

and the disease can be produced experimentally with it. Further, it has been clearly demonstrated that with this virus, weakened in various ways, immunity against the disease can be produced. This immunity, however, does not seem to last very long, and until the virus can be grown on artificial media, sufficient of it cannot be obtained to do a very large series of immunisation experiments. The work of Prof. and Mrs. Maitland in Manchester gives us hope of culture, for they have shown quite conclusively that multiplication of the virus will take place in the presence of living embryo tissue of guinea-pigs. This is a decided advance.

Further evidence is given in the Report of the different types of the virus, but the most encouraging fact in relation to treatment, especially serological treatment, is that 92 per cent of the strains obtained from outbreaks in Great Britain belong to the O type. If, therefore, we were able to obtain an anti-virus of this type, we could deal hopefully with almost all the cases that occur.

Much valuable information has been collected on the survival of the virus in sewage, in milk, in carcasses after storage at different temperatures, and of its

resistance to pickling, etc. In administrative work these results should prove of great importance. Again, the infection of rabbits, hedgehogs, and rats opens up a suggestive field for investigation of the method of spread. In 1924, I reported to the Committee the results of experiments by myself and colleagues which showed that rats could be infected with the disease, confirmed this by further reports in 1928, and suggested that the rat, by its migratory habits, might be a carrier. The infection in rats has now been fully confirmed by the Committee, and in a note on the origin of fresh outbreaks it is stated that "the discovery of very inconspicuous signs of the disease in rats must increase the care with which symptoms of infection in these animals are sought, and add fresh importance to the warfare waged against these animals". To the farmer and dairyman this possible carriage is of the utmost importance.

The whole Report is full of interest, and the scientific workers under the Committee are to be congratulated. All their work is leading to the goal of prevention. J. M. BEATTIE.

Cotton Growing in Egypt.

DR. W. L. BALLS and his assistants in the Botanical Section of the Egyptian Ministry of Agriculture have published within recent years two bulletins on the "Operation of the Seed Control Law upon the Pedigree of Cotton Seed".* The first is a survey of the effect of the control during the first two years, and the second includes the first and extends the period to four growing years from 1926 until 1930. Egypt supplies the bulk of cotton for the fine spinning industry, in which quality is of great importance, and competition with lustrous fabrics made from synthetic fibres is making the use of good quality cotton more and more essential.

It would appear that the maintenance of the purity of good strain cottons is desirable for both the farmer in Egypt and the spinner in England, and that little difficulty should be met in operating a law designed to help in securing plentiful supplies of high quality pedigree stocks. Unfortunately, the tests applied by the botanical staff show that as the law becomes better known, methods of evasion are discovered and practised. Cotton seed is used both for growing and crushing, and it is this dual purpose which leads to malpractices. The law has improved commercial stocks with commendable rapidity, and the method of evaluating the improvement, and incidentally of detecting evasions, is surprisingly simple. There exists in Egypt a low quality cotton, known as Hindi, which is very easily recognised when growing and also in seed form. The percentage of Hindi seed has been found to be a very good index of the amount of contamination in seed stocks. A simple count is all that is required, and the method of plotting these counts shows very vividly how the law is operating.

The curves in these publications are so easily interpreted that it is possible to obtain from them the maximum allowable Hindi-content from year to year, although the legal limit has been reduced yearly to a very low percentage. There can be little doubt that deliberate adjustment of the Hindi-content to fall with the legal limit is being practised, but if mixing could be kept within the limit the purpose of the law would be fulfilled.

* Ministry of Agriculture, Egypt: Technical and Scientific Service. Bulletin No. 85: The Operation of the Seed Control Law upon the Pedigree of Cotton Seed in Seasons 1926-27 and 1927-28. By Dr. W. Lawrence Balls and Armenag Eff. Bedevian. Pp. 61+27 plates. 5 P.T. Bulletin No. 100: Developments of the Existing System for Seed Supply of Cotton in Egypt. By Dr. W. Lawrence Balls. Pp. 11+3 plates. 5 P.T. Bulletin No. 104: The Operation of the Seed Control Law upon the Pedigree of Cotton Seed in Season 1926 to 1930, with a Discussion of Evasions of the Law. By Dr. W. Lawrence Balls and Armenag Eff. Bedevian. Pp. 28+23 plates. 10 P.T. (Cairo: Government Press, 1929-1931.)

There are many cases where the Hindi-content is well above the limit, and the system of analysis employed is searching enough to locate the law-breakers with scientific if not legal conviction. It seems that the offenders can only be made to mend their ways if the penalties for evasion are as carefully regulated as the system of diagnosing the culprits. While the Hindi-content is a simple and reliable index of either careless or deliberate lowering of the standard of purity of the seed stocks, it is not a true index of the purity of the cotton types, as natural crossing and other deteriorating influences are unavoidable in large scale cultivation.

The botanical staff clearly recognises that the most effective way of cleaning commercial stocks is by renewal of seed from clean stocks, and the methods adopted to achieve this are given in a bulletin entitled "Developments of the Existing System for Seed Supply of Cotton in Egypt".* Perhaps the most interesting technical item in this publication is the use of large cages of high light-transparency made of fine 'staybrite' steel wire, for the propagation of pure types. The mesh is fine enough to prevent natural crossing, and improvement in the design and production of these cages has advanced to the stage when the cost per unit area covered is little more than the cost of the pre-War cages made of corrodible wire.

The raising of sufficient seed from such small cage stocks to supply the extensive growing areas of Egypt is a story in itself, and the scientific organisation of the expansion process leads us almost to accept the statement that the botany of the cotton plant is better known than that of any other plant. It might be contended that the method of seed renewal is adequate for the maintenance of clean stocks, and that the pruning effect of the seed control law is antithetical. Assuming it is possible to provide adequate seed supplies from reliable sources at one or two years' remove, accident or carelessness will lead to premature contamination, but if all concerned in the handling of the stocks are compelled by rigorously enforced law to exercise necessary care to prevent mixing, the burden of seed renewal will be lightened. Pruning and seed renewal are thus complementary, and all who have an interest in the prosperity of the cotton industry will wish success to the botanical and agronomic sections in Egypt in their efforts to improve by both means the quality and uniformity of cotton seed stocks. F. P. SLATER.