

Lubbock for his investigations on the tides, and (2) Charles Lyell for his work, "Principles of Geology". The grounds for the latter award were announced as: (a) the comprehensive view taken of the subject, and its philosophical spirit and dignity; (b) the important service rendered to science by specially directing the attention of geologists to effects produced by existing causes; (c) the author's admirable descriptions of many tertiary deposits; (d) the new mode of investigating tertiary deposits, which his labours have greatly contributed to introduce, namely, that of determining the relative proportions of extinct and still existing species, with the view of discovering the relative ages of distant and unconnected deposits. The Rumford medal was awarded to Prof. Macedonio Melloni, of Parma, for his researches and experiments on the diffusion of heat by radiation, and its relationship in lunar light. Melloni was director of the Meteorological Observatory, Mount Vesuvius, 1839-49, and became a foreign member of the Royal Society in 1839; he died in 1853.

#### British Association: Norwich Meeting

THE annual meeting of the British Association will be held next year in Norwich on September 4-11 under the presidency of Prof. W. W. Watts. The following sectional presidents have been appointed: Section A (Mathematical and Physical Sciences), Dr. F. W. Aston; B (Chemistry), Prof. W. N. Haworth; C (Geology), Prof. G. Hickling; D (Zoology), Prof. F. Balfour Browne; E (Geography), Prof. F. Debenham; F (Economic Science and Statistics), Prof. J. G. Smith; G (Engineering), Mr. J. S. Wilson; H (Anthropology), Dr. Cyril Fox; I (Physiology), Prof. P. T. Herring; J (Psychology), Dr. Ll. Wynn Jones; K (Botany), Mr. F. T. Brooks; L (Educational Science), Dr. A. W. Pickard-Cambridge; M (Agriculture), Dr. J. A. Venn. The president of the Conference of Delegates of Corresponding Societies will be Prof. P. G. H. Boswell.

#### Dud Dudley and the Coal-Iron Industry

THROUGH the publication of his little work "Metallum Martis", 1665, Dud Dudley, 1599-1684, a son of Edward Sutton, Lord Dudley, has long enjoyed a reputation as being a pioneer in the use of coal, instead of charcoal, as a fuel for smelting iron. Most early writers on industrial history accepted Dudley's writings at their face value without inquiring into their correctness. A proposal made some years ago to erect a monument to him at Dudley, however, led to a closer scrutiny of what he had written and the state of the iron industry at the time, with the result that many of his assertions have been found impossible of belief, and many of his claims to our admiration as an outstanding pioneer have to be rejected. A review of the whole question was given by Mr. R. A. Mott on November 21 in a paper read to the Newcomen Society at the Iron and Steel Institute, and in the subsequent discussion Mr. Mott's views found general acceptance. Dudley lived in stirring times and had many adventures, but his work as an iron master was done when

he was a young man. That he did make iron there seems no need to question, but that he produced good quality iron with the use of coal has to be rejected. Mr. Mott's view is that, as a historian, Dudley's veracity has to be questioned, while as a man he was an opportunist, vain and boastful. A consideration of the technical basis of his claims shows that they were impossible of achievement. The *Transactions of the Newcomen Society* contain several valuable papers on the history of the iron industry and these, with that of Mr. Mott, should be studied by all interested in this phase of industrial history.

#### Cardiff Engineering Exhibition

THE thirteenth annual exhibition at Cardiff, held under the auspices of the South Wales Institute of Engineers, opened on November 21 and closes on December 1. The main object of these exhibitions is educational and also to encourage industry by bringing the manufacturers of machinery and plant into touch with the users. Whilst mining appliances were well represented, almost every branch of engineering activity has received attention. An outstanding feature of this year's display was an exhibition coal mine, equipped by the Coal Face Machinery Exhibitors' Association—an association which comprises nearly all the manufacturers of coal face machinery in Great Britain. It was installed not as an advertisement of any particular plant, but to show the possibilities of mechanisation at the coal face, and to keep mining engineers and others interested and informed of the most recent developments in this respect. The mine consists of a main roadway, a machine-mined heading and a longwall face, in which are placed examples of coal face machinery—longwall coal cutters and shearing machines, jigger and belt conveyors, dust filters and pneumatic drills. In the roadways and face, modern methods of supporting roof and sides are shown. The Department of Scientific and Industrial Research had a valuable exhibit illustrating some of the research activities of the National Physical Laboratory, the Fuel Research Station, the Chemical Research Laboratory and other scientific bodies. Thus, fatigue of metals, lubrication research, electric welding, alignment of machine tools, steel casting, micro-structure of metals, corrosion of metals, hydrogenation of coal, smokeless fuel and industrial applications of X-ray analysis, were among the topics illustrated. An interesting exhibit consisted of turned objects made of some of the latest plastic materials derived from coal, and intended to display the artistic possibilities of such materials.

#### Competitive Trials of British Military Aircraft

THE periodical trials for the selection of new types of aircraft for R.A.F. equipment, now in progress, include some machines that have considerable technical interest. Two of the day and night fighters now being tested are monoplanes, designed and built by Messrs. Bristol and Vickers respectively. The British Service requirements for a fighter have hitherto put extreme manoeuvrability in action first



in importance. In this respect the biplane is best, and at present all of the R.A.F. fighter machines are of this type. Some Continental nations consider superiority in speed of greater importance, allowing the pilot to engage or break off action at will. The clean lines and somewhat smaller head resistance of the monoplane give it the advantage in this case. The biplane has another point in its favour which must be considered when making comparisons. The wing structure can be built more sturdily for a given weight, and it is consequently safer for resisting the stresses developed in high velocity diving bombing, or in very small turns at high speeds when fighting. The new Bristol monoplane is fitted with a retractable undercarriage to eliminate the resistance of that part when in the air. The motion is carried out electrically, the pilot merely having to move a switch, an indicator on the dashboard telling him the position of the wheels. This type of undercarriage has not been used on R.A.F. standard equipment up to the present.

#### Heavy Water in Chemistry

At the Friday evening discourse at the Royal Institution on November 23, Prof. M. Polanyi dealt with heavy water in chemistry. Heavy water has a density ten per cent greater than ordinary water. Its chemical composition is the same as that of ordinary water, two hydrogen atoms to one oxygen atom. Nor is there anything unusual about the oxygen atom. All the heaviness is due to the new kind of hydrogen discovered by Prof. H. C. Urey, which is contained in the heavy water. Its atomic weight is two instead of one. Heavy hydrogen atoms have the same structure as ordinary hydrogen atoms, only with a heavier nucleus. Such a pair of atoms would have the same chemical properties if the atoms were merely material particles. Atoms, however, are not only particles, but they are also waves: as waves, the two hydrogen atoms are different. The heavy one has a shorter wave-length. The chemical dissimilarity between the two hydrogens shows to what extent atoms behave as waves and not as particles.

THE chemical differences of ordinary and heavy water make it possible to extract heavy water from its natural dilution of one part in four thousand and prepare it in pure form. The preparation is still a very expensive operation, but methods can be outlined by which it might be considerably cheapened. Heavy hydrogen might then be used in the manufacturing of drugs and dyestuffs, if its properties should turn out to be useful, for example, if it shows greater stability than the products made of ordinary hydrogen. With heavy hydrogen, reactions can be discovered in which chemically nothing is changed, because all that happens is an interchange of hydrogen atoms. When part of the hydrogen atoms are 'labelled' by being of heavier sort, this interchange becomes apparent. Some well-known chemical reactions of hydrogen appear now as subordinate effects of this hitherto undiscovered interchange process. When, for example, hydrogen is added to benzene forming hydrobenzene, for every molecule adding on hydrogen

there are a hundred molecules which react with hydrogen in the way of an interchange. It seems that hydrogenation may be just an occasional by-reaction of this main interchange process. Following this line, the atomic mechanism of hydrogenation can be worked out completely.

#### Preservation of Scenic Amenities

THE necessity for preserving the scenic amenities of the countryside is fortunately gaining more attention, and there is hope that some of the worst vandalism may be checked before it is too late. But the dangers of urban growth are still insistent, and to this topic Dr. Vaughan Cornish refers in an article in *Geography* of September on the scenic amenity of Great Britain. It is not only the growth of radial suburbs with their monotonous plans, but also the reconstruction of existing urban centres that needs to be controlled. The nineteenth century saw the spoliation of many picturesque market towns and beautiful cathedral cities and the growth of urban 'deserts' on the coalfields. Among the few examples of urban scenery from which Nature has not been expelled are the west end of London, the collegiate parts of Oxford and Cambridge and the precincts of most cathedrals. It is to be hoped that in schemes of reconstruction the dignified architecture of the eighteenth century, where it exists, will be preserved, while in the replacement of the closely packed streets of the Victorian era due regard should be paid to the possibility, with modern constructional materials, of accommodating the people on half the area by doubling the height of the houses and so leaving space for town gardening and afforestation. The conversion of every city into a garden city is the most important consideration in the replanning of towns, and this must entail the abandonment of formal lines which are so tiring to the eye.

#### Recent Acquisitions at the Natural History Museum

AMONG the recent acquisitions at the British Museum (Natural History), the Department of Zoology has received as a donation from the Rowland Ward Trustees an exceptionally fine mounted head of the Tian-Shan wapiti, and from Sir Arnold Hodson, Governor of the Gold Coast, a further skull of the so-called dwarf elephant, or 'Sumbi', from the Gola Forest, Sierra Leone. This specimen is a young individual of the forest elephant. The horns of a white rhinoceros from the Belgian Congo have been presented by Mr. Stanley C. Tomkins. This gift is of special interest in that the Museum already possesses the skull to which these horns belong. One hundred and fifty birds of 76 different kinds collected in the dry thorn bush region of the West Usambara Mountains, Tanganyika Territory, have been purchased, and also an interesting collection of more than 200 birds from Serbia and Macedonia. Extensive collections of insects made during the summer months of 1931, 1932 and 1933 by members of the staff of the Department of Entomology in the Scottish Highlands are beginning at last to yield interesting results. More than 7,000 specimens were obtained and added to the collections, and among them so