CEMENT
& LIME MANUFACTURE

VOL. XXXIX. No. 6 NOVEMBER, 1966

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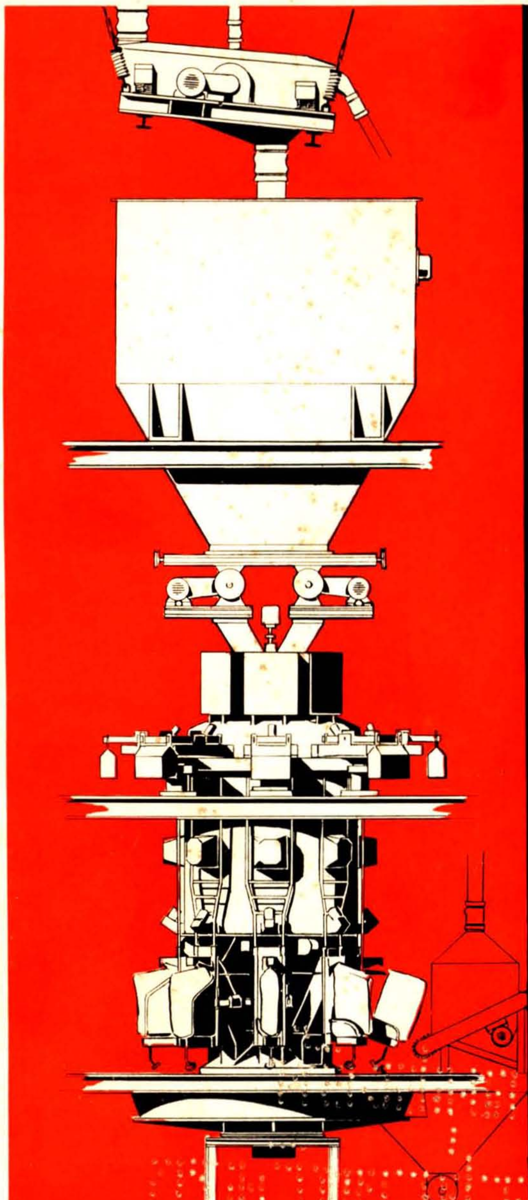

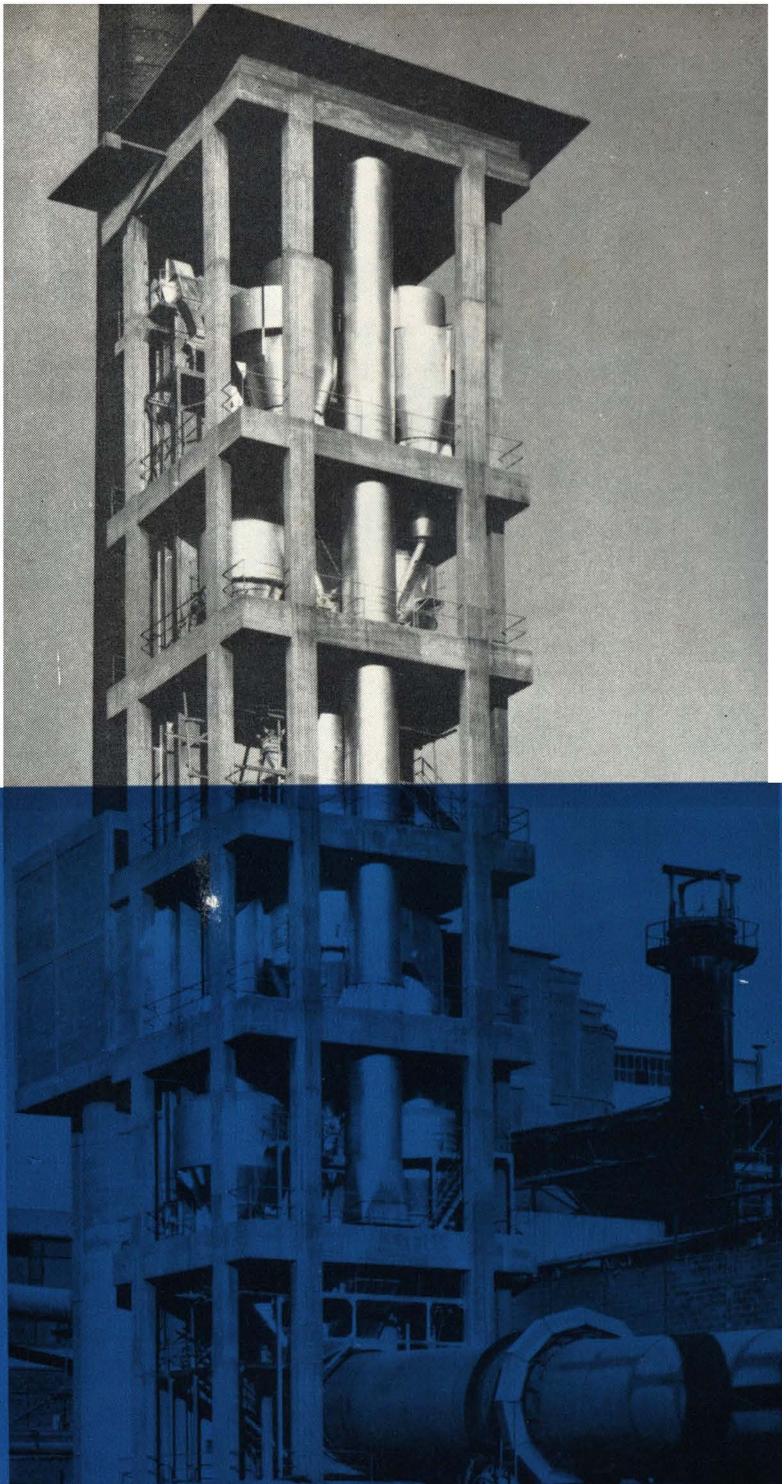

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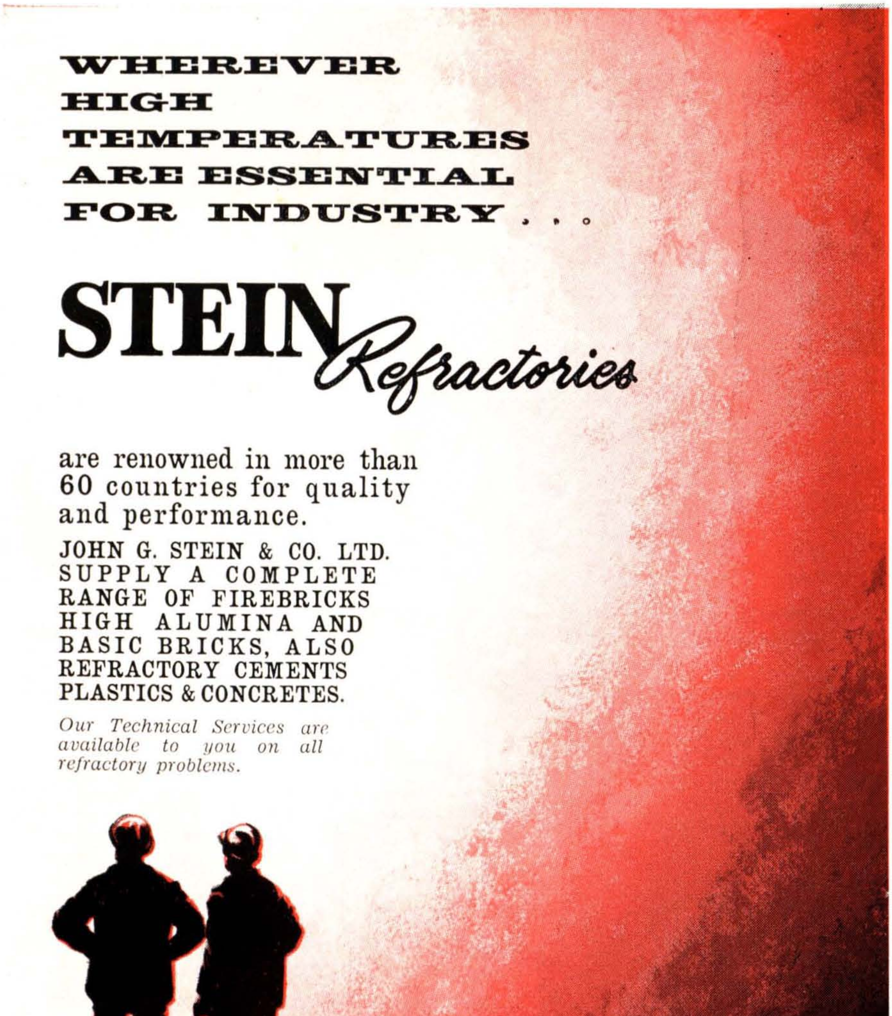
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PUBLISHED ALTERNATE MONTHS. PRICE 1s. 6d. A COPY ANNUAL SUBSCRIPTION 9s. POST FREE
$1.75 IN CANADA AND U.S.A

PUBLISHED BY
CONCRETE PUBLICATIONS LIMITED
60 BUCKINGHAM GATE, LONDON, S.W.1

TELEPHONE: VICTORIA 0705/6.
TELEGRAPHIC ADDRESS:
CONCRETIUS, PARL, LONDON.

PUBLISHERS OF
"CONCRETE & CONSTRUCTIONAL ENGINEERING"
"CONCRETE BUILDING & CONCRETE PRODUCTS"
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Large Vertical Cement Kilns.

THE following is a translation of a paper presented by E. G. LOESCHE at the Conference of the Verein Deutscher Zementwerke which was held in Germany in February last.

SEVERAL papers have been published on the technology of vertical kilns used in the manufacture of cement, and a distinction is usually drawn between the " conventional " and the " black meal " processes. There are fundamental papers by Spohn in which he explains the difference between the two processes, discusses the burning process and on the strength of experience, provides guidance concerning the operation of such kilns. Narjes has provided data of general validity defining the processes occurring in the vertical kiln. The present report is based on these sources and earlier papers, and reviews the current stage of development of vertical kilns, and refers in particular to experience gained with large vertical kilns.

The reason given for the fact that vertical kilns are not used in the German cement industry as extensively as at the beginning of the 1950's, is the need for larger units, the desire to obtain maximum output per man, and the critically high price of fuel. There may be some truth in these contentions in Germany where the greatest distance (from a construction site) to the nearest cement works is about 75 miles. In other countries, conditions may be different. A developing industrial area which, in a country where transport conditions are unfavourable, is far distant from the nearest cement works, has justification for the establishment of a local cement works. If the local daily demand is no greater than 200 or 300 tons and if fuel supplies favour the use of vertical kilns, it may be better to install a new vertical kiln with the advantage of lower investment costs. However, there is a limit up to which the installation of a vertical kiln is justified and above which it is more advantageous to install a rotary kiln. Vertical and

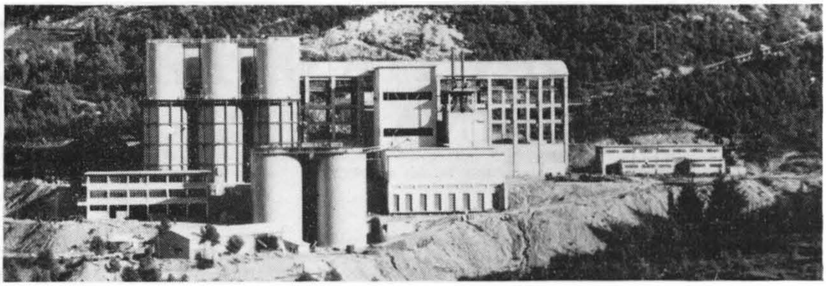


Fig. 1.

rotary kilns have never been in competition, and compete even less today. Vertical kilns are now being operated in collaboration with rotary kilns to provide increased capacity.

To define the limit, the lower capital cost of vertical kilns will not be taken into account; only interest and amortisation charges are included in the production costs, which alone affect the choice. Additionally, the potential development of the works over a period of at least ten years must be considered. Considerations may be in favour of a vertical kiln at first but the final decision may be in favour of a rotary kiln because the expected expansion of output may be so rapid that an initial installation of two vertical kilns might result, within five or six years, in an installation of seven or eight vertical kilns on the same site. In such circumstances a rotary kiln should be installed initially and another would be added a few years later. So rapid and considerable a demand for cement would not arise, however, in territories of emerging industrial development.

Investigation shows that production costs are less affected by the rates of wages than is generally believed. In countries with low wage-levels, one vertical kiln may be left in the care of a single operator, whereas in a highly developed industrial country an expert operator could look after two or more kilns. If production costs are compared on the basis of Central European wages and of uniform fuel costs (taking into account the slightly higher heat consumption of vertical kilns using raw materials other than natural marl), and if an allowance is made for amortisation, interest, maintenance and the finer grinding of raw material (necessary in the vertical-kiln process to give clinker of suitable quality), and if it is borne in mind that the entire installation, apart from the kiln, must be the same, the conclusion is reached that a works with an output of up to 600 tons per day could best be equipped with two vertical kilns, provided that double this output is unlikely to be needed within ten years.

The foregoing is a normal case, but in many instances other considerations have to be taken into account. Where, as in Spain, anthracite is the only native fuel, the decision is likely to be in favour of vertical kilns even for outputs larger than 600 tons per day. If a new cement works is to be erected near to an oil refinery, the availability of petrol-coke may justify economically the installation

Fig. 2.

of a vertical kiln having an output lower than 300 tons per day.

Investment costs critically influence the decision as to which type of kiln to install. In the case of a vertical kiln with a daily output of 300 tons, the cost of the complete mechanical and electrical equipment and buildings, and including an electrostatic precipitator installed and ready for operation is between 20 and 25 DM. per ton per annum.

On the strength of experience reported later, calculations can be based on an output of 300 tons per day.

In some vertical-kiln works in Spain (*Fig.* 1), on the basis of experience with an Austrian installation operating on the " black meal " process, the kilns have a diameter of 2·4 m. in the sintering zone and 2·6 m. at the grate section. On average, the output is 180 tons per day with peaks of up to 200 tons. Anthracite, limestone, clay and additives are proportioned by means of belt weigh-feeders and are fed to a " Loesche " mill and pulverised. The fineness is 6·8 per cent. residue on DIN 0·09 sieve. Cement quality is high because of the concentration on correct preparation of the feed.

In another plant in Spain (*Fig.* 2), four vertical kilns have been in operation for almost a year and embody several significant modifications in comparison with earlier kilns. In principle, they are similar to the kiln of 2·4-m. diameter but the shaft has a diameter of 3 m. in the sinter zone and is 10 m. high. The modifications are not in the kilns only. There is, in addition to a " Loesche " mill having an output of 80 tons of raw meal per hour, a smaller mill of the same design for pulverising coal. This grinds the very hard and abrasive Spanish anthracite to optimum fineness. Raw meal and pulverised coal are then proportioned in automatic weighers and are fed to the homogenising plant. The raw meal, comprising limestone and clay, is pulverised separately and is separately homogenised. It is conveyed to the kiln alongside the black meal by means of

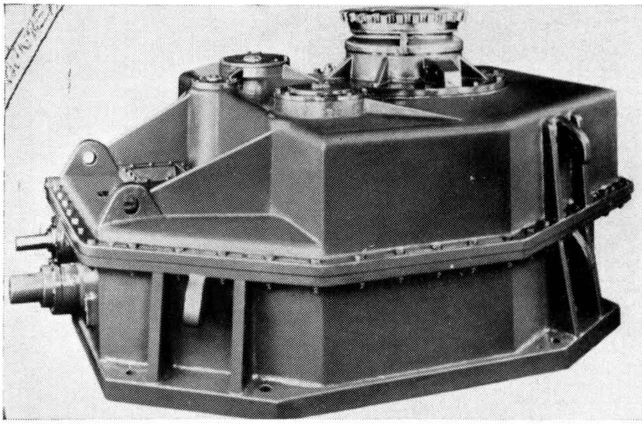


Fig. 3.

rubber-belt bucket-elevators 37 m. high. The power consumption of the bucket-elevator controls the raw meal discharge valve of the storage hopper. Two drag-link conveyors transport the two raw meals to the kiln house. At the side of the four kilns, there are two drag-link conveyors each with an overflow from which black meal and white meal respectively are drawn by a rubber-belt feeder. Overflow from the drag-link conveyors is returned to the storage silos.

The belt-feeders are each connected to a water pump and their speed can be varied. The black meal is fed to a disc pelletiser from which the pellets drop into a pelletising drum in which the white meal is added and which forms a shell around the pellets of black meal. The pellets then pass to the kiln via a rotary chute

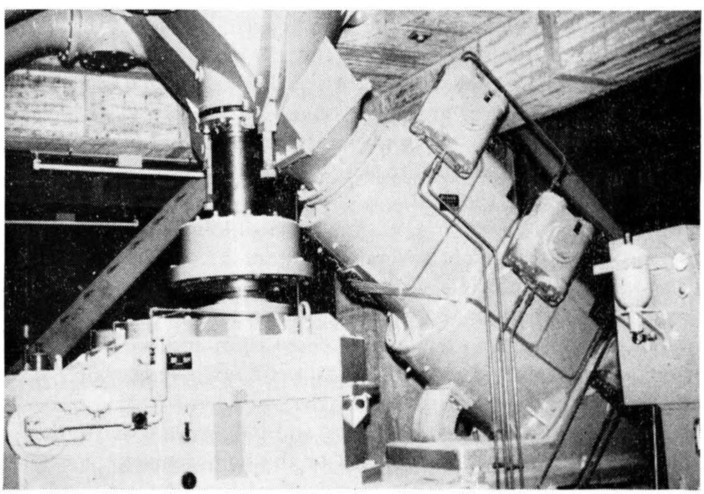


Fig. 4.

TABLE I.—OPERATING DATA FOR 3-M. VERTICAL CEMENT KILNS.

Item	Cement Works M	Cement Works H	Units
Diameter at top of cone.. ..	3·50	3·50	m.
Height of shell	10·00	8·80	m.
Height of cone	1·50	1·50	m.
Diameter of pellets	12 to 16	15 to 30	mm.
Moisture content of pellets ..	13	16	per cent.
Thickness of brick lining ..	0·85	0·95	m.
Quantity of air (at normal pressure)	15,000	—	cu. m. per hour
Kiln resistance	1,700	1,800	mm. WG
Temperature of waste gas ..	80	135	Deg. C.
Temperature of clinker ..	100	130	Deg. C.
Type of fuel	Anthracite	Petrol-coke	—
Calorific value of fuel	5,350	7,900	K cal. per kg.
Percentage of ash	27	—	Per cent.
Specific heat consumption ..	920	1,000	K cal. per kg.
Average output	280	265	Tonnes per day
Peak output	315	Limited by feed	Tonnes per day

which is hydraulically operated; a programming mechanism, which is adjustable permits a " carpet " to be deposited on the surface of the pellets in the kiln or a more-or-less steeply inclined crater to be formed as required. Moreover, the chute can discharge at any position required on the pellets in the kiln. Quantities of pellet feed and the raw meal are controlled according to the waste-gas temperature, but a change over to constant raw-meal feed can be made, in which case the air supply is adjustable. The latter can be effected because air is supplied by three equally large rotary piston blowers each having a maximum capacity of 6,000 cu. m. per hour, one of which can be varied in speed between 20 and 100 per cent., so that almost any desired quantity of air can be obtained.

The number of revolutions of the grate can be varied between 1·5 and 9 per hour. Below the grate, there are the collecting tray, as in a 2·4-m. kiln, and the discharge cone into which air is introduced tangentially. The central shaft is supported by a gear (*Fig.* 3) which has a transmission ratio of 1 : 6,500; it is designed to a maximum torque of 50,000 m.-kg. and is driven by a 10-h.p. motor. The clinker is discharged via bucket-type hydraulically-operated air-lock discharge gates (*Fig.* 4).

No dust collector has yet been installed at this works (the M works) but space is provided in the kiln house for a common electrostatic precipitator for all the kilns.

Another works now being built in Spain is to be equipped with an electrostatic precipitator from the start. The works shown in *Fig.* 1 was subsequently equipped with such equipment. Dry electrostatic precipitators are provided in all cases,

TABLE II.—DATA FOR VERTICAL CEMENT KILNS.
(Data given in **bold type** relate to existing kilns.)

Diameter of Kiln at Sintering Zone m.	Height of Kiln m.	Cross-sectional Area at Sintering Zone sq. m.	Output of Clinker *tonnes* per day	Reference to Cement Works
1·25	4·00	1·22	50	R
1·40	4·50	1·54	63	—
1·60	5·00	2·00	80	—
1·80	**5·60**	**2·54**	**100**	A
2·00	6·30	3·15	125	—
2·24	7·10	3·95	160	—
(2·40)	**(8·00)**	**(4·50)**	**(180)**	B, P, C, J, V, W
2·50	8·00	4·50	200	—
2·80	9·00	6·50	250	—
(3·00)	**(10·00)**	**(7·10)**	**(280)**	M, H
3·20	10·00	8·00	320	—
3·60	11·20	10·00	400	—
4·00	12·50	12·50	500	—

and the temperature of the waste gas is so adjusted that no condensation can occur.

Table I contains technical data relating to the two works in which kilns of the type described have been installed. In these installations, the diameter of the kiln, and the discharge gates are identical. At the M works, where four kilns are in operation, the kiln column is a little higher than at the H works, in which two kilns are in operation, but the kiln-feed system is still inadequate. The present large kilns occupy a site previously occupied by two kilns of 2·4m diameter. However, the feed system and the pelletising pans were not enlarged. Separate grinding of anthracite at the M works can only have a beneficial effect on output if such grinding can increase the reactivity of the fuel. If this is not the case, intergrinding of the raw materials and the fuel is to be preferred.

Results obtained with these kilns prove that the output increases in direct proportion to the increase in the area of the sinter zone. Air distribution is as good as with smaller kilns, and the quality of the clinker is at least as high. The pressure-drop in the kiln is as expected. There is reason to believe that a further increase of the sizes of vertical kilns should be advantageous.

Records of 3-m. kilns in operation and having a standard output of 280 tons per day, allow a type series to be established for vertical kilns. In order to reduce the different dimensions to a common denominator, it is assumed that what dictates kiln output is the diameter of the cross-section. Since, so far, it is intended to build kilns of circular cross-section, the diameter of the sinter zone will be considered as the basis, for the sake of simplicity. Larger pellets are used with increasing size of kiln, so that the pellet diameter varies with the kiln diameter. What is aimed at is pellets of 13-mm. diameter, with undersize and oversize exceeding as little as possible the 10-mm. minimum and 16-mm. maximum limits.

It can then be assumed that the resistance of a bed of pellets to a quantity of air, having a linear relation to the feed quantity or the cross-section, remains constant with the exception of the edge factor and the kiln height. Further, calculation is based on a uniform bulk density of 1 : 1 in the sinter zone, so that the velocity at which the pellets descend in the kiln is 25 mm. per minute, that is, 1·5 m. per hour, which is equal to an output of 40 tons per day per sq. m. of cross-section. Further, let it be assumed that the theoretical quantity of heat, the waste gas temperature, the clinker heat, the thickness of the brickwork, and the reactivity of the fuel are constant. If one or the other of these factors is not constant, there will, of course, be deviations from the standard capacity as defined, the assumption being that only a given quantity of fuel can be utilised in the sinter zone of given cross-section, so that, for example, higher heat losses must result in reduced output and heat savings in increased output.

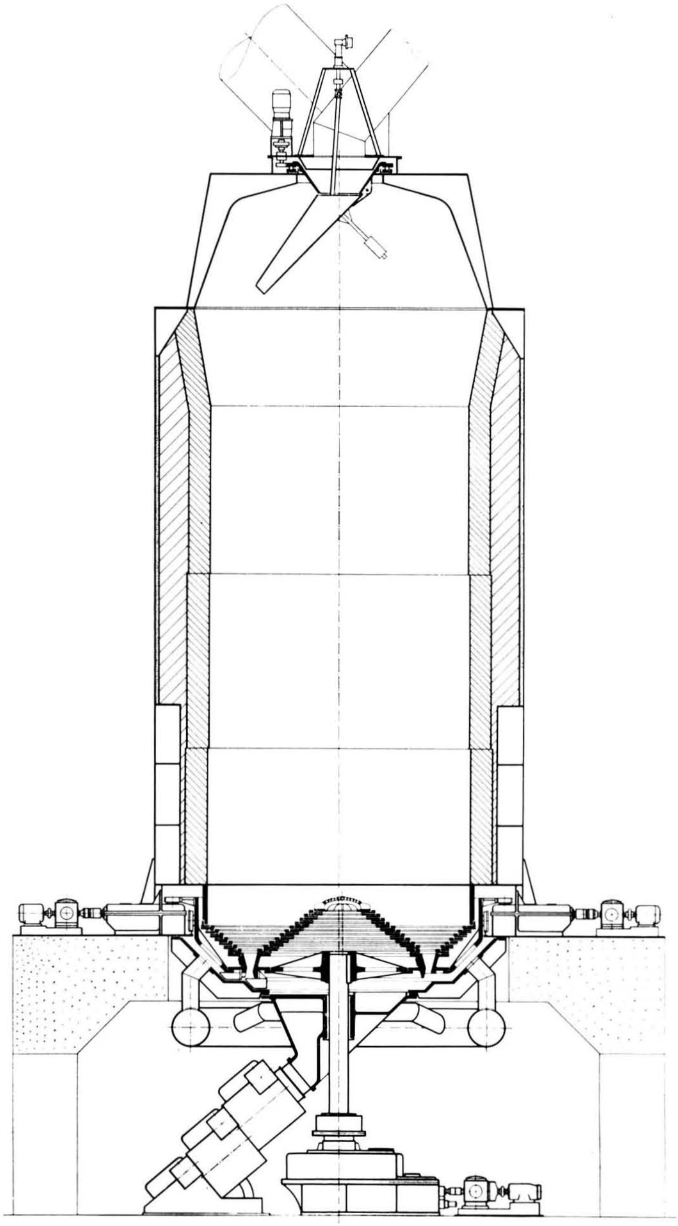
The data in *Table* II is concerned, not so much with absolute values, as with the relation between them and with the attempt to attain a suitable method of calculation for larger vertical kilns developed empirically.

The smallest known kiln for industrial operation has a diameter of 1·25 m. that is a cross-sectional area of 1·23 sq. m. It did not quite attain the theoretical output of 50 tons per day because it was fed, not by means of a disc pelletiser, but by means of a screw-conveyor and suffered from difficult fuel conditions. The output obtained with this kiln, converted to the proper size of pellet, would amount to 50 tons per day.

Kilns of 1·8 m. diameter have been built but all deviate in some way from traditional designs. Nevertheless, the results obtained confirm the theory according to which a kiln of this size should have an output of 100 tons per day; these kilns were, however, exceptions. The standard kiln at all the works examined has a diameter of 2·4 m., the standard rated capacity of a kiln of this kind being 180 tons per day. Considerable experience has been gained with these kilns. The results obtained with black-meal kilns in three works by the Verein Deutscher Zementwerke have been studied. Previous trials with kilns of slightly different diameters have produced no new results. For experimental purposes, a kiln was lined with brickwork to provide diameters of 2·6 m. in the sintering zone and 2·8 m. at the grate, but the results did not confirm the theory. Because the kiln discharge became irregular, the brick lining was altered again to give diameters of 2·4 m. and 2·6 m. Before World War II, a few isolated kilns up to 2·8 m. and 3 m. diameter were built, but they proved difficult to control mainly because of the inadequate design of the discharge gear, because they were erected in series with smaller kilns, and because neither feed nor other equipment was designed for higher outputs. Results obtained with the 3-m. kilns now confirm the theory.

With modern kilns, it can be assumed that the cross-sectional area of the sintering zone dictates the output. This applies to kilns from 1·25 m. diameter (1·2 sq. m.) up to 3 m. diameter (7·1 sq. m.), that is a range of about 1 to 6. It can therefore be assumed that the rule will continue to apply. The data in

Fig. 5.



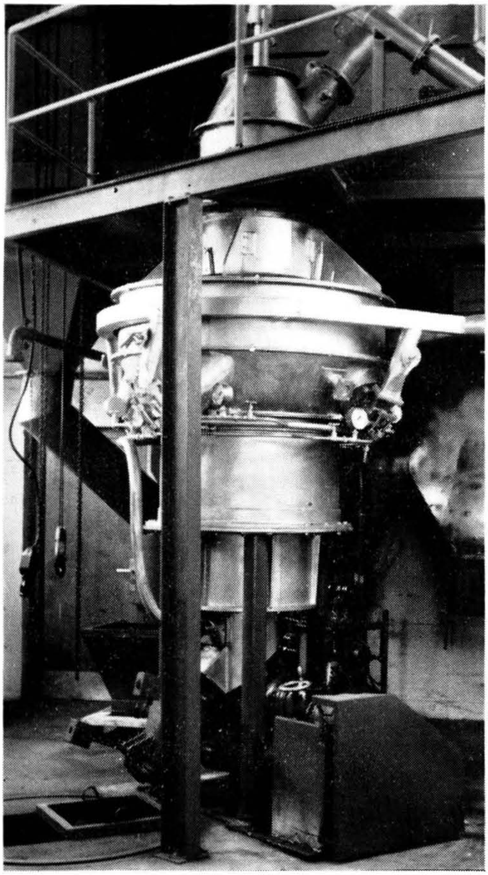


Fig. 6.

Table II indicates what is contemplated, and shows that the very kilns for which comparable results are available do not fit into a standard range of sizes. Consequently, the next stage would seem to be the installation of a 3·2-m. kiln having a rated capacity of 320 tons per day. This should be possible because the output for which the 3-m. kiln was designed has been confirmed in practice. This means also that elements of proven design could be used. The next stage would be a 3·6-m. diameter kiln for a capacity of 400 tons per day in which such elements should again be incorporated. The grate of the 2·4-m. kiln could be used (*Fig.* 5), surrounded by a concave rim which could rotate at different speeds either in the same or the opposite direction to the grate so that it would be possible to discharge clinker separately from the centre or the periphery. This new design of grate would admittedly be novel in a cement vertical kiln but, subject to certain modifications, it could be similar to grates in some gas-producer plants. To avoid the kiln-discharge arrangements from occupying too much space vertically, horizontal duplex discharge gates could be provided, this having the additional advantage that a proven design could be utilised, and thus ensuring the proper operation of the most important component, that is, the discharge gear. Consequently, air distribution and uniform descent of the clinker in the kiln would be assured. Feeding a kiln of this kind would be carried out through a rotary chute which has proved itself in the 3-m. kiln. The building of a 3·6-m. kiln with an output of 400 tons per day can, therefore, be confidently undertaken.

A 4-m. kiln with 500-tons daily output remains a development target for the time being, and no larger kiln is being planned at present.

Oil-fired Kilns.

Development of oil-fired vertical cement kilns has made no major progress to date, the greatest difficulty being to distribute temperature uniformly. A proposal made by Behringer may provide a solution. Experiments with oil-impregnated pellets are to be continued. *Fig.* 6 shows a small experimental oil-fired vertical kiln having a diameter of 800 mm. The oil burners are arranged tangentially around the outside. It can be assumed that larger kilns of this type can be built, but no attempt has yet been made.

Kiln Charge.

It is essential that larger vertical kilns must produce cement of competitive quality, the major requirement for this being careful preparation of the charge of raw meal. Excepting natural marls, meal for a vertical kiln must generally be finely pulverised, experience having shown that it should be ground to a fineness such that there is not more than an 8-per cent. residue on DIN 0·09 sieve. Independently of size, vertical kilns are sensitive to fluctuations in the quality of the limestone and the dynamic composition of the raw material.

Uniform feeding of pellets is also important, and greater expenditure on feeding devices, equipment for the accurate dosage of water, and the like has been proved to be essential. If the kiln is fed with pellets of uniform size and composition, it will give optimum output, and manual labour will be reduced to a minimum. The stage has not yet been reached at which a vertical kiln can be operated for an extended period of time without supervision, but investigation of this aspect is proceeding.

Summary.

Vertical cement kilns having daily outputs of up to 300 tons have proved themselves, and are suitable for all kinds of raw materials, but depend on the use of solid fuels having a low volatile content, such as coke, anthracite or petrol-coke. Oil-fired vertical kilns are being developed. Larger vertical kilns having daily outputs up to 400 tons are under construction.

The foregoing is based on a translation of Mr. E. G. Loesche's paper made by MR. S. R. DEVLIN, of Delo (Engineers) Ltd.

Lime and Lime Manufacture.

FOR an industry like the limestone and lime industry, having such an enormous output of a material having countless uses, there is a surprising dearth of literature. In the past forty years or so, there have been only three principal reference books, namely, " Cements, Limes, and Plasters " by E. C. Eckels, A. B. Searle's " Limestone and its Products," and N. V. S. Knibbs's " Lime and Magnesia." Tremendous changes in nearly all phases of these industries have occurred during the intervening period and, doubtless, further changes will continue to occur.

There should be, therefore, a special welcome for the new comprehensive book, entitled " Chemistry and Technology of Lime and Limestone," by Robert S. Boynton, from the foreword of which the statements in the opening paragraph of this review are summarised.

The principal contents of the book embrace a brief history of the lime industry, the geological formation and physical and chemical properties of limestone and lime, and the exploration, extraction and processing of limestone. Most of the many uses of the limestone and lime in the metallurgical industries, in agriculture and in the construction and civil engineering industries are considered in separate chapters for each material. Consideration of the manufacture of lime is preceded by a chapter on the theory of calcination, and followed by chapters, on the theory and methods of hydration. In the last two chapters, economic factors relating to the lime and limestone industries (mainly in the U.S.A.) and analytical testing of these basic and derived materials are considered. Various tables of chemical data are given in appendices.

New Developments in Lime Kilns.

One of the interesting sections of the book under review is that dealing with modern developments in the calcination of limestone. The following is a precis of this section, which should be referrred to for fuller details, illustrations, and bibliographical references.

A development since World War II for calcining very small stone is the " Fluo-Solids " kiln, which is also called a " reactor " and which is divided into three or five compartments comprising a calcinating section, a cooling section and from one to three preheating sections. The particles of fine kiln-feed are calcined while maintained in dense suspension produced by the emission of low-pressure air and combustion gases, this light fine material being fluidised in the preheating and calcining zones. These kilns, which can be operated at lower temperatures than conventional kilns because of the fineness of the stone, have productive capacities generally of from 100 to 125 tons per day, but a 200-ton unit went into operation in 1964. The quicklime produced is the most highly reactive of any commercial lime. The main deterrent to more extensive use of this type of kiln is the cost of obtaining the meticulously finely classified kiln feed but, with soft limestone, it may provide the most practical or even the only solution.

An entirely new concept of calcination is the " Calcimatic " kiln, the features of which are a large circular refractory hearth operating at speeds from 35 to 200 min. per revolution. The hearth is divided into heating zones, and precise temperatures can be maintained uniformly in the different zones. This characteristic, coupled with the adjustable speed of the hearth, enables the time of calcination to be controlled to suit stone of diverse sizes and of varying qualities. The first commercial kiln of this type uses stone ranging from ¼ in. to 4 in. in size, the hearth having an external diameter of 55 ft. 6 in. This completely automated kiln is claimed to produce 100 to 125 tons per day. It appears that kilns of this type provide the greatest flexibility in operation.

Two other post-war kilns of novel design are the " Ellernan " kiln and the " Corson " vibratory inclined kiln. Both probably require the lowest average capital investment of any modern kiln for a given capacity. The " Ellernan " kiln comprises a rectangular calcining chamber with horizontal tunnel beams. Heat is generated in an adjacent fire-box with oil or gas. Plants of productive capacity as low as 6 to 15 tons per day have been operated.

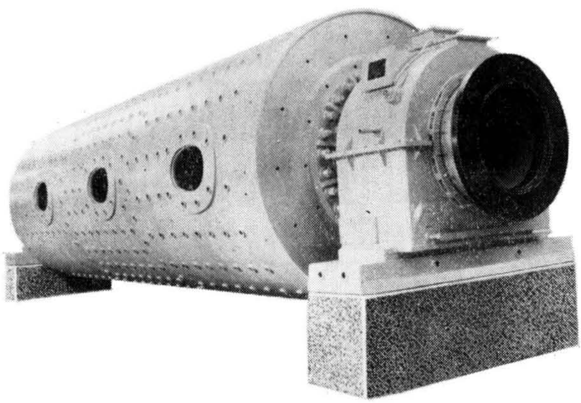
Information on the operation of the latest of the post-war kilns, the " Corson," is incomplete as it is still in the development stage. Its capacity and capital cost is greater than the "Ellernan" kiln. The Spencer & Priest kilns, which are of British design, operate on producer gas and are vertical kilns with special proprietary features. A Hungarian kiln developed in the period 1955 to 1960 is also of the producer-gas type. In Czechoslovakia and elsewhere, new plants have been installed with this Hungarian kiln, the basic fuel for which is low-grade cheap brown bituminous coal or lignite burnt in a gas producer. The kilns have a daily capacity of 50 to 100 tons.

Two other European kilns, which may have possible impact in the future, are the German "Fellner & Ziegler " rotary kiln, and an Austrian high-capacity vertical kiln. The latter features dual and triple calcining and/or preheating zones within a large vertical shaft and claims to be of very high thermal efficiency. Another new German kiln, the " Heiligstaedt," is a combination of a rotary and vertical kiln and comprises Azbe's terminal calciner; calcination is completed in a small vertical kiln at the discharge end of the rotary section. A new American vertical kiln of bizarre design has a doughnut-shaped cross-section, with an air-cooled vertical shaft in the centre. The capacity is 100 tons per day.

British Oil-fired Shaft Kilns for Lime.

IN an article entitled " Oil-fired Lime Shaft Kilns in Great Britain," by D. H. Anson and I. F. Kimberley, which was published in a recent number of " Cement, Lime & Gravel," and is based on a paper presented at the International Symposium on Lime held in Berlin in September 1965, the authors give a practical account of the progress made during the five years since oil-fired shaft kilns were introduced into the British lime industry. Kilns of two designs have proved satisfactory in practice. One is the 50-ton Swedish " Esbjornsson " kiln using "Urquhart" gasifier. The other is West's kiln using the Catagas system. These plants

MILLS FOR THE CEMENT INDUSTRY



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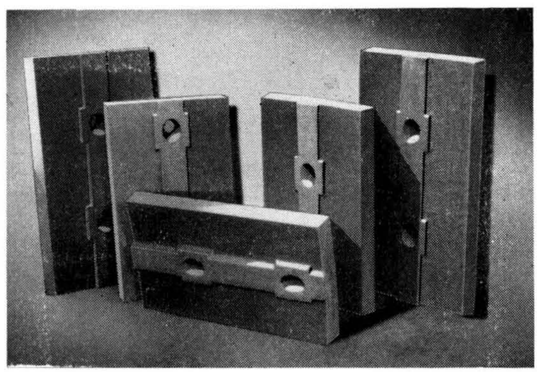

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are described, kiln performance data are given, and the pattern of the industry is discussed briefly in relation to the changing requirements for lime. The authors conclude that the designs currently available will meet the requirements for the immediate future, that solid fuel will gradually be replaced by oil, that it is unlikely that other hydrocarbon feedstocks will become available, and that a continued use of heavy fuel oil is foreseeable.

Revised Standard for Building Limes.

B.S. 890 (1966), "Specification for Building Limes," was published recently and has been revised to bring it into line with current practice and to incorporate improvements resulting from experience. The four main sections of the Standard are: General, Hydrated lime, Quicklime and Lime putty. Simplification has resulted from the elimination of a type of lime with less stringent requirements (the previous Class B) which, owing to general improvements by the industry, is no longer necessary. Requirements are included for types of lime made from limestone and chalk, namely high-calcium limes (white limes), semi-hydraulic lime (grey lime) and magnesian lime. Highly hydraulic limes, which are not widely available in the United Kingdom, are not included. High calcium by-product limes from the manufacture of acetylene from calcium carbide are included for the first time. Only those by-product limes made by the wet process are considered.

No autoclave expansion test, as has been suggested for magnesian limes, is included since such a test tends to exclude any lime containing unhydrated magnesia, which is present in appreciable quantities in the majority of magnesian limes in this country that are slaked by normal methods. Experience has shown that unhydrated magnesia does not give significant cause for dissatisfaction in the normal usage of such limes, which is mainly in brickwork above the damp-proof course.

Production of Lime in Poland.

Because the large modern lime works at Bukowa, Poland, is now in operation, it is expected that more than 2,200,000 tons of building lime will be produced in 1966; this is an increase of 8 per cent. compared with last year.

Methods of Testing Cements.

A British Standard relating to the testing of cement is in the course of preparation. The new document aims at securing uniformity of methods of testing and ensuring that, when future changes are made in any of the procedures, the standards for different types of cement are not affected. It will collect together the methods described in all British Standards for cements and those proposed in several new standards at present in the course of being prepared. Certain tests, including the method of chemical analysis at present undergoing consideration by ISO/TC 74 (Hydraulic Binders) and likely soon to become an International Recommendation, may also be incorporated.

Cement Industry in Britain

Dunbar Cement Works.

A third kiln has now been installed by The Associated Portland Cement Manufacturers Ltd., at their Dunbar works, East Lothian, Scotland, thereby increasing the annual productive capacity of clinker at this works from 400,000 to 700,000 tons. The productive capacity of cement will be about 750,000 tons a year.

New Cement Plant in Derbyshire.

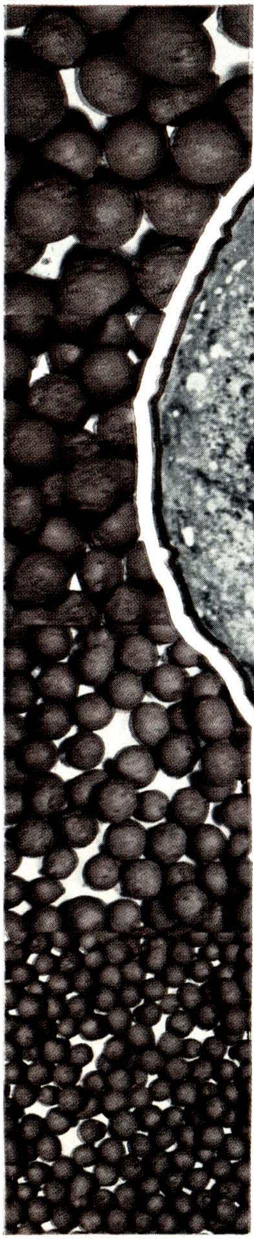
The new cement plant installed by I.C.I. at Tunstead Quarry, near Buxton, Derbyshire, is now operating at full capacity. The works, which has a designed annual productive capacity of about 200,000 tons, is part of the Lime Group of I.C.I.-Mond Division. The thin slurry that remains after limestone has been crushed, screened and washed, is utilised as one of the principal raw materials. The preparation of the raw-material feed and the operation of the kiln will be controlled by a Ferranti Argus computer and, ultimately, it is intended that the computer will be used to control the entire process. All the cement produced, apart from a relatively small amount used to meet I.C.I.'s local needs, will be sold directly to The Associated Portland Cement Manufacturers Ltd., which firm will despatch it in road vehicles to their customers in the north-west.

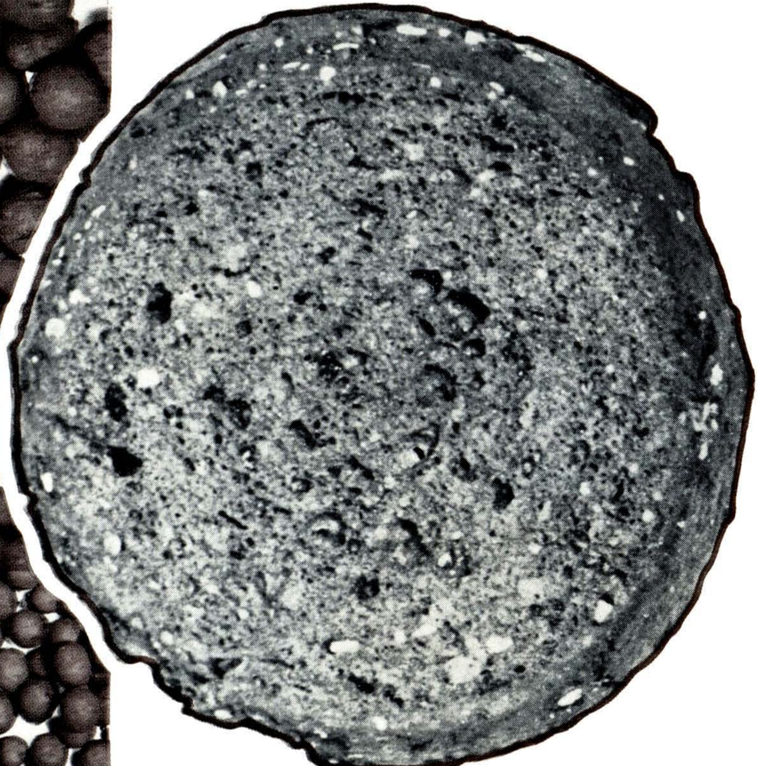
A New Major Cement Works.

It was announced at the last Annual General Meeting of The Associated Portland Cement Manufacturers Ltd., the parent company of the Blue Circle Group, that it is proposed to establish in Kent a works having an annual productive capacity of 4,000,000 tons. Since the works will take several years to construct, it will be opened in successive sections. It is expected that the first of the three kilns in the first stage will be in operation during the summer of 1967. It is intended that a number of older works will be closed down as the new parts of the works successively are brought into operation. Further information about this proposal, obtained from A.P.C.M. Ltd., is as follows.

The new works is being built because some of the existing works are scattered, are 40 years or more old, and are using small out-of-date kilns. The new works will centralise and modernise the manufacturing processes and will result in substantial economies. It has not yet been decided which of the existing works are to be replaced. Replacement will be a gradual process.

Since the establishment of the new works will help to reduce manufacturing costs, the result would be to aid in preventing the price of cement from rising as much as it otherwise might do due to factors outside the control of the manufacturers. One of the advantages of establishing such a large works is that, because of the more favourable cost of production (provided the cost of fuel is not excessive), the Company would be in a better position for gaining export trade. It is proposed that, by constructing a wharf and dredging, ships up to 50,000 tons will be able to be loaded direct from the works.



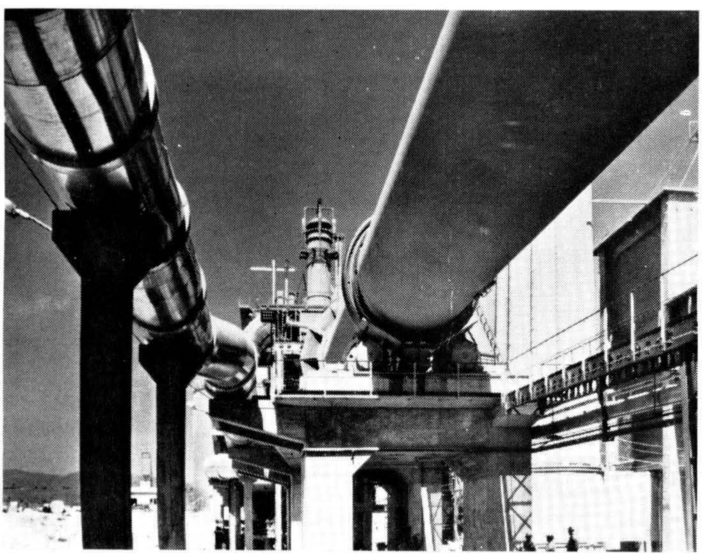


The Cement Industry Abroad.

Australia.—The complete material-handling plant for the new cement works now being built near Sydney by Metropolitan Portland Cement Pty., Ltd., is to be supplied by the Mechanical Handling Division of Mitchell Engineering Ltd., in conjunction with their associate company, Mitchell Engineering Pty., Ltd., of Brisbane. The plant includes deep trough-conveyors, paddle-feeders, elevators, crushers, apron-feeders, scraper-conveyors and additive-proportioning equipment. The plant is due to be commissioned in 1967.

Spain.—The new works at Cordoba constructed by Asland Asociada S.A., an associated company of The Associated Portland Cement Manufacturers Ltd., was opened on June 28 last. The new works, which is adjacent to an older works that produces 150,000 tons of cement a year, has cost more than £3,000,000, and has an annual productive capacity of 400,000 tons. The accompanying illustration shows part of the kiln and adjacent plant. The new Cordoba works completes the first phase of the modernisation of Asland Asociada's four works being carried out under the technical supervision of the Blue Circle Group. The programme also includes the erection of an entirely new cement works near Barcelona which will raise the Group's output in Spain to more than 1,650,000 tons per annum, thus ensuring that Asland Asociada S.A., maintains its position as the largest cement manufacturer in Spain.

South Africa.—It is expected that, early in 1968, a Humboldt dry-process cement plant, with a rotary kiln and a preheater, will be operating at Lichtenburg in the Transvaal, Republic of South Africa. The cement works will be at an



New Cement Works at Cordoba.

altitude of almost 5,000 ft. above sea-level, and will be about 150 miles west of Johannesburg and not far from the Witwatersrand industrial area. The plant is being supplied to White's South African Portland Cement Co., Ltd., a subsidiary of The Associated Portland Cement Manufacturers Ltd. A short rotary kiln about 12 ft. 6 in. (3·8 m.) in diameter and 176 ft. (54 m.) long will produce 250,000 tonnes of cement per annum, and will thus almost double the present output of the Lichtenburg works at which there are at present three wet-process rotary kilns each about 345 ft. (106 m.) long. The heat requirements are expected to be reduced by about 60 per cent. In addition to the kiln and preheater units, the equipment supplied by Klockner-Humboldt-Deutz A.G. will include the raw-material combined grinding and drying plant, a clinker cooler, raw-mix homogenising and storage plant, an electrostatic precipitator, electrical equipment and structural steelwork. Much of the equipment will be manufactured in South Africa.

An Early Cement Kiln.

IN connection with the account of an old cement works near Whitby, Yorkshire, which was given in the number of this journal for May last, MR. F. L. WOOD, technical advisor to Messrs. G. & T. Earle Ltd., Wilmington of Hull, writes:

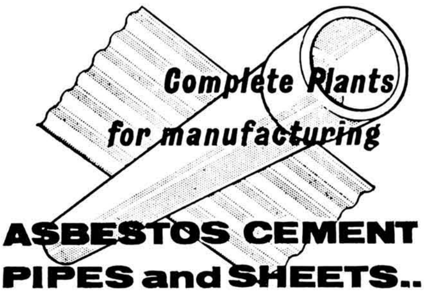
I was particularly interested in your article on the small cement works at East Row, Sandsend, near Whitby, as I knew this works when it was in production, having visited it on several occasions with my father who, at the time, was Manager of the Wilmington Works. The following additional information may be of interest.

The works, which towards the end of its productive life was owned by Mr. John Griffiths, finally closed down a few years before World War II since there was no one to follow him in the business. The works was originally built by Mr. Griffiths's grandfather, who was the manager of Francis & White's Cement Works, Nine Elms, London, before he moved to Sandsend where he purchased the site of the works from the Earl of Mulgrave.

The stone used for making Roman cement was found in the form of nodules, or noddles as they were called locally, in the alum shale cliffs at Sandsend and Kettleness; some were obtained from the surface of the alum working (a flourishing business at one time in this part of Yorkshire), or from shallow adits driven into the cliffs. Much of the stone, particularly from Kettleness, was brought to the works by fishing cobbles which sailed into Eastrow Beck where the works was situated.

The preliminary breaking down of the stone was done by hand before being loaded into the kiln for firing. The kiln fuel consisted of wood faggots (called ' bavins ') with layers of coal and coke. After firing, the material was ground into the finished cement using millstones which were driven by a waterwheel through wooden friction gears. The output was about 4 tons per month.

After the production of cement ended, the works was used as a sawmill, the waterwheel still being used as the motive power.



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Published by Concrete Publications, Ltd., 60 Buckingham Gate, London, S.W.1

INDEX TO VOL. XXXIX, 1966

Printed in Great Britain by CORNWALL PRESS, Paris Garden, Stamford Street, London, S.E.1.
Published by CONCRETE PUBLICATIONS, LTD., 60, Buckingham Gate, London, S.W.1, England.

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