

### Prehistoric Society of East Anglia.

RESEARCHES in East Anglia of considerable general importance were described at the summer meeting of the Prehistoric Society of East Anglia, held at the Royal Anthropological Institute in June last. The president, Mr. J. E. Sainty, of Norwich, gave an account of investigations undertaken by aid of the Sladen trust into the contents of the Stone bed beneath the Norwich Crag, the equivalent of the basement bed of the Red Crag in Suffolk. The conclusions were wholly in favour of the human origin of the flaking upon the flints, which, from the bold character of the work upon a hand-axe from Whitlingham, was considered to date from the Early Chellean period. It appears probable that there is little difference in geological age between the Norwich Crags and the deposits of the Cromer Forest bed.

Mr. J. Reid Moir showed black unrolled hand-axes of Combe Capelle, Early Mousterian type, which with numerous flakes and remains of mammoth and reindeer, and also fine Early Solutrean flint blades, were recovered from below thick deposits of gravel forming the flood plain of the River Gipping, near Ipswich. The Solutrean implements come from a clay at the base of the gravel which is here ten to eighteen feet thick, and the Early Mousterian hand-axes from a peaty loam beneath. In the Orwell estuary, the tidal part of the same valley, below Ipswich, peat occurs at a depth of thirty feet below high-water mark, and numerous teeth of the mammoth have been dredged from it. This peat is covered by gravel and grey alluvial mud, and may possibly be

the equivalent of the peaty loam of the Early Mousterian horizon farther up the valley. It is seen, therefore, that a date much older than that usually assumed must be assigned to the greater part of the deposits filling the deep channels beneath the river valleys of the east of England, as the Neolithic layer appears to be only about four feet from the surface in the Orwell alluvium.

In the discussion, in which Messrs. R. A. Smith, H. Dewey, and Henry Bury took part, it was recalled that black unrolled hand-axes have been dredged up at Erith, which may indicate a horizon in the bed of the Thames equivalent to that in the buried channel of the Gipping. Another significant fact was that on the south coast the 'Coombe Rock' deposit is known to pass below sea-level. The new evidence was unexpected, and as it points to an order of events different from that assumed for the formation of the deposits of the lower Thames valley, it is important that investigations in that area should be commenced.

In reply, Mr. Moir stated that the trend of the evidence suggested to him that the buried channels beneath the river valleys of the east of England were excavated so early as the second interglacial period.

The discovery of thin ovate palæoliths in a clay deposit at Denham, Bucks, at 214 feet, O.D., and covered by gravel, hitherto classed and mapped as glacial, was reported by Mr. J. G. Marsden, and Mr. E. J. Guerrard Piffard exhibited microliths from the Horsham district showing a considerable amount of wear.

### Scientific Utilisation of Coal.

THREE Cantor Lectures on the "Treatment of Coal" were delivered last winter before the Royal Society of Arts by Dr. C. H. Lander, Director of Fuel Research; these have been printed in the Society's *Journal* of Aug. 9, 16, and 23. The first lecture details steps taken in Great Britain to standardise methods of sampling and analysis—a task long overdue and of great importance to those engaged in buying and selling fuel and also in the testing of fuel-using appliances.

Recent work on the constitution of coal is surveyed and the problem of burning coal in large and small particles is subjected to a critical analysis. The combustion of gaseous fuel is so rapid that it is merely a question of bringing air and gas into intimate mixture. With solids, even the smallest solid particles in practice are gross compared with simple gaseous molecules, and the rate of supplying oxygen to the surface of the fuel becomes the dominating factor. A rapid velocity of air-flow relative to the coal is essential to facilitate the supply of oxygen and removal of products from the surface of the fuel. In modern practice this is attempted by the use of 'turbulent' burners.

Successful as this has been, Dr. Lander believes that it will be preferable to obtain a stable and stream-line motion of air and induce the particles of fuel to move from one stream-line to another in controlled manner. By facilitating the supply of air to the coal dust, it has become possible to reduce the 'combustion volume' considerably until the properties of the refractories have become a limiting factor. It has also become possible to burn pulverised coal in the Scotch marine boiler, and Dr. Lander considers that eventually this will be done in the locomotive boiler.

The importance of these developments to the

British coal industry is obvious. Encouraging results have been obtained with ships adapted to use pulverised fuel, and recently a new vessel, the *Berwindlea*, specially constructed for this purpose, made its first voyage, apparently with complete success.

In the second lecture, Dr. Lander traversed briefly the methods and results of chemical investigations of the structure and composition of coal, of which a great volume has been made in recent years. The replacement of cruder methods of fuel use by more refined treatment necessitates an investigation of these fundamentals.

So far as standard practice of carbonisation at high temperature is concerned, there is no prospect of any revolutionary improvements in efficiency, although advances in technique in recent years have been made which, reckoned on such large industries, amount in the aggregate to very considerable financial savings. The recent technical history of the gas and coke industries is traversed in an informative manner, and some indication is made of problems under investigation and of topical interest.

The third lecture deals with the attainments and prospects of processes of low temperature carbonisation. Much money has been squandered on this subject owing to the earlier methods of 'research by catastrophe'. More recently the extensive investigations of many serious workers have placed the subject on a more certain basis, and one can justifiably say that there are processes which are technically satisfactory. It is emphasised that the ultimate test, namely, whether the processes can produce dividends on invested capital, is not yet answered with certainty. In order to secure answers to these questions the Government has made technical trials of processes, cost free, and reports of these have been from time to time referred to in the columns of NATURE. In