

provided much new information as to the general laws and relations which determine the nature and properties of alloys. Dr. E. A. Rudge, who is forty years of age, graduated B.Sc. (London) with first class honours in chemistry in 1915, and thereafter was engaged as an analytical chemist first at Messrs. Johnson and Sons, at their smelting works, and then as an analytical and research chemist in the Osram Robertson Lamp Works. Since 1930, Dr. Rudge has made a special study of the uses and behaviour of timbers in South Wales industries, and of the causes and circumstances of decay in industrial timbers, and he has now in the press "The Decay of Wood in Relation to Humification", and "Wood Decay and Coal Formation".

Palaeolithic Pottery

NOTWITHSTANDING the number of claims for the discovery of pottery of palaeolithic age made hitherto, none has been substantiated. Such claims, owing to defects in the evidence, have usually had to be rejected or at best to be held 'not proven'. It would indeed be remarkable, if palaeolithic man really had been a potter, that among the very numerous relics of his cultural activities which have survived, there should be no trace of his pottery. There are, however, certain fragments recently discovered in East Anglia and the Lower Thames Valley, for which the evidence for a palaeolithic origin is unusually well attested. The fragments in question were discovered in stratified deposits at Ipswich and at Swanscombe, and they were associated in both localities with flint implements which are regarded by Mr. J. Reid Moir and Mr. J. P. T. Burchell as of Upper Palaeolithic type. A description of six of the fragments of pottery and of the conditions of their discovery are given by Messrs. Moir and Burchell in *Man* of November. The floor from which they were obtained lies at a depth of about twelve feet beneath three distinct strata in Ingress Vale; but deposits of about ten feet depth had been removed before the site was first visited, so that the possibility of intrusion, though unlikely, is not entirely eliminated. One of the fragments obtained is ornamented and certain authorities, it is said, have adjudged it thereby to be of Bronze (Beaker) Age date. Mr. Stuart Piggott, writing in the same issue of *Man*, while hesitating, on account of the size of the sherd, to be more precise in his verdict than "prehistoric", thinks that the Bronze Age beaker is suggested as the immediate parallel among the prehistoric wares of Britain. An influential committee, including among others Prof. P. H. G. Boswell, Mr. M. C. Burkitt, Mr. A. S. Kennard, Dr. L. S. B. Leakey, Dr. K. S. Sandford, and Mr. Reginald Smith, as well as Mr. Reid Moir, is to examine and report on the deposits and their contents.

Respiration of Fruits

In his Friday evening discourse on November 9 at the Royal Institution, Dr. Franklin Kidd discussed the respiration of fruits. The lecture opened with a number of demonstrations illustrating the way in

which oxygen enters fruits and carbon dioxide escapes from them in the process of respiration. Failure of the mechanism for the escape of carbon dioxide is considered as the possible cause of bitter pit, a disease which is responsible for great losses to orchardists. The changes in respiratory activity throughout the life of a typical fruit such as the apple were then described and corresponding changes in chemical constitution of the fruit considered. The conclusion arrived at is that the primary sugar which forms the basis of respiratory oxidations is the active or gamma form of fructose. Attention was then given to the sudden rise in respiratory activity which occurs at maturity and upon which ripening depends. This change, called the climacteric, probably occurs when the acidity of the fruit falls to a certain point, and can be delayed by keeping the fruit in the presence of carbon dioxide. Oxygen is also necessary for the change. After the climacteric, the fruits begin to produce odours, and if these are not allowed to escape freely, fruits become injured. The injuries due to this cause are responsible for the large amount of wastage in fruit storage. The recent discovery that ripening fruits produce a toxic substance which is probably ethylene was discussed. Unripe fruits exposed to the vapour of ripe fruits are stimulated to begin ripening at once. The intermediate stages in the oxidation of sugars in respiration were discussed. In the absence of oxygen the climacteric change which initiates ripening does not occur. The storage life of fruits can be lengthened by treatments which reduce their respiratory activity, such, for example, as certain manurial treatments in the orchard and the storage of fruit in atmospheres rich in carbon dioxide and poor in oxygen.

A Famous Dutch Pumping Engine

IN a paper read to the Newcomen Society on October 17 by Eng.-Lieut. J. J. Bootsgezel, late of the Dutch Navy, an account was given of the pumping engines erected about ninety years ago for draining the Haarlemmermeer, or "The Meer", a tract of flooded land stretching from Haarlem and Amsterdam to Leyden. The task of draining this area was entrusted to the two Dutch engineers A. Lipkens (1782-1847) and G. Simons (1802-68). Three large pumping stations were erected and in them were installed Cornish pumping engines made in Cornwall. The three stations were named after three individuals associated with the draining of the Meer: J. A. Leeghwater, F. G. van Lijnden and N. Cruquius. The engines were put into commission in 1848, and on July 1, 1852, the *State Gazette* announced: "The Meer is dry." The area drained was more than 44,000 acres. Two of the engines have been dismantled, but through the action of the Koninklijk Instituut van Ingenieurs, the Cruquius engine, which last worked on June 10, 1933, has been put in a state of preservation, and the boiler house will be maintained as a museum. Lieut. Bootsgezel was able to give many interesting particulars of the engines. The main features of the Cruquius engine included a single vertical high-pressure cylinder of 7 ft. diameter within a low-pressure cylinder of 12 ft. diameter.

The stroke was 10 ft. There were five piston rods in all, carrying an overhead weight of more than 80 tons and connected to eight great beams disposed radially about the cylinder. From the outer ends of the beams hung the pump rods and pump buckets. Each pump barrel was 6 ft. in diameter and had a stroke of 10 ft. The engine is installed in a fine round castellated building surrounded by a platform with a parapet, and the whole undoubtedly forms the most imposing historical example of pumping machinery in the world, and one which we are sure will attract the attention of many visitors to Holland.

German Sterilisation Laws

RECENT German legislation on eugenic sterilisation is described by Dr. Aubrey Lewis in the *Eugenics Review* (Oct. 1934, p. 183), especially as regards the ordinances issued by the Ministers for Home Affairs and for Justice, and the semi-official commentary of Rüdin, Gütt and Ruttke. Voluntary sterilisation is precluded except for the diseases for which sterilisation is compulsory, and carriers of a hereditary disease may not be sterilised voluntarily. If an appeal is lodged against a sterilisation order, the patient must be detained until his case is disposed of. The physician must report every relevant case encountered in his professional work, but all information collected by the Psychiatric Research Institute is strictly confidential. Overcrowding of the mental hospitals is resulting from the administrative delays. The total population of mental institutions in Germany is reckoned at 160,000, of which 36,000 will probably undergo sterilisation. However, Roemer, an influential psychiatrist, estimates that 400,000 people in Germany are envisaged for sterilisation, 360,000 of which are psychiatric cases. In the same journal (p. 211) Dr. F. Tietze gives an account of the Austrian sterilisation trial at Graz, in which the supreme court reversed the decision of the provincial court and condemned the defendants to imprisonment for practising or advocating eugenic sterilisation, on the ground that the consent of the individual did not exclude 'hostile intention' or change the character of a sterilising operation.

U.S. Petroleum Industry

THE review of the petroleum industry in the United States by Hale B. Soyster and members of the U.S. Geological Survey, Bureau of Mines and Petroleum Administrative Board, recently published by the U.S. Department of the Interior (Circular 11), gives an authoritative, unbiased survey of the American petroleum industry to-day, besides supplying up-to-date statistics of production, stocks, imports and exports. A vital fact is that petroleum reserves, both proved and unproved, are limited and irreplaceable. Wastage, whether physical or economic, is to be deplored and must be combatted with carefully planned and controlled development of all supplies. Latterly, knowledge of methods of preventing waste of both oil and gas and conserving natural energy necessary for recovery of these substances, has rapidly increased, but there are still varied forms of economic

waste, to some of which it is difficult to find a solution. Competitive development and premature extraction of petroleum still characterise a majority of new fields and will continue to do so as long as the theory of 'capture and reduction to possession' holds sway.

WITH petroleum increasingly incident in the industrial life of the nation, particularly as motor fuel, and with the knowledge that reserves are limited, it is natural that extensive researches should be prosecuted to find substitutes in the event of shortage. After consideration of possibilities of high- and low-temperature carbonisation, hydrogenation and complete gasification of coal, the most feasible method for large-scale production of gasoline, should petroleum resources decline rapidly in the future, is that of hydrogenation and liquefaction. During this process, however, more original fuel energy is lost than in making gasoline from petroleum, and the cost of gasoline produced is higher. The reassuring fact that processes are available for producing motor fuel substitutes from coal is no excuse for wasteful exploitation of present oil reserves. Coal should be used wherever possible for ordinary heating and stationary power generation, and petroleum strictly conserved in all phases of its production and refinement to avoid the necessity of producing gasoline from coal by an elaborate and expensive process.

Bulk Supply of Electric Power for Manufacturers

SHEFFIELD CORPORATION has now connected up what is probably the largest individual user of electricity in Great Britain to its supply mains, increasing the supply by more than thirty per cent. Messrs. Thomas Firth and John Brown, Ltd., of Sheffield, have works covering 140 acres, and formerly had two generating stations of their own having a capacity of 20,000 kilowatts. Now they have abandoned these, and obtain energy from the public supply mains. Generally speaking, there are many reasons for taking this course. They will be able, for example, to concentrate on their own particular processes of production, leaving the generation of electricity to experts. The space formerly occupied by the boilers and turbines of the private plants can now be utilised for extensions. The basis of the manufacturing processes carried out by the firm are in the melting house, where there are installed furnaces ranging from a capacity of 2 tons to 40 tons. The largest furnace, when melting at its peak load, requires 5,000 kilovolt amperes. The electric furnaces alone melt 1,000 tons per week. This is much greater than the output of any other electric furnace plant in Great Britain. All the supply problems are now dealt with by the Corporation engineers, who have the Grid behind them as a reserve. The bulk supply is given to the works at 33,000 volts, and the distribution is so operated that the lowest possible simultaneous demand is made. The decision reached by this firm to take the public supply will carry great weight with other companies which are considering the problem of continuing to manufacture their own electric power or not.