

the industry may be considered a variety. One type of tortoise core now described for the first time appears peculiar to the Clactonian of Swanscombe, while another approximates to those characteristic of Crayford. Some of the cores are remarkable for their size and weight, two described weighing 16 lb. and 19 lb. respectively. Ten types of artefacts are distinguished and the series dealt with in the present paper, and in that published in 1929, illustrate all the types of Clactonian implements so far known at Swanscombe.

A communication from Miss N. F. Layard described the discovery in the Buttermarket, Ipswich, of bone implements beneath 9 ft. of soft gravel, and at a depth of 23 ft. from the surface. A bone needle with hour-glass perforation, a bone awl, the handle of some implement, and an antler tine perforated for suspension, were associated with a human tooth and fragment of jawbone. The objects were removed from the matrix by Miss Layard, personally, in 1899, and the circumstances carefully noted at the time. It was submitted that the needle corresponded with the broken-eyed needles found by M. Didon in the Abri Blanchard, Dordogne, in an Aurignacian deposit and other late palæolithic cave deposits in France, figured by Didon and by Lartet. Mr. J. Reid Moir stated that, if actually *in situ* in the deposit described, the specimens would be of Palæolithic age. Mr. M. C. Burkitt compared the finds with those made at the Wookey Hole, which were of Late Celtic age, and doubted their greater antiquity.

Lieut. K. R. U. Todd exhibited flint implements discovered in the alluvial beds bordering the south shore of the Orwell Estuary and submerged at high tide. One industry is characterised by long blades associated with burins; one was 137 mm. in length, while a hundred measured specimens gave an average length of 67 mm. Dr. Godwin's analysis of the peat on which certain implements of early Neolithic forms rested indicated a temperate climate of post-glacial, Atlantic type, whereas the similar long blade industry found on the north shore of the estuary and described by Mr. J. Reid Moir, had been tentatively referred to the Madelenian by Prof. H. Breuil, and the measurements of the present specimens from the south bank were very near those from the type station of La Madeleine. Mr. M. C. Burkitt and Mr. Graham Clark compared the industry associated with the floor in the peat with that at Lower Halstow, and emphasised the occurrence of burins in Mesolithic times. It has to be remarked, however, that there is more than one cultural horizon in the Orwell alluvial beds, and that it is now regarded as highly probable that the long-blade industry comes from floors at lower levels than those yielding the flints for which Mesolithic associations were claimed in the discussion.

Experimental Gob Fires

THE Safety in Mines Research Board has issued papers Nos. 75 and 76, concerning gob fires, written by T. N. Mason and F. V. Tideswell (London: H.M. Stationery Office, 1933. 1s. net and 6d. net). The first of these deals with the possibility of explosions in sealed-off areas in non-gassy seams, and the second with the possibility of the revival of heating by in-leakage of air. The experiments were carried out in a special building arranged for the

purpose at the Experimental Station at Buxton. This building consists of a central chamber 30 ft. square and 9 ft. high to simulate a mine goaf, circumscribed by an air-course approximately 6 ft. wide by 7 ft. high. The chamber and air-course are connected by doors 6 ft. square capable of being closed, and in one corner of the air-course there is a centrifugal blowing fan.

The first group of experiments simulated a fire in the goaf in a pack situated centrally in the goaf chamber; with an open fire it was found that there was no possibility of the formation of an inflammable atmosphere; with an enclosed fire this was found to be possible, though no inflammable atmospheres were actually produced under the conditions of the experiments. The next set of experiments simulated a gob fire developed in a roadside coal pack such as would be caused by a partly crushed pillar with a waste area behind. The most dangerous condition was when the fire was supplied with air from a leakage from intake to return, which also partly ventilated the waste.

A third set of experiments simulated fires in dirt packs adjoining a waste, the dirt containing as usual in practice approximately ten per cent of coal. Apparently no explosions occurred, but it is not safe to conclude that such conditions would never lead to the formation of an inflammable atmosphere. Special emphasis is laid on the fact that if an underground fire is to be sealed-off, the sooner and the more quickly that operation is carried out the better. The maximum danger of the formation of an explosive mixture is immediately after the sealing-off.

Paper No. 76 shows that an in-leakage of air which causes the oxygen content to rise to as little as 5 per cent (in one case 3 per cent only) usually results in a marked increase in activity of the heating. It was found that when the temperature had fallen so low as 75° C., a fire may be revived under suitable conditions. It is pointed out that although the flame of a safety lamp is extinguished when the oxygen in the air has fallen below 17 per cent, that is no guide whatever in determining whether an atmosphere is capable of extinguishing a gob fire or not.

Calendar of Nature Topics

Second Buchan Cold Spell

April 11-14.—Of the six 'cold spells' enumerated by Dr. A. Buchan, the second, April 11-14, receives the least support from either fact or folk-lore. There appears to be no popular saying associating these days with a fall of temperature, and the average daily temperatures at Greenwich from 1841 until 1930 do not reveal any marked cold period in April. An examination of the figures for the individual years at Kew Observatory from 1881 until 1923 showed that April 11-14 had been more often above the temperature to be expected at this season than below it. A different series of years might give a different result, but the inference is clear that Buchan's second cold spell has no real existence in London.

Spawning of Frogs, and a Remarkable Tadpole

The factors which determine the time of the spawning of frogs, the temperature of the air or the temperature of the water of the spawning pond or