

### Scientific Aid in Agriculture

THE story of the founding at Indore, in Central India, of an Institute of Plant Industry, its unique territorial associations and duties, the work in hand, and its bold, comprehensive policy of research has become widely known through the writings of its first director, Mr. Albert Howard. These have now been extended by articles in the *Empire Cotton Growing Review*, vol. 9, Nos. 2 and 3, 1932, entitled "The Improvement of Cotton Production". Plans are explained for dealing with specific cotton problems in Central India, but the articles also contain an important treatment of the general question of policy in agricultural research. During the past twelve months enforced economies have made responsible bodies all over the world scrutinise closely their disbursements on agricultural research. Some have inclined to grasp an excuse for ending scientific work with which they never sympathised, but the more common and the reasonable reaction has been to ask whether all the work in progress is well conceived and likely to benefit industry. Howard, speaking of the present position—a superabundance of raw cotton and low prices—asks if science can help the cotton industry under such conditions, and he bluntly adds that if it cannot "the days of agricultural research are indeed numbered".

Against agricultural research in general is laid the charge that practical problems have always been approached by one science at a time, working alone. This has imposed on research stations an inelastic organisation which, weakly following the strict departmentalism required for the teaching of the sciences, has produced rigid specialists and set them to attack isolated fragments, leaving major problems untouched. It is suggested that research must concern itself less

with the details of existing agricultural methods and more with the possibility of evolving wholly new methods to meet the changes of situation which have swept over all branches of crop production. If cotton growing is to be substantially aided, the living plant must be the centre of action, and this can only be studied effectively in relation to the soil, the agricultural conditions, and the economic uses. Study of this kind, however, is not provided for by the accepted subdivisions of agricultural science. A new, broader outlook on agricultural problems is needed, with consequential changes in research organisation.

When he deals with "the improvements which really matter", Howard prescribes for cotton-growing improvement "a well-balanced combination of agronomy and genetics with soil science". Against insects and fungi the cultivation of suitable varieties in an efficient manner is urged as the only practicable method, and support is derived for this view from the history of the now famous sugar researches in Java.

Some of the minor points may be considered contentious and open to criticism, but the main thesis is an important statement on a great and urgent problem. To ask for attack on a wide front, for joint action by the various formal divisions of science, and that the structure of the industry itself should be added to the subjects for investigation, is to ask for no more than systematic planning of research, based upon careful reconnaissance of industry. Whether crop production can better be helped by inviting specialised branches of science to choose their own problems or by trying to resolve great practical problems into their scientific components and applying the sciences to these is the essential question these articles try to answer.

F. L. E.

### Annual Exhibition of the Royal Photographic Society

THE seventy-seventh annual exhibition of the Royal Photographic Society was opened on Sept. 9 at the Society's house at 35 Russell Square, London, W.C. The exhibition will remain open each weekday until Oct. 8.

The Scientific and Technical Section this year, besides its usual features, possesses a notable series of photographs of the invisible. On one hand are some excellent examples of fluorescence photography of visually undecipherable documents. Here the invisible writing is shown by differential fluorescence of the parchment or paper surface when exposed to ultraviolet radiation. At the other end of the scale, photography by means of plates sensitive to the infra-red is shown in several aspects. First are many examples of long-distance photography through haze. Next are shown photographs taken in complete darkness, among them being photographs of hot flat-irons taken by their own invisible radiation. A very interesting example of the application of infra-red photography has been made in the examination of some rare old books in which certain passages were deleted some three hundred years ago by the censor for the Spanish Inquisition. The ink used for the deletions is, however, transparent to infra-red radiation, though the original printed characters are opaque; infra-red photography has thus been able to make the original paragraphs easily legible. Infra-red photomicrography has been mentioned recently in these columns; some fine examples of this work are shown in the exhibition. Lastly, spectrograms are shown taken with plates sensitised with xenocyanine; by using this sensitiser many new lines have been recorded in the spectra of the rare gases between 8500 and 11,000 Å.

Chemical engineers will be interested to find on view a working model of an electrolytic plant for the recovery of silver from used fixing baths. The exhibit represents part of a motion picture film laboratory in which millions of feet of film annually are developed, fixed, washed, and dried. In one of these factories the cost of the hypo fixing baths may easily exceed £2000 a year, and the unreduced silver bromide which is dissolved from the film may represent as much as £7000 worth of metallic silver, even at its present low price. Previously, the silver was salvaged by throwing it down as a sludge of silver sulphide, which had then to be treated by a somewhat costly refining process. The silver is obtained by the new process as 98 per cent pure metal on stainless steel cathodes. Fortunately, owing to an admixture of a small amount of gelatin, the deposit is very brittle, so that it can be readily scaled off from the cathodes. The hypo itself is regenerated by the electrolysis, and is run back into the fixing tanks for further service; owing to dilution and to the accumulation of soluble bromide, however, the solution would eventually become unfit for use; for this reason, about one-third of the desilvered solution is run to waste, and fresh hypo is added to the fixing baths. The total consumption of hypo is thus reduced to about one-third of the amount employed formerly.

In its other sections the exhibition maintains its customary high standard. The Colour Section, while not being large, contains some very fine examples of three-colour portraits. The examples of Press photography bear ample witness to the very high sensitivity obtained in certain new nanchromatic materials.