degree of salinity. It is impossible to discuss here the various theories of fertilisation to which these astonishing experiments have given rise.

But such phenomena appear, perhaps unreasonably, all the more astounding to us, as the animals experimented on are higher in the scale; and so we may look with renewed wonderment at a phenomenon which M. Bataillon has demonstrated in the frog, and M. Henneguy has repeated and confirmed.[1] Eggs were taken from the body of a female frog, under proper antiseptic precautions and with careful simultaneous "control" experiments. The eggs were placed in a little dish, and were then carefully pricked with a tiny needle of platinum or a sharp spicule of glass, after which they were covered with a layer of water sterilised by heat. In the hands of these physiologists, the little needle was as potent (or almost as potent) as Aaron's Rod. In about four hours the eggs began to develop, but while all of them passed through some initial stages, it was about one-fifth only that segmented in the normal way. At every stage the mortality was greater than in the case of ordinary fertilised eggs, but at length, out of a thousand eggs experimented on, one hundred and twenty hatched into tadpoles, and of these three were reared through parts of their metamorphosis. They did not actually turn into frogs, but died accidentally or for want of proper nourishment after the appearance of their legs, and after the oldest (about three months old) had all its four legs well developed and its tail already beginning to disappear; it was, in short, all but a perfect frog. As with St. Denis, when he walked a short distance with his head under his arm, "ce n'est que le premier pas qui coûte"; but these tadpoles, if they did not endure to the end, went a long distance on their way.

It is all but superfluous to add that the authors of these researches are men of high standing and reputation, skilled in all the precautions necessary for the carrying out of their experiments and for safeguarding them from all sources of accidental error. In short, we may have no doubt at all that what they assert they have actually performed—that they have demonstrated the artificial fertilisation of a vertebrate ovum by a simple mechanical stimulus, and that, so to speak, they have raised a hybrid between a needle and a frog! But here we are face to face with the double *rôle* which the male plays in the process of fertilisation, for, on one hand, it is his part to give the initial impulse or stimulus to the act of development, and on the other to convey to the offspring a share of his own hereditary qualities or characteristics. In these artificial experiments of parthenogenesis the two influences are dissociated. The former one is efficiently replaced by chemical or mechanical means, but the other drops out of sight altogether. For, as a French critic has remarked, "il ne peut être question d'hérédité du côté du père, car on ne voit pas très bien les jeunes grenouilles héritant des propriétés de leur épingle paternelle"!

D. W. T.

AGRICULTURAL RESEARCH IN CEYLON.[2]

THE staff of the Royal Botanic Gardens, Ceylon, show commendable activity in investigating the planters' problems that come under their notice. At frequent intervals issues are made of the Circulars and Agricultural Journal containing their papers, which will be found to bear comparison with any publications from other experiment stations. These papers show an obvious mastery of the situation, they are conceived in a scientific spirit, and exhibit none of the looseness characteristic of amateur investigations into agricultural questions. Tea and rubber naturally come in for a good share of attention, but other crops also present their problems, many of them of considerable interest and importance.

As usual in subtropical countries, most of the problems are connected with insect and fungoid pests, and half of the present batch of publications are from the mycologist, Mr. T. Petch. Five root diseases of tea caused by fungi are described. The commonest is caused by *Ustulina zonata*, Lév.; the dead tea roots show no external mycelium, but only a few inconspicuous black spots; if the cortex is removed, however, white fan-shaped patches of mycelium are found overlying the wood. The starting points of the disease are usually the dead stumps of Grevillea, which is grown among tea, and cut down either for firewood or when it has grown too large. Another common disease is caused by *Hymenochaete noxia*, Berk., a fungus that attacks numerous other plants. Here the mycelium is external to the root, and binds up a mass of sand, earth, and small stones, thus forming a crust 3 or 4 mm. thick; in the early stages the mycelium is brown, whence the name brown root disease has been given; later on, however, the whole turns black. It is the commonest root disease of Hevea in Ceylon, but does less damage than *Fomes semitostus*; unlike the latter, it does not spread through the soil, but only along the roots of trees; hence its progress is so slow that, as a rule, the first affected tree is dead before the neighbouring trees are attacked. Another root disease of Hevea, so far uncommon, is also described. It is caused by *Sphaerostilbe repens*, B. and Br., and is characterised by the black or red flattened strands running over the surface of the wood after the cortex is removed, there being no external mycelium. *Acacia decurrens*, which has been extensively planted as a wind-break for tea or for green manuring, and for more than thirty years seemed immune from disease, has now been found to suffer from two root diseases in addition to a "gummosis," the cause of which is not yet ascertained. An agaric, *Armillaria fuscipes*, causes one root disease, and *Fomes australis* the other. Another publication deals with canker in cacao and hevea. The latter plant does not usually suffer from canker when grown alone, but it is badly affected when grown in mixed plantations with cacao, which serves as a permanent source of infection. It is concluded that both canker and pod diseases are caused by *Phytophthora faberi*, Maubl.; complete examination was, however, made of the other fungi also present.

Mr. E. E. Green describes the extraordinary outbreak of snails, *Achatina fulica*, that has occurred in part of the island, and to which reference has already been made in these columns. This snail is large, its shell being about 4½ inches long, and weighs about 4 oz. It has only recently been introduced, but it has not effected nearly so much damage as might have been expected, because it feeds on human and cattle excreta; indeed, Mr. Green considers that, on the whole, it is doing more good than harm, and does not recommend any drastic attempts at extermination. Before long the natural enemies will keep it down.

Messrs. Kelway, Bamber, and R. H. Lock give a preliminary account of their studies on the effect of different intervals between successive tappings in Para rubber. A previous investigator, Parkin, obtained an increase of more than 600 per cent. of latex by increasing the frequency of tapping; Bamber and Lock, on the other hand, find no such marked wound response, although they advise frequent tappings from the practical point of view.

The official correspondence with regard to cotton-growing in Ceylon is also published. Dr. Willis does not think there is much future for the crop; other products yielding larger profits are not likely to be displaced. There is also a useful account of various samples of Cymbopogon grass oils prepared by Mr. Jowitt, of Bandarawela, and examined at the Imperial Institute.

ABSORPTION SPECTRA OF METALLIC SALTS.[1]

THE present volume is designed as a continuation of the work of Jones and Uhler and Jones and Anderson, and gives the results of a detailed study of the absorption spectra of salts of potassium, cobalt, nickel, copper, chromium, erbium, praseodymium, neodymium, and uranium, as affected by various chemical reagents and different temperatures. For the purpose of the discussion some 3000 solutions have been examined. The main points

[1] "L'embryogénèse complète provoquée chez les Amphibiens par piqûre de l'œuf vierge," etc. Par E. Bataillon. C.R., Avril 13, 1910; Arch. de Zool. exp. et gén. (5), vi, Nov. 1910; C.R., 27 Mars, 1911.
"Sur la parthénogénèse expérimentale chez les Amphibiens." Par F. Henneguy. C.R., Avril 3, 1911.

[2] Circulars and Agricultural Journal of the Royal Botanic Gardens, Ceylon. Vol. v.

[1] "A Study of Absorption Spectra." By H. C. Jones and W. W. Strong. Pp. ix+159+98 plates. (Washington, D.C.: The Carnegie Institution, 1910.