

tion of modern film, and its mechanism is important to photographic manufacturers. Processing and some stages of the manufacture are only possible because of the ease of diffusion of ions and molecules in the medium into and out of gelatine. For special purposes, it is sometimes necessary either to harden or even insolubilize the gelatine, or to soften it, and gelatine can easily be modified in these ways. Gelatine has a profound effect on the sensitivity of the emulsions, and much work has been carried out on this; but the mechanism of the action is still not completely understood. It is desirable that the gelatine should be of uniform standard from batch to batch, particularly with respect to viscosity and sensitizing power.

CAUSATION AND EXPLANATION IN THEORETICAL BIOLOGY

IN a recent issue of the *British Journal for the Philosophy of Science* (1, No. 4; February 1951), J. S. Wilkie considers some of the classical problems of explanation in biology in the light of a relative theory of causation. A cause is taken to be some factor to which is attributed the disturbance of some regularity. Living things are extremely complex systems in which the parts have causal relations *inter se*: the regular rhythm of the heart is disturbed by nervous stimulation; the regularity of an undifferentiated field of competent ectoderm is disturbed by the presence of an optic vesicle near some part of the field. But living things as relatively isolated systems can themselves be considered as complex regularities which are disturbed by environmental interference. Reaction with the environment can be considered as constituting a causal event only if there is some assignable disturbance of some regularity of the system: since the system is not totally isolated, it will have regular and constant relations with its environment which are necessary to its maintenance as a system; thus the entry of oxygen into the system cannot as such be considered as a causal relation with the environment. On the other hand, episodic changes such as a temporary increase or diminution of oxygen in the immediate environment definitely disturb the rhythms of the organism and can thus be considered as causal. Among such episodic causal events are the reactions of environmental changes with the sense-organs.

Whatever can be deduced from the known properties of the system alone receives explanation, but not causal explanation.

Mnemic phenomena introduce causal events of peculiar interest. With respect to the organism they are causal, since there is nothing in the structure of the organism from which we can deduce the memories it acquires. Whereas in reflex activity the organism behaves as an elastic system, in memorizing it behaves as an inelastic system. Mnemic traces, considered as imposed upon the structure common to a species, are consequences of causal events and therefore causal themselves with respect to the specific regularity of the species. But mnemic traces do not remain indifferent to one another, as do the traces left in the wood of a tree by wet and dry seasons; they become organized *inter se*. Thus the behaviour of these traces has its own regularities which, since they are regularities, might be explained by a knowledge of the properties of the materials of the

system (as cleavage patterns can be explained by molecular forces). This, however, appears improbable, since the physical language lacks the necessary concepts (constructs) under which the peculiar behaviour of mnemic traces could be subsumed. Physical attractions all appear as functions of space and time, whereas mnemic attractions appear as functions of space, time and similarity.

Wilkie also attempts to justify teleological explanations; but it is not considered appropriate to treat these as causal explanations.

FORESTRY COMMISSION ANNUAL REPORT FOR 1949

THE thirtieth annual report of the Forestry Commissioners covering the year ending September 30, 1949, has recently been published*. Since the passing of the Forestry Bill in 1919, the Commission has published quinquennial reviews of the work done, in 1924, 1929 and 1934. The Second World War brought the gap to fifteen years, the present report being the first to be issued since the War ended.

In the thirty years of its existence the Forestry Commission has acquired an area of 1,500,000 acres, of which 971,000 were classified at the time of acquisition as plantable. In addition, 57,000 acres of standing woodland have been acquired. By the aid of planting grants, private owners planted 182,000 acres. Planting operations were of necessity severely interrupted during the Second World War.

With regard to the plantations, which range from 1 to 30 years in age, there is a total of 550,624 acres, of which 515,666 are conifers and 34,958 hardwood trees. The youngest ones, 1-5 years old, cover the largest area (123,483 acres), while the oldest, 26-30 years, the smallest (32,959 acres). These latter are now producing some revenue. Furthermore, there is what the Commissioners term a by-product, namely, the establishment at a small cost of six national forest parks comprising 240,000 acres.

Other minor Forestry Acts have been passed since 1919: the Act (Transfer of Woods) of 1923, which empowered the transfer of the majority of the existing Crown woods—for example, the New Forest, Forest of Dean—to the Commission, and in 1927 a short Act authorizing an increase in the number of Commissioners and empowering them to make by-laws with respect to their properties. The issue in 1943 of a report by the Commissioners on post-war forest policy resulted in the Forestry Act of 1945. The Act brought into force ministerial responsibility for future forest policy, an action which was by then very justifiable. The Minister for Agriculture and Fisheries was responsible for England and Wales, while Scotland came under the Secretary of State, the lands acquired since 1919 being invested under the appropriate Minister.

A further measure of the Forestry Act of 1947 provided for the dedication of private woodland to forestry purposes, and dealt with such matters as the enforcement of dedication covenants in England and Wales and of dedication agreements in Scotland. This measure proved very contentious, and has been subject to considerable modifications.

Lastly, a New Forest Act, 1949, was passed just after the period of this report. The Act amends the

* Forestry Commission. Thirtieth Annual Report of the Forestry Commissioners for the Year ending September 30th, 1949. Pp. 148+15 plates. (London: H.M. Stationery Office 1950.) 4s. net.