

scientific curiosity; they may also have practical consequences. Research has confirmed the prediction (originally made on theoretical grounds) that a high tendency to see objects in their real sizes irrespective of distance should be of advantage to the drivers of motor vehicles. The amount of this tendency may be altered by the action of drugs and by the presence of mist and fog, and this change may affect driving. One case has been reported of its change in a neurotic condition.

The psychology of vision can no longer be treated as if vision were a function of the eye alone. The foundations of a psychology of vision were firmly laid by the work of Helmholtz and his contemporaries, who made a scientific study of the sensory physiology of the eye. The most fruitful field of research at present is in those wider problems of visual perception in which the eye and the higher centres co-operate.

Physiology of the Plant Cell

PROF. W. STILES, in his presidential address to Section K (Botany), defines the general physiology of the plant cell as those vital activities of plants which are manifested by every living cell, and are thus distinguished from those special processes such as photosynthesis, which are restricted to certain specialized organs. These general activities of living matter are respiration and the absorption and excretion of water and dissolved substances.

The usually accepted meaning of respiration is that it provides the energy for plant movements and the building up from the products of photosynthesis of substances of higher energy content than these products. Yet as respiration is a constant property of living matter, even when there is no movement and no formation of fresh material it may be questioned whether this current view of respiration is complete. As regards the synthesis of proteins and other complex substances, while there is evidence of the linkage of anabolic processes with the breaking down of carbohydrate, this anabolism only concerns the re-formation of carbohydrates, and no evidence has yet been obtained which sheds any light on the way in which energy released in respiration is transferred to the processes involved in the synthesis of proteins and other substances of higher complexity than those forming the respiratory substrate.

The absorption of water and dissolved substances by plant cells was formerly assumed to be a simple process of diffusion through cell membranes, but during the present century experimental work has shown that while the absorption of non-electrolytes may sometimes take place in

this way, the absorption of electrolytes is a much more complex process, for the unequal absorption of the two ions of a salt, and the entrance of the ions of a salt against their own concentration gradients are very general phenomena. Theories based on adsorption and interchange of ions have been put forward to account for these observed facts, but while such processes probably operate, it is doubtful whether they afford a complete explanation of the phenomena.

The connexion between respiration and the salt relations of tissues was pointed out in 1927, and since then further evidence has been forthcoming which has emphasized the connexion between respiration and the diffusion of salts into plant cells against the concentration gradient. The energy required for the entrance of salt thus is presumably provided by respiration, and theories have been enunciated which regard the absorption of ions as a continuous interchange of the former with the hydrogen and bicarbonate ions continuously produced within the cell as a consequence of respiration. While this interchange may be a factor in salt accumulation, there is evidence that the connexion between respiration and accumulation is generally much more indirect, and that the failure of cells to accumulate salt when respiration is lowered through deprivation of the cells of an adequate oxygen supply is related to their generally lowered vitality under this condition.

It is emphasized that salt accumulation, like respiration itself, is a vital process dependent on the protoplasm, while there is some evidence that in the absorption of water by the plant cell, there is in some, though not all, cases an active secretion of water. It is thus clear that a further analysis of the protoplasmic system is necessary for a better understanding of general cell physiology.

The general physiology of the cell is not only of fundamental importance for plant physiology in general, but it is of similar importance for all ecological investigation which is not merely descriptive, while it also impinges on the important fields of mycology and cyto-genetics. Cell physiology is the scientific basis of many important plant industries, including those of food preservation and storage.

Administration of Public Education

IN his presidential address to Section L (Education) Mr. John Sargent discusses the part which administration, and local administration in particular, ought to play as a medium through which the basic principles of educational science, as revealed either by *a priori* reasoning or as the

result of research and experiment, may be translated into action so far as the public system of education is concerned.

Attention is directed in the first instance to a change during the last century in the conception of the function of government which has exercised a profound influence on the whole theory and practice of administration. This transition is from the idea of the State as essentially a policeman to that of an active promoter and provider of facilities for enabling all citizens to live fuller and happier lives. This change of conception as to function is connected with the abandonment in favour of the idea of human progress of the Platonic principle that any social and political order, however perfect, is bound sooner or later to decay. It is clear that both the nature and the aims of an administrative system which is inspired by the belief that it can and should assist individuals along the road to perfectibility will differ fundamentally from those of one which only hopes to postpone inevitable decay.

The consequence of regarding the State as some kind of universal provider has been a vast increase in the legislative activities of government and has led in turn to greatly increased devolution of executive functions from the central to the local authority. An examination of the capacity of the present local education authorities to cope with their continually increasing burden reveals certain defects, many of which derive from the historical and traditional considerations which have determined the boundaries of English units of local government. In brief, the main defects from which local education authorities appear to be suffering are inherent in their large number and in the great variety in their sizes, resources and the powers delegated to them; the result being possibilities of overlapping, friction and in many cases of almost intolerable financial strain. It is admitted that some of these difficulties are being successfully overcome by co-operation, but co-operation of itself cannot be regarded as an ideal method of administration.

A more serious defect, arising from the same set of circumstances, lies in the increasing difficulty in securing men and women with the necessary time and intelligence to devote to the business of local government. This applies particularly to the unpaid partners in the administrative system. The increase in the demands which the business of local government makes on the time of members of authorities, and the parallel increase in similar demands arising from earning a livelihood, are working together to deprive local bodies of the services of persons in the prime of life and actively engaged in industry and commerce. The type of disinterested administrator on whom local govern-

ment was able to rely a generation ago is steadily dying out.

It is recognized that any attempt to remedy these defects may involve changes in the traditional boundaries of local government areas, and would certainly bring the reformer up against that formidable factor known as local patriotism. It is, however, suggested that fewer authorities, with areas and powers more uniform than at present, would not only simplify the problems of administration but would also widen the choice so far as personnel is concerned. A further suggestion is that consideration might be given to modifying the duties performed respectively by members of the committees and their officials with the view of reducing the present calls on the time of the former. Failing this, the only alternative would appear to be to attempt to counteract any deterioration in the amateur element by raising the standard of the professional, although it is realized that any development along these lines would raise a natural suspicion of undue bureaucratic control and would need adequate safeguards in this respect.

A Long-Term Agricultural Policy

PROF. R. G. STAPLETON, in his presidential address to Section M (Agriculture), stresses the importance of ley-farming in relation to the present-day needs of the nation, and in general he discusses the bearing of systems of farming on the formulation of a long-term agricultural policy. He urges that the needs of the nation must be made to govern the activities of the farmer. In considering national need, it is pointed out that account must be taken of future contingencies, as well as of present requirements. Thus, as well as producing an abundant supply of fresh food, our agricultural policy must take heed of war danger, fall in the population, and the influences of soil erosion overseas. The essential matter is therefore to maintain our acres in a fertile condition, while it is also desirable that we should conduct our farming in such a way as to make possible the maximum of flexibility in commodity production, and to make ourselves altogether less dependent upon imported feeding stuffs.

The main features of the arable, permanent grass, nondescript (much permanent grass and a little arable land per farm) and ley systems are outlined, and it is shown that the arable and ley systems are those which accord best with national needs. Permanent grass allows of the minimum of flexibility, and does not afford the best means of turning grass as such to the most