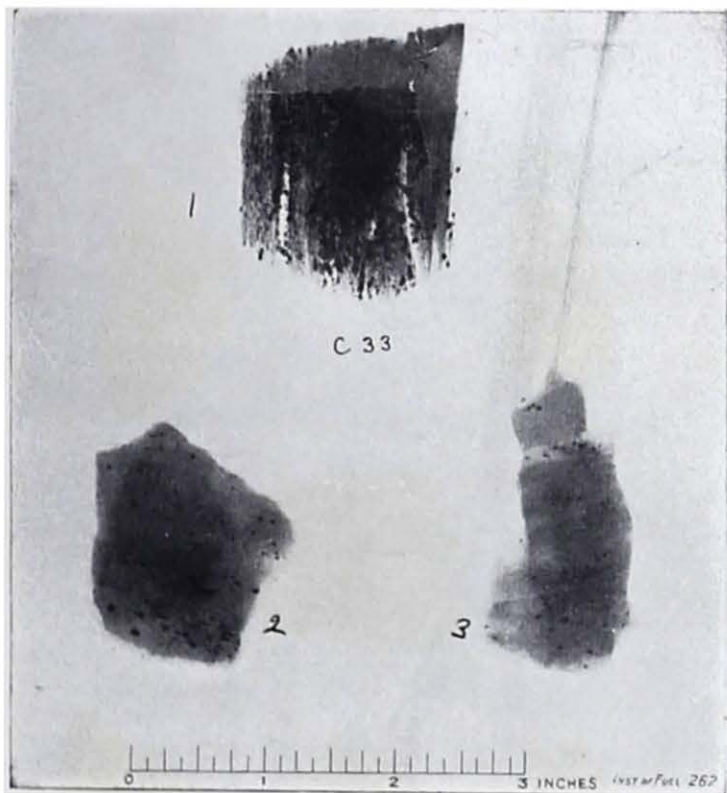


PLATE VII

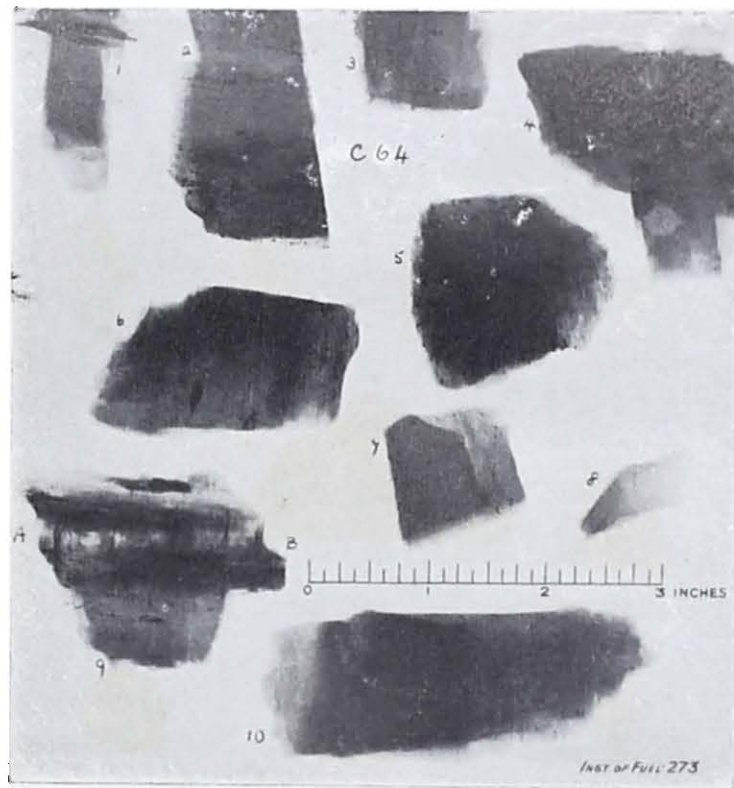


PLATE VIII