THE Chemical Age

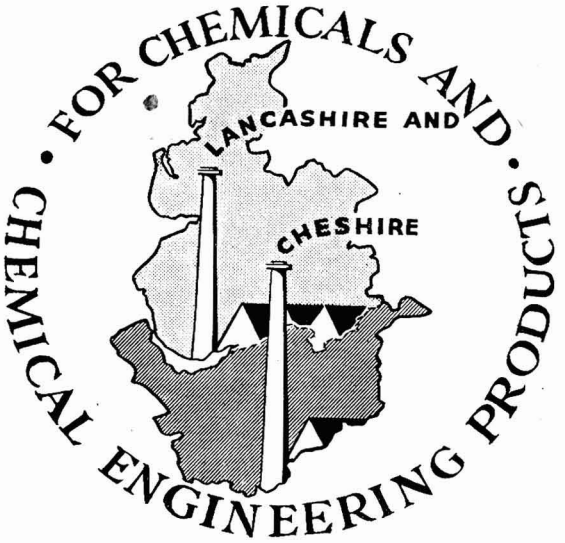
VOL. LXXIV 24 MARCH 1956 No. 1915

LANCASHIRE

and

CHESHIRE

REVIEW



When foresight is supported by diligence the result is always progress. The counties of Lancashire and Cheshire have long been noted for their progressiveness and the prominent place these counties hold in the chemical and chemical engineering industries is the result of many years of determined—and often inspired—pioneering. In the following pages we review the part which Lancashire and Cheshire have played, and are still playing, in the development of the two great industries served by

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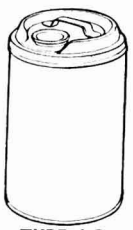

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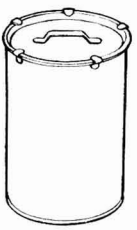

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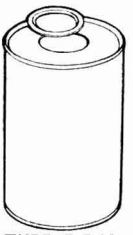

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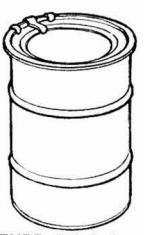

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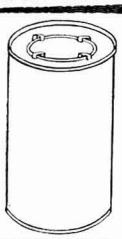

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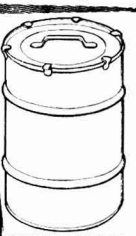

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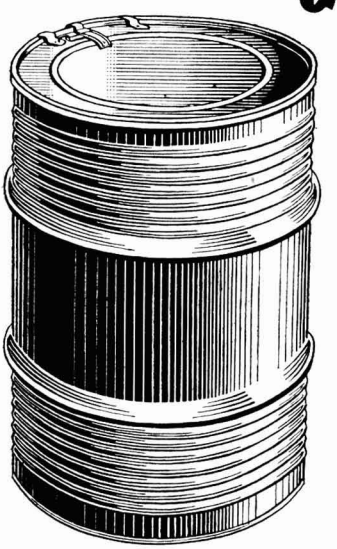

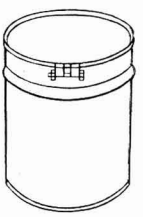

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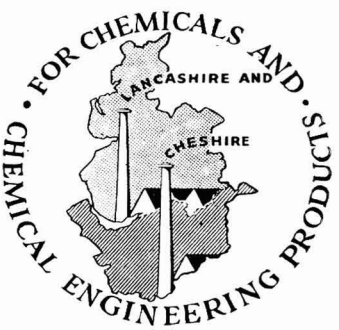

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'As Good an Education . . .'

AN announcement in our last issue (p. 638) advised readers of a forthcoming debate at Senate House, University of London, on the formidable thesis, 'that science can provide as good an education as the humanities.' The debate will not be held until 20 April, and in discussing it now we may be accused of thunder-stealing. Yet it is an ancient thesis, one of controversy's hardiest of annuals—and it was dealt with, but with an important difference, in a recent issue of *Nature* (1956, **177,** 443). If by chance we anticipate any of the arguments to be elaborated next month in WC1, we must ask for the benefit of the doubt in any verdict of censure, and for two reasons (1) that the recent White Paper on Technical Education has given this familiar subject topical red-heat, and (2) we are not so much stealing thunder as raising curtains.

The 'important difference' in *Nature*'s recent comments on this theme is the distinction made between science and technology. Here certainly we are open to a charge of theft, but we are in such powerful agreement with *Nature* on this matter that we must risk the accusation of plagiarism. 'As a basis for humanism, science has one insurmountable disqualification. It is of the essence of the scientific method that the human element must be eliminated. Science does not dispense with values, but it does eliminate the variety of human responses to values. . . . The whole procedure of the scientist assumes that science has to be dehumanized. Scientific humanism should therefore be ruled out as an alternative to classical humanism.' Those who on 20 April propose the motion of the debate must find this forthright comment in a notable scientific journal awkward hurdling to pass. It is the very substance of the case against the sciences as subjects of liberal education. But, as *Nature* continues: 'There is another alternative which could be called technological humanism.' No scientist who has moved from research to industry, or simply from pure to applied research, can deny that this difference is important, that the drive to eliminate the human factor in the one field is matched by an imperative necessity to assess and allow for many human factors in the other. In a liberal sense the education of science graduates has often not begun until they have been flung into an industrial works.

Those who will oppose the motion of the forthcoming debate cannot expect to establish their case merely by showing that science has severe limitations as a basis of liberal education. The older 'humanities'—or *literae humaniores* to use *Nature*'s phrase—are today separated

from modern life by a huge gulf that widens each year. Elderly schoolmasters and tutors who still preach the cause of the classics are themselves in most cases anachronisms. In their own secluded worlds they may be greatly respected as 'characters' but in terms of life today and all the inescapable needs of mid-twentieth century society theirs is a message from the past, a museum-piece to be admired but labelled 'not for use.' Indeed, it should be far from difficult for the proposing side of the motion to prove that scientific subjects can give as good an education. The comparison is unflattering.

Where the recent leader in *Nature* has made so useful a contribution to contemporary thought is in pointing out that technological subjects can provide a far better basis for liberal education. Technology 'concerns itself with the creative acts of man.' Its broad study involves 'many of the ingredients which have for centuries been associated with a liberal education . . . and at the same time it could enter the bloodstream of modern society, which the old humanism fails to do.' It is extraordinary that this point has been so little perceived before. For generations and certainly until the 1920-30 period our great academic centres conceded expansive positions to the sciences but opposed or deplored the opening of doors to technology. Yet it is these subjects they have so fiercely rejected or scorned that in fact contain far more ground that is commonland for both the sciences and the arts.

Nature suggests a reason why this almost obvious thesis has been neglected hitherto. Until recently technology has been a 'disruptive force', bringing great upheavals to human society. A liberal education should be an instrument of coherence. Here we cannot continue in agreement. If a liberal education is to be hall-marked for ability to create coherence in society, it must equally be black-marked for opposition to change. It is because the *literae humaniores* deal with past centuries that the education they used to provide has largely failed in our own time—in the face of rapid change the products of earlier education via the humanities have seldom been able to give the leadership that should spring from any country's top-level system of education. Yet there has always been one exception—the medical profession. None of the ivory-towered scorn for technology has ever been directed towards doctors, and there is no readier example of humanistic technology than medicine.

The anti-humanistic precision of pure science (which incidentally is an ideal pursued but rarely caught) is beset by variations in technologies and medicine, and successful practitioners are those who can handle these variations, particularly in distinguishing between the significant and the unimportant. Nothing perhaps demonstrates this point about industrial technological subjects more than the rapidly rising introduction of methods of control by statistical science. The typical bell-shaped curve or distribution diagram for frequency distribution in property deviations of a manufactured product may seem mathematical, but it is as valid a piece of humanistic thought as the study of Greek or Roman philosophers in their original language. The mental outlook derived from studying the great classical works of former civilisations was once regarded as important (though never essential as many exceptions showed) for running banks or organizing armies; today the wisdom of the ancient past is displaced in both commerce and defence by statistical studies of variable factors and their effects. To regret this is picturesque but hardly realistic.

The recent White Paper (see THE CHEMICAL AGE, 1956, **74,** 581) made it clear that education in the technological subjects will be increasingly separated from the universities, and will develop in centres with their own rights and with steadily increased status. Science *per se* will continue to rub shoulders with the arts in the universities. If *Nature*, as we think, is right, the rear-guard of academic education in this country has lost two battles, not one. The proper recognition of technological education has not been prevented—and the universities have lost the benefits of being invaded by the twentieth century's most humanistic subjects.

Notes & Comments

Cloud Productivity

INFORMATION about Britain's official rain-making experiments has recently been given in the Ministry of Agriculture's *Journal* (1956, **62,** 512). Holiday-makers might like to note that at present the experiments are centred on Salisbury Plain. However, it is suggested that there has already been a good deal of public misunderstanding about the experiments of 1955, and that in any case rain probably cannot be made to fall when it would not otherwise fall. The objective seems limited to the popular industrial theme—extracting more productivity, in this case from passing cloud belts.

Minute Crystals

SOME of the information made available is of chemical interest. The GEC (American) method of projecting minute crystals of silver iodide is being employed. Five ground-generators for silver iodide projection are used, a solution of silver iodide in acetone being fed into a blow-lamp flame at a controlled rate; each generator is said to release 20,000,000,000,000 silver iodide crystals per second. This seems an incredible figure, and it seems even more incredible when it is also stated that an experiment, presumably involving all five of the generators, consumes about six pounds of silver iodide. It is also said that a single experiment may last 10 hours, and the generators are started an hour or two before a cloud belt arrives and not stopped until two hours after it has passed. Mathematically-minded readers are invited to work out the number of crystals produced from six pounds if for only six hours, not 10, five generators are sending up 20 million million crystals per second. We make it 21,600,000 million million crystals. Divide 96 ounces by this figure and the average weight of one of these crystals is obtained; say, without being meticulous, 0.000000000000000005 ounces (17 noughts after the decimal point). This seems very tiny. We would like to have made some comparisons with the weight of silver iodide molecules, but perhaps subdivision has not proceeded as finely as that. However, the theory is that if a crystal of silver iodide, however minute, enters a super-cooled cloud, it will cause ice crystals to form. Also, it is unlikely for air movements to take the iodide crystals up to the necessary height until they have travelled for about 50 miles.

Why Bother ?

FRANKLY we are inclined to believe that the natural arrangements in this country for rainfall require little supplementation in most years and particularly in most summers and autumns, and we are more doubtful than we were before about the effectiveness of silver iodide particles. The World Meteorological Organization has said that results so far produced 'could be termed, at best, inconclusive'.

Man-Power

THERE is the clearest ring of reality in an American industrial scientist's recommendations for alleviating the shortage of technical man-power (*Chemical & Engineering News*, 1956, **34,** 938). Having personally assessed the shortage for the US at 500,000 by 1975, he puts forward these proposals to industry and teaching. Industry should make more use of the reserve of scientific man-power that is above 40 years of age. This means revising conditions of employee-intake and altering retirement ages so that continued work may be voluntary. Training courses inside industry for currently employed scientists aimed at enabling them to handle more work, presumably by better programme-planning; surveys of all technical production processes to see whether in fact some technical man-power can be released by introducing automatic control devices; these are two methods by which fuller and better use could be made of the man-power already available. He also advocates a bonus-system

for patentable discoveries, but here most of us would hope that all reputable firms are enlightened enough to offer this kind of incentive to creative talents.

Science Courses Too Hard

AS for teaching, methods should be revised to reduce the feeling by students that science courses have become too hard. He believes that scientists from industry could help here. It is the teaching outlook that tends to overstress difficulties in learning, and lectures by men from industry could put the difficulties into a better perspective. For science teachers also, retirement ages should be raised to allow voluntary continuation. In all areas regional committees of technical companies should co-operate with educational authorities in designing science curricula at schools. Companies should provide consultative and other scientific work for science teachers during the summer vacations.

Obduracy

LONG-ESTABLISHED customs are always obdurate in the face of reform. Both in the United States and Britain, it seems likely that industry —with a smaller sense of custom or habit—can be more flexible than education in plans to alleviate the scientist shortage. Unfortunately, the fullest contribution by industry cannot be more than a minor one; the larger part of the solution lies with the schools and the teaching profession, with youth's reaction to science and with educational authorities. But it is time for industry's effort in these directions to be forthright. For two reasons such effort will have a greater value than is factually apparent—it will keep public attention focused upon the main problem and its seriousness, and it will act as a pace-making influence upon educational effort. This is perhaps a stronger argument here than in the US.

IN THE EDITOR'S POST

Water Fluoridation

SIR,—Mr. P. W. G. Rayner, in your issue of 10 March, justly claims novelty for his reason for objecting to fluoridation, *viz.* that it may do good to his teeth despite the fact that he may not want to have good done to them.

I doubt if it is logically possible not to want what one believes to be good for oneself, but if Mr. Rayner is capable of such a paradoxical attitude there is still some consolation for him; from the facts, rather than from the opinions and arguments expressed in his letter, one must infer that he is past the age when the last (so-called 'wisdom') teeth normally erupt, and there is therefore no need for him to fear that fluoridation will now do his teeth much good. However he can make quite sure by not drinking water from the public supply after it is fluoridated. (He ought to avoid tea also since it contains fluorine and may be beneficial).

As a resident of Luton he perhaps knows that some of the local water comes from Greensand beds and contains twice as much fluorine as that from the chalk, but is mixed with the latter before distribution; this constitutes, in fact, though not in intention, the addition of fluorine (as a solution of fluorides) to drinking water, and differs only in degree from the same process as carried out by a fluoridation plant. The presence of this fluorine is an accident, but any effect it may have is the same as if it were deliberately added. If Mr. Rayner thought that the concentration, in the water he now drinks, was sufficient to do his teeth any good, would he object to that?

If one objects to one constituent of the supply as being beneficial to teeth one might as well object to any other constituent as benefiting other parts of the body and nothing would then remain to be pumped but useless solid and gaseous impurities. Would this be what the Water Act means by 'wholesome water' or would it even satisfy Mr. Rayner? It would, of course, have the same merit as his argument, that it would not hold water at all.

Yours etc.,

R. B. D. STOCKER.

London.

Lancashire & Cheshire

The Home of the British Chemical Industry

BECAUSE of the vast size of Wilton and Billingham and the rapid growth of other new areas such as Grangemouth it is sometimes not fully realised that the Merseyside is still the centre of the British chemical industry. Everyone knows that the heavy chemicals are concentrated there but it is not usually realised just how much of this country's total output of chemical products comes from the North West. The older members of the trade have not forgotten, but there are others who have read so much about the growth of the newer centres that they tend to believe that other counties have become more important than Cheshire and Lancashire. This is certainly not the case. In terms of either bulk or value of output, or in terms of numbers employed, the two counties which hem the Mersey are still the greatest chemicals producing area in the world. Nowhere else can chemical plants of such a wide diversity be so thickly concentrated. Furthermore, no other area of similar size has played such an important part in the development of what is probably the world's most rapidly growing industry. Because we feel that some of the younger areas have stolen their thunder only because of novelty or newness we are devoting the following pages to a brief outline of the early history of the chemical and chemical engineering industries in Lancashire and Cheshire and brief descriptions of a few of the firms which operate in that area.

Some Early History . . .

DURING the most active period of Sir William Perkin's life, Lancashire and Cheshire were entering a tumultuous and exciting stage, for the manufacture of chemicals as an industry was just beginning. It was, as it were, a new 'Industrial Revolution.' Perkin did not go to the Merseyside to win his fame and fortune but countless other brilliant young men did and they came not only from all corners of the British Isles but from several European countries as well. Approximately 100 years ago Lancashire and Cheshire attracted the world's chemists and engineers just as Paris still attracts the ambitious artist. It was recognized that it was the place to go if one wished to make rapid progress.

Eight years after Perkin's discovery of Mauveine there arrived in Manchester from the Continent a 19 year old youth, Ivan Levinstein, who was destined to play a leading role in the development of the dyestuffs industry. A year after his arrival Levinstein had established a colour works at Blackley and this firm was soon doing far more research work than any firm in England. The dyestuffs industry was the foundation of the organic chemical industry and industrial research started with it.

England was then, as Dr. Herbert Levinstein has often explained, the Eldorado for German chemists. Heinrich Caro, the most brilliant of all inventors in the industry, was at Roberts, Dale & Co., in Manchester in

1859 and so was Martius, the joint creator of Act. Ges für Anilin-Fabrik. In 1860 Roberts, Dale & Co. started to make Mauveine and in 1869 Caro took out an English patent for the production of synthetic alizarin. In 1876 Dr. Charles Dreyfus, who had come to Manchester to be a chemist with a printing firm, started the Clayton Aniline Co., the first to introduce into this country the Mannheim process for manufacturing oleum from pyrites.

Widnes the Centre

Widnes was the centre of the chemical industry at that time in this country and prior to the 1890 merger when the United Alkali was formed with a share capital of £6,000,000, no secret could be kept. Information filtered freely through a constant exchange of workers and the town rustled with intrigue. Factories were built literally in each other's smoke and leaned towards each other like eavesdroppers, while men with patents and processes that were to make chemical history passed in and out of the factories trying to sell their discoveries and inventions.

The history of the chemical industry in Lancashire is a romantic story, and Widnes is the heart of it. To the man-in-the-street chemicals symbolize stinks and uninspired, dry-as-dust routines, yet Widnes can offer the film script writer or playwright some of the most dramatic stories of this country's history.

In his fine book 'A History of the Chemical Industry in Widnes' published by the General Chemicals Division of ICI in 1950, Dr. D. W. F. Hardie has recorded the Widnes story and succeeded in breathing life into the past. He makes one feel present when the young German, Ludwig Mond, struggling with his broken English, tried to sell to John Hutchinson, the principal founder of the Widnes chemical industry, his process for recovering sulphur from alkali waste. One can almost hear John Hutchinson with smug assurance answering Lord Stanley of Alderley who was questioning him about noxious vapours arising from his alkali works in Widnes in 1862 before a select committee in the House of Lords.

But to write even briefly of the men who developed Widnes from a hamlet of less than 1,000 people to an industrial and lead-chemical centre of 48,000 people in just over a century would require volumes. The list is formidable: the Hutchinsons, the Muspratts, McClellan, Gossage, Holbrook Gaskell, Henry Deacon, the Monds, Hargreaves, John Brock, Hurter and Sir Holbrook Gaskell and a host of others. Today, next to Manchester, Widnes employs the largest number of people in chemicals and dyes in Lancashire, almost 8,000.

Although Widnes was the hive of Lancashire's growing chemical industry, St. Helens also began to develop. In fact the first chemical works was established there in 1819 by John Bethune on Greenbank. It was a copperas works, probably making vitriol. But it was in 1828 that the destiny of St. Helens began with the arrival of two Irishmen, Josias Gamble and James Muspratt who later introduced the Leblanc process for the manufacture of alkali into this country and thus revolutionized the British chemical industry.

Two years after their arrival in St. Helens Gamble and Muspratt parted and Gamble bought a plant containing five sulphuric acid chambers from a blind solicitor named Rawlinson. To raise the £400 capital he needed, Gamble was forced to take the Crosfield brothers of Warrington in partnership. The soap making Crosfields never struck a very amicable partnership with Gamble who fell out with Joseph Crosfield in 1836 when Crosfield arranged to erect Gossage condensing towers without first getting Gamble's approval. For nine years Gamble smouldered over this before breaking away from the Crosfields to run an alum works at Gerards Bridge.

Intrigues at St. Helens

If the foundation of a chemical industry in St. Helens was less spectacular than in Widnes, the intrigues and fervour were no less. Gamble in the light of history seemed to have been a stormy petrel and in 1846 was involved in a law suit with Andrew Kurtz. At the time Kurtz had only one patent, one relating to sulphuric acid furnaces, and it was this which involved him with Gamble. He died in his sleep just before the court's verdict in his favour was announced. His son, Andrew Kurtz who was at one time a fellow student with John Hutchinson in a Paris technical school, took over the alkali works and amassed over £250,000 before he died in 1890.

James Muspratt who had served an apprenticeship with a Dublin apothecary, was an adventurer. Failing to gain a commission in the British Army then fighting

Napoleon in the Peninsula War he followed the Army, walking from Madrid to Lisbon, where to evade capture by the French he enlisted as a midshipman on a British warship. When the ship docked at Swansea, Muspratt, disillusioned with service life, deserted and returned to Dublin. A year after he had broken with Gamble, Muspratt began manufacturing prussiate of potash at 289 Vauxhall Road, Liverpool; he was then 29. The next year he was producing soda by the Leblanc process.

In the year that Muspratt began this process the Salt Tax was repealed. First imposed in 1694 it had steadily increased and at the turn of the 18th century it was 5s on the bushel. It was a tax successive Government's feared to remove because of the loss of revenue it would involve. Between 1791 and 1792 more than 4,500,000 bushels were exported from Liverpool, and by the end of the 18th century the tax had risen to 15s a bushel.

The Salt Tax had strangled the growth of the soda industry and committed it to a long, tedious expansion, but its repeal and the start of Muspratt's Vauxhall works were co-incidental. Muspratt had revealed dogged determination to open a market for manufactured alkali, but the repeal of the Salt Tax was only one obstruction removed. The others were the vested interests of the barilla and kelp trades and the soap makers' reluctance to accept soda in place of potash. To establish a market Muspratt was forced to give away his black ash and actually had to supervise its use in soap making.

Muspratt Created Nuisance

But Muspratt trod no primrose path and in 1828 he was cited as being a public nuisance and he was fined 1s on the understanding he would put things right. Ten years afterwards bills and posters worked up a campaign against him and he was prosecuted by the Crown.

Dr. Thompson, professor of chemistry in the University of Glasgow, appeared as his witness in a three-day hearing in Liverpool. The prosecution witnesses gave a formidable list of charges: 'tarnished doorknockers', 'dead trees', 'damaged cabbages in Everton' and the 'lowering of land values'. Against these charges the defence was unprepared and some of Muspratt's previous actions bounced back and cost him the case. He had been operating an alkali plant near St. Helens for several years and because of damage caused by fumes he had been voluntarily paying compensation to local farmers.

A contemporary of Muspratt was William Gossage. Gossage, who had a passion for invention, began making alkali in Widnes in 1855. Although he was to make a fortune from soap his chief interest was in contemporary invention, and his Gossage towers for condensing acid fumes from the LeBlanc process were to be erected at almost every alkali factory in the world.

The Gossage Tower

At the time Muspratt's Vauxhall factory was inciting the local citizenry to condemn him as a public nuisance, Gossage was in the process of taking out a patent for his tower. About the same time Thomas Lutwyche's patent for absorbing hydrochloric acid was published. Gossage approached Muspratt and recommended his towers to him but Muspratt shared Lutwyche's opinion that 'water in the mass' was required to absorb the acid through a series of conducting pipes. He was to learn to his cost that 'Mr. Lutwyche's pipes and jars were not working efficiently'.

But in spite of hostile opposition the Lancashire chemical industry moved on to more solid foundations and with neighbouring Cheshire, whose bowels were clogged with salt which even today are estimated to contain 15,000,000,000 tons, expansion speeded up. The alkali industry with the repeal of the Salt Tax had gained a freedom and a new impetus. Years later, in 1888, the Salt Union was to revolutionize the salt industry and make Cheshire a stronger basic power behind the Lancashire chemical industry.

It was Lancashire, however, that attracted the men of ideas around the middle of the last century. Then the manufacture of solid caustic soda was a novelty, although it is believed that James Young, of petroleum fame, was producing it for his own use before 1852. Gamble, one time partner of Muspratt, was the first to make red liquor caustic soda on a large scale at St. Helens, but this was under a Gossage patent. The white variety had several pioneers, among them Dr. Pauli, of St. Helens, although credit for large-scale production goes to Roberts, Dale & Co., of Manchester, and Hutchinson & Co., of Widnes.

Although several prominent chemists were active in St. Helens, the town was to evolve as the centre of the glass industry, and today according to the latest Ministry of Labour figures the number of people employed in chemicals and dyes is only about 100. Synonymous with St. Helens is the Pilkington family who entered the glass industry in 1826.

Associated with the Pilkington brothers in their early days was Henry Deacon who was in charge of their glass research. Deacon's most important contribution to the chemical industry was the chlorine process he developed in collaboration with his chief chemist, Dr. Ferdinand Hurter, a Swiss who was to become the chief chemist of the United Alkali Co., one of the four original parties to the merger which created Imperial Chemical Industries Ltd.

It was Ferdinand Hurter who influenced the breakdown of negotiations between the United Alkali Co. and the Aluminium Co. which held the mercury cell patented by the American, Hamilton Young Castner, for manufacturing caustic soda and bleaching powder by an electrolytic process. Hurter saw no commercial value in it and his decision affected the chemical industry in Widnes for many years, for had he favoured it the Leblanc process would have become obsolete a long time before it did.

When negotiations failed the Aluminium Co. entered into an agreement in 1884 with the Solvay Co. who held patent rights for a similar process to Castner's which had been patented by a Viennese Chemist, Carl Kellner. The following year the Castner-Kellner Co. was formed by the Aluminium Co. to operate at Weston Point, Runcorn, Cheshire.

Although intrigues and even threats were no doubt commonplace in those earlier days they at least tempered the industry with a strength which a passive acceptance might have weakened. There is the case of William Hesketh Lever, founder of the giant Unilever empire. The first Viscount Leverhulme became a soap manufacturer at Warrington in 1885 when he took over the premises of Winser & Co., a chemical company. Within a year output had gone up to 20 tons per week and in the following year output capacity had been increased to 450 tons per week. In 1889 the factory was moved to Port Sunlight and in the first full year of operation there 15,688 tons were turned out. But when Lever decided to produce his own own soda he ran into opposition. Brunner Mond, who by that time were exceedingly powerful, threatened to buy Crosfields and make soap if he encroached upon their domain.

A young man engaged on drawing up plans for Lever's proposed soda plant at Lymm was Mr. Norman Swindin, the founder and chairman of Nordac Ltd., chemical engineers of Uxbridge, Middlesex. Mr. Swindin, now aged 75, is a Yorkshireman who has given many lectures about the chemical industry in Lancashire.

In 1901 he went to work for George E. Davis whom he describes: 'He may not have been the first chemical engineer, but he was the first to make it a profession'. Davis worked with some of the great men of his time in Lancashire; Roscoe, Mond, Deacon, Hargreaves, Weldon, Glover, Chance and others.

It is said that the real beginning of the chemical industry dates from the Leblanc process for making soda. James Muspratt, by introducing this process into this country was the true founder of the British alkali industry. The plant was erected in Liverpool in 1823 but he was driven out of that city for discharging HCl into the air and with Josia Gamble built a soda works at St. Helens. Gossage invented the absorbing tower which added hydrochloric acid to the list of heavy chemicals and thus completed the foundations of the British heavy chemicals industry.

In 1884 John Brunner and Ludwig Mond bought their site at Winnington in Cheshire and next year made 838 tons of soda. The next year output was trebled and by 1894 capital was £1,500,000 and the business was established on a vast scale. They manufactured alkali by the ammonia-soda process and by this method could produce a purer product at a lower cost than the old Leblanc method. In 1926 Brunner, Mond & Co. Ltd. became one of the four main parties to the ICI merger.—T.A.B.

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So much for the past: let us now look at the grown baby. Following are brief descriptions of some of the plants and firms now operating in Lancashire and Cheshire.

ICI in Lancashire & Cheshire

Division Headquarters Factories

IMPERIAL CHEMICAL INDUSTRIES LTD. has widespread interests in Lancashire and Cheshire and these are not confined to the heavy chemicals industry traditionally associated with the area. Six of the company's divisions have their headquarters in the two counties, and others have factories there—including the Plastics, Billingham and Nobel divisions.

DYESTUFFS DIVISION

The Dyestuffs Division has its headquarters at Blackley, Manchester, where the administrative, research and technical service departments are centred. Of the division's nine factories, two are in Manchester. That at Blackley concentrates on dyestuffs, rubber chemicals, pigments and lakes. The other, at Trafford Park, makes penicillin in addition to dyestuffs and intermediate products. The largest division factory is at Huddersfield.

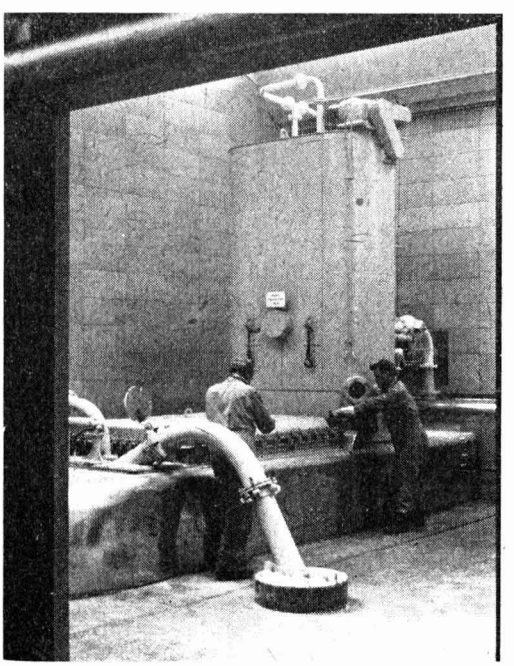
At Ellesmere Port, Cheshire, synthetic indigo is made, and the factory at Billingham (Co. Durham) is devoted to the manufacture of nylon polymer. The division also has several large manufacturing plants at Wilton Works, Yorkshire. Over 14,000 people are normally employed by the division, which makes more than 6,000 different products.

The division claims direct descent from the firm of Perkin & Son, founded in 1857 by W. H. Perkin (later Sir William Perkin), discoverer of the first synthetic dyestuff. In 1919 the inheritors of this business joined with British Dyes Ltd., to form the British Dyestuffs Corporation Ltd.—an amalgamation which made it possible for the British dyestuffs industry to offer effective competition to its much less diffuse counterparts in Germany and other countries. British Dyestuffs Corporation Ltd., was absorbed into the main ICI merger in 1926.

Dyes are the division's chief concern, but are only one aspect of the huge field of organic chemistry which the division's research workers are constantly exploring. As a result, its activities have gradually extended. Today, products include textile auxiliary products (non-coloured compounds for processing and finishing textiles); rubber chemicals needed in the manufacture of rubber products; synthetic resins for high-quality paints, lacquers and other surface coatings; nylon polymer; synthetic drugs and medicinal products, veterinary compounds, insecticides and agricultural chemicals. The textile industry takes 60 per cent of the division's output.

Such a diversity of interests places a heavy responsibility on the technical service departments. There are four of these, each adapted to the industries with which it is concerned. They have two general functions: to assess the value of new products, and to lay down the standard of quality that must be attained in the manufactured article. Consequently the service departments, in dealing with the research and manufacturing departments, act as representatives of the consumer. They also suggest and, where necessary, define in specific terms targets for research.

Biggest of all the service departments is the dyehouse, which acts as a general con-



Men at work on equipment designed for the grinding and blending of special products in one of ICI's Dyestuffs Division's factories

sultant to all industries using dyestuffs and pigments. It is divided into sections, each dealing with specific trades such as cotton, wool, rayons, leather and fur and textile printing, or with special groups of products. The dyehouse also has sections devoted to identification, fundamental physical research on dyeing, standardization and test methods. Each section has its own well-equipped laboratory with, in many cases, reduced-scale models of the machines used in the industries served.

The other service departments operate on similar lines. The rubber service department possesses the best-equipped rubber laboratories in Britain—if not the world. The resins department covers all the industries that employ synthetic resins in surface-coating compositions. The miscellaneous chemicals department deals with the servicing of certain other classes of organic chemical products.

The dyestuffs division's main laboratories at Blackley—claimed to be the largest centre of organic chemical research in the British Commonwealth—employ a staff of more than 1,000, over half of whom are graduate scientists.

In the sphere of dyestuffs research three of the five major discoveries of the past 34 years have been made in the division's laboratories. These are Monastral blue pigment, Caledon jade green vat dyestuffs, and the range of Duranol dyestuffs.

ALKALI DIVISION

The Alkali Division has its headquarters at Winnington, Cheshire. It has seven factories—at Winnington, Wallerscote, Lostock and Middlewich in Cheshire; Fleetwood in Lancashire; Silvertown in London; and Wilton in Yorkshire. Although basically a producer of alkalis, employing some 10,000 persons for this purpose, the division also makes polythene on a large scale, mostly at Wilton.

The division had its origin in the pioneer works founded by John Brunner and Ludwig Mond at Winnington in 1873 for the manufacture of alkali by the ammonia-soda process. This revolutionized the British alakali industry by producing a purer product at a lower cost than the old Leblanc method.

Alkalis are made from all-British raw materials and no imports are needed for their manufacture. The chief raw materials are brine, produced from the salt deposits of Cheshire and Lancashire; limestone, coal and coke, water from local streams; and small quantities of make-up ammonia from ICI's Billingham factory or from gas-works and coke ovens.

ICI today supplies one-eighth of the world's annual consumption of alkali. Among the chief products of the Alkali Division are soda ash, caustic soda, bicarbonate of soda, soda crystals and sodium silicate. Also manufactured by the division are the industrial chemicals ammonium chloride and calcium chloride, which—though not alkalis—are by-products of the ammonia-soda process.

Some two-fifths of ICI's output of alkali is consumed by three industries alone—glass, soap and rayon. About a quarter goes to make paper, to the chemical trade and to process textiles. The balance is used in over 400 industrial processes.

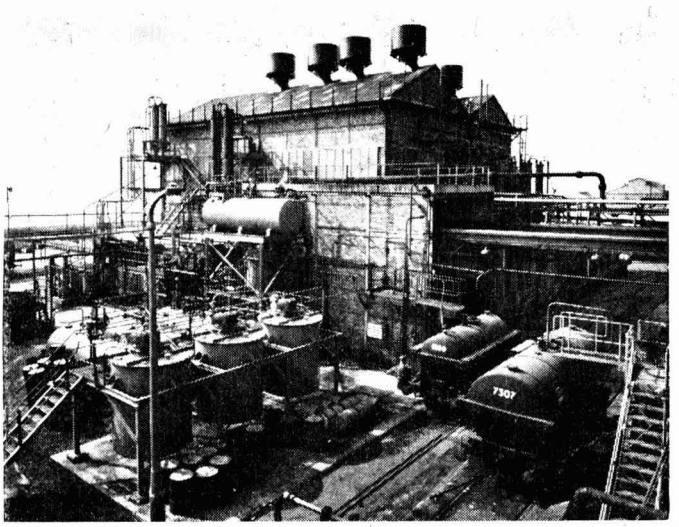
The Alkali Division is claimed to be one of Britain's biggest exporters. It also has substantial interests overseas, and has erected alkali plants in Australia and Pakistan. It works in close co-operation with ICI's subsidiary in Kenya, the Magado Soda Co. Ltd., which produces soda ash from natural deposits.

The division's research work extends beyond the field of alkalis and their uses, and has been responsible for several outstanding discoveries. One example is the plastic, polythene, which achieved world-wide recognition during the war. Although polythene was discovered as long ago as 1933, the high pressures involved in its production made bulk manufacture impossible until 1938. The first full-scale manufacturing unit was handed over to the works on 1 September, 1939.

New Alkathene plants have been built to cope with the great demand, and a new type of Alkathene which withstands boiling water, is stiffer and of higher density was introduced early in March 1956. It is made by a modification of the high-pressure process.

GENERAL CHEMICALS DIVISION

The General Chemicals Division has its headquarters at Liverpool in the Cunard Building, overlooking the port—a convenient position for a division operating 13 factories ranging in location from Runcorn and Widnes on the Mersey in the west, from Tees-side in the north-east to North Lancashire, and to Oldbury and Wednesbury in the Midlands. The division employs some 12,500 people.



Pilkington Sullivan Works, ICI General Chemicals Division. A general view of the plant manufacturing MCPA

General Chemicals Division claims direct descent from James Muspratt's original enterprise in Vauxhall Road, Liverpool, which first began the large-scale manufacture of soda by the Leblanc process in Britain in 1823.

The manufacture of heavy chemicals, which constitutes the division's chief activity, began in the early nineteenth century with the production of soda from salt by the Leblanc process. The Leblanc process required—in addition to salt—limestone, sulphuric acid and coal as its raw materials. In its original form the process was described as making one chemical (soda) and wasting two (chlorine and sulphur). In the course of its development, the Leblanc system ultimately found means of recovering the sulphur it had formerly sent to waste heaps and of utilizing the chlorine. The great development in the applications of chlorine in industry was first due to the abundance of that active element which resulted from its recovery by the Leblanc manufacturers.

In the 1870s the supremacy of the Leblanc system was attacked by the introduction of the Solvay process for manufacturing soda, operated in this country by Brunner, Mond & Co. This competition resulted in the formation by the Leblanc alkali-makers of the United Alkali Co., the first important amalgamation in the history of the world's chemical industry. A further threat to the Leblanc system followed in the 1890s with the introduction of the electrolytic manufacture of caustic alkali and chlorine by the Castner rocking mercury cell. Today the division operates a large modern mercury cell installation at its Castner-Kellner factory, where Castner's inventions were first worked on a commercial scale in Britain.

The United Alkali Co. was one of the four original parties to the ICI merger, and with such companies as Castner-Kellner Alkali Co. Ltd., and Chance & Hunt Ltd., which had been making alkalis and acids for many years, it formed the nucleus of the General Chemicals Division as it is today.

The division produces a wide range of products—about 150. Among them, the heavy chemicals—particularly chlorine, caustic soda and acids—remain important staple lines. Chlorine is made by electrolysis of brine at the division's factories at Runcorn, Widnes, Cassel, Hillhouse and Wade (Cheshire); caustic soda and hydrogen are also derived from this process. Metallic sodium is made by the electrolysis of fused salt at Runcorn and Cassel works—a process which also results in the production of chlorine.

One of the many products based on chlorine is hydrochloric acid, employed in large quantities by the iron, steel and textile industries. An important development during the last 20 years or so has been the great increase in the number and quality of organic derivatives containing chlorine. Thus, trichlorethylene, one of an important range of non-inflammable solvents used extensively for metal degreasing, dry cleaning, and oil and fat extraction, has become

an important product. Vinyl chloride, the basis of pvc, and refrigerants are also important in the range of chlorine-containing chemicals. Chlorine is also supplied in large quantities for the manufacture of organic chemicals, some of which do not contain the element—e.g. ethylene glycol ('anti-freeze'). Sulphuric acid is manufactured at the division's Widnes, Runcorn, Oldbury and Wednesbury factories.

The division manufactures a range of compounds from metallic sodium, of which sodium cyanide is the most important industrially.

As might be expected in an organization based primarily on the large-scale production of chlorine, caustic soda and sulphuric acid, a great part of the post-war capital development has been directed to increasing the manufacturing capacity for these products. The fundamental importance of electric power to the division, which uses electrolytic processes on a large scale, is amply demonstrated by the impressive programme of extension and modernization of the division's power stations which is being carried out. The division was one of the first large sulphuric acid producers to meet the sulphur shortage which developed in 1951 by making an extensive changeover from the use of sulphur to pyrites or spent oxide (obtained from gas works).

The focal point of the division's research is its Widnes laboratory, one of the largest and most fully equipped institutions for industrial chemical research in Britain. At this laboratory there are always several hundred investigations in progress, ranging from problems in chemical engineering to the electron-microscopic study of molecules. In recent times the laboratory in conjunction with the metals division has developed a full-scale process for the manufacture of titanium metal.

PHARMACEUTICALS DIVISION

The Pharmaceutical Division which has its headquarters at Fulshaw Hall, Wilmslow, near Manchester, was specially formed in 1942 to co-ordinate and develop ICI's widening interests in the field of drugs and medicinal chemicals. In addition, therefore, to the substantial programme of research that the pharmaceuticals division itself carries out, one of its important functions is to explore the range of compounds turned out by ICI's research centres and develop those with actual or potential medical value—making them available for general use both in men and animals.

The research centre most closely linked with the division is that of the dyestuffs division. This association originates from the fact that dyestuffs chemistry and medicinal chemistry have much in common. Indeed, many dyestuffs have medical value—e.g., acriflavine, a yellow dye, has powerful antiseptic properties.

Several important discoveries in the field of medicinals have arisen as a direct consequence of researches on dyestuffs. For this and kindred reasons, the chemical and biological research and the biological testing or evaluation which lie behind the marketing of medicinal and veterinary products by IC(P) are at present carried out principally in laboratories and factories adjacent to those of the dyestuffs division—with which there is the closest liaison, although the direction and control of these activities lies with the Pharmaceuticals Division. The scale of the division's research today, however, is such that a new research headquarters is being built at Alderley Park, in Cheshire.

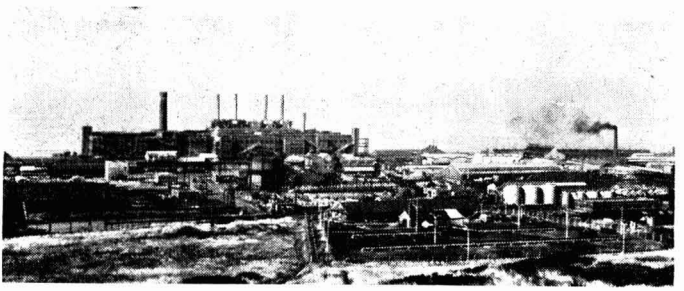
Most of the products that IC(P) sells are manufactured in bulk form by the Dyestuffs Division and converted by the Pharmaceuticals Division into a pharmaceutical form (e.g., tablets, solutions, powders) at its processing factory at Regent Works, Linlithgow. The division also has working arrangements with the General Chemicals Division, because several of its products are valuable as medicinals.

Through its agents and distributors, IC(P) is now marketing a variety of medical and veterinary products in 58 countries abroad as well as in Britain. Among the more notable of the drugs it has produced are Paludrine, a widely used antimalarial drug; Sulphamezathine, an all purpose sulpha drug; Antrycide, for controlling animal trypanosomiasis (sleeping sickness); Avlosulfon, used in the treatment of leprosy; Mysoline, an anti-epileptic drug; and Hibitane, a new bactericide.

PLASTICS DIVISION

The Plastics Division has two production centres in the Lancashire area—at Hillhouse, and Darwen. Altogether the division employs some 4,500 people. It is said to be the largest manufacturer of plastics materials in the Commonwealth.

ICI's General Chemical Division's Castner-Kellner Works



Called into being by the needs of an expanding industry, the Plastics Division is one of the youngest in ICI. It was formed in 1936 to co-ordinate the company's rapidly growing plastics interests, which had started in 1933 with the acquisition of a part-holding in Croydon Mouldrite Ltd., producers of phenol formaldehyde and urea formaldehyde moulding powders. The division prospered and, by the outbreak of the war in 1939, was an established manufacturer of phenolic products, of urea formaldehyde, and of the methacrylate products Perspex and Diakon (polymethyl methacrylate in granular form).

The war saw a rapid expansion in the range and production of plastics. Polythene, discovered by the Alkali Division in 1933, became vital for radar development, and Perspex acrylic sheet established itself as the standard material for aircraft glazing.

The next big wartime development was that of polyvinyl chloride (pvc) products. The first ICI production of the material started in 1940, and again expansion was so rapid that a large new plant at Hillhouse was erected by ICI for the Government. This was acquired by the Plastics Division in 1946. The production of nylon monofilament began at Welwyn in 1941 and was transferred to Hillhouse in 1946, to allow for extension of semi-technical research and development premises at Welwyn.

In 1944 the division started to manufacture corrugated Perspex at Darwen, and this new form of sheet was to become increasingly popular. Today it is one of the most important products of the Plastics Division.

SALT DIVISION

The headquarters of the Salt Division are at Vale Royal, near Winsford in mid-Cheshire, and its works are at Winsford and Weston Point near Runcorn, Cheshire; Stoke Prior, Worcestershire; Stafford; and Carrickfergus, Northern Ireland. The division employs about 1,600 people, more than half of them near Winsford.

The division originated in the purchase by ICI in 1937 of the Salt Union Ltd., a company formed in 1888 by the amalgamation of most of the chief operators in the saltfields of Cheshire, Worcestershire, Durham and Northern Ireland. The practically inexhaustible deposits in these counties, together with those in Lancashire and Staffordshire, supply the British salt and alkali industries.

Salt is obtained from natural deposits of rock salt which lie several hundred feet underground in beds up to 100 ft. thick or more. For more than two centuries salt-mining was a flourishing industry in England, but the wholesale flooding of workings and the growing demand for a purer product brought about its decline in the past century. At Winsford, ICI operates the only mine in Britain still producing salt in rock form.

Nowadays most of the salt produced by the division is obtained not by mining but by evaporating brine. The 'white salt' thus obtained accounts for the bulk of the modern salt trade and is the division's main product. The brine is evaporated in two main ways—in steam-heated vacuum pans and in directly heated open pans. Vacuum salt consists of fine cubic crystals, and will be familiar in the form of free-running table salt. Open-pan crystals are irregular in shape and often flaky in texture, and make the coarser types of cooking salt. The vacuum method is gradually replacing the ancient and relatively expensive open-pan process, but there is still a demand for the open-pan type of salt. In recent years ICI has developed the production of two new types of vacuum salt, granular and dendritic, to meet this demand.

About 1,000,000 tons of salt are produced annually in Britain, ICI's Salt Division being the largest single producer.

Important industrial applications of salt are in dyestuffs manufacture and dyeing processes, water softening, soap-making, saltcake and hydrochloric acid manufacture, metallurgy (for smelting non-ferrous ores, refining aluminium and manufacturing magnesium), in refining oils and fats, and in the tanning industry for preserving hides.

LEATHERCLOTH DIVISION

The Leathercloth Division employs over 1,400 people, and its factory at Hyde (where its headquarters are located) is one of the largest coated-fabrics plants in the world.

This division had its origin in the absorption of the three leading leathercloth concerns—New Pegamoid Ltd., the British Pluviusin Co. Ltd. and the British Leathercloth Manufacturing Co. Ltd. (makers of Rexine)—into Nobel Industries Ltd., in 1923.

Rexine is the trademark for the division's nitrocellulose-coated materials, while its polyvinyl chloride-coated materials have been given the trademark Vynide. The development of Vynide has resulted in materials which are to some degree replacing Rexine for many purposes, and are also helping to extend the uses of coated fabrics by providing materials with outstanding durability and flexibility for such things as protective clothing, light industrial belting and waterproof coverings.

Although the division's products are thus briefly referred to as Rexine and Vynide, their uses are manifold, and they have to be produced in a number of qualities on various base fabrics and with a variety of coatings.

Coated fabrics are used for upholstery and panelling, in motor cars, public transport and commercial road vehicles, railways, ships and aircraft, as well as for furniture, bookbinding, handbags, travel and fancy goods, shoes, perambulators and interior decoration.

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Other Important Chemical Producers . . .

Phosphorus Manufacturers

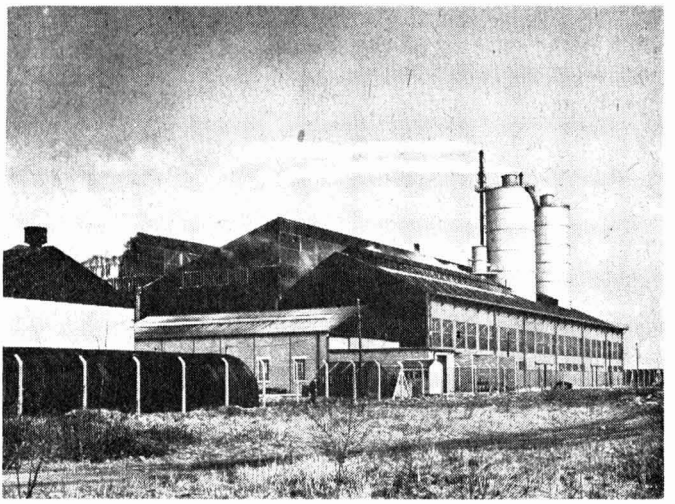
ALBRIGHT & WILSON'S first factory in the north of England was established at Widnes in 1933 to make phophorus. Phosphorus had been manufactured at the company's Oldbury works from 1851 to 1919. Manufacture then ceased at Oldbury and the UK's demand was supplied for the next 14 years by Albright & Wilson's associated company in Canada, The Electric Reduction Co. Ltd. In 1931 Albright & Wilson felt that the steady demand for phosphorus in this country would soon be too great to be met by the Electric Reduction Co. and it therefore decided to start manufacture again in the UK. Two alternatives presented themselves: either production could be restarted at Oldbury, or a new site could be acquired close to a main seaport. Such a site would need to have a supply of cheap electric power and be within easy reach of Oldbury.

The choice eventually fell, in 1932, on a site at Widnes which was the property of ICI. This site, of 11½ acres, was adjacent to ICI's private power station and had rail connections with Garston Dock. A phosphorus plant of four electric furnaces rated at 1,500 kW was erected, together with a boiler plant, office buildings, an electric shop, a fitting shop and a carpenters' shop. In just over eight months the first two furnaces were ready and they came into operation at the beginning of November 1933. The third furnace started up in December and the fourth was put into operation in the following August.

The increasing demand for phosphorus soon made the addition of a fifth furnace necessary, and in 1936 an extra 1¾ acres were leased and a furnace of 3,000 kW installed.

Phosphorus produced at Widnes was sent by rail to Oldbury to replace that previously imported from Canada. It was also used at Widnes in the production of phosphoric acid from which tetrasodium pyrophosphate and acid calcium phosphate were made together with other phosphates.

In 1934 a carbon tetrachloride plant was built to take advantage of the chlorine and carbon disulphide available from the adjacent ICI factory. During the second world war, at the request of the Ministry of Supply, this plant was enlarged to meet the war time demand.



The tripolyphosphate works at Kirkby, owned by Albright & Wilson Ltd., showing two of the phosphoric acid units

In 1937 new maintenance shops were added, while in 1938 Widnes started the manufacture of tartaric acid. The following year saw an increased demand for phosphates for use in detergents.

During the second world war 40,000 sq. ft. of shops and plant were erected to meet the demand of the services and the pay roll rose to 500 compared with 100 in 1934.

Although phosphorus production at Widnes in 1939 was 3½ times greater than that at Oldbury during the first world war, the greatly increased demand for phosphorus during the second world war called for the installation of extra furnaces. It was impossible to extend further at Widnes so at this stage production began again at Oldbury on New Year's Day, 1940.

During the war the manufacture of strontium salts was transferred from Oldbury to Widnes; this was only temporary, and at the end of the war the manufacture of these compounds was moved to Stratford.

Expansion at the Widnes works has been rapid since the end of the war. The carbon tetrachloride plant has been extended still further, while those for making detergent phosphates have also been enlarged.

The rapid growth of the synthetic detergent industry after the second world war called for a very considerable increase in the output of sodium tripolyphosphate. A factory was therefore erected on the Kirkby Trading Estate near Liverpool.

Phosphorus is sent to Kirkby from Albright & Wilson's Portishead works in special 24-ton rail tankers. At Kirkby it is burnt with dry air in special steel towers and the resulting phosphorus pentoxide is hydrated to form phosphoric acid. This is then used in the manufacture of sodium tripolyphosphate. The capacity of the Kirkby plant is 75,000 tons of sodium tripolyphosphate a year.

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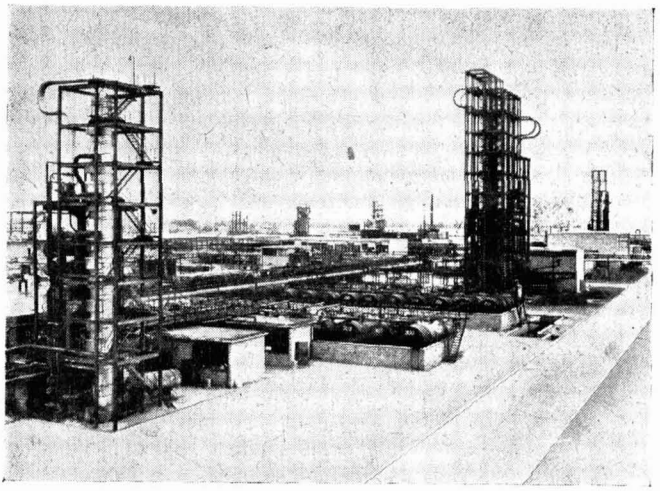
Petroleum Chemicals

THE cracking process used by PETROCHEMICALS LTD., is based on an original observation of Dr. Ch. Weizmann going back to 1937. Laboratory investigation by a handful of chemists had advanced sufficiently by 1940 to warrant detailed study on a semi-commercial scale. It was after Dunkirk, in the early days of the blitz, that this programme was started, and by the end of the war the Catarole process was fully developed.

In 1945, Petrocarbon Ltd. was formed, and acquired certain rights to operate the process commercially. The decision was taken to build a plant to be owned and operated by Petrochemicals Ltd. The site chosen was by the Ship Canal at Parkington about seven miles from Manchester, occupying 120 acres of an 885 acre estate. Starting from the basic cracking process, a whole series of plants was designed to treat the new products, and to synthesize chemicals.

Construction started in 1946 and in early 1949, the first cracker went on stream, though it was nearly another two years



Petrochemicals Ltd. Left to right: the vacuum and atmospheric distillation plant; the plant of Oxirane Ltd.; the ethylene oxide and glycols plant; the re-run and azeotropic distillation plant and the isopropanol plant

before the whole of the plant was fully operational. The distillation, gas separation and other specialized plants had already been designed and built in Britain, and those were one of the earliest attempts to build up this new industry. The scope of the scheme was such that the problems involved in operating such a complex plant required additional capital expenditure, thus increasing the total cost already swelled by post-war inflation. Because the project was considered of importance to the national economy, financial backing came from the Finance Corporation for Industry. The years 1951-54 were a story of up-hill struggle to increase output, survive trade recession, build up markets, increase efficiency of plants, and reduce production costs.

By 1954 current operations were financially sound, but the company was heavily in debt. In March 1955 arrangements were concluded for Petrochemicals Ltd. to become a wholly-owned subsidiary of Shell Chemical Co. Ltd.

During the last few years, the organic chemical industry has been developing at an unprecedented speed. Not only had the coal tar industry become unable to meet all requirements, but the availability of ethylene, propylene and other olefines, or raw materials for producing them, had opened up new possibilities for synthetic chemicals, particularly in the US. In Britain it was necessary to import much of these chemicals using currency we could ill afford.

The Catarole process produced two classes of basic raw material, starting with petroleum fractions provided from sterling sources. These were aromatics, of high purity, and olefinic gases for chemical synthesis. From the start, it became apparent that the olefinic gases were of paramount importance for economic reasons, and thus specialization in the production of ethylene and propylene derivatives has followed. The principle products are: benzene and toluene, paint resins and tile resins, aromatic solvents of boiling range 150-300°C ethylene and propylene derivatives.

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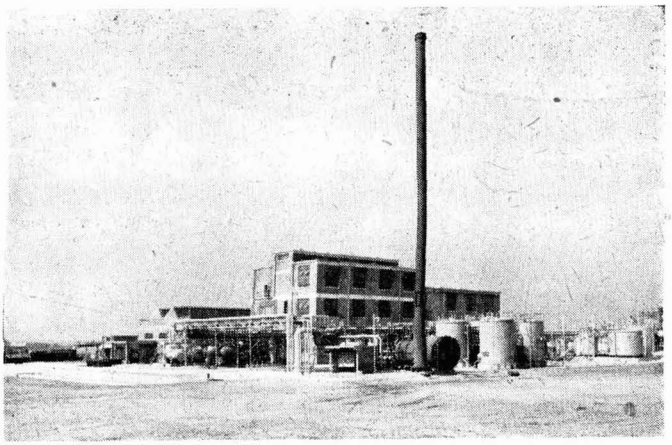
Shell's Stanlow Plant

THE most important event of 1955 at the SHELL CHEMICAL CO. LTD.'s Stanlow plant was the commissioning of a unit to produce Epikote resins. These resins can be derived entirely from petroleum sources although at present one of their raw materials, phenol, is of non-petroleum origin. The first stage in their manufacture is to combine acetone, which is derived from propylene via isopropyyl alcohol, with phenol to form diphenylol propane. This is then combined with epichlorhydrin, also derived from propylene, to form the resin. The proportions of the reactants in this latter stage, and the conditions of the reaction, control the molecular weight of the resin and hence its properties for various applications.

At present acetone, diphenylol propane, and the finished resins are manufactured at Stanlow. Epichlorhydrin is imported from Shell Chemical Corporation in the US.



The Epikote resin unit at the Shell Chemical Co. plant at Stanlow

Another development during the year was the completion of the 'sulphur cycle' at Stanlow. Its completion means that all Stanlow refinery's requirements of sulphur and acid are met from sulphur in crude oil, that all waste acids and sludges arising from product treating and chemical manufacture are re-processed to sulphuric acid, and considerable quantities of sulphur are available for sale.

The basis of this complex of plants is the incidental production of large quantities of hydrogen sulphide during cracking, reforming and desulphurization processes carried out in the refinery. The hydrogen sulphide is separated in an almost pure state, and the majority converted to sulphur in a Claus plant. At the same time, waste acids and sludges are decomposed into sulphur dioxide and coke in a convertor plant which includes not only decomposition of the waste acids but stringent purification of the sulphur dioxide-rich gas resulting from the decomposition. A contact sulphuric acid plant is then fed with sulphur dioxide, hydrogen sulphide and sulphur, and produces all the 95 per cent and 98 per cent sulphuric acid, and oleum, required by the refinery. The total amount of sulphur passing through this system is in the neighbourhood of 30,000 tons per annum, all derived from crude oil.

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Soaps & Enzymes

NORMAN EVANS & RAIS LTD., was founded shortly after the 1914/1918 war by the late Mr. Norman Evans, father of the present chairman, Mr. J. E. Evans, and his brother, Mr. P. M. Evans, who share the responsibilities of joint managing directors.

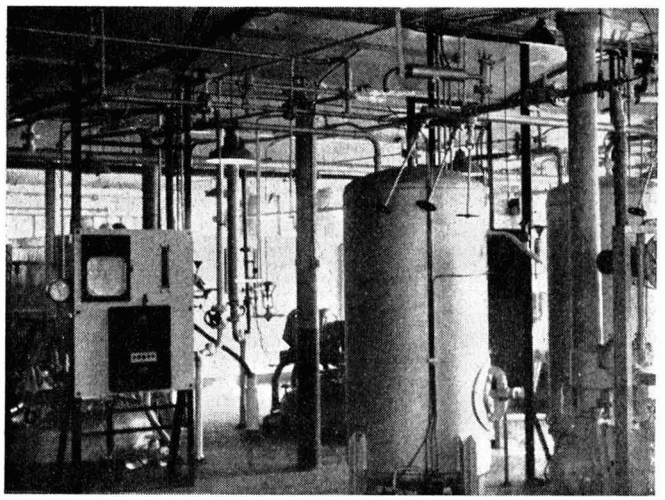
Until the early 1930s it was engaged solely in the merchanting of colours and chemicals. Soon after the present managing directors joined the company a modest start in chemical manufacturing was made in small premises adjoining the company's head offices in Manchester.

The first products to be made were metallic soaps, which found a ready sale in the paint, varnish and linoleum industries, to which trades the company was already selling various pigments and earth colours for overseas markets.

Cobalt and lead linoleates and naphthenates were the first metallic soaps to be made and to these, before the outbreak of the second world war, were added most of the other metallic soaps. A full range, including all the known metallic naphthenates, as well as the more generally used linoleates, oleates and stearates, have now been manufactured for many years. Since 1939 several of the new ethyl hexoates have been added to the range.

The original factory space was soon found to be inadequate and in 1946 all manufacturing was moved to more suitable premises at Stoneclough, between Manchester and Bolton.

On the outbreak of world war II, a small works was acquired for the production of a commercial grade of bacterial amylase for use as a desizing agent. This factory was the first in the UK to produce commercial enzymes. To this product the company has now added a refined grade of amylase for use in the foodstuffs industries, as well as a number of different enzymes for the breakdown of proteins, locust bean gum



Interior of the enzyme plant of Norman Evans & Rais Ltd., Woodley, near Stockport

and pectin etc. as well as others, for use in various applications in the leather and other industries.

It soon became obvious that the enzyme factory at Cheadle, Cheshire, was too small to cope with demand and shortly after the last war a new works was purchased at Woodley, near Stockport.

From the inception of the company the sale of surface active agents, especially textile auxiliaries, has been one of the main activities, and a few years ago the company started to manufacture them. A factory was purchased at Heaton Mersey, Stockport, and various detergents, wetting agents, sulphated fatty alcohols and solvent scourers etc. went into production. The firm was one of the first to commence the manufacture in this country of metal sequestering agents of the ethylene diamine tetra acetic acid type, and a complete range of such products is now made.

Since commencing the manufacture of the more ordinary type of surface active agents the company has, in addition to adding the range of metal sequestering agents, included in its manufacturing production dodecyl sulphosuccinates, lauric diethanolamides and polyethylene glycol esters.

* * *

House of Evans

FOUNDED in 1809 by John Evans and his brother Edward, in Worcester, EVANS MEDICAL SUPPLIES LTD., established itself in Liverpool in 1833.

Soon afterwards laboratories were operating in London and Liverpool and by the middle of the century the House of Evans was well established at home and abroad.

At the start of the 20th century the business was incorporated as a public company under the name Evans Sons Lescher & Webb Ltd., and shortly afterwards it became agents for the sale of sera and vaccines prepared at the Incorporated Liverpool Institute of Comparative Pathology—an organization sponsored by the University of Liverpool. In 1911 the company took over the Institute and became manufacturers of sera, vaccines and tuberculins, thus beginning a long association with biological research and manufacture.

In 1916 the demand for fine chemicals led the company to manufacture medicinal chemicals, particularly bismuth salts, citrates, iodides and similar inorganic compounds. The company introduced liver extracts shortly after the work of Minot & Murphy, and from then onwards the name of Evans became associated with liver therapy and Hepatex.

A significant step in the extraction of liver was announced by Evans in 1943 when a paper in the British Medical Journal described the proteolysis of liver and provided medicine with a new and potent weapon for the treatment of refractory anæmia, further research enabled the process of proteolysis to be applied to liver extracts, greatly increasing their effectiveness. Another contribution from Evans research was the introduction of a pure, stable heparin prepared by a large-scale economical process.

Evans Medical (as the company is now called since it changed its name to Evans Medical Supplies Ltd., in 1945, four years

after having its Liverpool headquarters destroyed by enemy action) is still undertaking considerable expansion. In 1953 the company concluded an agreement with the Burmese Government to create a pharmaceutical industry for Burma. In January this year the first part of this project, which is costing £5,000,000, was officially opened.

* * *

Soaps & Chemicals

SOAPS for home and industry, sodium and potassium silicates, glycerine, edible oils and fats, alkaline detergents and special chemicals such as silica gel and ion exchange materials are produced by JOSEPH CROSFIELD & SONS LTD., which Joseph Crosfield founded in the year of the battle of Waterloo.

Early prosperity of the company was built on soap but towards the end of the nineteenth century William Gossage patented the addition of sodium silicate to soap as an improver. To use this process small batch furnaces to make silicate glass were installed; these were the forerunners of the present large continuous production units.

The beginning of this century saw further developments. Seed crushing and extracting were followed by the first commercial use of the Normann patent in the production of hydrogenated fat. This was followed in 1907 by the launching of Persil, a domestic detergent.

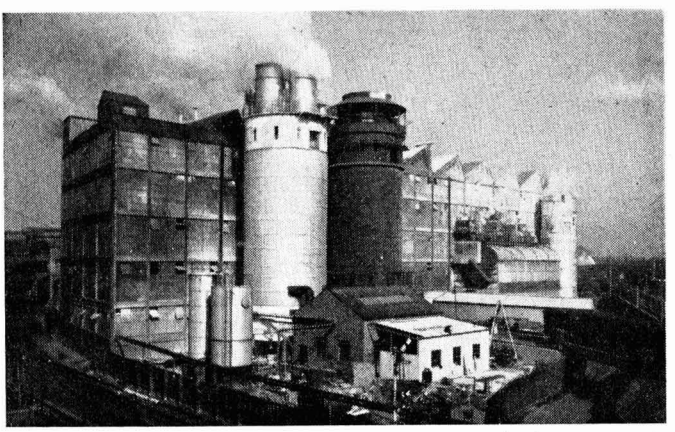
Meanwhile silicates were finding many new outlets unsuspected when their manufacture was commenced. The adhesive properties of sodium silicate were developed so that today over 90 per cent of the solid and corrugated fibreboard produced in this country is laminated or sealed with this mineral glue. These properties, and others, are also fully exploited in the manufacture of abrasives and in refractory, furnace and acid proof cements.

Sodium and potassium silicates are used in a great variety of other processes from making roads to coating TV screens. They have also played a part in the development of four other Crosfield chemicals.

The first of these was an extension of the known detergency powers of sodium silicate and was the formulation of an alkaline detergent by adjusting the ratio of silicon dioxide to soda. The result was metasilicate, first produced in the early 'thirties and now a large tonnage chemical, although only one of an extensive detergent range. Modern industry calls for a wide variety of highly specialized washing products consisting of soaps, soapless 'detergents' and blended alkalis and the majority of them incorporate sodium silicate because of its detergent, colloidal or anti-corrosive properties.

The second product is sodium-aluminosilicate, or artificial zeolite, used as a base exchange medium for water softening plant. And the third is silica gel, a chemical which, by virtue of its porous state, is used for dynamic and static air drying, for vapour adsorption and for gas drying.

A £1,000,000 plant was opened four years ago at Bank Quay to manufacture the fourth silicate-based chemical. This is a synthetic catalyst used in mineral oil refineries for the fluid catalytic cracking of feed stocks when its use results in more petrol of a higher octane value being obtained.



The Persil building of Joseph Crosfield & Sons, Ltd., a well-known landmark in the area

Dyes to Pharmaceuticals

IN the year 1758 Johann Rudolf Geigy registered in the Guild Book of the Swiss town of Basle his intention to trade in drugs. Ever since that date THE GEIGY CO. LTD. has been concerned with colouring matters, first importing dyewoods and later grinding and extracting them into suitable raw materials for the then flourishing silk industry in that town. When Perkin made his discovery, the company had close on 100 years' experience in natural dyes, and within three years—by 1859—were manufacturing synthetic dyestuffs in their works.

The half century that followed saw great developments in manufacture and expansion of trade. Many dyestuffs were added to the Geigy range and many agents appointed overseas and in Europe. These years were dominated by the name and personality of Sandmeyer (a pupil of Viktor Meyer) who joined the firm in 1888. Sandmeyer combined a remarkable insight into numerous manufacturing problems with an unusually versatile talent for evolving practical techniques in the laboratory. The Sandmeyer reaction is one of his many contributions to the chemical industry of his day.

A more tangible discovery by Geigy was the wool dyestuff, Eriochrome Black T (Hagenbach 1904). In more recent years the firm has developed Polar Grey BL. This was a new type of dyestuff which was soon joined by further products of a similar type which were then renamed Irgalan dyestuffs. These are neutral and weakly acid dyeing metal complex colours and differ from ordinary chrome dyes in that, by simple application and without strong acid treatment, they produce excellent fastness.

Up to the first world war the company had restricted its interests almost entirely to the manufacture and sale of colouring matters, extracts, tannins and auxiliary products for the dyeing industry. In the early 1920s, however, research was directed at the development of a permanent mothproof for wool. Observations on certain dyestuffs led eventually to the discovery of Mitin which is often referred to by technicians as a 'colourless dyestuff' It is today used in large quantities to protect wool against moth and carpet beetle grubs.

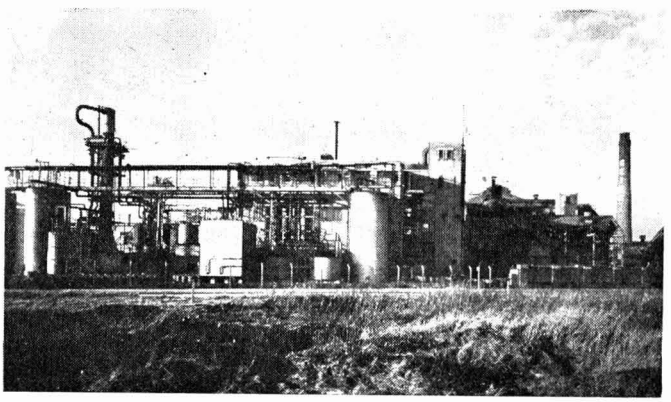
At the outbreak of World War II, the company's research team discovered DDT. This first synthetic insecticide is still widely used in spite of subsequent discoveries in that field. It is but a short step from insecticidal to pharmaceutical products, and today Geigy is noted for a wide variety of ethical specialities.

Today Geigy is a world wide organization with works in fifteen different countries. Among the products which it produces are dyestuffs for the textile industry, pigments, plasticizers, textile and leather chemicals, moth proofs, pesticides and pharmaceuticals.

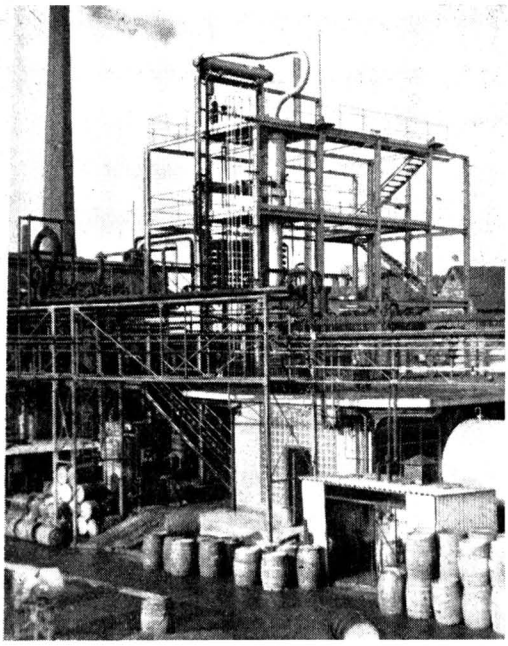
* * *

Widening Range

LANKRO CHEMICALS LTD. was founded in 1937 for the manufacture of leather finishes, sulphated oils, wetting and soaking agents, for the leather industry. Progress of the company in this field has proceeded steadily up to the present day but the major growth of the company has occurred in the post-war years. In 1942 the manufacture of butyl acetyl ricinoleate was started for use as a low temperature plasticizer for vinyl resins for service requirements. Out of this



The Ashburton Chemical Works Ltd., the Trafford Park works of The Geigy Co. Ltd.



Part of the plasticizer plant of Lankro Chemicals Ltd.

small beginning has grown a well equipped and well organized esterification department producing a wide range of plasticizers. The company's products now fall into three groups.

The first is leather finishes. The second comprises sulphated oils, alkylates and a wide range of products used mainly in the leather, engineering and textile industries. To this department has recently been added a range of non-ionic products which are being sold in ever increasing quantities for general emulsification and as emulsifiers for insecticides and herbicides.

The third main department produces a large tonnage of esters comprising a full range of phthalates, sebacates and many other esters as well as several ancillary products.

The total productive capacity of the company is now in excess of 15,000 tons per annum.

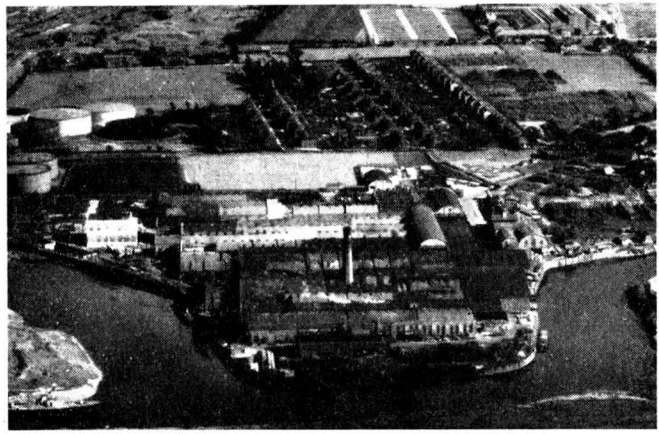
Lankro Chemicals Ltd. has its own research and development department and is continually expanding its main range of products. The company has played the leading part in the introduction of dialkyl phthalate 79 and now di-iso octyl phthalate as plasticizers for vinyl resins. The most recent addition to the product range is Lankroflex ED3, an epoxydized monoester plasticizer for vinyl resins and synthetic rubber. This material will be economically priced and is said to have excellent low temperature and stabilizing properties. The company is also actively expanding its range of emulsifying agents which are proving popular, particularly overseas.

* * *

Fatty Acid Specialists

IN 1954 PRICE'S (BROMBOROUGH) LTD. celebrated their centenary as fatty acid manufacturers at the Bromborough Pool Works near Birkenhead. Apart from being the oldest firm in this business they are the largest manufacturers in Western Europe.

In producing fatty acids new methods are replacing the early ones developed by Price's and batch processes are being replaced by continuous plants constructed in stainless steel. The refining of fatty acids



Price's (Bromborough) Ltd. near Birkenhead

is based on vacuum distillation and one leading type of continuous distillation plant was developed in conjunction with Price's. The separation of fatty acids into their solid and liquid components is now carried out by a continuous solvent separation process developed in the US for which Price's hold the UK rights. The chief products of the company are stearines, oleines, textile oils, fatty acids and fatty alcohols.

Stearines are produced in many grades for pharmaceutical and cosmetic uses, through intermediate grades for chemical manufacture, soap making and similar purposes, to the lower priced types used in textile finishes and plastics. Qualities are also available for rubber compounding, candle making and other requirements.

Oleines range from an extra pale pharmaceutical quality to darker coloured grades used for printing inks and veterinary emulsions, while for stencil manufacture, soap making and textile use, specified types are supplied. The company is the chief supplier to the wool textile trade of oleines, cloth oils, wool oils and combing oils, and blended fibre lubricants.

Fatty acids of all types are produced for the soap making, chemical and paint industries, while fatty alcohols range from the solid stearyl and cetyl blends to a water white liquid oleyl alcohol, used chiefly in chemical manufacture, textile additives, pharmaceuticals and stencils.

* * *

Pest Control

THE BRITISH NICOTINE CO. LTD., Bootle, Liverpool, which is said to be one of the largest producers of nicotine sulphate 40 per cent and nicotine alkaloid in the world, is this year celebrating its 50th anniversary.

The company's products are now exported to 26 countries, where they are used to control insect pests, principally those attacking food crops.

Despite the advent of newer chemicals for this purpose and competition from many quarters, last year's sales of Britnico nicotine sulphate were a record.

* * *

First to Produce Formaldehyde

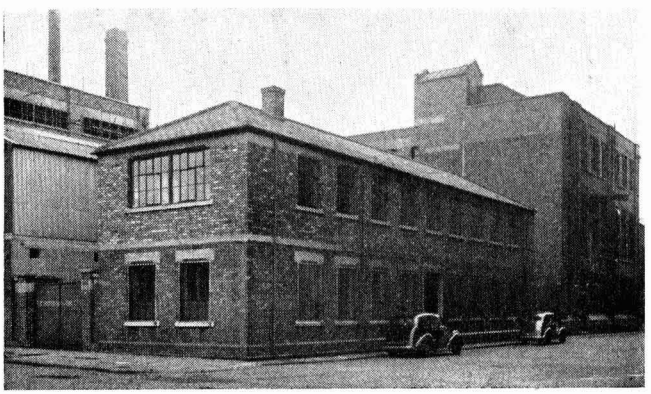
THE first commercial manufacture of formaldehyde in Britain was started by ARTHUR ASHWORTH LTD., of Bury, in 1909. Since then many changes have taken place and new units are being added embodying devices to ensure consistency of high quality products. The standard of purity is claimed to be far higher than the BP requirements. The company also produce hexamine, paraformaldehyde, modified starch and dextrine products.

* * *

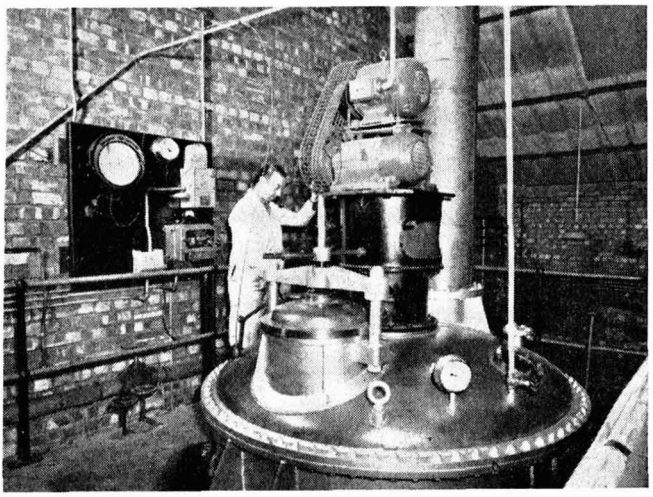
Wood Distillers

A FIRM specializing in chemicals and by-products from wood is PRODUCTION CHEMICALS (ROCHDALE) LTD., of Deansgate, Manchester, and Excelsior Works, Rochdale. This company offers a wide range of products stemming from the cellulose extract in liquid form and in spray-dried fine powder which is used extensively in the preparation of insecticides, dyestuffs, and as a binder and filler in a variety of chemical industrial products.

Through new processes of wood distillation and treatment of basic material, lignin, the company are making available to industry many new products. As a further



Offices and laboratories of The British Nicotine Co. Ltd., Bootle, Liverpool, showing part of the works and extension (since completed)



A resin still in the works of Chas. Lowe & Co. (Manchester) Ltd.

derivative from wood, wood flour in grades from 60 mesh up to 120 and 200 mesh are supplied from UK manufacture and from Continental sources. In the field of mineral products the company specializes in Bentonite which is both sodium and calcium based and is available in fine powder and granulated form.

* * *

Resins to Order

FOUNDED in 1864 by Charles Lowe, the first man to produce phenol commercially, CHARLES LOWE & CO. (MANCHESTER) LTD., of Reddish, Stockport, is a firm specializing in the manufacture of resins to customers' individual requirements. They make no standard resins and although the company operates on a substantial scale, it is a private company being wholly-owned by the descendents of Charles Lowe. The products now being manufactured by the company are; phenol, cresylic acid, meta cresol and ortho cresol, and industrial synthetic resins from phenol, cresol, melamine, urea, and resorcinol.

* * *

A Storey on Board

JOSEPH STOREY & CO. LTD., of Lancaster, was founded by Joseph Storey in 1860 to manufacture a range of products which included sizes, picric acid, coal tar products, pigments and driers. Of these only pigments and driers are made by the company now, although a variety of other products have been added to meet demands.

Fine colours manufacturered by the company are employed in the production of a variety of articles which include plastic tablecloths and curtaining, linoleum, upholstery and paint, while pvc stabilizers

Offices and loading bay, Joseph Storey & Co., Ltd., Lancaster

which are in demand for the lighter plastic materials have become essential ingredients in the heavy conveyor belting used in coal mining.

In 1950 the company opened new offices on the site of the two old cottages which had served this purpose for ninety years. A programme of further expansion is now under way as modernization is constantly being effected. In the 95 years' history of the firm there has always been a member of the Storey family on the board. Products manufactured by the company are: fine colours, pvc stabilizers, lead borate, manganese borates, zinc borates, and other heavy chemicals.

* * *

Tanning Specialists

WALKER EXTRACT & CHEMICAL CO. LTD. is a member of the Walker & Martin Ltd. group of Bolton, a tanning and leather concern which has been established for over 100 years.

The company processes large quantities of mimosa, myrabolam, quebracho and other natural vegetable tanning materials. When the materials have passed through the extraction process they are adjusted chemically and concentrated, in many instances the final product being spray dried. The products, including many special blends and formulations, are supplied to tanners in the UK and overseas.

Synthetic tanning agents are made at the Bolton factory in increasing quantities. These materials are based on phenols, cresols, amino products, etc. The company also manufactures some speciality synthetic resins, and during the last 10 years has been expanding its activities into the chemical field. The latest chemical to be produced is a high grade pentaerythritol.

* * *

Zinc Producers

A SMALL zinc smelter and flux works was started in Widnes by the brothers Kenyon about the middle of the 19th century. A farm, well known for its vine, gave place to the industrial development both of the railways and the new works, and because of the association, the works was called the 'Vine Chemical Works', a name by which it is still known locally.

The Kenyons took an active interest in zinc salts. It was partly because of this, and the general advantages of Widnes, that Mr. J. B. Orr formed a partnership with Thomas Kenyon for the new pigment of sulphide of zinc (Orr's zinc white), which Orr had been developing in Scotland. Meanwhile, Mr. Orr carried out the commercial development of the pigment from his paint works in London. This arrangement was not very effective and in 1898 J. B. Orr took over full control and formed a limited company—ORR'S ZINC WHITE LTD.

As the new pigment became established and demand increased, Orr's Zinc White works expanded until, by 1919, a complete barium reduction plant had been built and production had extended from the original south works site to two units, one in what became known as north works and one in Lugsdale works.

In 1930, Orr's became a member of the Imperial Smelting Corporation Ltd. and the re-organization which followed resulted in two extra production units being built, thus giving two at north works and two at Lugsdale works.

Throughout this period and until after the second world war there was a steady demand for the main product. In 1934 the operating rights in this country for an American process for the precipitation of pure zinc sulphide were obtained and a new plant was built. This was to be a more economic means of maintaining the range of Orr's lithopones to include the high strength qualities. Development of the plant and process was interrupted by World War II.

After the war, schemes were put in hand for the modernization of various sections of the works and the construction of a fifth unit. A new precipitation plant was built and a new scrubbed gas producer plant. Warehouse handling was mechanized, and instrumentation, as a feature of process control, was introduced on a fairly extensive scale.

Parallel with developments of the main product, lithopone, the range of Orr's products since the second world war has been extended to include the re-introduction of high strength pigments, zinc chloride solution, zinc sulphate crystals, zinc tetroxychromate and high purity zinc and cadmium sulphides.

In addition, the barium chemicals side of the operations has been developed. Ground

white barytes has been made at Widnes works since the early years of this century, and in 1953 blanc fixe manufacture was started. In 1955 the range was extended to include the production of barium chloride crystals and barium carbonate. Thus the development of the Vine works is still going on, and manufacture has been spread over a much wider basis so that, in addition to producing to meet the demands of the paint, linoleum and rubber industries, the works is now in a position to meet the requirements of a much wider field of industry.

* * *

Some Who Serve the Chemical Industry...

Gas & Chemical Engineers

THE firm of R. & J. DEMPSTER LTD. was former in 1885 when the late Robert and John Dempster transferred their business to Manchester. By-product plants, condensers, gasholders, purifiers, tanks, tar extractors and washers were among the firm's earlier products.

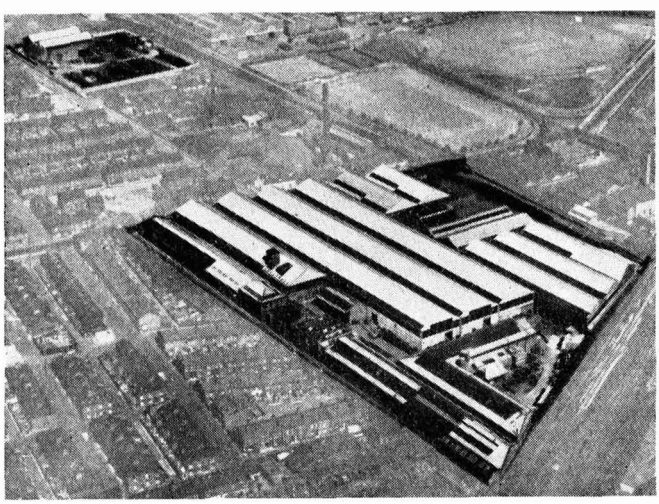
The company's Manchester premises cover eight acres and include, in addition to the office block, ambulance room, boiler shop and smithy, building maintenance and joinery department, canteen, chemical laboratory, electricians' department, fitting and machine shops, foundry and fettling shops, heat treatment and stress relieving furnace for welded products, maintenance department, miscellaneous stores, pattern making shop and store, planing shop, power house, radiography department for weld testing, tackle stores, template floor, welding department, and welfare department etc.

The firm's spirally-guided gasholders were introduced in 1948. Since then gasholders of this design totalling over 40,000,000 cu. ft. capacity have been installed by, or ordered from the organization or its sub-licensees.

Since 1927 the company has installed 32 waterless gasholders, including the 8,000,000 cu. ft capacity gasholder at Southall, said to be the largest waterless gasholder in Britain. Much progress has been made with electrostatic tar precipitation and gas condensation, and the firm's electro-detarrers function satisfactorily in various parts of the country. The company's latest production in condensing plant is the cross-tube-flow condenser. Since 1946, it has been manufacturing liquid purification plant of the Manchester type.

The firm's static multi-stage washer has found uses in ammonia, naphthalene and benzole removal, the latter in conjunction with the company's distillation plants.

The workshops are also well equipped for



Aerial view of the gas plant works of R. & J. Dempster Ltd., Newton Heath, Manchester

the production of gas valves, iron castings, cast iron pipes, riveted and welded steel connections, and cast iron and steel stills and tanks for the storage of liquor, oil, spirit, tar, water etc.

* * *

100 Years of Boiler Making

ONE hundred years ago Robert Jenkins founded ROBERT JENKINS & CO. LTD. at Rotherham. For some years, boiler making was the main business of the works. When Alfred Jenkins joined his father in 1876 the firm employed some 30 men. About 1900 Alfred Jenkins' two eldest sons came into the business and expansion quickly followed.

Edgar Jenkins, who was appointed works manager in 1910, was to become a pioneer of electric arc welding in this country. This marked the start of considerable development in the firm, which today carries on business as welding engineers, boiler makers, and galvanizers. The company now has over 1,000 employees.

Today, the boiler making section is only a small part of the works. Other products include underground petrol and storage tanks, above ground storage tanks, a large range of chemical and general engineering vessels made in mild steel, stainless steel, Monel metal, stainless clad, aluminium etc. Products also include vessels and fractionating columns for refinery work, and stainless and mild steel vessels used in the development of atomic energy. Vessels are manufactured to the requirements of Lloyd's Class I for fusion welded pressure vessels, and also to American specifications.

The company is planning further extensions to the works and a new shop is expected to come into use in the autumn.

* * *

Toys to 'Top Secrets'

FOUNDED as recently as November 1946, LOYNE LTD., of Ashton-under-Lyne, have graduated in 10 years into a company employing 70 workers and a contract for three 'secret list' undertakings. Beginning by stove-enamelling toys, the company undertook a contract in 1948 for Dobson & Barlow Ltd., who required some machinery to be covered with stoved phenolic resin.

From that contract Loyne Ltd. progressed and now concerns itself with Epikote, Teflon, Fluon, Araldite, silicones, nylon, phenolics, pvc, and heat-cured site work enamelling. Among outside contracts undertaken last year was work on sea-going tankers, chemical plant, and supersonic wind tunnels.

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Founder Still at Helm

AN organization with its founder still at the helm is L. A. MITCHELL LTD., chemical engineers of Manchester. Started in 1920 by Mr. L. A. Mitchell, A.M.I.Mech.E., M.I.Chem.E., M.I., Struct.E., the chairman and managing director, the company handles a wide range of equipment including industrial drying plant for the chemical, foodstuffs, colour, plastics, textile and drying industries, pumps for corrosive liquors, fluid agitating equipment, complete chemical plants and bulk storage installations, and special types of filtration equipment for dealing with effluents and solutions. Although all technical matters, sales and design work are conducted at Manchester, the manufacturing is carried out by an associated company, Pratchitt Bros. Ltd., general engineers and ironfounders, at Carlisle.

* * *

Pharmaceutical Machinery

MANESTY MACHINES LTD. was incorporated as a limited company in 1936, having been formed from the chemical and pharmaceutical machinery side of Thompson & Capper Wholesale Ltd., which has been associated with Lancashire since 1798. In 1946, Manesty Machines Ltd. was taken over by John Holroyd & Co. Ltd., of Milnrow, Lancashire, gear and machine tool manufacturers.

The products of Manesty Machines Ltd. include tablet compressing machines, mixers, granulators, coating pans, drug mills, compact presses, punches and dies, and automatic water stills.

A new machine developed by the company is the DryCota combined tablet making and compression coating machine. This machine in effect puts one tablet inside another, and avoids the long and difficult process of pan-coating, besides having special advantages in coating materials which could not be handled successfully by the earlier method. The machine has been chosen by the DSIR to be shown on their special New Products and New Processes Stand at the BIF, Birmingham, 23 April to

4 May 1956. At the same time, Manesty Machines will be showing the DryCota and other models at the BIF, Olympia, London.

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Copper for Chemistry

THOMAS BOLTON & SONS LTD. was established in 1783, and has works at Widnes and St. Helens in Lancashire, and at Froghall and Oakamoor in Staffordshire.

The firm manufactures copper and copper-base alloys in the form of wire, sheet, strip, tubes, rods, sections machined components, and many of its products are ultimately used in the chemical industry.

Smelting and refining of copper is carried on in the Widnes works in Lancashire, where Mersey sulphate of copper is manufactured.

* * *

Electronics

FIELDEN ELECTRONICS LTD., was founded by Mr. J. E. Fielden, M.Sc., A.M.I.E.E., in 1946, in Holt Town, Manchester, to manufacture and market the Fielden Drimeter, an electronic instrument using the capacity principle for the measurement of the moisture content of fabrics. Its success enabled work to be done on other measuring devices, using the principle of electrical capacity including the Fielden Tektor Level Control and the Proximity Meter. In 1948 an Australian company, Fielden Electronics (Aust.) Pty. Ltd., was formed. Later that year Fielden also formed a company in the US.

Besides the associated American and Australian companies, Fielden has representatives throughout the world and, apart from the large turnover on Fielden instruments in the US 25 per cent of the US company's output is exported.

In its short existence the company has filed scores of patents and a new company Fielden Research Ltd. has been formed at Bangor, North Wales. A representative range of Fielden products, suitable for the chemical industry, will be shown at the ABCM Conference at Harrogate in April.

* * *

Filter Cloth Specialists

SAMUEL HILL LTD., of Rochdale, was founded in 1873 and acquired by Oswald & Duncan Ltd., cotton canvas manufacturers, in 1913. Under this arrangement the company is able to control manufacture from the spun thread to the finished article.

Products cover a wide range of industries. In liquid filtration all types of equipment, pressure, vacuum and centrifugal are covered, while air filtration and dust collection bags and sleeves are supplied to fit any type of plant. The organization is equipped to deal with synthetic fibres for special uses, and maintains a testing laboratory to maintain the standard of the products and to assist customers in their problems.

* * *

Metal Packing

THE firm of READS LTD., was founded in Liverpool in 1869 to manufacture metal utensils and containers, since when the company has extended its activities to serve the metal packaging requirements of most industries.

To-day the company's four factories on Merseyside are engaged in the production of an extensive range of tin boxes, steel drums and other metal containers and patent metal and plastics closures. The containers range in capacity from one ounce to 50 gallons and include steel, tinplate and aluminium drums with various types of

The mobile demonstration unit parked in front of the premises of Fielden Electronics Ltd., Wythenshawe

neck-fittings and full-aperture closures with aluminium-lined, plastic-lined or lacquered interiors.

* * *

Wire Screens

SINCE 1811, when James Locker began to make wire screens, the tradition has passed directly and continuously down the family line for over four generations. He was a pioneer in the industry and was the first man to produce wire screening on a power loom, a method of manufacture revolutionary in its effects throughout the entire trade.

His son, Thomas Locker, founded the firm of THOMAS LOCKER & CO. LTD., which, under his control, developed rapidly. On his death in 1892, he was succeeded by his two sons, James Thomas Locker and Thomas Locker, who controlled the company jointly for over 30 years, during which time a considerable expansion in overseas business was achieved, and the Warrington works was greatly expanded.

In 1926, Thomas Cecil Locker, on the death of his father, James Thomas Locker, was appointed joint managing director of the company, and was joined in that capacity by his brother, James Reginald Locker in 1930. These two brothers have controlled the company during the last 26 years and have further extended the business in Warrington. The company has also acquired a number of subsidiary works.

* * *

Valves & Pumps

FOUNDED in 1832, SIR W. H. BAILEY & CO. LTD. originally manufactured turret clocks and instruments. Trading under the name of J. Bailey & Co., the company was then situated in Salford. By the 1870s, the firm had expanded sufficiently to supply all classes of valves, pumps, indicating and recording instruments, turret clocks, machine tools, gas fittings, and raw materials such as non-ferrous and ferrous bar.

From about 1910 the firm started to specialize and in 1939 the products were limited to roughly the following ranges: all types of valves and pumps, recording and indicating instruments and testers.

After the second world war the range of products was further limited and now consists of a range of reducing and float valves, a range of sluice and reflux valves, a range of hand test pumps, and a range of single and double cylinder slide valve dry vacuum pumps.

Fluon Price Reduced

ICI has reduced the price of Fluon polymer (brand of polytetrafluoroethylene PTFE) from a development price of £5 per lb to £2 per lb—a reduction which opens up new fields for this material.

Fluon possesses a combination of properties that give it an unrivalled position in the chemical and electrical industries. Not only does it maintain excellent dielectrical properties up to very high temperatures and frequencies, but it is also immune to practically all forms of chemical attack. In addition, Fluon has a very low coefficient of friction. Few materials adhere to its surface, and this has led to the development of Fluon bearings (which require no lubrication) and to the use of Fluon as a facing material for machinery handling sticky materials (e.g. for covering bakery rollers used in dough-mixing).

Fluon polymer can be moulded and machined to form small electrical components with outstanding insulating properties. High heat-resistance is an additional advantage. It is being moulded to form gaskets, seals and packings in wide variety for the chemical and oil industries. The material can be extruded to give a flexible tubing capable of handling all the liquid products of the chemical and oil industries up to very high temperatures.

PVC Price Cut

THE price of emulsion pvc made by Imperial Chemical Industries Ltd. has been reduced by 1d to 1s 8d. a pound from 19 March. This is stated to be in line with the policy of passing on the benefits of increased production to the consumer.

This grade of pvc is used mainly in the manufacture of non-inflammable mine conveyor belting, rainwear, bathroom curtains, hand-bags, travel goods, cable sheathing and leathercloth upholstery materials.

For most of the grades of compounded pvc sold under the name of Welvic the basic price has been cut by 2d a pound.

HOME

QVF Exports Up

Exports of glass pipeline and industrial plant supplied by QVF Ltd., of Stone (Staffs), rose by 20 per cent in 1955—the firm's second year of full production. The firm's products were sent to six continents and almost every country in the world.

Nylon Paper Produced

A sheet of nylon paper is reported to have been produced at Leicester College of Art, after experiments lasting two months. The paper is said to be immune from mildew, damp and chemical damage.

UK Buys US Heavy Water

Britain is to buy 50 tons of heavy water from the US at a cost of $3,000,000 (£1,100,000), which is said to be considerably below that of any of the estimates of heavy water production costs using different processes so far released. The purchase will enable Britain to proceed with plans for constructing heavy water moderated reactors at the Atomic Energy Research Establishment, Harwell, and at Dounreay, Caithness.

Sundour Golden Jubilee

Last week Morton Sundour Fabrics Ltd. celebrated the golden jubilee of Sundour Fabrics for it was just 50 years ago that these materials were first put on the market —the first fabrics in the world to be sold with a guarantee against fading. Two cocktail parties were held on Tuesday, 13 March, an anniversary dinner was held on Thursday, 15 March, and a booklet 'Fifty Years of Sundour' was published to commemorate the occasion. Sir Alexander Fleck, chairman of Imperial Chemical Industries Ltd., was one of the speakers at the dinner.

Corday-Morgan Award

Copies of the rules governing the Corday-Morgan Medal and Prize for 1955 are now available from the general secretary of The Chemical Society at Burlington House, Piccadilly, London W1. The award, consisting of a silver medal and 200 guineas, is made annually to the chemist (either sex under 36) of British nationality, who in the judgment of the Council of The Chemical Society has published the most meritorious contribution to experimental chemistry during the year.

Design Centre Grant

The Council of Industrial Design has received a donation of £350 from the Dunlop Rubber Company as a contribution to the new Design Centre about to be opened in London.

CCF Record Output

The phosphate section of the products works of ICI Billingham had a record output of Concentrated Complete Fertilizer (CCF) last year. Speaking on 6 March to celebrate this fact Mr. K. H. L. Cooper, Billingham Division commercial director, said: 'More fertilizers are certainly going to be used and I am confident that the use of compound fertilizers will continue to move ahead, and particularly the more concentrated ones.'

Fatal Accident

One man was killed and two others had to be treated for shock on 14 March when an air compressor burst in the chemical plant of the Staveley Iron & Chemical Company's factory near Chesterfield. The man who was killed was standing beneath the pipe as the air compressor was started up, and the pipe burst and fell on him.

New British Standards

The British Standards Institution has just issued three new Standards in the series for solvents and allied products. These are: BS 2710:1956 for bromomethane (methyl bromide), BS 2711:1956 for cyclohaxane, and BS 2712:1956 for dipentene. Limits are specified for physical properties of the materials and for impurities likely to be present. Full details of methods of analysis are given.

Record Attendance at OCCA Luncheon

The Eighth Technical Exhibition of Raw Materials Used in the Paint, Varnish and Printing Ink Industries was officially opened by The Rt. Hon. Viscount Waverley, president of the Parliamentary and Scientific Committee, at the Royal Horticultural Society's New Hall on Tuesday, 20 March. The exhibition, which was organized by the London Section of the Oil and Colour Chemists' Association, lasted for three days and was even better attended than usual. A record number of members and their guests attended the Exhibition Luncheon which preceded the official opening.

OVERSEAS

Phosphate Survey

A survey to determine whether New Zealand has any workable phosphate deposits may be ordered by the Government.

Manganese Refinery

The construction of a mill at Woodstock, New Brunswick, for refining manganese will probably begin next year, announced Dr. H. J. Rowley, chairman of the National Resources Development Board.

Indian Sugar Plan

The Development Council for the Sugar Industry in India is considering a programme for the development of the industry under the second Five-Year Plan.

Sweden's Chemical Industry

Sweden's chemical industry, which accounted for about 6 per cent of the total value of Sweden's industrial production in 1952, foresees an annual increase of 4.5 per cent in the next five years.

US Boron Minera's

US sales of boron minerals increased nine per cent over the previous year to 778,420 short tons valued at $26,714,440.

£26,500,000 Expansion Plans

Norway's biggest industrial concern, Norsk Hydro, is planning to invest £26,500,000 in the next six years in building new plants and extending and modernizing existing installations. Most of the money will be spent on augmenting hydro-electric power generation. Norsk Hydro specializes in the production of nitrogenous fertilizers.

German Steel Record

It is predicted that Western Germany's steel production will rise above the record 21,340,000 tons produced in 1955 even if the rate of growth of investment in capital goods should fall off this year.

Sales Exceed Production

In December 1955 the US sulphur industry produced 574,144 long tons of native sulphur and 35,750 long tons of recovered sulphur. Output during 1955 reached record totals of 5,743,344 long tons of native sulphur and 401,650 tons of recovered sulphur, increases of 4 per cent and 12 per cent respectively over the previous year. Sales were greater than production and consequently there was a small decrease in sulphur stocks.

Unilever Extension

Unilever NV is preparing plans for a considerable extension to its head office in Amsterdam.

US Soda Ash

Production of natural soda ash in the US in 1954 was 527,282 short tons, a 26 per cent increase over the record tonnage of the previous year, according to reports of producers. This increase, however, was offset by a decrease in the quantity of manufactured soda ash.

Imported Glues

The Government of India has decided that besides casein glue, other imported glues should be licensed freely on shipping bills for export to all permissible destinations, other than Portuguese possessions in India, up to 31 December, this year.

BP to Add Reforming Unit

A 400,000 tons a year thermal reforming unit is to be added to BP's Aden refinery, which came on stream in July 1954. This unit will increase the refinery's production of high grade motor spirit by improving the low octane spirit from the distillation units. Work is also going ahead with an extension to the refinery's cooling water supply. At present, about 2,000,000 gallons an hour of cooling water are circulated through the refining units. Installation of new pumps and pipelines will increase this to more than 3,000,000 gallons an hour.

QVF Apparatus at Utrecht

Glass distillation apparatus, supplied by QVF Ltd., of Stone (Staffs), is being used at the Utrecht Trade Fair (Holland) from 13 to 22 March to demonstrate electrode boilers. Steam is generated by the boilers and is passed through the distillation apparatus, a standard QVF unit.

Appeal Under Stimulation Act

Compania Nacional de Exlosivos of Havana have applied to the Cuban Government for tax exemptions and other benefits offered under the Industrial Stimulation Act to enable them to establish a factory to manufacture explosives and accessories. The project would require the import of a variety of products such as potassium chlorate, dinitro toluene, mirbane oil, solid and liquid paraffin, sulphur, and dynamite, fuses and copper cable.

PERSONAL

MR. W. W. WATT, managing director of the British Oxygen Company, will retire from the board on 31 March. Mr. Watt, who is 65, first joined the company in 1938.

MR. ALAN E. CRAWFORD, A.M.BRIT., I.R.E., A.R.Ae.S., has joined the Brush Crystal Co. Ltd., at Hythe, Southampton, to take charge of a new research laboratory for the development and application of piezeolectric materials. He is the author of the recently published book 'Ultrasonic Engineering'.

The Minister of Fuel and Power has appointed DR. BASIL SCHONLAND, deputy director, Atomic Energy Research Establishment, Harwell, to his Scientific Advisory Council.

MR. T. A. H. MILTON, formerly chemicals sales manager of the Bradford area office of ICI, has been appointed ICI Lime Division sales control manager as from 1 April, in succession to MR. C. D. FLANDERS who is to retire on 31 March. Mr. Milton joined ICI in 1933, and after service in the second world war, was appointed sales manager of ICI (Levant) Ltd., Palestine. From 1947 to 1952 he was manager and a local director of ICI (Export) Ltd., Iraq. On his return to the UK in 1952, Mr. Milton was with the European department of the head office until appointed chemicals sales manager of the Bradford area office.

PROFESSOR HUGH C. LONGUET-HIGGINS, John Humphrey Plummer Professor of Theoretical Chemistry in the University of Cambridge, England, and a prominent investigator in the field of molecular theory, has been named Arthur D. Little Visiting Professor of Chemistry at the Massachusetts Institute of Technology for the current semester. DEAN GEORGE R. HARRISON of the School of Science at the Institute, who announced the appointment, also outlined plans for a series of lectures on the application to chemistry of modern physical theories of atomic and molecular structure to be presented by Professor Longuet-Higgins during the next three months.

The Esso Petroleum Co. Ltd., have announced the retirement of MR. WILLIAM E. JENKINS, C.B.E., from his position as a managing director of the company, and the appointments of MR. H. C. TETT and MR. R. J. PINDER to managing directors. MR. C. CHILVERS, manager of the co-ordination and economics department, has been appointed to the board of directors. The appointments are effective from 1 March, 1956.

Mr. H. C. Tett

Mr. C. Chilvers

MR. NORMAN FRENCH, joint managing director of Benn Brothers Ltd., proprietors of THE CHEMICAL AGE, is to retire on 31 March. Mr. French joined Benn Brothers directly after the 1914-18 war and after a few years was appointed editor of *The Hardware Trades Journal*. In 1932 he was appointed editor of *The Timber Trades Journal*. He rapidly became a prominent figure in the timber trade and was a member of the United Kingdom Timber Trade Delegation—the first of its kind—which went to Canada in 1938 and he was also a member of the delegation which visited Canada in 1947. He again visited Canada in 1952 when he attended the British Commonwealth Forestry Conference, and both before and since the 1939-45 war he has travelled widely in Sweden and Finland. More recently he has served on the Departmental Committee appointed by the Minister of Agriculture to inquire into the marketing of the produce of privately owned woodlands. Rarely has a trade journalist enjoyed such widespread respect and the complete confidence of members of the trade as has Mr. French.

The 82nd Annual General Meeting of the Society for Analytical Chemistry was held on 29 February. The following officers and members of the council were elected for the forthcoming year:— *President*: K. A. WILLIAMS; *past presidents serving on the council*: LEWIS EYNON, D. W. KENT-JONES, J. R. NICHOLLS and GEORGE TAYLOR; *vice-presidents*: D. C. GARRATT, J. HASLAM and H. M. N. H. IRVING; *honorary treasurer*: J. H. HAMENCE; *honorary secretary*: N. L. ALLPORT; *honorary assistant secretary*: R. E. STUCKEY. *Other members of council*: S. G. BURGESS, R. C. CHIRNSIDE, C. H. R. GENTRY, W. C. JOHNSON, D. D. MOIR, T. MCLACHLAN, R. F. MILTON, MISS MAMIE OLLIVER, F. C. J. POULTON, S. A. PRICE, A. A. SMALES and A. F. WILLIAMS; *ex-officio members*: J. R. WALMSLEY (chairman of the north of England section), F. J. ELLIOT (chairman of the Scottish section), P. J. C. HAYWOOD (chairman of the western section), J. R. LEECH (chairman of the midlands section), G. F. HODSMAN (chairman of the microchemistry group), J. E. PAGE (chairman of the physical methods group), K. L. SMITH (chairman of the biological methods group). The membership of the Society is now 1,842, an increase of 43 compared with the previous year.

Mobil Oil Company's general sales manager (industrial), MR. F. N. JUDSON, retires to-day. He is succeeded by MR. G. M. MCGAVIN. Two years ago Mr. Judson celebrated 40 years service in the company, and, in recognition of his contribution to the affairs of the oil industry throughout these years, he was awarded an M.B.E. in the 1956 New Year's Honours List.

Obituary

The death has occurred of MR. FRANK STANLEY BENTLEY, of Moorcliffe, Halifax, chairman of J. E. Bentley & Co. Ltd., dyers and finishers, Woodfield Mills, Greetland, near Halifax. Mr. Bentley, who was 67, was the brother of the novelist, DR. PHYLLIS BENTLEY.

The death has occurred at the age of 58 of MME. I. JOLIOT-CURIE. Mme. Joliot-Curie was the daughter of PIERRE and MARIE CURIE, the discoverers of radium, and worked with her mother's X-ray service during the 1914-18 war. In 1921 she started her own researches into radioactivity. She married PROFESSOR FREDERICK JOLIOT in 1926. Their joint discovery that substances bombarded by radium rays could be made radioactive earned them the Nobel Prize for chemistry in 1934. During the last war both worked for the resistance movement. Mme. Joliot-Curie was appointed head of the Radium Laboratory in Paris in 1947 and was one of the four directors of the French Atomic Energy Commission when her husband was chairman. He was dismissed from that post in 1951 because of his membership of the Communist Party. She was removed a year later because of her whole-hearted support for her husband. In 1953 she became president of the World Federation of Scientific Workers.

du Pont Record Sales

SALES and earnings of E.I. du Pont de Nemours & Co. in 1955 were a record. At $1,909,000,000 sales were 13 per cent above 1954, and nine per cent over the previous record of $1,750,000,000 in 1953. The increase was the result of larger physical volume, since the company's index of sales prices decreased about one per cent during the year.

Total earnings of the company came to $432,000,000, including $307,000,000 from du Pont sources and $125,000,000 from General Motors Corp. dividends.

The sales record reflects the results of $1200,000,000 the company spent to build new plants and improve existing ones over the last 10 years. Fourteen new plants were built in this period. Four new plants are under construction: at Tucker, Georgia, for finishes; Cincinnati, Ohio, for sulphuric acid; at Montague, Mich., for neoprene; and at Antioch, California, for tetraethyl lead and Freon refrigerants. A large integrated unit, to produce sodium, ethyl chloride, and other products, is being designed for construction at Antioch.

MR. FRANCIS HERON ROGERS, of Sherwood Mount, Uplands Road, Kenley, Surrey, chartered patent agent and consulting engineer, company director, and a past-president of the Institution of Chemical Engineers, left £114,473 (duty £57,502).

Law & Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages & Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages or Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary but such total may have been reduced.)

ASHBURTON CHEMICAL WORKS LTD., Manchester.—15 February, deed securing £540,000 deb. stock of Geigy (Holdings) Ltd., together with a premium of up to five per cent in certain events and secured by a Trust Deed dated 2 February, 1956; general charge. *Nil. 8 September, 1955.

CIMEX-FRASER TUSON LTD., Orpington, manufacturers of insecticides etc.—15 February, by order on terms, £5,000 charge, to Wool Exchange & General Investments Ltd.; charged on land at Gray-av., St. Mary Cray. *£10,000. 11 November, 1954.

GEIGY CO. LTD., Manchester, colour merchants etc.—15 February, deed securing £540,000 deb. stock of Geigy (Holdings) Ltd., together with a premium of up to five per cent in certain events and secured by a Trust Deed dated 2 February, 1956; general charge. *Nil. 12 September, 1955.

GEIGY-HARDESTY CO. LTD., Manchester, chemical manufacturers.—15 February, deed securing £540,000 deb. stock of Geigy (Holdings) Ltd., together with a premium of up to five per cent in certain events secured by a Trust Deed dated 2 February, 1956; general charge. *Nil. 29 August, 1955.

GEIGY (HOLDINGS) LTD., (formerly Geigy Co. Ltd., & Geigy Colour Co. Ltd.). Manchester.—15 February, £540,000 deb. stock with a premium of up to five per cent in certain events, secured by Trust Deed dated 2 February, 1956; general charge. *Nil. 3 November, 1955.

GEIGY PHARMACEUTICAL CO. LTD. (formerly Pharmaceutical Laboratories Geigy Ltd., & Geigy Pharmaceutical Co. Ltd.). Manchester.—15 February. deed securing £540,000 deb. stock of Geigy (Holdings) Ltd., together with a premium of up to five per cent in certain events secured by a Trust Deed dated 2 February, 1956; general charge. *Nil. 25 August, 1955.

Satisfaction

BIOPLASTICS LTD., London WC.—Satisfaction 18 February, of mortgage registered 27 February, 1947.

Increases of Capital

ALLIED COLLOIDS (MANUFACTURING) CO. LTD., Cleckheaton Road, Low Moor, Bradford, increased by £30,000, in £1 ordinary shares, beyond the registered capital of £75,000.

ALLIED COLLOIDS (BRADFORD) LTD., 18a North Parade, Bradford, increased by £66,000, in £1 ordinary shares, beyond the registered capital of £40,000

E. NICKERSON & COMPANY LTD., chemical, drug and general merchants etc., Royal Dock Chambers, Grimsby, increased by £60,000, in £1 ordinary shares, beyond the registered capital of £60,000.

PHARMETHICALS (LONDON) LTD., industrial and manufacturing chemists, etc., 18 Gt. Portland Street, London W1, increased by £5,000, in £1 ordinary shares, beyond the registered capital of £5,000.

New Registrations

Maylon (Research and Development) Ltd.

Private company. Capital £100 in £1 shares. To carry on the business of manufacturers and suppliers of and dealers in materials, chemicals or products used in the improvement, preservation, storage, protection or processing of foodstuffs or beverages, etc. Subscribers: Alfred L. Leddiman and Philip G. May. Registered office: 30 Cornhill, London EC3.

Reactron Ltd.

Private company. (562,599). Capital £3,000 in £1 shares. To carry on the business of mechanical, electrical and chemical engineers, etc. Subscribers: A. C. Askwith and B. de Carle, of 1 Threadneedle Street, London EC2.

Vactron Ltd.

Private company. (562,599). Capital £5,000 in £1 shares. To carry on the business of electrical and/or mechanical

engineers, etc. Subscribers and other particulars similar to those of Reactron Ltd. (q.v.).

Company News

Associated Electrical Industries

Trading profit of the Associated Electrical Industries group for the year 1955 was £13,300,000, before tax, compared with £11,700,000 for the previous year. Net profit was £5,960,000, against £4,500,000 in 1954. Orders received by the group during the year increased from £102,000,000 to £127,000,000. Production for the year both in value and volume was a record, according to the annual review.

The Texas Co.

The consolidated net income of The Texas Co. in 1955 amounted to $262,729,738, or $9.57 a share, compared with $226,140,761, on $8.24 a share, in 1954, announces Mr. J. S. Leach, chairman of the board, and Mr. Augustus C. Long, president of the company. Gross income was $1,890,499,534, compared with $1,695,795,434 for 1954, and income from sales and services was $1,767,266,455, a 12.3 per cent increase. Capital expenditures of the company in 1955, including investments in and advances to non-subsidiary companies, totalled $283,090,555. Since 1945 the company has invested nearly $2,000,000,000 in additions to properties, plant and equipment, of which approximately 56 per cent has been for producing activities. The capital investment budget for 1956 is $325,000,000. Among major projects now under construction are an 80,000 barrel-a-day crude distillation unit and a fluid catalytic cracking unit at Port Arthur, Texas, and a 20,000 barrel-a-day refinery in Santiago de Cuba.

In April 1955 the company entered the synthetic rubber business through the newly-organized Texas-US Chemical Co.

New Fertilizer Plant

Imperial Chemical Industries Ltd., Billingham-on-Tees, are to construct a new fertilizer plant and the approval of the local planning authorities is being sought. The plant will, it is stated, result in a substantial increase in the production of concentrated fertilizer.

Record Sales in US

MCA Figures Up on 1954

CHEMICAL industry sales in the US during 1955 are estimated at $23,000,000,000, which is claimed to be an all-time record. This figure represents a 17.6 per cent increase over the 1954 figures, according to the Manufacturing Chemists' Association.

Chemicals are now America's fourth largest industry, and production for 1955 was also a record. The Federal Reserve Board production index for the first eight months of the year was 162 (index for 1947-49 = 100).

Estimated output for plastics and resins, based on the first six months of the year, is 3,500,000,000 pounds, 20 per cent above the figures for 1954. An increase of 23 per cent for man-made fibres was recorded for the first three quarters of the year.

Profits are also up on last year, rising from $585,000,000 to $777,000,000. Dividends for the first half of the year were $379,000,000 as against $325,000,000 for the corresponding period last year. Chemical industry payments represented 13 per cent of all cash dividends paid by manufacturing industries during the period.

It is estimated that the total paid in taxes by the chemical industry in 1955 will amount to $1,400,000,000.

The chemical industry supplied direct employment to 810,000 men and women in 1955. The average weekly earnings for hourly paid workers were $84.25.

Baxter Laboratories Move

BAXTER Laboratories of Canada Ltd., will complete the transfer of operations by the end of this year from existing premises at Acton, Ont., to a new 30,000 sq. ft. plant at Alliston, Ont. The company has purchased seven acres at Alliston and construction begins this spring. The $300,000 plant will employ 75 to 100 people to start with, rising to 300 in three years.

Alliston was chosen as the site for the new plant because of its proximity to the main CPR line, stated Baxter vice-president Ralph Falk. Associated with Baxter Laboratories of Chicago, the Canadian company makes intravenous solutions, plasma and related equipment.

Next Week's Events

MONDAY 26 MARCH

Institution of the Rubber Industry

Manchester: Grand Hotel, 6.45 p.m. 'Polyester Isocyanate Foams' by J. T. Watts and E. A. Packer of ICI Ltd.

The Chemical Society

Nottingham: The Great Hall, The University. A symposium on 'Antibiotics & Mould Metabolites'. Morning session 9.30 a.m. to 12.35 p.m. Afternoon session 2.30 to 5.30 p.m.

TUESDAY 27 MARCH

Society of Instrument Technology

London: Manson House, 26 Portland Place W1, 6.30 'Atomic Energy Plant Instrumentation' by R. K. Sandiford.

Chadwick Public Lectures

London: 90 Buckingham Palace Road SW1, 5.30 p.m. 'Survey of Progress in the Control of Stream Pollution' by B. A. Southgate, C.B.E., Ph.D., D.Sc., F.R.I.C.

Society for Analytical Chemistry

Nottingham: Gas Showrooms, 7 p.m. 'The Analytical Chemistry of Mercury' by G. J. W. Ferrey, B.Sc., F.R.I.C., and Dr. R. F. Milton, B.Sc., F.R.I.C.

The Chemical Society

Nottingham: The Great Hall, The University, 10.45 a.m. 'Alkoxides, Old & New' by Professor W. Wardlaw, C.B.E., D.Sc., F.R.I.C.

WEDNESDAY 28 MARCH

Society of Instrument Technology

Chester: 5 Kings Buildings, King Street, 7 p.m. 'Recent Instrument Developments' by Dr. J. W. Drinkwater of Shell Research Ltd.

Oil & Colour Chemists' Association

London: Royal Society of Tropical Medicine & Hygiene, Manson House, 26 Portland Place W1, 7 p.m. 'Current Views on How Paint Films Prevent Corrosion' by J. E. O. Mayne, Ph.D., A.R.C.S., D.I.C.

The Chemical Society

Nottingham: The Great Hall, The University, 11 a.m. Faraday Lecture 'Personal Reminiscences of a Radiochemist' by Professor Dr. Otto Hahn.

SCI (Chemical Engineering Group)

London: Geological Society, Burlington House, Piccadilly W1, 6.30 p.m. 'Some Aspects of the Use of Radio-isotopes' by F. Seligman.

SCI (Food Group)

London: Rooms of The Chemical Society, Burlington House, Piccadilly W1, 6.30 p.m. 'Fish Spoilage & Fish Freshness Tests' by J. M. Shewan and N. R. Jones

Microchemical Methods

STARTING on 14 April, a course of 12 lectures and appropriate practical work will be held on Saturday mornings at the Norwood Technical College, London SE27, from 9.15 a.m. to 12.30 p.m The course is designed to survey the principal branches of chemistry in which small-scale methods have been successfully applied.

Lectures, illustrated by demonstrations, will deal with the following topics:—Scope, aims and achievements of small-scale techniques; design and contruction of simple apparatus; organic and inorganic preparations on the reduced scale; simple chemical microscopy; inorganic qualitative analysis; volumetric and gravimetric analysis on the reduced scale; organic qualitative and quantitative analysis, and micro techniques for the determination of molecular weight etc.

Application forms for admission to the course may be obtained from the Secretary of the College. For London residents the fee is £1.

New Royal Society Fellows

AMONG new Fellows of the Royal Society elected for 1956 are three men well known in the fields of chemistry and metallurgy.

The first is Norman Percy Allen, superintendent, metallurgy division, National Physical Laboratory, who is distinguished for his work on alloy steels, their transformations and engineering properties.

The second to be honoured is Professor Richard Maling Barrer, Professor of Chemistry, Imperial College of Science and Technology, London. Professor Barrer has carried out much work on the mechanism of adsorption and diffusion of gases in solids and the problem of molecular sieves in zeolite minerals.

Professor John Alfred Valentine Butler, Professor of Physical Chemistry, University of London, is the third chemist on the list of new fellows. Professor Butler has studied thermodynamics, and the application of physical techniques for the solution of problems of molecular structure of deoxyribonucleic acid.

DECHEMA Discussions

SEVEN topics were discussed in the 'Dechema-Erfahrungs-Austausch' and the results of these discussions have been incorporated in a new number (No. 9) of the series entitled 'Ergebnisse von Einzelfragen des chemischen Apparatewesen' (Answers to Questions on Chemical Apparatus and Equipment Practice).

The subjects discussed were: How can incrustation in evaporators be prevented?; separation of metallic dust from pvc powders; filtration of highly viscous solutions; plastics tubes for use with concentrated nitric acid; SO_3 corrosion in boilers and its prevention; heat exchange in mould driers; and use of carbon fluoride compounds for the manufacture of packing and jointing.

Many contributors both in Germany and elsewhere have participated in these discussions. In addition to a summary of the answers to each question, the individual contributions, many of which are very comprehensive and contain much valuable information, are also published in the number under notice.

This volume has been privately printed in German by DECHEMA, Frankfurt am Main, W7, Postfach, price DM 8 for members, DM 10 for non-members, postage DM 1.

Ethanolamine Unit

CONTRACT for construction of an ethanolamine unit at the Dow Chemical of Canada Sarnia plant has been awarded to Catalytic Construction of Canada Ltd., Sarnia. Construction is expected to get under way this spring following engineering planning with completion scheduled for next September.

The ethanolamine unit, first to be installed in Canada, will produce a range of ethanolamines for use in gas purification and the manufacture of synthetic detergents and cosmetics.

QVF Open German Branch

EXPANDING sales to Germany of glass pipeline and industrial plant has prompted QVF Ltd., of Stone, Staffs, a member of the Triplex group of companies, to form a subsidiary company with headquarters and works at Wiesbaden. The subsidiary, QVF Glastechnik GmbH, will manfacture pipeline and plant to implement the range imported from England. All machinery for the factory was made in England. Before the war Germany had a virtual monopoly of industrial glassware manufacture.

Market Reports

LONDON.—The industrial chemicals market has shown no decided trend during the past week, and such slight changes in demand as have taken place are not unusual for the period. The movement against contracts has been well up to schedule, and a steady flow of export enquiry has been reported. Prices generally are unaltered, but quotations for a number of the chemical compounds have been affected by price movements in a firm metal market. Business in the coal and tar products market continues to follow a steady course with a good call for naphthalene against a limited supply position. Cresylic acid is a firm market with pale AFD higher at 95 cents per US gallon cif New York.

MANCHESTER.—The textile and allied trades in the Lancashire and Yorkshire areas are reported to be absorbing reasonably good quantities of a wide range of heavy chemicals and traders on the Manchester market are dealing with a steady demand from most other industrial outlets, especially for the alkalis and other leading heavies. Values generally continue on a firm basis, with little actual change of any consequence to record. Most fertilizer materials, including superphosphates and the nitrogenous materials, are moving steadily into consumption, and a continued good demand for the light and heavy by-products is reported.

GLASGOW.—During the past week business continued to be brisk in the Scottish heavy chemical market, and from most sections of the industry an improved position has to be reported. Contract demands have been steady, and in regard to current requirements the emphasis has been on prompt delivery. Fertilizers also have been well maintained, and compatible with seasonable demands. On the whole, prices remain steady but some slight increases have been advised.

COMPANY MEETING

United Kingdom Provident Institution

A Year of Further Records

The U.K. Flexible Pensions Scheme
Business can Encourage a New Sense of Purpose

SIR JOHN BENN'S SPEECH

THE 115th annual general meeting of the United Kingdom Provident Institution was held on 21 March at the Chartered Insurance Institute, London EC2.

Sir John Benn, Bt., the chairman and managing director, in moving the adoption of the report and accounts for the year ended 31 December 1955 said:—

All the figures by which the progress of a life assurance office are normally measured were better in our Institution's experience in 1955 than in any previous year. This was perhaps to be expected in a period when British incomes were higher than ever, but since our business is still mainly with the professional and salaried classes, whose remuneration has not kept pace with the general rise in wages, the record new assurances amounting to £9,553,550 net reflect the sterling quality of our membership.

Our pensions business in 1955 was again substantial. So far the Institution has catered for pensions entirely by individual policies, a basis we have used for over 40 years for the Federated Superannuation System for Universities and similar plans. Since the war we have written staff pension schemes for commercial firms on a growing scale, and I am now able to announce that we are entering the group market with a new policy, to be known as the UK Flexible Pensions Scheme. This has a number of special attractions. Interest on the premiums received is allowed at a variable rate which is geared to the Bonus, so that the new policies will share in the fortunes of the Institution in the same way as policies issued under our normal with profit tables. This entirely new and distinctive feature should ensure a large market for the scheme.

The steady advance in the Institution's figures is assisted by the Board's practice of sharing information on policy and aims with the staff at all levels. I have included in our annual report a statement on 'Pounds, Shillings and—Purpose', describing further steps we are taking to inform the public about our business, on lines we have pursued since 1950. The announcement that the Prime Minister and the British Employers' Confederation have agreed there should be a national campaign to bring home the facts of the economic situation underlines the importance of all such steps both now and as a matter of long-term policy.

To inform public opinion effectively, we must first impress the thinking minority of all political persuasions whose influence is out of proportion to their number. These are the folk who chip in when a speaker is getting too far from the facts, whether in a railway carriage, at a public meeting, or in a letter to the Press. While advertising with this object is growing, the surface has only been scratched. There are immediate opportunities for every firm to act on its own initiative, and on an appropriate scale, sharing information in the first instance with its employees and shareholders and customers. Similar steps by the nationalized industries as large employers could be very valuable in promoting a more dynamic attitude today.

This review of our progress in 1955 has once more touched on wider issues which affect the fortunes of our Institution. In asserting that individual effort, which is the basis of life assurance, is also the mainspring of business and public affairs, there has been no intention to under-rate the part that government must always play. Nor do I under-estimate the efforts of the present government to deal with a very complex situation. But business can also give a bold and positive lead at this critical time.

CLASSIFIED ADVERTISEMENTS

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 *inclusive, or a woman aged* 18-59 *inclusive, unless he or she, or the employment, is excepted from the provisions of the Notifications of Vacancies Order,* 1952

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