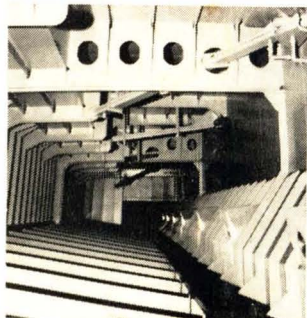
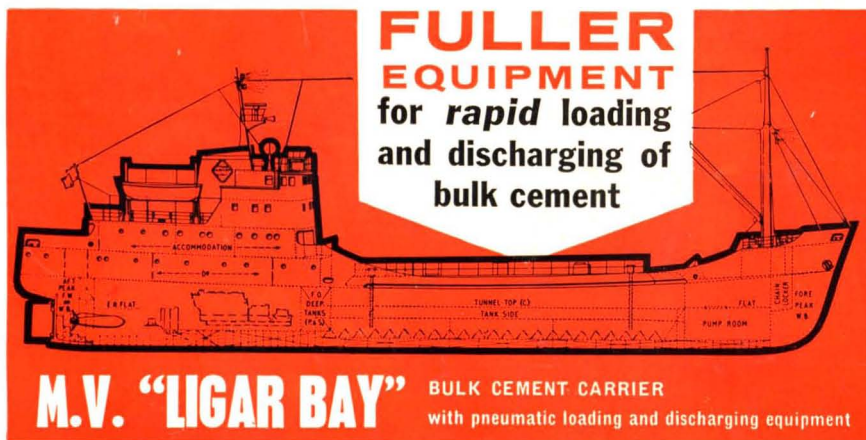


CEMENT & LIME MANUFACTURE

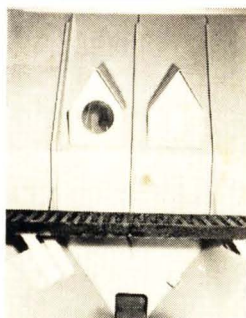
VOL. XL. No. 3

MAY, 1967

Price 1s. 6d. per Copy.
Annual subscriptions: Inland 9s. post free.
Overseas 11s. 6d. including postage.
Canada and U.S.A. 2.15 dollars incl. post.



Wall of screw conveyor tunnel equipped with inspection windows, and catwalk over self-cleaning haunching.



F-H Airslide conveyor in self-cleaning valley, showing blade of adaptor gate operated from tunnel.



Fuller Kinyon pump with F-H Airslide conveyors from fluid lift.

The bulk carrier M.V. "Ligar Bay", built by Henry Robb Ltd., Leith, for the Tarakohe Shipping Company of Wellington N.Z., is equipped with Fuller Kinyon pneumatic cement-handling equipment supplied by Constantin (Engineers) Ltd., capable of automatically loading bulk cement at over 550 tons per hour, and discharging—up to 1,500 ft. from the ship's side, and a lift of 60 ft.—at 130 tons per hour.

Please write or telephone for full details of Fuller equipment.

CONSTANTIN
(ENGINEERS) LTD.

RADNOR HOUSE · LONDON ROAD · NORBURY
LONDON · S.W.16 (01-764 9571)

ECONSTANTIN
S.A.

105 rue Lafayette
PARIS 10^e (526 91.29)

CONSTANTIN
ESPAÑOLA S.A.

Sancho el Sabio 28
SAN SEBASTIAN (18442)

Licenses of FULLER CO. U.S.A.



PNEUMATIC CONVEYORS · BLENDING SYSTEMS
DUST COLLECTORS · COOLERS · CONTROL EQUIPMENT

GRINDING MEDIA INFORMATION

USED AND RECOMMENDED BY

"CRETIDS"

Reg. No. 573298

have been specially produced by us to meet the requirements of manufacturers for producing cement of extreme fineness. They have proved highly successful in finishing-mills without any cooling devices and, as with all our other types of grinding media, the wear-and-tear cost of "Cretoids" is infinitesimal. Free working samples are available on application.

THE WORLD'S LEADING CEMENT MAKERS

The comprehensive range of grinding media supplied by us and our unique experience in the cement industry in practically every country of the world enable us to give expert advice and to supply a type of grinding media that will provide the answer to any grinding problem.

HELIPERS LTD PHONE: GLOUCESTER 24051
GRAMS: HOLPEBS, GLOUCESTER
PREMIER WORKS
GLOUCESTER



If this is your problem

Stein Two-Taper System is the solution



In two-taper construction, two sizes of bricks are used, one with "fast" and one with "slow" taper, easily identified by different colours and supplied in the correct ratio to suit a given kiln diameter.

Two-taper construction has the advantages—

- Linings do not have to be tailor-made giving quicker delivery from the manufacturer.
- Brick stocks are simplified and reduced—just vary the ratio of tapers for the different sizes of kilns in the plant.
- If kiln shell irregularities are encountered through re-lining, the ratio can be altered as required using proportionately more "fast" or "slow" tapers to maintain a tight build to the shell and at the same time, ensuring that all joints are radial.

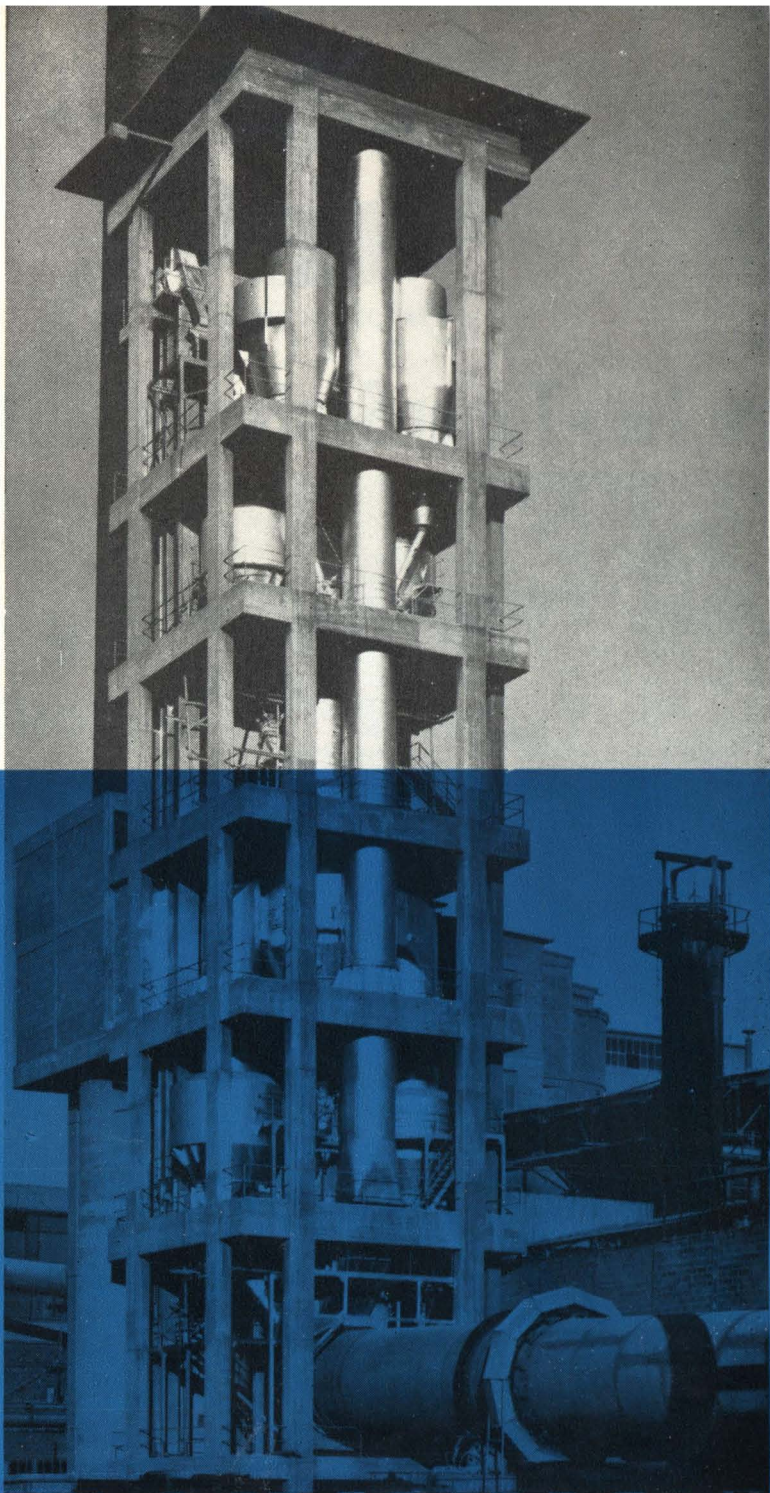
As major suppliers to Rotary Cement Kilns in the United Kingdom and Exporters to Cement Plants throughout the World, we would be pleased to advise on and quote for your requirements from our comprehensive range of Rotary Cement Kiln Refractories.

For further details please consult our Technical Service Department.

JOHN G. STEIN & CO. LTD., BONNYBRIDGE, SCOTLAND. TEL: BANKNOCK 255 (4 LINES) 361 & 362

STEIN
Refractories

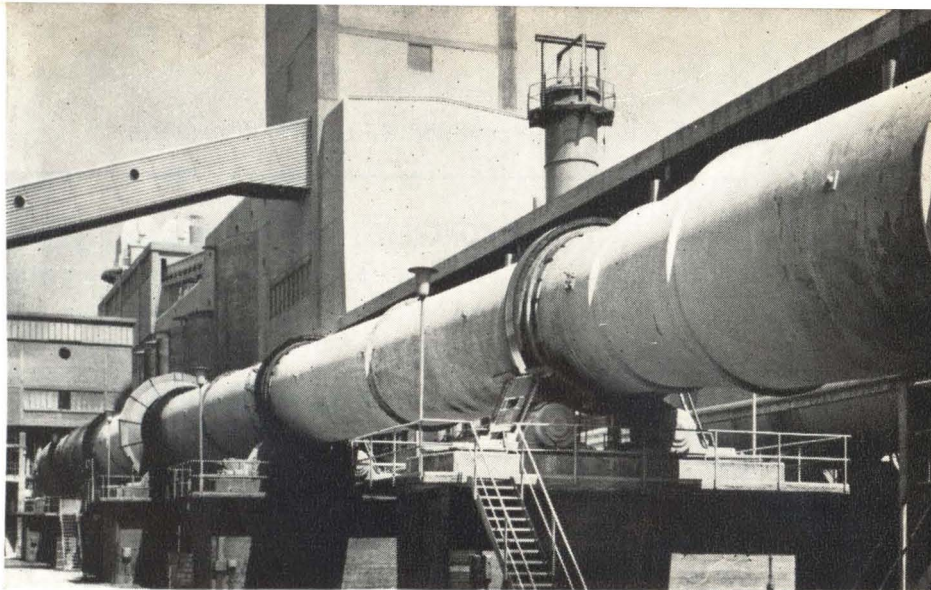
ANTICIPATE THE NEEDS OF INDUSTRY



DOPOL kiln
with raw mat
erial preheate

POLYSIUS

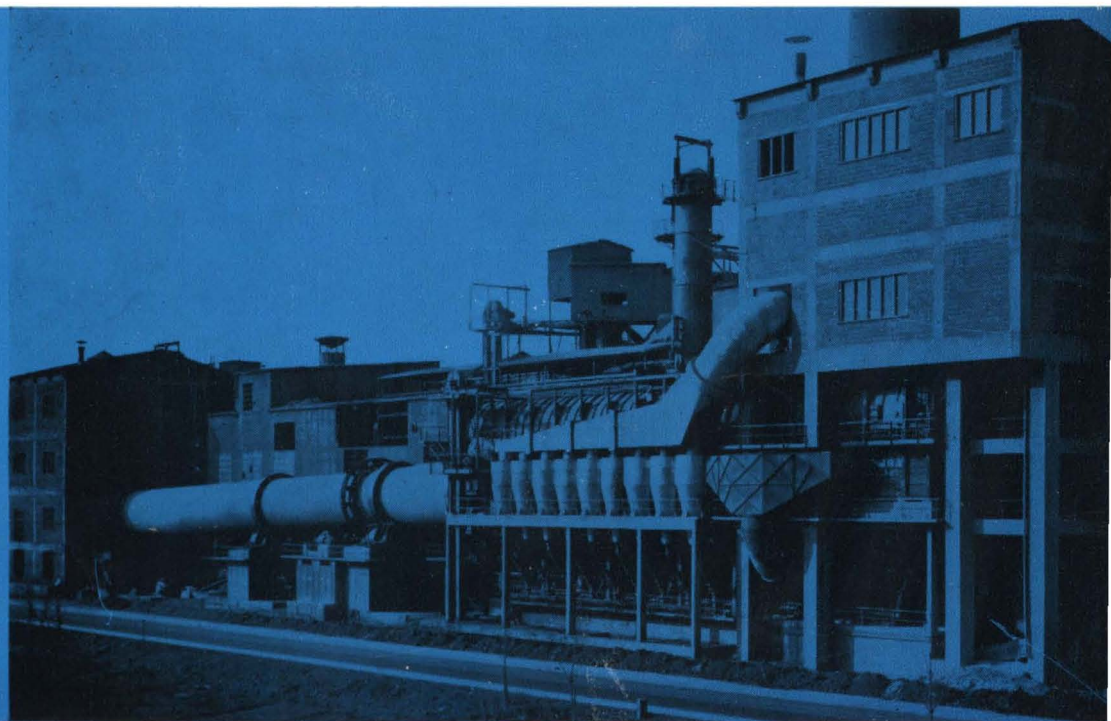
POLYSIUS
engineers
advise you
to choose



Long kiln for wet and dry process

The correct kiln for every raw material

LEPOL kiln with preheater for granulated and small-size material



POLYSIUS GMBH
4723 Neubeckum,
West Germany.
Telefon: (02525) 711
Telegramme: Polysius Neubeckum
Telex: 0892 893

POLYSIUS LTD.
London Road,
Ascot, Berks.
Telephone: Winkfield Row 2011
Cables: Polysius Ascot
Telex: 84 102

POLYSIUS S.A.R.L.
13 Rue Auber,
Paris IXe(Frankreich),France
Tél: Paris-Richelieu 87 49
Télégrammes: Polysius Paris
Telex: 21602

"CONCRETE SERIES" BOOKS

Detailed particulars of the books in the "Concrete Series" will be sent on request.

In the following list, the dates are the year of publication of the edition in print.

Prices in Canada and U.S.A. are given in dollars in brackets.

BOOKS FOR THE CEMENT INDUSTRY

Cement Chemists' and Works Managers' Handbook. WATSON and CRAIDOCK. 1965. 234 pp. 30s.; by post 31s. 9d. (\$7.50).
Structural Lightweight - aggregate Concrete. NESBIT. 1967. 280 pp. 28s.; by post 29s. 6d.

How to Make Good Concrete. WALSH. 1955. 108 pp. 8s.; by post 8s. 10d. (\$1.90).

Concrete Finishes and Decoration. CHILDS. 1963. 144 pp. 18s.; by post 19s. (\$4.50).

OTHER BOOKS ON CONCRETE AND ALLIED SUBJECTS

Concrete Construction Made Easy. TURNER and LAKEMAN. 1958. 115 pp. 6s.; by post 6s. 9d. (\$1.50).
Concrete Construction. REYNOLDS. New edition in preparation.

Concrete Formwork Designer's Handbook. GILL. 1960. 160 pp. 15s.; by post 16s. (\$3.50).

Basic Reinforced Concrete Design. REYNOLDS. 1962. Vol. I. 264 pp. Vol. II. 224 pp. Each volume (sold separately) 24s.; by post 25s. 3d. (\$6.00).

Engineering Mathematics (Modern Developments). DOUGLAS with TURNER. 1964. 224 pp. 63s.; by post 66s. (\$15.75).

Theory and Practice of Structural Design Applied to Reinforced Concrete. ERIKSEN. 1953. 402 pp. 25s.; by post 26s. 6d. (\$5.50).

Explanatory Handbook on the B.S. Code of Practice for Reinforced Concrete. SCOTT, GLANVILLE and THOMAS. 1965. 20s.; by post 21s. 6d. (\$5.00).

Members Subjected to Biaxial Bending and Thrust. PANNELL. 1966. 52 pp. 24s.; by post 25s. (\$6.00).

Reinforced Concrete Designer's Handbook. REYNOLDS. 1965. 358 pp. 20s.; by post 21s. 9d. (\$5.00).

Examples of the Design of Reinforced Concrete Buildings. REYNOLDS. 1959. 266 pp. 12s. 6d.; by post 13s. 10d. (\$3.00).

Reinforced Concrete Members subjected to Bending and Direct Force. BENNETT. New edition in preparation.

Formwork for Concrete Structures. WYNN and MANNING. 1965. 388 pp. 50s.; by post 53s. (\$12.50).

Prestressed Concrete. MAGNELL. 1954. 354 pp. 20s.; by post 21s. 6d. Customers in America should obtain the American edition from McGraw-Hill Book Company, Inc., New York 36.

Guide to the B.S. Code of Practice for Prestressed Concrete. WALLEY and BATE. 1961. 104 pp. 15s.; by post 16s. (\$3.75).

Design and Construction of Reinforced Concrete Bridges. LEGAT, DUNN and FAIRHURST. New edition in preparation.

Reinforced Concrete Reservoirs and Tanks. GRAY and MANNING. 1960. New edition in preparation.

Concrete Water Towers, Bunkers, Silos and other Elevated Structures. GRAY and MANNING. 1964. 312 pp. 36s.; by post 38s. (\$9.00).

Reinforced Concrete Chimneys. TAYLOR and TURNER. 1960. 80 pp. 12s.; by post 13s. (\$2.80).

Introduction to Concrete Work. CHILDS. 1961. 120 pp. 4s.; by post 4s. 9d. (\$1.00).

Elementary Guide to Reinforced Concrete. LAKEMAN. 1950. 95 pp. 6s.; by post 6s. 9d. (\$1.50).

Introduction to Prestressed Concrete. ABELLS. Vol. 1: 1964. 379 pp. 60s.; by post 62s. (\$15.00). Vol. 2: 1966. 347 pp. 72s.; by post 74s. (\$15.00).

Prestressed Concrete Designer's Handbook. ABELLS and TURNER. 1962. 294 pp. 28s.; by post 29s. 6d. (\$7.00).

Ultimate Load Theory Applied to the Design of Reinforced and Prestressed Concrete Frames. BAKER. 1956. 96 pp. 18s.; by post 19s. (\$4.00).

Continuous Beam Structures. SHEPLEY. 1962. 128 pp. 12s.; by post 13s. (\$3.00).

Statically-Indeterminate Structures. GARTNER. 1957. 128 pp. 18s.; by post 19s. (\$4.00).

Analysis of Structures. SMOLIRA. 1955. 176 pp. 18s.; by post 19s. (\$4.00).

Nomograms for the Analysis of Frames. RYGOLL. 1957. 58 pp. text and 26 nomograms. 18s.; by post 19s. (\$4.00).

Charts for Helical Stairs. CUSENS and SANTATHADAPORN. 36 pp. 10s.; by post 11s. (\$2.50).

Arch Design Simplified. FAIRHURST. 1954. 64 pp. 12s.; by post 13s. (\$2.80).

Influence Lines for Thrust and Bending Moments in the Fixed Arch. ERIKSEN. 1955. 27 pp. 4s.; by post 4s. 8d. (\$1.00).

Design of Non-Planar Roofs. TERRINGTON and TURNER. 1964. 108 pp. 15s.; by post 16s. (\$3.75).

Arch Ribs for Reinforced Concrete Roofs. TERRINGTON. 1956. 28 pp. 4s.; by post 4s. 8d. (\$1.00).

Design of Pyramid Roofs. TERRINGTON. 1956. 20 pp. 4s.; by post 4s. 8d. (\$1.00).

Design of Prismatic Structures. ASHDOWN. 1958. 87 pp. 9s.; by post 10s. (\$2.10).

Design and Construction of Foundations. MANNING. 1961. 231 pp. 24s.; by post 25s. 3d. (\$6.00).

Raft Foundations: The Soil-Line Method. BAKER. 1965. 148 pp. 15s.; by post 16s. (\$3.75).

Deep Foundations and Sheet-piling. LEE. 1961. 260 pp. 20s.; by post 21s. 3d. (\$5.00).

Reinforced Concrete Filling and Piled Structures. WENTWORTH-SHEILDS, GRAY and EVANS. New edition in preparation.

Foundation Failures. SZECHY. 1961. 140 pp. 20s.; by post 21s. (\$5.00).

Concrete Products and Cast Stone. CHILDS. 1961. 320 pp. 18s.; by post 19s. 9d. (\$4.50).

Moulds for Cast Stone and Concrete Products. BURREN and GREGORY. Designs for garden ware. 1957. 96 pp. 6s.; by post 6s. 9d. (\$1.50).

Estimating and Costing Precast Concrete Products and Cast Stone. FIELDER. 1963. 138 pp. 16s.; by post 17s. (\$4.00).

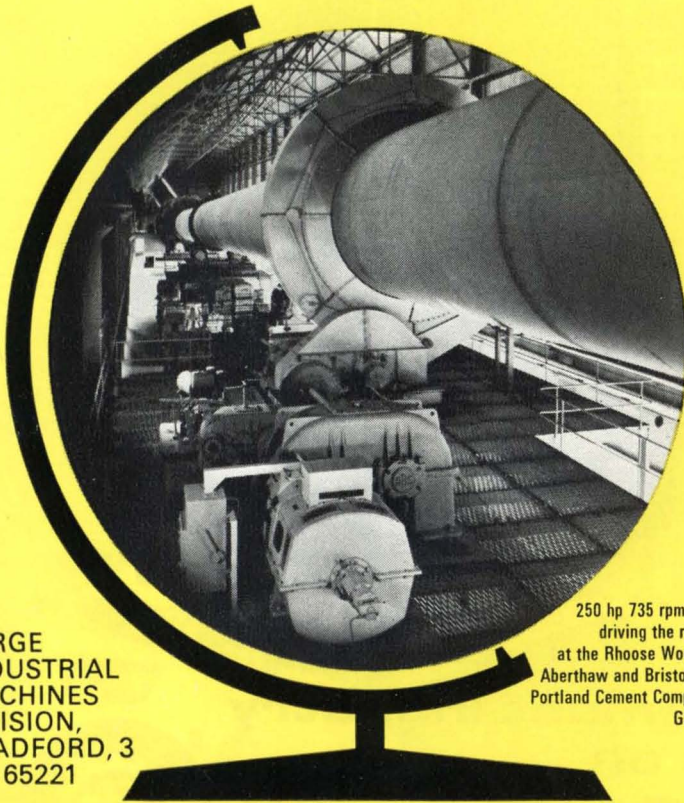
Concrete Farm Structures. PENNINGTON. 1954. 156 pp. 12s.; by post 13s. (\$2.80).

universal

Drives for the largest pumps, compressors, fans, mills, mixers and crushers for any application in any industry.

international

Complete factory electrification including the generation of power anywhere in the world.



LARGE
INDUSTRIAL
MACHINES
DIVISION,
BRADFORD, 3
Tel: 65221

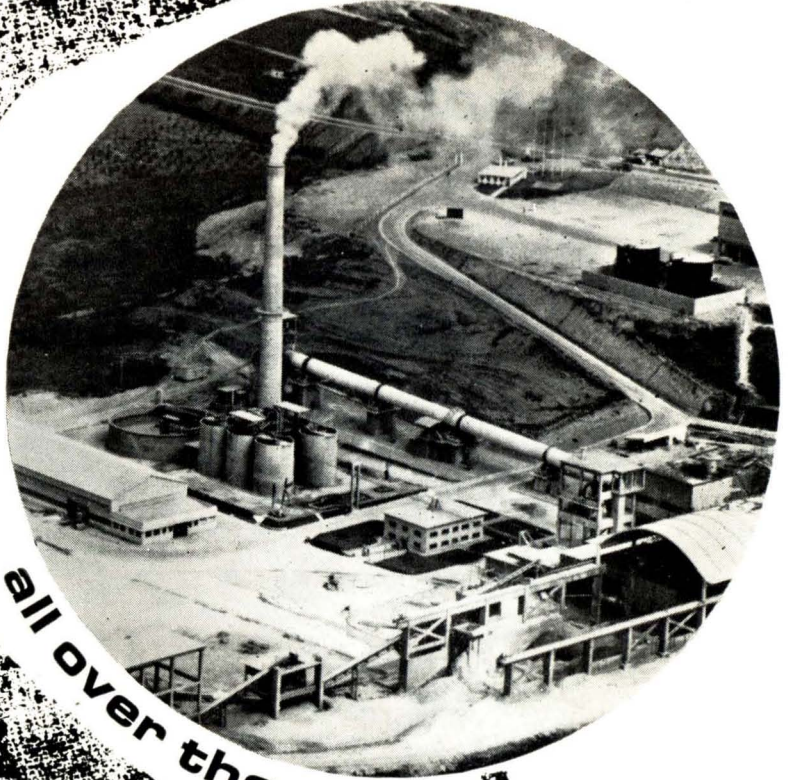
250 hp 735 rpm dc motor
driving the rotary kiln
at the Rhoose Works of the
Aberthaw and Bristol Channel
Portland Cement Company Ltd.,
Glamorgan.

Never too big – or too small – for

**ENGLISH
ELECTRIC**



Matosinhos Cement Factory
(Brazil)



all over the world ...

the cement industry
relies on
FIVES LILLE-CAIL

7 RUE MONTALIVET PARIS 8^e - ANJ. 22.01, 32.40

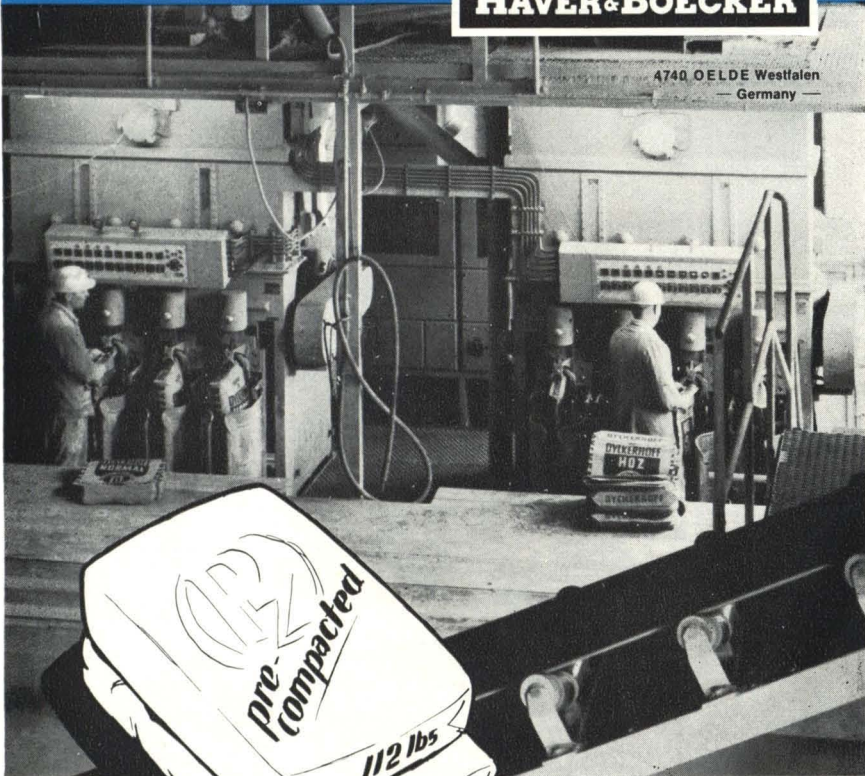


HAVER AUTOMATIC PACKING MACHINES

in-line packers: series BB and BBV
 rotary packers: ROTO series R and RV
 Outputs up to 110 l.p.h. with one operator
 Pre-compacting of cement (shorter bags)
 Vertical bag-drop
 Automatic bag push-off
 Complete packing and loading plants
 More than 2500 HAVER Packing Machines
 in operation all over the world

HAVER & BOECKER

4740 OELDE Westfalen
— Germany —



U. K. Representatives:-

CONTINENTAL ENGINEERING CO. LTD.
London Road, Ascot, Berks. · Tel. No: Winkfield Row 2011

A
NAME AS
FAMILIAR AS
CEMENT ITSELF



F.L. SMIDTH & CO.

*Designers of complete
Cement Works and manufacturers
of machinery for the cement industry*

F. L. SMIDTH & CO. LTD., P.O. Box No. 137, 17, Lansdowne Road, Croydon, CR9 2JT.
Tel: MUNICIPAL 5555. Telex No: 264021. Telegrams & Cables: FOLASMIDTH CROYDON.

CEMENT AND LIME MANUFACTURE

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"
"CONCRETE BUILDING & CONCRETE PRODUCTS"
"CEMENT & LIME MANUFACTURE"
"THE CONCRETE YEAR BOOK"
"CONCRETE SERIES": BOOKS.

VOLUME XL NUMBER 3

MAY, 1967

Counterflow Preheaters for Rotary Kilns.

A PREHEATER operating on the suspended-dust principle, for rotary kilns working on the dry process, has been developed during some three years by Messrs. Fried. Krupp Maschinen-und-Stahlbau, Rheinhausen, and is now in commercial operation in five cement works and is under construction or projected for some nineteen more. An installation in Switzerland having a daily productive capacity of 500 tonnes of clinker is illustrated in *Fig. 3*. A diagram of the construction is shown in *Fig. 2*, and a photograph of a model in *Fig. 1*.

This counterflow preheater comprises a vertical tube with an inlet chamber, three preheating chambers and two cyclones. An auxiliary chimney, mounted above the topmost chamber, is provided with a top cover and dampers so that, while starting-up the kiln, the flue-gas can by-pass the cyclones and be discharged, under natural draught, to atmosphere. During normal operation, the cover is closed and the dampers open. The gases are then drawn from the kiln through the system of chambers and cyclones by an induced-draught fan and discharged either directly, or through the raw-material drying plant, to an electrostatic precipitator for cleaning before being discharged, via the main chimney, to atmosphere. In *Fig. 3*, the precipitator and main chimney are seen on the left of the preheater.

The feed of raw meal to the kiln is usually controlled by a feeder situated near ground level, as seen in *Fig. 1*. This controlled quantity of raw-meal is then transported by a mechanical or pneumatic elevator up to the auxiliary chimney, and there fed into the ascending current of gas, through a rotary valve, in the mechanical method, or directly in the pneumatic method. The raw meal caught by the cyclones is re-introduced by screw-conveyors into the system at the top chamber also seen in *Fig. 1*, from which it drops into the first narrowing tube section. In this section, the falling material is arrested by the comparatively strong current of gas and whirled in such a manner that it comes into close contact with the hot gas, thus ensuring a very complete exchange of heat. The whirled-up

B

ห้องสมุด กรมวิทยาศาสตร์
๒๕ ก.ค. 2510

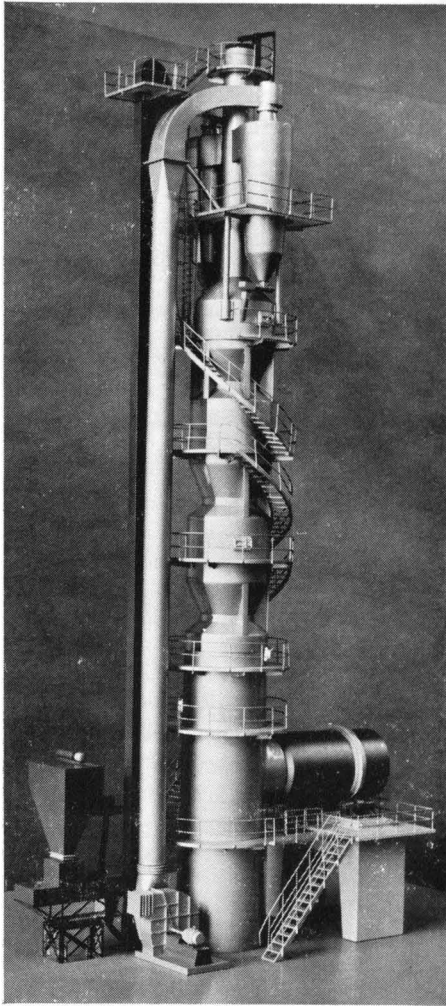


Fig. 1.—Model of Preheater.

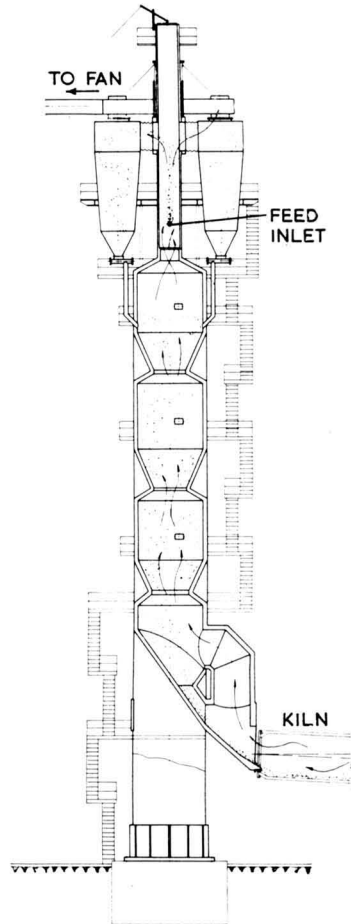


Fig. 2.—Diagrammatic View of Preheater.

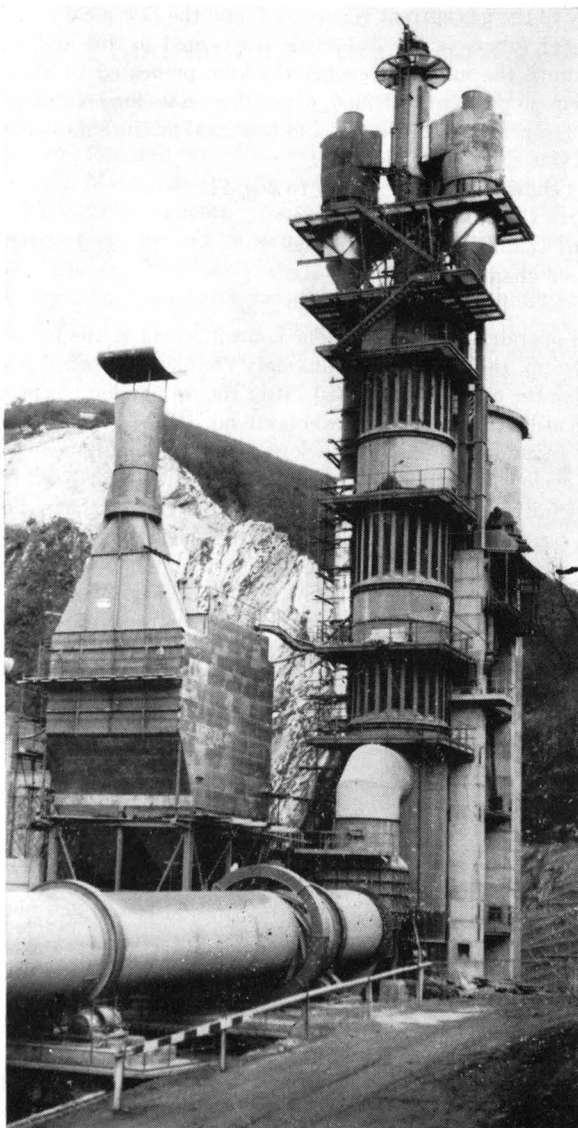


Fig. 3.
Preheater
installed
in
Cement Works
in
Switzerland.

material is then carried up by the gas into the expanded section of the tube where the velocity drops sufficiently for the majority of the raw meal to separate from the gas current and to fall again to the narrow tube section. With the continual feeding of fresh raw meal into the system, the point is very soon reached

where the lifting capacity of the gas current is exceeded, and the raw meal begins to drop into the next-lower tube section. The cycle is repeated in this and the following tube sections, until the material reaches the kiln, preheated to about 800 deg. C., and more than 30 per cent, calcined, depending on its lime standard.

Typical approximate temperatures of the gas and raw meal mixture measured at the various stages are stated to be as follows:

Inlet chamber	..	..	810 deg. C.
Fourth Chamber	..	..	700 „
Third Chamber	..	..	590 „
Second chamber	..	..	490 „
Cyclones	..	..	350 „

The preheater can be operated entirely from the control centre at the burner platform. During heating-up, the cover of the auxiliary chimney is opened and the dampers located before the cyclones are closed. After the rotary kiln has been heated up sufficiently and utilisation of the preheater is intended, the fan is switched on, raw meal is fed in, the cover of the auxiliary stack is closed and, simultaneously, the dampers before the cyclones are opened; all operations are carried out by means of electrical drives initiated from the control centre. Even in the event of a sudden failure of power supply, it is not necessary for the burner-attendant to leave the control centre because the cover of the auxiliary chimney as well as the dampers before the cyclones are connected with the burner platform by means of ropes and can be opened and closed from there by means of hand-winch in case of emergencies. Thus the cyclones and the induced draught fan will be protected against excessive temperatures due to suddenly retained heat.

The makers claim that this preheater is unaffected by deposits and incrustations arising from alkalis in the raw materials, largely because of the large cross-sectional areas of the tube in which any build-ups fall off by their own weight before hard rings or bridges are formed, and particularly through the avoidance of a large difference in the temperatures of the materials and gas in the inlet chamber, which has often been a point of trouble in suspension preheaters. In all their operating experience, no interruption resulting from deposits has occurred.

Stress is also laid on the following features of the preheater. The fuel consumption, depending upon the quality of the raw materials, is in the range 800 to 850 Kcal. per kg. of clinker; the pressure-drop through the preheater is from 250 mm. to a maximum of 300 mm. water-gauge (10 to 12 in.) corresponding to about 4 kWh per ton of clinker; there are no moving parts in the high temperature zones, and the only moving parts directly associated with it are the two screw-conveyors below the cyclones and the rotary feed valve, and consequently maintenance costs are negligible; and due to elimination of deposits and absence of moving parts, no attendant is required on the preheater.

The preheater is self-supporting and requires no steel or concrete tower construction. This not only reduces the cost but speeds up construction. The reduction in area occupied, facilitates the installing of a preheater in old rotary-kiln plants, where very restricted space only is likely to be available.

Fluidisation in the U.S.A. Lime Industry.

RESEARCH carried out recently in the U.S.A. by the Dorr-Oliver Co., has established that dry limestone can be successfully "sized" in a fluidising apparatus. An air-sizer unit was installed in the works of the New England Lime Co., at Adams, Massachusetts, to prepare a dust-free feed for a "FluoSolids" limestone calcining pilot reactor. The air-sizer, which has a diameter of 14 in., operated satisfactorily up to a capacity of 1 ton of feed per hour. In *Fig. 1* is shown the Dorr-Oliver "FluoSolids" reactor installed at one end of a building housing an old rotary kiln. The reactor has a diameter of 12 ft. and a rating of 100 tons per day.

When the lime reactor was operated using feed prepared in the sizer, the dust loss from the reactor was reduced by 50 per cent., and the fuel requirement for the reactor was reduced from 42 U.S. gallons to 39 U.S. gallons of Bunker C oil per ton of lime produced.

The New England Lime Co., uses rotary kilns for calcining dolomite at its works at Canaan, Connecticut, and it was thought that a sized feed might prove advantageous here. For this works, the Dorr-Oliver Co., designed a combined dryer and sizer plant capable of handling up to 50 tons of feed, of variable moisture content, per hour. The plant, an operational diagram of which is shown in *Fig. 2*, is operating satisfactorily on a commercial basis. The welded steel shell of the dryer-sizer plant has an internal diameter of 5 ft. 8 in. and an overall height of 15 ft. 6 in. The air-heater compartment and the wind-box are provided with an insulating lining of refractory bricks. The equipment employed in conjunction with the plant

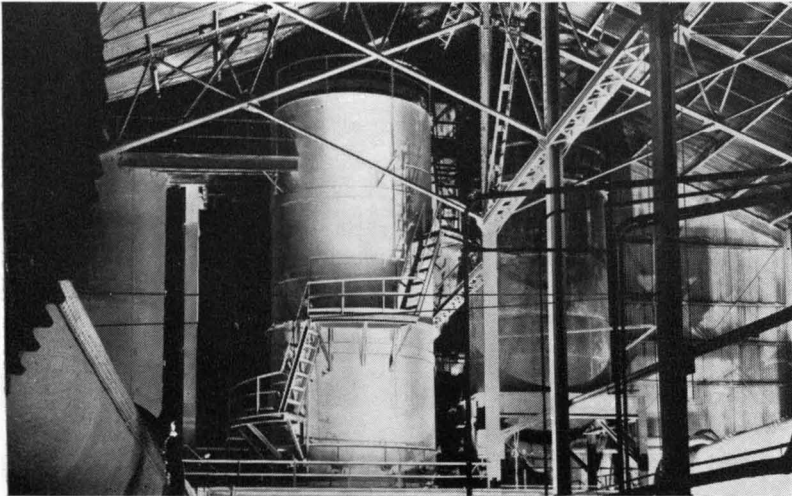


Fig. 1.—"FluoSolids" Plant installed in a U.S.A. Lime Works.

includes a proportioning oil-burner, a turbine air-blower, a vibrating feeder, and indicating and control equipment for temperature, pressure and flow.

In Fig. 3 is shown the flow-sheet for the drying and sizing of dolomite. Because

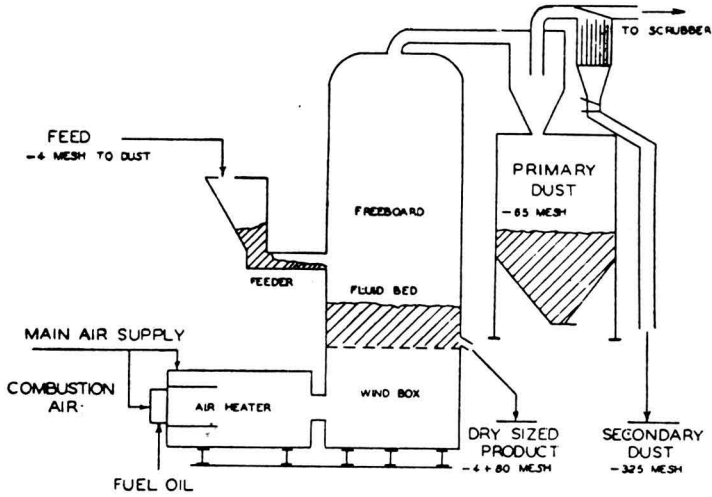


Fig. 2.—Air-sizer and Drier.

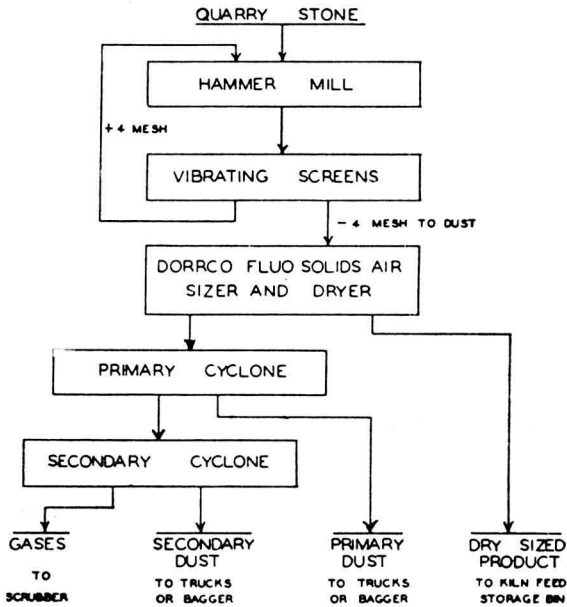


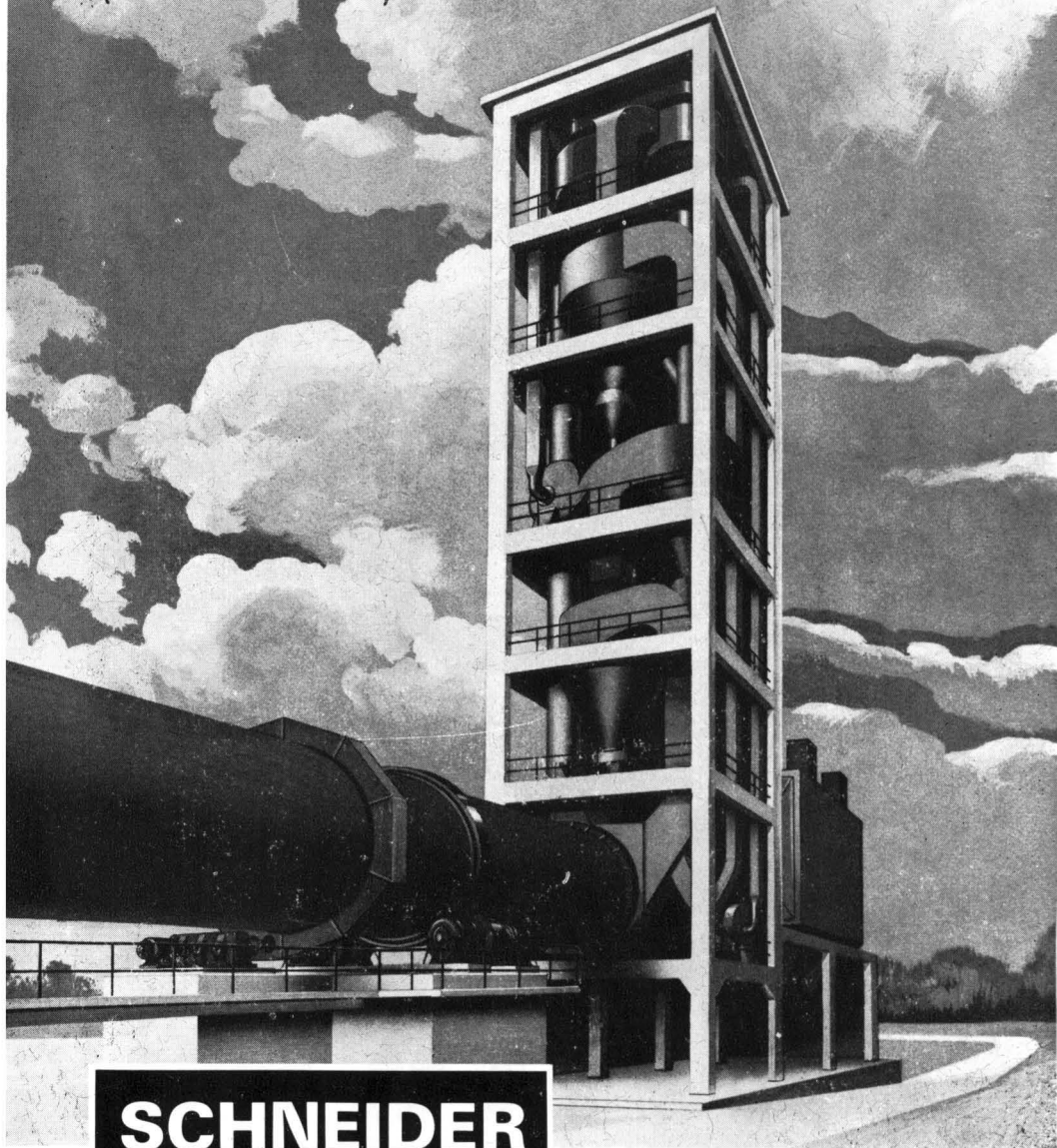
Fig. 3.—Flow-sheet for Continuous Operation.



REFRACTORY CONSTRUCTIONS

S.G. BLAIR & CO. LTD., LESLEY HOUSE, BEXLEYHEATH. Telephone 5696

**ROTARY KILNS WITH RAW MATERIAL PREHEATERS
(S.F.A.C. Process)**



**SCHNEIDER
CREUSOT**

**EQUIPMENT FOR CEMENT PLANTS
DRY PROCESS AND WET PROCESS**

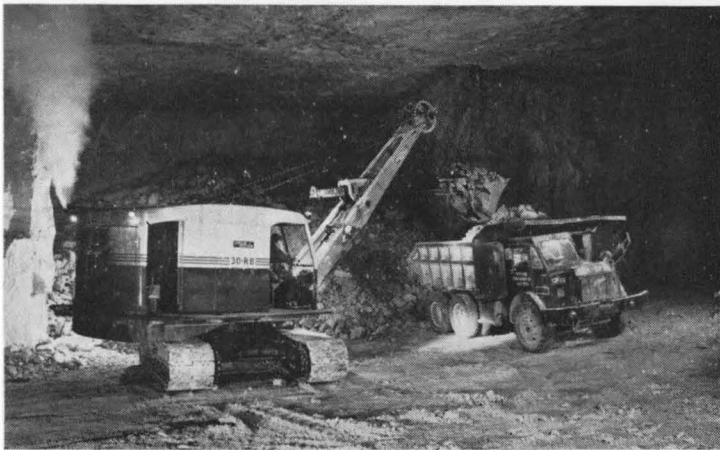
SOCIÉTÉ DES FORGES ET ATELIERS DU CREUSOT
DÉPARTEMENT CONSTRUCTIONS MÉTALLIQUES
5, Rue de Montessuy - Paris 7^e - Téléphone 705 89.09 et 90.00
Télégramme BATICHATIL-Paris - Telex : BATENSA 20.657



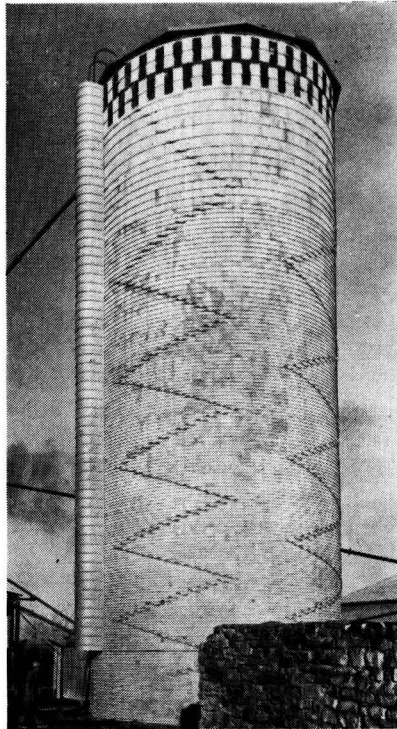
the plant is operated on a one-shift per day basis, it must be started up each morning. As soon as the first load of limestone arrives, the blower is switched on and the air rate adjusted to about 5,000 cu. ft. per minute. The burner is then lighted and the apparatus warms up. When the freeboard thermocouple indicates a temperature of 75 deg.C., the vibrating feeders for both the hammer-mill and the dryer are turned on. As soon as the fluid builds up to a depth of 1 ft., the automatic discharge gate actuated by the differential pressure across the fluid bed takes over and holds the depth of the bed at 1 ft. The rate of feed and the moisture content of the stone vary, and the oil rate is automatically adjusted by a temperature controller to maintain a temperature of 75 deg.C. in the freeboard. The range of rates of supply of oil to the burner which come within the control of the automatic controller can be quickly adjusted up or down to take care of unusual loads. The pressure at the blower under existing conditions is 1.2 lb. per sq. in.

Separation from 20 to 100 mesh per inch is possible. Mesh of separation is defined as that on which the undersize product registers 1.5 per cent. Separation finer than 100-mesh requires relatively low velocities with resulting low capacities of sizing and drying. For fine meshes of separation the feed is first crushed to a relatively small size.

Mining Limestone.



THE accompanying illustration shows limestone being loaded, after excavation, at the underground mines of Derbyshire Stone Quarries Ltd., at Middleton-by-Wirksworth. The mine is currently producing about 5,000 tons of crushed limestone each week for use in industry. The machine is a diesel-powered Ruston-Bucyrus 30-RB, a special feature of which is that, for underground working, irritant sulphur and aldehyde exhaust gases are absorbed by means of a conditioning scrubber installed in the exhaust system.

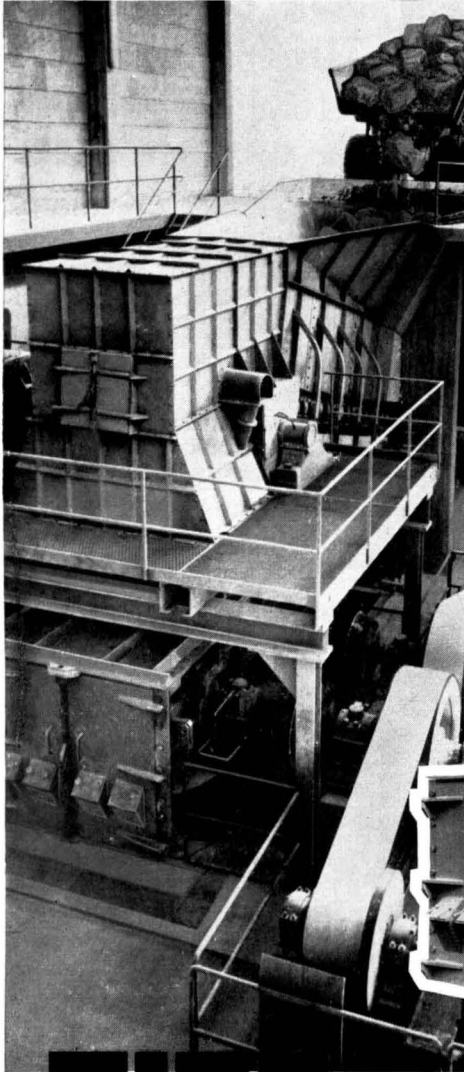
Precast Concrete Silos at Lime Works.

THE accompanying illustration shows a precast concrete silo erected at Blencowe lime works, Derbyshire, where it is used for storing ground limestone. The silo is constructed of concrete staves banded with post-stressed galvanized steel hoops, which are set at closer spacing near the bottom of the silo where the outward pressures may be up to 1,700 lb. per sq. ft. The hoops are joined by lugs which form the zig-zag pattern clearly visible in the illustration.

The silo is one of a range manufactured by Edenhall Concrete Products Ltd., of Penrith, Cumberland, which Company is associated with London & Northern Securities Ltd. It is similar to that provided for agricultural purposes in co-operation with Colman & Co. (Agricultural) Ltd., of Sudbury, Suffolk. The Blencowe Lime Co., is also an associated concern.

The design and size of the outer wall is standard, but a wide range of internal layouts and filling and emptying systems can be accommodated. The external dimensions range from 12-ft. diameter and 16 ft. high up to 30-ft. diameter, 80 ft. high. The largest silos have a capacity of 56,000 cu. ft., nominally 2,200 tons. The precast concrete staves are 30 in. by 10 in. and are $3\frac{1}{8}$ in. thick. Erection times are claimed to be ten to twelve days.

Simple in construction, unequalled in performance



MIAG double-shaft hammer crusher "TITAN"

Crushes limestone and similar minerals to a size smaller than one inch in a single operation up to 1000 t/h

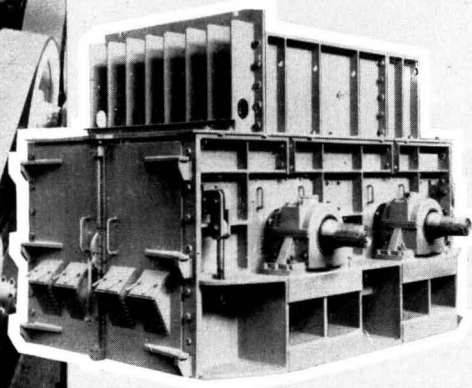
Unaffected by tramp iron

Lower power requirements

Crusher inclosed for operational safety

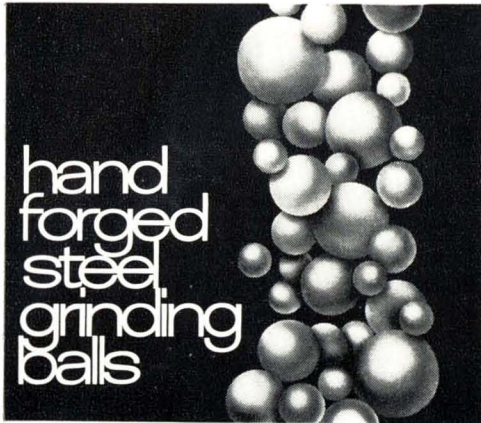
Ready access for inspection and maintenance

Easy replacement of wear parts reduces down time



BRAUNSCHWEIG / Germany

Agency for Great Britain
INDUSTRIAL EQUIPMENT CO.
(N.I.) Ltd.
58, Howard St. Belfast



hand
forged
steel
grinding
balls

**FOR BALL AND
TUBE MILLS IN
HIGH CARBON
OR CHROME STEEL
from 1" to 6" diam.**

All hand forged to grind faster, last longer, never break and never lose shape.

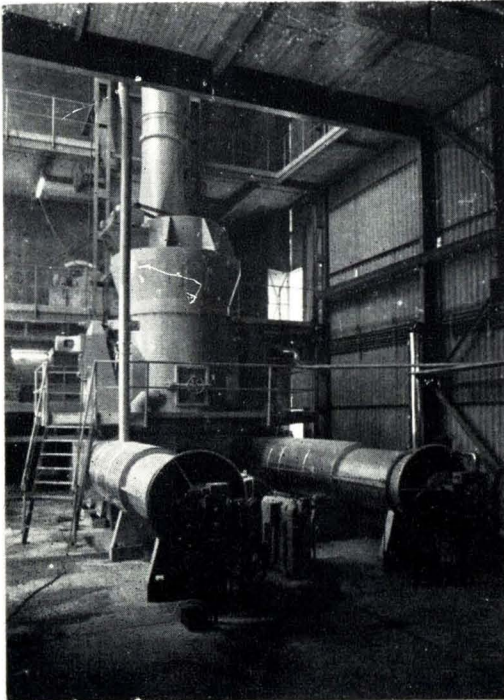
Also fine hand forged tools for quarry and mine.

BRINDLEY

F. J. BRINDLEY & SONS (SHEFFIELD) LTD.

**CENTRAL HAMMER WORKS,
ACRES HILL LANE, POOLE RD.,
DARNALL, SHEFFIELD 9.**

Tel: Sheffield 49663/4 Grams: 49663/4



“LOMA” FURNACE

The illustration shows a “LOMA” duplex, oil-fired FURNACE (no refractories) serving “LOESCHE” MILL engaged in grinding a mixture of limestone, anthracite and coke at the rate of 35 tons per hour with an average moisture of 4% and a maximum of 7%. 32,000 cu. ft. of air per minute at a temperature of 175°F. after the Mill. Entrance temperature about 400°F. Fuel is Bunker C oil. MILL fed by “LOESCHE” all-enclosed ROTARY FEEDER.

Also Feeders, Disc Pelletisers,
Pneumatic Conveyors.

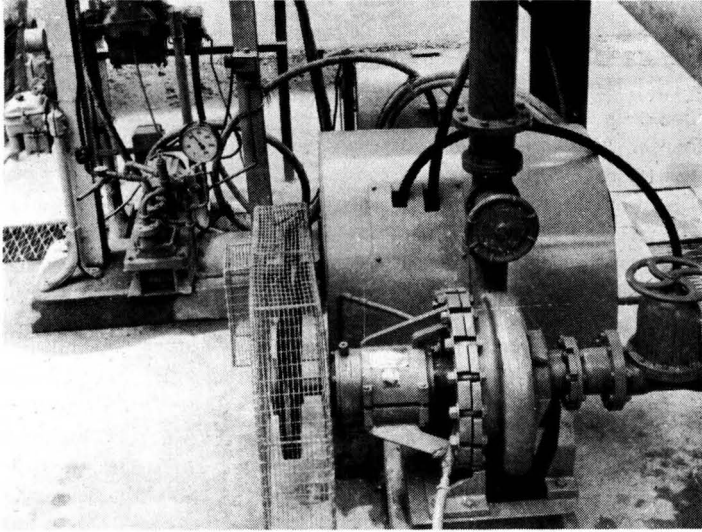
DELO (ENGINEERS) LTD.

138 Borough High Street,
LONDON, S.E.1.

Tel: Hop 0085/6

Telegrams:
(INLAND) CLAYCOMP LONDON, S E 1
(OVERSEAS) CLAYCOMP LONDON S E 1

Seals for a Slurry Pump.



At the Shoreham Works of The Associated Portland Cement Manufacturers Ltd., an Allis-Chalmers CWG pump is used to pump cement slurry under pressure from a storage tank to a pipeline feeding the hydrocyclones. The slurry consists of hard grains of silica, fine textured chalk and particles of clay all mixed with water to give a suspension having an average specific gravity of 1.6. The slurry is abrasive and, because of the fine particles (maximum size No. 200 B.S. sieve), is notoriously difficult to seal effectively. The fine particles tend to penetrate between conventional carbon seal-faces, and wear seepage paths which become enlarged, resulting in leakage.

In association with Allis-Chalmers (Great Britain) Ltd., Crane Packing Ltd., recommended a double seal comprising two type 1A mechanical shaft seals arranged back to back, and fitted with special faces which resist the tendency of abrasive particles to penetrate and abrade. The double-seal arrangement, which is shown in the accompanying illustration, was installed in May 1966, and operates continuously and efficiently. The pump in which the seal is installed handles 205 tons of cement slurry per hour.

Petrological Study of Limestone.

A STUDY has been made, by the Road Research Laboratory, of the petrological characteristics of soft limestones, mainly from Jamaica, by microscopical examination of thin sections cut from specimens impregnated with dyed resin to strengthen the material and delineate the voids. A report of the investigation is given in RRL Report No. 21, "A Study of the Petrology of Some Soft Limestones from Jamaica in Relation to Their Engineering Properties," by L. W. Tubey and P. J. Beaven. Although the investigation was mainly directed to the use of such limestones for roadstone, the methods of analysis and the results are of interest to the cement industry.

Consideration of the relation between the petrological nature of the limestones and their engineering properties as indicated by laboratory tests has shown that the proportion of voids has a marked two-fold influence on strength as measured by the ten-per-cent. fines test; strength increases as void-content decreases and as the proportion of voids filled by calcitic cement increases. The voids are themselves affected by the type and proportion of fossils present. The turbidity, which is a measure of the fine material, correlates well with abrasion, polished stone, specific gravity and water-absorption values. In general, a higher degree of correlation between petrological and engineering properties occurs for the soft limestones examined than for the harder material in the United Kingdom. The Jamaican materials were compared with British materials obtained from Cement Works Pit, Harefield, Middlesex, which is upper chalk from the micraster coranguinum zone, and samples of lower chalk from the Chinnor Cement Co., Ltd., Chinnor, Oxfordshire.

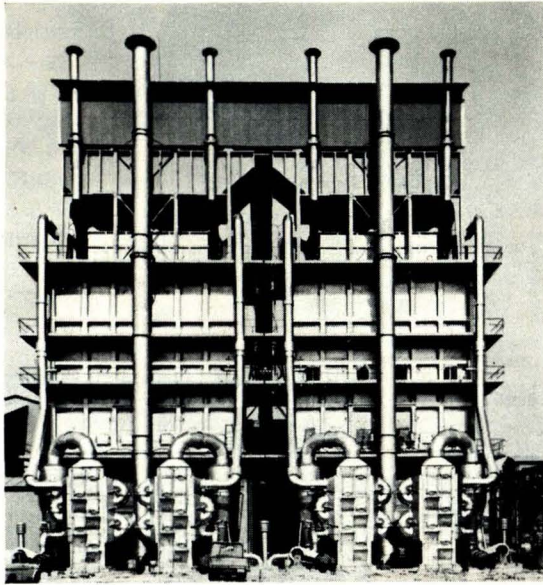
It is considered that petrological examination could usefully be extended to other soft limestones to improve understanding of their engineering behaviour and to aid in selecting the most suitable stone in a range of soft limestones for commercial and other purposes.

New Symbol for Tunnel Cement

THE Tunnel Portland Cement Co., Ltd., which is the second largest cement manufacturing group in Britain, recently adopted a new symbol, a big "T". It will appear on cement bags, lorries and railway waggons, as well as on the company's stationery and industrial clothing. The symbol was designed by Allied Industrial Designers Ltd.

The Tunnel Portland Cement Co., Ltd., which was founded in 1911, has cement works and other factories in Britain, including paper-bag factories at West Thurrock and Padeswood, North Wales, and a Thames-side asbestos-cement plant. The cement works are situated at West Thurrock, Essex; Pitstone, near Tring, Hertfordshire; and Padeswood, near Mold, Flintshire. The Company has a 50 per cent. share in Ribblesdale Cement Ltd., at Clitheroe, Lancashire, and a clinker grinding plant on the River Clyde, Scotland, operated by The Clyde Portland Cement Co., Ltd.

HUMBOLDT offer something new in the range of lime shaft furnace construction:



A furnace type which has successfully been built for the past seven years.

HP 7/67

Now is that we have taken over the design, construction and sales of a furnace type which up to now had been built by the Friedrich-Siemens, Industrieofenbau GmbH, Düsseldorf. It is the cross flow kiln - Röchling system. A lime shaft furnace which has successfully been sold in all parts of the world during the past seven years.

Now, through Klöckner-Humboldt-Deutz AG, this furnace system is further available to the construction, steel and chemical industries. If you have any problems in the field of lime shaft furnace construction, con-

sult us and we shall answer with a completely new HUMBOLDT product — with a gas or oil operated cross flow kiln, Röchling system.

HUMBOLDT design and build: Dressing plants for mineral-bearing raw materials, smelting works cement factories, plants for the chemical and fertilizer industries, automatic control systems, special centrifugal pumps and steel constructions. Humboldt Works, Telephone Köln 82 31, Telex 088 73501.

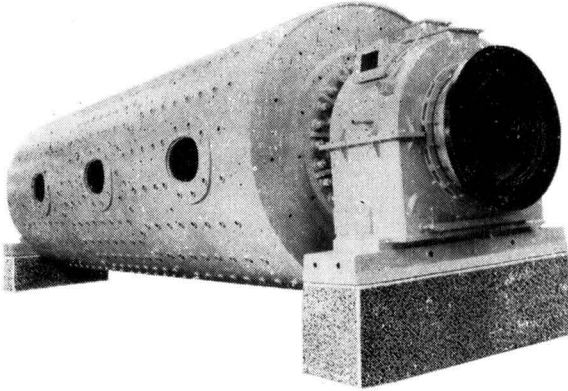


HUMBOLDT

KLÖCKNER-HUMBOLDT-DEUTZ AG - KÖLN 

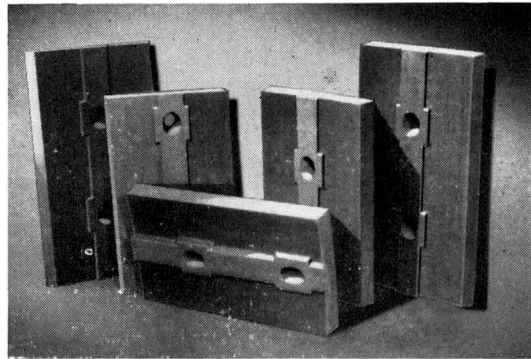
ห้องสมุด กรมวิทยาศาสตร์

MILLS FOR THE CEMENT INDUSTRY



1200 H.P. THREE CHAMBER GRINDING MILL RUNNING IN SELF-ALIGNING WATER COOLED OIL CASCADE LUBRICATED MAIN TRUNNION BEARINGS, PATENT FABRICATED STEEL ENDS AND SHELL LINED WITH MARTENSITIC NI-HARD LINERS.

PATENT 'H' TYPE MARTENSITIC NI-HARD SHELL LINERS FOR BALL, ROD AND TUBE MILLS. BRINELL HARDNESS UP TO 650. STANDARD PATTERNS AVAILABLE. OTHER TYPES TO CUSTOMERS OWN DESIGNS TO SUIT EXISTING MILLS CAN ALSO BE SUPPLIED.



Other Products include:—

Rotary Kilns, Coolers and Dryers.

Apron, Table, and Scraper Feeders.

Slurry Pumps and Slurry Mixers.

NEWELLS
MISTERTON

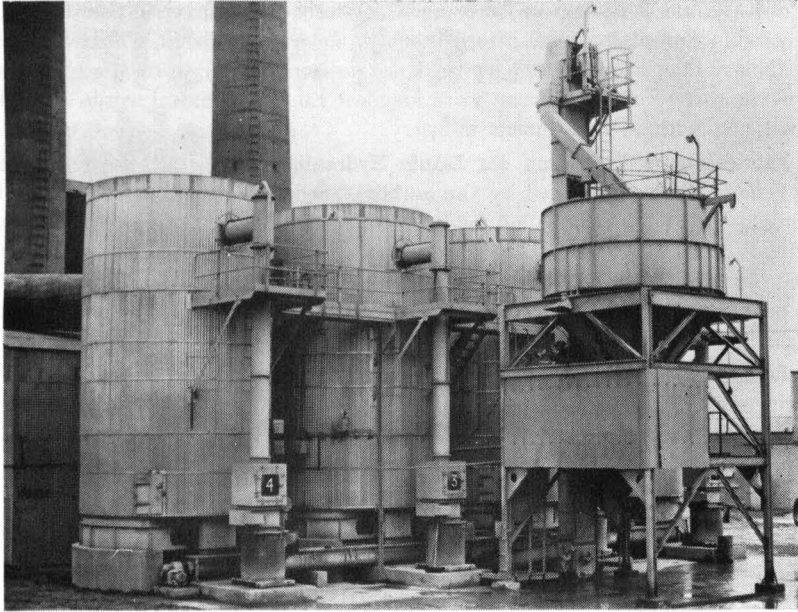
**ERNEST NEWELL & COMPANY LIMITED
MISTERTON VIA DONCASTER, ENGLAND**

Cables: Newells, Misterton, Notts, England

Telephone: Misterton 224-225

MEMBER OF THE HADFIELD'S GROUP OF COMPANIES

Insulating Dust Plant.



THE cement works of The Associated Portland Cement Manufacturers Ltd., at Kirton in Lindsey, Lincolnshire, produces weekly some 5,000 tons of ordinary Portland and rapid-hardening cement and "Walcrete". The dust is removed from the kiln gases, before they pass into the chimneys, by modern electrostatic precipitators. Because a sudden drop in the temperature of the gases would cause condensation and corrode the ducting and precipitators, the ducts from the kilns to the precipitators and the latter are insulated with mineral-wool slabs covered with sheets of aluminium. As a result of this protection, the temperature drop is only 10 deg. F., from 400 deg. F. to 390 deg. F. The accompanying illustration shows the installation at Kirton in Lindsey.

Aerial Ropeway for Conveying Limestone

AN aerial ropeway 2,250 m. (1.4 miles) in length is to be installed at the United Provinces Government cement works at Churk, India. The ropeway, which is designed to carry 400 tons of crushed limestone per hour, is to be supplied by The British Ropeway Engineering Co., Ltd.

Books and Brochures Received.

Dictionary of Cement Manufacture and Technology. (German-English and English-German.) By C. van Amerangen. (Wiesbaden: Bauverlag GmbH. 1966. Price: £5)—Containing some fifteen-thousand entries, this book, which is more a vocabulary than a true dictionary since the meanings of the words are not given, gives the corresponding German word for most English technical words (and vice versa) met with in the cement industry.

Fabrication et Utilisation des Liauts Hydrauliques. By M. Papadakis and M. Venaut (Paris: published by the authors. Second edition. 1966. Price: 65 francs.)—This book is intended for manufacturers and users of cement. Modern methods of manufacture are described in sufficient detail to constitute a reference book for chemists, engineers and superintendents in the cement industry. Users of cement are given practical advice and useful information about the choice of cements and the making of concrete.

Testing Equipment for Concrete, Cement, Aggregates and Plaster. (Caplin Engineering Co., Ltd.)—Section 2 of this brochure gives particulars of the H. F. Vibrator for making cubes for cement tests in accordance with the various British Standards, Le Chatelier moulds and Vicat apparatus.

The Sir George Earle Trophy.

THE British Non-ferrous Metals Federation has won the Sir George Earle Trophy which is awarded annually by The Royal Society for the Prevention of Accidents. The Federation has been awarded the trophy in recognition of the work “performed since 1956 on behalf of the industry, both nationally and internationally, not only by fully exploiting well-established safety techniques, but also through a system of works visits as part of a general advisory service to its member companies. Furthermore, it has undertaken and continues to carry out a series of specialist studies in collaboration with Her Majesty’s Factory Inspectorate and with other organizations to the advantage of industry as a whole.”

A certificate of commendation has been awarded to Messrs. Joseph Lucas Ltd., the outstanding safety record of which firm made the task of choosing this year’s Trophy winner difficult.

solve your dust collection problems

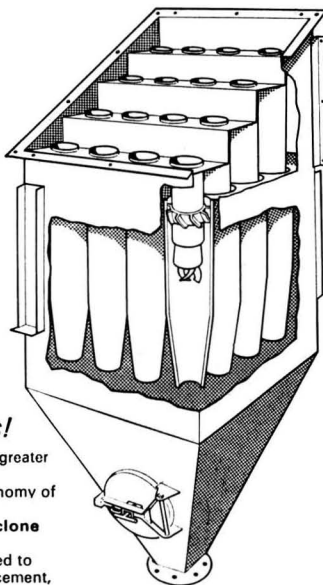
with the Multiclone[®] Dust Collector

—proved in over 4,000 installations!

Multiclone, with its small diameter multi-tube design, means greater compactness, better adaptability, higher efficiency, and less maintenance. In every industry, the **Multiclone** offers the economy of unit construction with the adaptability of custom-built design. Long and narrow . . . square . . . short and wide . . . the **Multiclone** can be made to fit YOUR installation requirements.

APPLICATIONS: The **Multiclone** has been successfully applied to dust collection problems in many industries, including power, cement, chemical, coal and rock products.

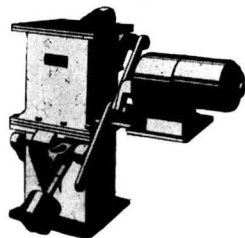
[®] *Multiclone is a registered trade mark*



with Western Precipitation Dust Valves

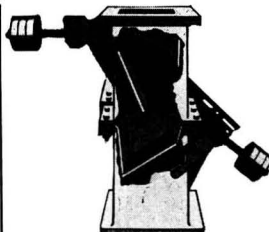
—the best you can buy!

These valves all operate efficiently at temperatures up to 750°F and are available in six, eight and ten inch sizes.



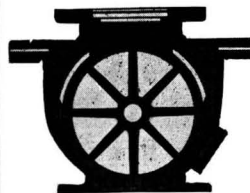
**THE TYPE R-1
MOTORIZED TIPPING
VALVE**

. . . positive time cycle motorized operation; gravity free-flow flushing features; gravity return assuring positive valve seating without pressure closure that guarantees non-jamming.



**THE GRAVITY OPERATED
TIPPING VALVE**

. . . ideal for sealing dust collector hoppers operating under negative pressure (0-6 ins. W.G.) when handling dry free-flowing material.



**THE FLOATING SEAL
DUST VALVE**

. . . for operation when handling abrasive materials particularly at high temperature.

Western Precipitation, the world leaders in dust control, are manufacturers of cottrell electrical precipitators, mechanical dust collectors, gas scrubbers, high temperature bag filters and dust valves. Write for more information about any of the above products to:



WESTERN PRECIPITATION

division of Joy Trading Corporation, 7 Harley Street, London W.1.
Tel: Langham (01-580) 7711. Telex: 23704. Cables: Joyloader London.

W.P.6



Consett

ROTACON Bricks

THE Hot Zone Lining for ROTARY CEMENT KILNS!

Specially developed for Portland Cement Kilns by Consett Iron Co. Ltd. ROTACON possesses all the important characteristics necessary in a basic liner brick. ROTACON bricks build up a sound coating rapidly and withstand kiln shut-downs without spalling. They are not subject to chemical attack at high operating temperatures and will not disintegrate from thermal contraction. *The ideal basic lining for the production of Portland Cement.*

**ROTACON BRICKS SAVE MONEY
BY INCREASED KILN AVAILABILITY**



CONSETT IRON CO. LTD.
CONSETT · COUNTY DURHAM

Telephone: Consett 3411 Telex: 53172



Reactions of Tobermorite Gel

AN article entitled "Reactions of Tobermorite Gel with Aluminates, Ferrites, and Sulfates," by L. E. COPELAND, E. BODOR, T. N. CHANG and C. H. WEISE, all of the Basic Research Section of the Research and Development Laboratories of the Portland Cement Association (U.S.A.), was published in the "Journal of the P.C.A." for January 1967.

The conclusions drawn by the authors resulting from their investigations on the reactions of tobermorite gel with aluminates, ferrites and sulphates are that such reactions are consistent with the requirements for substitution reactions.

Aluminium, iron and the sulphur of sulphate ions will substitute for silicon in tobermorite gel. Aluminium and iron will also substitute for calcium. The maximum amount of substitution that occurs corresponds to approximately one atom of substitute to six atoms of silicon.

Substitution will occur directly into the tobermorite gel, and also during the formation of the gel if the substitute is present. It occurs in hardened pastes as well as in slurries.

In the case of sulphate ion, charge balance is maintained by the replacement of two hydroxyl ions by an oxygen ion. When aluminium substitutes for silicon, charge balance is maintained by the introduction of a proton to change one of the unshared oxygens of the tetrahedron to hydroxyl. Two Fe^{3+} substitute for 1Ca^{2+} and 1Si^{4+} simultaneously, thus maintaining charge balance. Aluminium substitutes for calcium in the ratio of 2Al^{3+} to 3Ca^{2+} , to balance the charge.

Changes in the morphology of the gel and apparent structure of hardened pastes accompany the substitution reactions.

That one substitute in a gel can be displaced by another is shown by the reaction of sulphate ion with aluminium-substituted gel to form calcium sulphoaluminate and sulphate-substituted gel; the converse reaction also occurs.

The Cement Industry Abroad

Malaysia—The Associated Portland Cement Manufacturers Ltd., announce that its subsidiary Malayan Cement Ltd., has concluded an agreement with Pan Malaysia Cement Works Ltd., Ipoh. This will result in the formation of a new company with a value of over £7,000,000 and called Associated Pan Malaysia Cement Ltd., which will be jointly owned on a fifty-fifty basis. This Company will acquire the manufacturing plants of Malayan Cement Ltd., near Kuala Lumpur, and of Pan Malaysia Cement Works Ltd., in Northern Malaya and Singapore. The management of the joint enterprise will be carried out by Malayan Cement Ltd., subject to a joint board of directors. A.P.C.M. Ltd., has undertaken to act as the technical managers, and it is confidently expected that substantial benefits in economies and increased efficiency will accrue from the merger. The combined annual productive capacity of cement under Blue Circle management in Malaysia will, after the merger, be over 700,000 tons, which is substantially more than half the total production in Malaysia and Singapore combined.

The Cement Industry Abroad (*continued*).

South Africa.—White's S.A. Portland-cement Co. Ltd., a subsidiary of The Associated Portland Cement Manufacturers Ltd., has placed an order for the extension of the Lichtenburg works, which is situated at an altitude of some 1,500 m. in the Transvaal, 240 km. west of Johannesburg. The works is at present equipped with three rotary kilns operating on the wet-process. The dry process is to be adopted for the extension, as by so doing it is expected that the heat consumption will be reduced by some 50 per cent.

The principal plant in the extension is a Humboldt rotary kiln of 3·8 m. diameter and 54 m. long, and fitted with a preheater. The annual productive capacity will be 250,000 tonnes which is nearly twice the capacity achieved so far by the wet-process. The installation also includes the raw-material combined grinding and drying plant, the raw mix homogenizing and storage silos, the clinker cooler and the dust-collecting plant which incorporates electrostatic precipitators. All of this plant is being supplied by Klöckner-Humboldt-Deutz A.G., which firm is also supplying the complete electrical equipment, the measuring and control apparatus the structural steelwork for the buildings, and the silos. Most of the equipment is being made in South Africa. It is expected that the new works will be started up in Spring 1968.

It is reported that cement production in South Africa in 1966 amounted to 4,000,000 tons which was an increase of 119,000 tons compared with 1965. **New Zealand.**—It was reported in a recent number of the "Tarakohe & Waitomo News," that the installation of the new plant is proceeding well and that the alteration to kiln No. 2 is completed. The No. 2 Lepol grate, Fuller cooler and auxiliary equipment was also complete and, by now, the installation of the electrostatic precipitators on the exhaust of kiln No. 2, and the bleed-off for alkali removal, and the cascade blending silo should all have been completed. The foundations for No. 5 cement mill were commenced early this year.

U.S.A. and Canada.—In the early stages of the efforts made by Lafarge Aluminous Cement Co. Ltd., to enter the highly competitive Canadian and U.S.A. markets, selling companies were set up and, for reasons of currency restrictions, were largely financed locally. Now that these concerns are firmly established, particularly in Canada, the entire activities of both distributing companies have been acquired under the names of Ciment Fondu Lafarge (Canada) 1966 Ltd., Montreal, and Ciment Fondu Lafarge Corporation, New York.

MISCELLANEOUS ADVERTISEMENTS**WANTED**

HOPPERS, Weighing & Bagging plant to weigh 56-lb. bags, to be used for powder type material, similar to flour. **Box 2020, CEMENT & LIME MANUFACTURE, Concrete Publications Ltd., 60 Buckingham Gate, London, S.W.1.**

**SCALE OF CHARGES
FOR
MISCELLANEOUS
ADVERTISEMENTS**

5s. per line
(average seven words per line).

For use of Box Number,
allow two lines.

Minimum £1
for not more than four lines.

DISPLAYED ADVERTISEMENTS

45s. per single column inch.

Advertisements must reach the offices of this journal at 60 Buckingham Gate, London, S.W.1, by the 1st of the month of publication.



**MAXIMUM PROFITABILITY—
TROUBLE-FREE OPERATION**

We are specialists in the design and construction of high-efficiency Lime Hydrating Plants. Sturtevant Plants continuously produce hydrate of guaranteed quality, are fully automatic in operation and have full dust suppression. Only two operatives are required, including bagging-off. Sturtevant Plants have in-built safeguards against breakdown, and accurately classify hydrate by air separators. They are in use all over the world.

Write or telephone for full details.

STURTEVANT

STURTEVANT ENGINEERING CO. LTD.
ENGINEERED PROJECTS DIVISION

Sturtevant House, Highgate Hill, London, N.19.
Telephone: 01-272 0233



Designers and Manufacturers of plant for Drying, Pneumatic Conveying, Gas Cleaning, Lime Hydrating, Vacuum Cleaning, Batching and Blending, Formulation of Insecticides and Materials Classification.

Autoclave Expansion of Portland Cement

Designed for determination of soundness of cement in the form of samples 1" square x 10" long when subjected to internal steam pressure of 295 p.s.i. for a period of 3 hours, the apparatus consists of electrically heated mild steel vessel with detachable cover, combined water bath and frame holder for samples, air release valve, pressure control switch, safety valve and pressure gauge.


Leaflet and prices from:

**CHAS. W. COOK
& SONS LTD.,**

97, Walsall Road,
Birmingham 22b, England.

Tel: 021 BIR 4223

Cables: ABNORPRESS



**Complete Plants
for manufacturing**

**ASBESTOS CEMENT
PIPES and SHEETS..**

PRESSURE PIPES

DOWN PIPES

CORRUGATED

AND FLAT

SHEETS



ASBESTOS CEMENT ENGINEERING CO.
AEULESTRASSE 772, YADUZ - LIECHTENSTEIN
Switzerland . P.O. Box 34,722.

... Production, delivery, service and (if required) finance for complete installations, large or small.

Installations complètes pour la fabrication des tuyaux haute et basse pression et des plaques planes et ondulées en amiantement.

Production, livraison, service et (si désiré) financement des installations complètes grandes ou petites.

AGENTS REQUIRED

Editorial appointments

Concrete Publications Ltd

publishers of CONCRETE and other journals and books related to the cement and concrete industries, have two vacancies on the Editorial Staff.

SENIOR EDITORIAL ASSISTANT

Applicants should have had a training in structural engineering, but previous editorial experience is not necessary. The ability to write plain English is, however, essential and the ability to prepare engineering drawings is desirable.

The work in this position would include obtaining information for, and preparing articles on the design and construction of concrete structures, and on the precast concrete and cement industries, and would necessitate visiting meetings, offices, sites and works for this purpose. The duties also include liaison with the Concrete Society and other bodies, and some general office work related to the production of technical journals and books. The holder of this position would work directly under the Technical Editor.

EDITORIAL ASSISTANT

The duties in this position would be mainly the performance of the general work of an editorial office, including correspondence, but would also include visiting and reporting meetings and the like. Gaining experience of preparing articles and other productive work would be encouraged.

For this position, the ability to type is essential and some previous editorial experience and knowledge of shorthand would be an advantage. The position would be suitable for a young man or lady.

Both positions offer progressive careers and an interesting and varied life. It would be an added advantage if applicants for either of the positions have a flair for or could acquire the knowledge of the 'art lay-out' of technical magazines.

The positions are permanent and pensionable. A bonus scheme is in operation and luncheon club and sports facilities are available. The working conditions in an office near Victoria Station are good and include a five-days' week and generous holidays.

Applicants should write in the first instance, giving particulars of their education, experience and range of salary expected to

MANAGING EDITOR

CONCRETE PUBLICATIONS LTD

60 BUCKINGHAM GATE, LONDON SW1

PLANET HUNWICK ALITE

a complete range of lining blocks for cement & lime kilns

send for full details of these grades

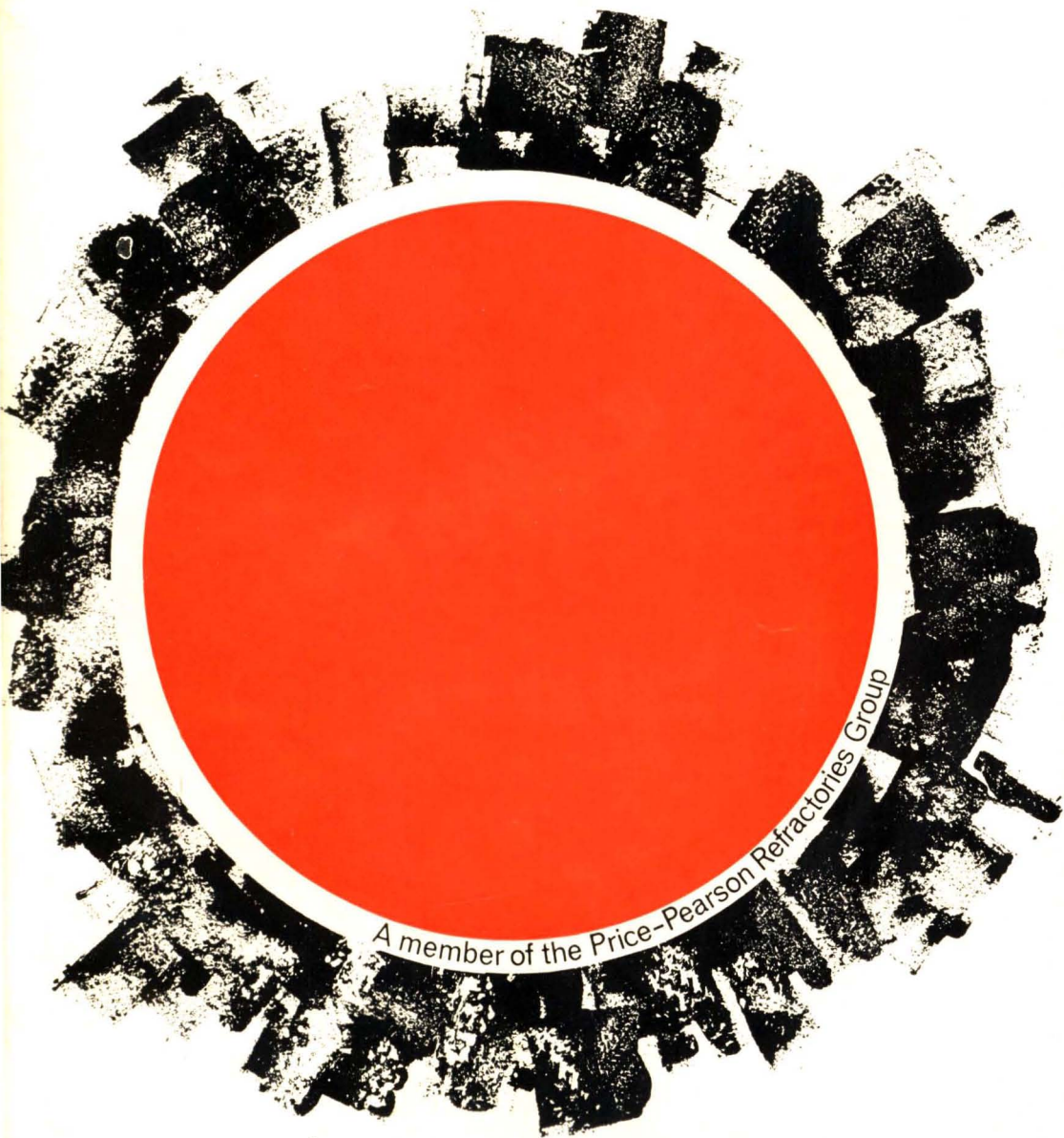
HUNWICK magnesite-chrome

ALITE high alumina

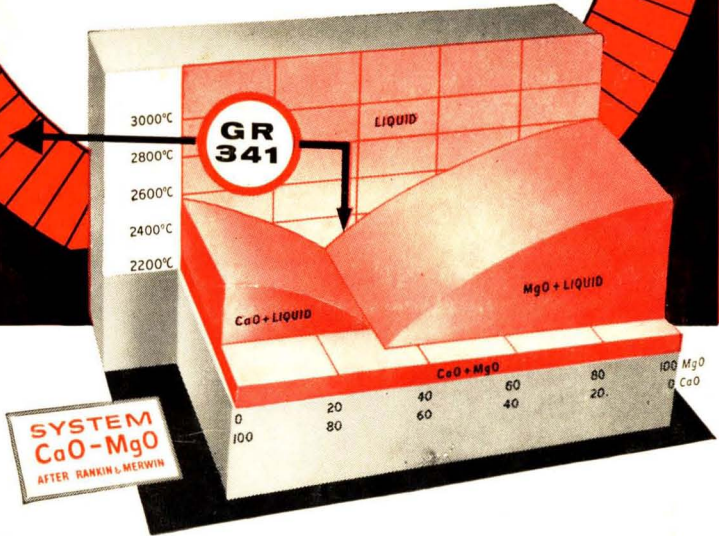
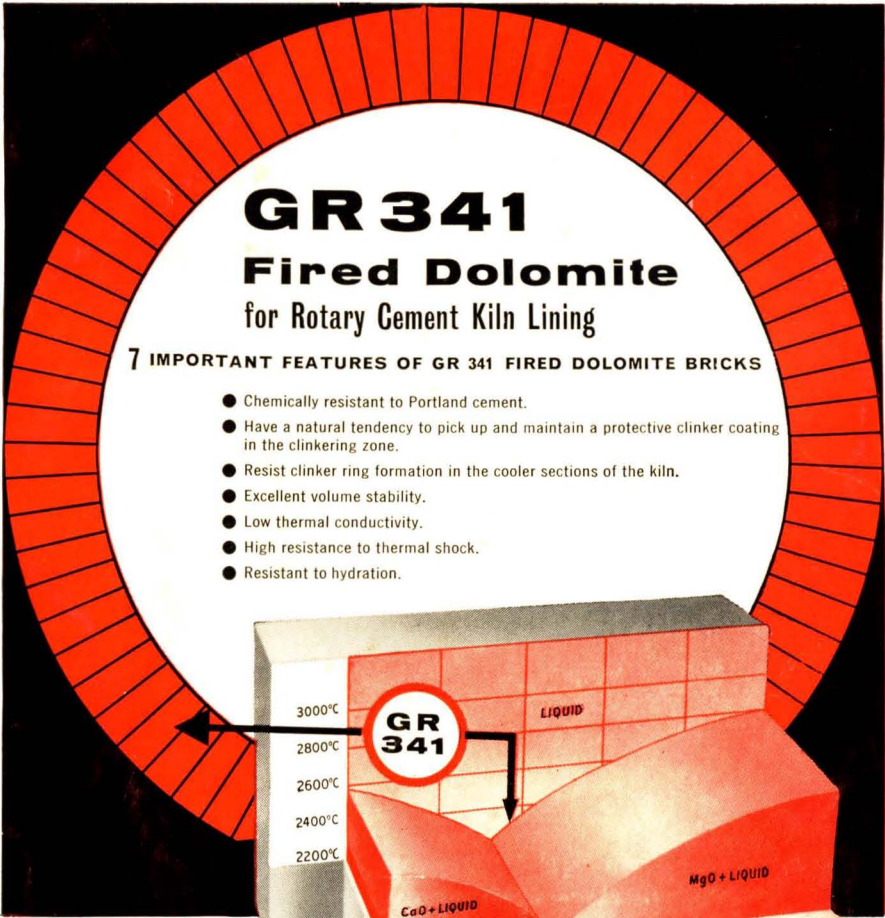
PLANET abrasion resistant



PRICE-PEARSON (SALES) LIMITED STOURBRIDGE WORCS.



A member of the Price-Pearson Refractories Group



SYSTEM
CaO-MgO
 AFTER RANKIN & MERWIN



Full particulars from:

GENERAL REFRACTORIES LTD

GENEFAX HOUSE · SHEFFIELD 10 · TEL: SHEFFIELD 31113

507

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.

18 N.A. 2510