

Research Items

Wooden Cauldron from Co. Monaghan, Ireland. A remarkable cauldron of wood has recently been acquired by the National Museum of Ireland. It was found at Altartate, near Clones, Co. Monaghan, in 1933 at a depth of 160 cm. in a peat bog, 356 cm. above the clay at the foot of the deposit. The cauldron was undoubtedly complete when it was found, but was broken by the finder and onlookers. The remains have been restored by Prof. J. Bayley Butler and has been described by Dr. A. Mahr (*Proc. Roy. Irish Acad.*, 42, Sec. C., No. 3). The dimensions are: opening 34 cm. × 35 cm.; external measurement, 45 cm. × 49 cm.; height, 28.5 cm.; thickness, 0.9 cm. near rim to 2 cm. The vessel is now slightly elliptical, doubtless owing to warping. The wood is poplar; the handle, only one remaining, of yew. The cauldron is unique, owing to the handles and the ornamentation on the upper portion. The handle, something between a triangle and a semi-circle, is a translation into wood of the ring-handles of the well-known riveted cauldrons of the late bronze age of Britain, the ribbed lugs carved out of the solid wood also being reminiscent of the metal staples found in these cauldrons; but the lugs of the Altartate vessel are on the shoulder, the difference being due to the material. The ornamentation consists of six concentric patterns with central dots, encircling the upper portion. The circles, which are not closed, are connected with each other by tangential bands, these being a continuation of the bands forming the incomplete circles. The concentric pattern is a faint reminiscence of the old metal rivets, but has become purely ornamental. Looked at as a whole, the pattern has a 'step' character, like a debased spiral ornament. No similar pattern is found in the Irish bronze age, and it seems to be nothing but a clumsy expression of a provincial La Tène art. The vessel may, therefore, be a belated descendant of metal cauldrons which had gone out among the well-to-do, but lingered among the poorer classes. The suggested date of early iron age is confirmed by a pollen analysis by Prof. Knud Jessen.

Diving Powers of Whales. It is little likely that the physiological processes of the larger Cetacea will ever become known from direct observation. For this reason Mr. A. H. Laurie has felt that it would be well worth while to undertake a careful and detailed study of the properties of fresh carcasses of the Southern Blue and Fin whales in the belief that he might thereby be enabled to make tentative but nevertheless useful deductions as to their mode of life. The results of his observations and experiments ("Discovery" Reports, 7, 363-406; 1933) provide striking confirmation of the soundness of this belief. After analyses of the data which he has been able to collect, Laurie supports the view—stoutly opposed by certain cetologists—that whales are capable of diving quickly to great depths and as rapidly returning again to the surface. If this indeed be true (and the bulk of the evidence seems to point to this conclusion) certain physiological considerations of great interest are involved, the most important of which is the whale's immunity from caisson sickness. On the basis of human performance, a whale which dives to a depth of 100 metres and stays down there for 15 minutes will require to spend rather more than 1½

hours in returning slowly to the surface, in order to avoid this malady. Yet all whalers are agreed that whales rise from deep soundings much more quickly than that. Up to the present, no convincing reason why whales enjoy immunity from caisson sickness has ever been put forward. A very surprising yet exceedingly plausible explanation is now indicated by the results of Mr. Laurie's observations and experiments. He has found that whale blood, both adult and fetal, contains vast numbers of tiny bacteria-like organisms, provisionally referred to as X organisms. These X organisms appear to possess the power of bringing about some kind of 'nitrogen fixation', with the result that excess nitrogen dissolved in the blood under extra pressure does not escape from it on decompression and cause caisson sickness in the animal (see also NATURE, 133, 636, April 28; 874, June 9, 1934).

Adoption of an Orphaned Brood by a Wasp. In the *Entomologist's Monthly Magazine* for April 1934, Mr. G. E. J. Nixon describes the finding of a rudimentary nest of *Vespa vulgaris* containing sixteen cells, and of about the size of a golf ball. The nest was dug out from the ground along with the queen and carried indoors. The queen made no attempt to leave the nest until it was indoors and then it flew to a window. The nest was suspended across the top of a fairly large and deep box and, after several attempts to escape, the queen was ultimately induced to adopt the new abode and was regularly fed. At the time when the nest contained two cocoons and many larvæ of different sizes she disappeared and was not seen again. Three days later a queen of the allied species *V. germanica* was obtained, and this individual adopted the orphaned brood just as completely as if it were her own. She accepted blow-fly puparia and caterpillars which she malaxated and fed to the brood. The experiment was brought to a conclusion owing to an accident which caused the comb to fall and become broken.

Sex in the Myxomycetes. A paper by S. Abe in vol. 1 of the Science Reports of the Tokyo Bunrika Daigaku (Tokyo University, Koishikawa, Tokyo) describes some very interesting experiments on male and female gametes of various slime fungi ("On the Syngamy of some Myxomycetes", pp. 193-202, Jan. 23, 1934). The work deals with the planogametes of *Fuligo septica*, *Erionema aureum*, *Didymium nigripes*, *Physarum crateriforme* and *Stemonites fusca*. It was observed that one of the gametes (the male) moved towards the other, and the two can be further differentiated by staining reactions. Neutral red, safranin, neutral violet, methylene blue and cresyl blue all stain male and female gametes differently. The female gamete has a positive charge, whilst the male is negative.

Ice in the Arctic Seas. The survey for 1933 of ice in the Arctic Seas (*Isforholdene i de Arktiske Have*) by the Danish Meteorological Institute shows that unusually favourable conditions prevailed in the Barents and Greenland Seas, where for the greater part of the year the ice was well to the north of the average limits. Off Spitsbergen there was no ice to the west in winter and spring or from the middle

of June through the summer and autumn. The north coast was clear from May until August and the east coast was almost clear in August. Novaya Zemlya was almost clear in July and entirely clear in August, in which month Franz Josef Land was accessible in open water. Not during the last 34 years have conditions been more favourable on the east coast of Greenland. In March and April the edge of the pack was 120 miles west of its normal position and by August the whole coast between lat. 70° N. and Cape Farewell was clear of ice. The coasts of Iceland were free throughout the year. On the Newfoundland Banks, ice was rare except in May. Davis Strait was unusually clear in most months. Hudson Strait was almost clear in August. On the other hand, conditions were severe in Bering Strait and the Beaufort Sea and towards Wrangel Island. North of Asia, so far as information goes, the ice was abundant but it was mainly new ice. The White Sea did not clear until May. On the whole, it would appear that the outflowing polar drift was checked in the Barents and Greenland Seas and diverted towards Alaska and eastern Siberia.

Three Commercial Sands of Canada. Several reports of the Canadian Department of Mines, published early this year, have reached us; these appear to be mainly of interest to Canadians, but one, "Investigations of Mineral Resources . . .", makes a somewhat wider appeal. This pamphlet contains three papers all referring to certain sandstones; the first is an account of a bed of Potsdam sandstone between Buckingham and Gatineau Point, Quebec; it appears to be a friable sandstone easily disintegrated into individual quartz grains which are rounded to sub-angular. The authors (L. H. Cole and R. K. Carnochan) conclude that this deposit will probably yield a silica sand sufficiently free from iron for glass making. The second paper, by L. H. Cole, refers to a band of Chazy sandstone at Hawkesbury, Ontario. The stone appears to be fine grained and strong, is easily carved and worked, and apparently would make a good building stone, for which purpose it appears to have been used for something like a hundred years. The third paper gives an account by S. C. Ellis of the bituminous sands of McMurray, Northern Alberta. The author holds and has held for a considerable time "that the McMurray deposit of bituminous sand should be regarded as a potential source of liquid hydro-carbons". The quantity of available bituminous sand appears to be very large; it is assumed that its bitumen content is 12½ per cent and that the petroleum products derived from the bitumen would be about 75 per cent by volume of the bitumen. The author estimates costs of production and shows that the material can be worked at a profit, and concludes that the conditions are "favourable to commercial development of the Alberta bituminous sands".

Treatment of 'Slurries' in Coal Washing. Every advance in technology creates new problems. The need for cleaner coal led to development of coal washing. But coal is friable and contains dust, which interferes with the efficiency of most washing processes. Therefore the dust may not be permitted to accumulate in the wash water, and tanks are provided where the dust is allowed to settle and form a 'slurry' or mud of particles of coal and earthy matter. Owing to the fineness and character of the dust particles, the clarification of the wash water is often difficult, and

chemical precipitants are added to promote flocculation and deposition of the slurry. This may contain more water than fuel and must be 'dewatered', after which it may be used as a low-grade fuel or incorporated in the slack fed to coke ovens. The 'dedusting' of coal and the treatment of 'slurries' form the subjects of Memoranda 13 and 14 of the Institution of Mining Engineers. During coal strikes, accumulations of slurry have proved unsuspected fuel reserves of no small importance.

Hot Wire Anemometers. The lecture on these instruments and their uses given at the Institut de Mécanique des Fluids of the University of Paris by Dr. E. G. Richardson, of Armstrong College, Newcastle in March 1932 has been amplified by him and issued as an Institut pamphlet with the title "Les Appareils à Fil Chaud" (Paris: Gauthier-Villars). It extends to 68 pages and is well printed and illustrated. After showing how the change of resistance of a wire carrying an electric current, due to the movement past the wire of the gas or liquid in which it is placed, may be used to determine the speed of the fluid, he shows how by placing two wires parallel to each other and near together the sheltering action of one wire to the other allows the direction of the motion of the fluid to be determined. The effects of to and fro movements of the fluid, and of solid walls are also traced. The second part gives an outline of the results obtained by these methods for the motions of the air about the wings of an aeroplane, about a cylinder and in the pipes and cavities of musical wind instruments. References to 62 papers dealing with the subject are given. There are a few misprints: Fig. 2, p. 16, and Camobell, p. 57, are examples.

Atomic Weight of Cæsium. The atomic weight of caesium in use for some time rests on the work of Richards and Archibald and Richards and Françon, who found the value 132.81. Aston, and Bainbridge, however, found by the mass-spectrograph that caesium is a simple element, and Aston's packing fraction together with the conversion factor from O^{16} to $O=16$ of 1.00022 leads to $Cs=132.904$. A re-determination of the atomic weight by chemical methods, using caesium from pollicite of Maine, U.S.A., made by G. P. Baxter and J. S. Thomas (*J. Amer. Chem. Soc.*, May), has given a result in close agreement with that of Aston, although sufficient reasons for the difference between their results and those of Richards and his collaborators are difficult to discover. The caesium salts were very carefully purified and showed no trace of rubidium or potassium on spectrographic examination. The chloride was fused in a platinum boat in an atmosphere of nitrogen, hydrogen, or various mixtures of hydrogen and hydrogen chloride, before weighing. The silver precipitation method, with adjustment of the endpoint with a nephelometer, was used. Fourteen experiments are reported, the average ratio $CsCl : Ag$ being 1.56063, or $Cs=132.903$. By rejecting one experiment, which gave rather low values, the averages are $CsCl : Ag=1.56065$ and $Cs=132.906$. The values for the first seven determinations, for which probably the material was of slightly better quality, are $CsCl : Ag=1.56070$ and $Cs=132.911$, the value finally adopted being $Cs=132.91$. It is very reassuring that the chemical and physical methods have been found to agree so well in this region of the atomic weight scale, and that a supposed anomaly has been removed.