"Laënnec before 1806" and "Laënnec after 1806."

*Medals.*—The Arago medal to Auguste Pavie, for the eminent services which he has rendered to science and to France by his explorations in Indo-China.

*General Prizes.*—Prize founded by the State: Grand prize of the physical sciences. No memoir was received on the subject set, but two honourable mentions (1500 francs each) are awarded to Paul Honoré Fritel, for his works on the palæobotany of the Paris Tertiary, and to Pierre Marty, for his researches on the fossil flora of the Cantal. The Petit d'Ormoy prize (pure and applied mathematics) to the late George Humbert, for his work as a whole; the Petit d'Ormoy prize (natural science) to Marcellin Boule, for the whole of his work in palæontology; the Le Conte prize to Georges Claude, for his numerous inventions and applications of science to industry; the Jean Reynaud prize to the late Yves Delage, for the whole of his scientific work; the Baron Joest prize to Jacques Duclaux, for his researches and memoirs on colloids; the Parkin prize to Fernand de Montessus de Ballore, for his work in seismology; the Saintour prize to Pierre Boutroux, for his work in mathematics and the history and philosophy of science; the Henri de Parville prize to Camille Martinot Lagarde, for his publications on aviation motors; the Lonchampt prize to Augustin Damiens, for his researches on the bromine existing normally in animal tissues; the Wilde prize to Ferdinand Canu, for his study of the fossil bryozoa; the Gustave Roux prize to Louis Eblé, for his meteorological work; the Thorlet prize to Adolphe Richard, for his work in bibliography.

*Special Foundations.*—The Lannelongue foundation (accumulated interest) between Mmes. Cusco and Rück.

The Laplace prize to Pierre René Ricard and Jean Louis Joseph Edmond Berthelot; the L. E. Rivot prize to Pierre René Ricard (750 francs), Jean Louis Joseph Edmond Berthelot (750 francs), Michel Raymond Hippolyte Clovis Duhameaux (500 francs), Pierre Jules Lion (500 francs), Jean Pierre Paul Chapouthier (750 francs), Jean Gustave Marie de Sèze (750 francs), Jean Emile Lecoannet (500 francs), and Gaston Albert Oudotte (500 francs).

The Trémont prize (1000 francs) to Louis P. Clerc, for his work entitled "The Applications of Aerial Photography"; the Gegner foundation (arrears of interest) to Ernest Lebon; the Henri Becquerel prize to Camille Flammarion, for the whole of his work; the Charles Bouchard foundation to Maxime Ménard, for his work in radiography.

*The Bonaparte Foundation.*—The committee has examined twelve applications for grants from this fund and recommend the following:—(1) 2000 francs to Fernand Blanchet, for his researches on the detailed geological structure of the Escreins massif (High Alps); (2) 10,000 francs to the Fédération française des Sociétés des Sciences naturelles, as a contribution to the publication of the "Faune de France."

*The Loutreuil Foundation.*—(1) Grants to establishments mentioned by the founder:—

National Museum of Natural History.—6000 francs to Paul Lemoine, for geological researches on the Paris basin. 2000 francs to Ferdinand Le Cerf, to assist him in pursuing his researches on the Ægeriidæ by the study of the collections in England.

National Veterinary School at Lyons.—2000 francs to this establishment for completing the grant made in 1918 for the purchase and installation of a kinematograph for teaching purposes. 2000 francs to François Maignon, for his researches on opotherapy and avitaminosis. 1500 francs to Armand Porcherel, for his studies on mules.

National Veterinary School of Toulouse.—3000 francs to Jean Sendrail, André Martin, and Robert Lasserre, for their researches on various parasites of the Toulouse region and the diseases caused by them. 1500 francs to Charles Hervieux, for his studies on the transformation of chlorophyll in animals.

(2) Grant accorded to establishments called to the committee of the foundation by the President of the Institute:—

Conservatoire national des Arts et Métiers.—3000 francs to Léon Guillet, for an installation for the study of magnetism and the examination of metal fractures.

(3) Grants made on direct application:—

6000 francs to Louis Bazy, for his researches on the application to surgery of the data acquired in general bacteriology.

2000 francs to Louis Bedel, for the study of the fauna of the Seine basin.

5000 francs to the Société des Amis du Laboratoire des Essais méchaniques et métallurgiques de Grenoble, to contribute to the organisation of a laboratory.

3000 francs to the *Journal des Observateurs.*

2500 francs to Jean Charcot, for the purchase of instruments to be placed on ships in the Navy in view of oceanographic researches.

5000 francs to Henri Deslandres, for his studies on the ionisation of the air.

6000 francs to the Ecole supérieure d'Aéronautique et de Construction méchanique, for the purchase of a Le Chatelier apparatus required for the micrographic study of metals.

10,000 francs to the Fédération française des Sociétés des Sciences naturelles, for the publication of the "Faune de France."

8000 francs to the Institut agricole de Beauvais, to develop agricultural experiments.

4000 francs to the Institut industriel du nord de la France, to improve the scientific equipment of this establishment.

3000 francs to Armand Lambert, for the revision of the calculations of the catalogue of fundamental stars.

10,000 francs to the Observatory of Ksara, to enable it to resume its normal working.

5000 francs to the Société de Géographie, for the publication of various maps.

15,000 francs to the Académie des Sciences, for printing the catalogue of the inventory of the scientific periodicals of Paris.

## Anthropology at the British Association.

SECTION H (Anthropology) met under the presidency of the Right Hon. Lord Abercromby, Sir James Frazer, who had been announced to preside, finding himself unable to attend the meeting. Owing to the late date of Lord Abercromby's acceptance of office he had had no opportunity to prepare an address, and the sectional programme consequently lacked this important item, upon which the success of the sectional proceedings largely depends. Notwithstanding this unfortunate omission, a full and interesting programme attracted good audiences and gave rise to much valuable discussion.

Of the three organised discussions included in the programme reference has already been made in these columns to two, namely, Sir Richard Temple's appeal for an Imperial School of Applied Anthropology and

the discussion on "The Origin of the Scottish People," held in joint session with Section E (Geography). The third discussion—on totemism—was initiated by Sir William Ridgeway. He said that some years ago he had pointed out that vegetation spirits and totemic beliefs were secondary to a primary belief in the continued existence of the soul after death and in its transmigration. The sacredness of certain rocks, trees, plants, and the like depended upon the belief that they were the abode of the spirits of those who were buried under or near them or were killed near them. Totemism arose from a like belief. The bodies of the dead were left to be devoured by wild beasts, and it was believed that the spirits inhabited their devourers. In other cases it was still believed that the spirits of the dead entered or dwelt in certain animals or trees. Sir William Ridgeway's theories appeared to be generally acceptable to his hearers with the exception of Dr. Hartland, who, without entering into a detailed discussion of the evidence in support of the theory, pointed out that it made totemism later than and dependent upon, the belief in the immortality of the soul, which is not a primary or fundamental belief in primitive religion. On the other hand, Dr. Rivers gave wholehearted support to Sir William Ridgeway's view, laying particular stress upon the element of reincarnation. Totemic peoples were averse from eating their totem, as it would be cannibalism. The strong impression made upon the community by the personality of the ancestor with whom the totemic cult originated suggested that he was the representative of a higher culture coming from outside the community. Dr. Haddon suggested that the hero-cult of Eddystone Island, which had been mentioned as cutting across the totemic cult, was probably a graft on an earlier hero- or ancestor-cult. Dr. Donald MacKenzie pointed out that beliefs connected with holy trees and other objects did not necessarily connote a totemic belief, and Mr. H. A. Migeod referred to the absence of totemism among the peoples of West Africa.

Among other ethnographical papers considerable interest attached to the two communications by the Rev. J. Roscoe, dealing with work of the Mackie Ethnological Expedition to Uganda. Of these, one gave a popular summary of the results of investigations among the peoples of Ankole and Bunyoro, and described in detail the milk ceremonial of the dominant pastoral tribes. He suggested that these peoples may be connected with the Galla, and through them with ancient Egypt. Wherever they are found they are the dominant race, having subdued and enslaved the aborigines. In some districts they avoid intermarriage, and the two clearly differentiated races are found side by side. The expedition had succeeded in finding a line of demarcation between the pastoral people of the Lake region and the Somali, Nandi, and Masai tribes, who are of the same origin. In his second paper Mr. Roscoe dealt with the death ceremonies of the tribes of the Lake region, which are based upon the belief in ghosts—the only supernatural being in which the native believed. The Bagesu are ceremonial cannibals, and eat their dead lest the ghost do harm to the young people of the family. In Ankole, Bunyoro, and Buganda the ghosts are propitiated by various forms of offering. An important paper by Mr. T. F. McIlwraith also dealt with African death rites. As the result of an analysis of the ceremonial of West Africa and the Congo, he suggested that the sporadic custom of preserving the bodies of chiefs, combined with the occasional use of a coffin, the anthropomorphic figure, and sometimes the use of representations of the deceased, point to the possibility of influence from ancient Egypt, which may have spread inland from the coast; this would account for the absence of similar practices in East Africa. If, however, the diffusion took place by land, their absence in that area would be due to the influx of the pastoral tribes. An interesting paper by Mr. F. W. H. Migeod dealt with the ceremonial avoidance of contact with the ground as practised in different parts of Africa on a variety of occasions. The author was not, however, able to suggest any one general reason for the practice. A communication presented on behalf of Mr. M. W. Hilton-Simpson described a primitive "water-clock" in the form of a bowl in use among the Shawia of Algeria. In the bottom of the bowl is a hole through which water penetrates until the bowl fills and sinks. This "clock" is used in connection with the regulations of the water-supply for irrigation; each landowner is entitled to a definite number of "sinkings," after which the water is turned off. The bowls, which are the property of the community, are now often made of zinc, but old specimens are of beaten copper. The author attributed a considerable antiquity to this method of time-measurement.

Dr. W. H. R. Rivers described the Melanesian system of land tenure, with special reference to the customs of Ambrim and Eddystone Island. In the patrilineal societies of these islands the system of land tenure is essentially communistic, and agrees with the type of tenure found in the matrilineal parts of the archipelago. On the other hand, ownership of trees may be assigned to individuals by a religious ceremony, and is distinct from ownership of the land. Dr. Rivers held that the system was a compromise-formation between the communism of the indigenous population and the individualism of immigrants. Mr. Lewis Spence discussed the sources of our knowledge of the religion of ancient Mexico.

Aspects of Scottish folk-lore formed the subject of two communications. Canon J. A. MacCulloch dealt with the attitude of sixteenth- and seventeenth-century folk-lore to fairies and witches, attributing the common ban which the people placed upon fairies and witches alike to the ecclesiastical attitude which regarded them both as equally connected with the powers of darkness; and Dr. Donald MacKenzie discussed the peculiar features of Scottish folk-lore, with special reference to its differences from that of Ireland, and the evidence which, in his opinion, it exhibited of culture drifting. It is interesting to note that whereas pork was eaten freely in Ireland from the dawn of history, it was, and in certain localities still is, tabu in Scotland.

Apart from the discussion on "The Origin of the Scottish People," only two communications dealt with the physical side of the science, but both these were of considerable interest. Dr. Nelson Annandale exhibited photographs of physical types, part of a series which had been formed in the Zoological Department of the Indian Museum at Calcutta, and suggested the institution of similar series in other localities for educational and scientific purposes; and Miss Fleming discussed the necessity for recognising modifications in the standards of race distinction in the case of women, particularly in connection with the ages at which alterations take place in skull form, in the shape of the head, and in coloration.

The archæological papers presented to the section, as is usual, attracted considerable attention, and with good reason. Prof. Baldwin Brown, in a paper of a more philosophic type than is common in the proceedings of the section, discussed the *rationale* of primitive art, with special reference to recent discoveries, and pointed out that, being of practical use to

the individual and the race, it was, in a sense, forced on them. It was thus in conflict with the idea of the freedom of artistic activity—the corner-stone of current artistic theory. Mr. Miles Burkitt described the new painting of Palæolithic age found in the Pyrenean cave of Trois Frères. The painting portrays a number of animals arranged as a frieze and the figure of a masked man with stag's antlers on his head and with a tail which the author compared with the early Gallic god, always shown as masked, and the Cretan god of Minoan times. This figure elicited some interesting remarks from Miss Murray on the possible existence of a witch-cult in Palæolithic times. Mr. Leslie Armstrong exhibited a reproduction of the engraved flint found last year at Grime's Graves.

As a preliminary to the excursion made by members of the section to the excavations on Traprain Law, Mr. Alex. O. Curle gave an account of the earthworks and settlements on this site, and described the magnificent hoard of fourth-century silver plate discovered there and believed to have formed part of the booty pillaged by Saxon pirates from Gaul.

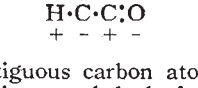
Among other communications on archæological subjects mention must be made of Miss Murray's account of her investigations in Malta, which brought to light the site of a megalithic temple at Boy en Nadur, on the Bay of Marsa Scirocco, and Dr. T. Ashby's account of the year's work in Italy and Tunisia, which has given us, particularly at Ostia and Pompeii, much fresh evidence as to Roman domestic architecture. Mr. J. Whatmough dealt with the functions of the Rehtia, the Venetic goddess of healing, suggesting that the so-called "nails" and "wedges" associated with the cult are to be explained as a specialised type of votive hair-pins with pendant axe-shaped talismans.

Mr. Stanley Casson gave a descriptive account of a journey through Macedonia undertaken under the auspices of a committee of the Association with a view to archæological investigation. Excavations of a cemetery at Chauchitsa produced a large number of objects of the Iron age, including bronze ornaments, pottery, hand- and wheel-made, some gold, and a little iron. These finds throw an interesting light upon the culture of Macedonia and its relations with Greece at this period.

## Valency Bonds and the Mechanism of Organic Reactions.

IN recent years the significance of the conventional bond in the structural formulæ of organic compounds has been the subject of much speculation, more particularly in reference to the view that the bond corresponds with the field between two opposite electrical charges associated with the chemically combined atoms. The electrical conception of the valency bond has been further developed in a very interesting manner by Prof. A. Lapworth (Manchester Memoirs, vol. 64, No. 3, 1920) with the object of explaining the mechanism of the reactions of organic compounds.

Certain reactions, such, for example, as those of carbonyl compounds with electrolytes, suggest that the carbon atom of the carbonyl group is more electropositive than the oxygen atom of this group, in that the carbon atom invariably enters into combination with the negative ion. The relative polar character which the two atoms seem to display at the moment of chemical change may thus be indicated by ascribing + and − signs to the carbon and oxygen atoms respectively. Other reactions—for example, the aldol reaction—suggest that the hydrogen atom in the group :CH·CO· is positive relatively to the carbon atom with which it is in combination, and it would therefore seem that the group in question can be represented by the formula



in which the contiguous carbon atoms have opposite polarities. There is a good deal of evidence in favour of the existence of such latent polarisation in pairs of contiguous carbon atoms, and of the view that the carbonyl group tends to develop alternate negative and positive polarities in all the carbon atoms of any chain with which the carbonyl group is associated.

Similar effects are produced by the $\cdot NO_2$, $\cdot SO_2\cdot$, and ·CN groups, and it would seem that the divalent oxygen and tervalent nitrogen atoms are the directing or "key atoms" to which the development of the alternating latent polarisation is to be referred. The halogens are much less effective than oxygen and nitrogen, whilst hydrogen apparently exercises a perceptible influence of the opposite kind.

The extension of the influence of the "key atom" over any considerable range seems to require for its fullest display the presence of double bonds, usually in conjugated positions. The conjugated structure of aromatic compounds affords ample scope for the directing influence of the "key atom," and the behaviour of aromatic compounds is quite in accordance with the predictions of the underlying general principle to which Lapworth has given the name of the "principle of induced latent polarities." It is shown that this principle affords a very plausible explanation of many groups of well-known reactions.

The mechanism of organic reactions is also dealt with in the same volume (No. 4) by Prof. R. Robinson in a paper on "The Conjugation of Partial Valencies." The views put forward by this author have a close connection with the above theory of the development of latent atomic polarisation by induction. It is assumed that reactive (activated) molecules are those in which a rearrangement of valencies or a change in the position of the electrons has taken place. Such rearrangement or change in position is synonymous with the development of partial valencies. To illustrate by a simple example, it is suggested that whereas the normal molecule of hydrogen chloride is represented by the formula H·Cl, the activated molecule is symbolised by $\overset{+}{\cdot}\cdot\cdot H \cdots Cl \cdot\cdot \overset{-}{\cdot}$, in which the dotted lines represent partial valencies of which that of hydrogen is positive and that of chlorine is negative. The author shows that the mechanism of many important reactions can be readily interpreted in terms of such activated molecules. In particular, mention may be made of the phenomena of conjugation, the representation of which is considerably simplified, whilst at the same time the conception of a conjugated system is widely extended. From the author's point of view, conjugation consists, in fact, of the transfer of a free partial valency (or latent polarity) to an adjacent carbon atom or to other carbon atoms more widely removed, and in theory there is no limit to the transmission of reactivity within the limits of the molecular aggregates.

Whether it is preferable to speak of the induction of latent polarisation or the transfer of partial valencies is not a matter of the first importance; it may be taken for granted, however, that the views outlined by Lapworth and Robinson will be of great value in obtaining further insight into the mechanism of the reactions of organic compounds.

H. M. D.