Third International Locust Conference

THE investigations on the locust problem in Africa and Western Asia, organised since 1929 by the Economic Advisory Council, have developed from the beginning on an international scale, for it was considered as hopeless to study the locust problem on a narrow territorial basis. This point of view proved acceptable to other Governments, and in 1931 the First International Locust Conference was called in Rome, where representatives of three countries (Great Britain, France and Italy) accepted a common policy for the investigation of the problem, and designated the Imperial Institute of Entomology in London as the international centre for anti-locust research. The second Conference took place in 1932 in Paris, where nine countries were represented, and further arrangements were made to ensure better co-operation in the study of the problem.

Between 1932 and 1934 great progress has been made in the investigations. Vast areas in Africa and in India have been explored by special entomologists of the British, French and Indian locust research organisations. The information, which has been steadily accumulating at the Imperial Institute of Entomology, made it possible to reconstruct the course of the present locust outbreak, to disentangle the records relating to different species of locusts, and to throw much light on the problem. The Third International Conference held in London on September 11–18 had, therefore, two aims. One was to summarise the results already attained in the study of the locust problem, and another, to elaborate a programme of further work on an international scale.

The Conference was attended by the delegates and experts of thirteen countries. A noteworthy feature was the presence of practically all the specialists actually engaged in locust investigations in Africa and India, which made the discussions very fruitful and devoid of unnecessary general statements. The programme of the Conference was carefully prepared in advance, and all the papers submitted to it were printed beforehand, to avoid the waste of time involved in reading them at the Conference. Owing to these arrangements, it became possible for the Conference to work through its full programme, and to discuss in detail outstanding points of the locust problem.

The main work of the Conference was definitely based on the fact, recently established by French and British investigators, that invasions of each locust species arise from the relatively restricted, so-called outbreak centres. It is only in these centres that the transformation from the solitary phase into the gregarious phase is possible, owing to the peculiar ecological conditions. Therefore, the location of the outbreak centres for each species should constitute the basis of a comprehensive policy for the prevention of locust invasions. A number of outbreak centres have already been discovered and studied, but many more remain unknown. The Conference, therefore, paid special attention to the preparation of a list of suspected areas which must be investigated without delay by the respective Governments. The methods to be employed in the field investigations and in ecological studies in the outbreak centres have been discussed in detail, in order to standardise them and thus to make the results comparable. Particular attention was paid to the methods of studying locust populations in different habitats, to the microclimatic work and to the standardisation of biometric methods for the study of phase transformation. A similar discussion on methods of work was arranged with reference to the study of locust migrations. In this study, close co-operation must be established between entomologists and meteorologists, since the causes of the migration and its directions are most probably climatic. The Conference accordingly recommended that meteorologists should be attached to locust research organisations, and a series of suggestions was elaborated as to the types of meteorological charts most likely to be of assistance in the study of migrations.

An interesting discussion took place on the problem of fundamental research. It was pointed out that out of the field investigations there arises a number of problems in locust biology and physiology which can be solved only in well-equipped research laboratories. The Conference recommended, therefore, that Governments should provide financial assistance to university and other laboratories for research on specific problems of immediate value in locust investigations. This means that research laboratories would be offered opportunities for carrying out scientific work of general interest, provided it is done on an object of practical interest, namely, locusts. Since researches of this kind may be undertaken in various institutions, the Conference recommended that the laboratories undertaking research on locusts should communicate with the Imperial Institute of Entomology in order to avoid overlapping.

The practical problems of locust destruction did not come within the scope of the Conference, but the relatively recent method of destroying locusts by arsenical dusting from aeroplanes was discussed in some detail. The experimental results obtained so far are considered encouraging and a hope was expressed that they will be continued. At the same time, the Conference pointed out the

necessity of investigating the physiological action of poisons on locusts, in order to find possible substitutes for arsenical compounds, which have certain disadvantages.

Apart from the very fruitful discussions during the meetings, the Conference provided a unique opportunity for entomologists of various countries engaged in locust research for the personal exchange of experiences and ideas. These informal discussions occupied all the intervals between meetings, and their value for those working of necessity for years in the wilds of Africa must be very great.

The Conference demonstrated very fully that the international investigations on the locust problem are following the only possible way to its solution. The value of international co-operation in this work has now become so obvious, that it was decided to make the next Conference still more comprehensive. Accordingly, it was suggested that the Egyptian Government, which has invited the Fourth Conference to meet at Cairo in 1936, should be asked to extend the invitation to all the countries of the world suffering from locust invasions. The Fourth Conference will, therefore, mark a new period in the international attack on the locust problem. B. P. UVAROV.

Two Types of Diamond

SIR ROBERT ROBERTSON'S recently published résumé of his researches on the two types of diamond* is one of the most fascinating detective stories of modern science. It has the advantage that though the circumstances of the crime are laid bare step by step, the real criminal escapes, to be dealt with, we hope, in the sequel.

The diamond has been studied for longer than any other natural stone, and its unique character had always been taken for granted. But it has been left for Sir Robert Robertson to discover that there are two types of diamond fundamentally different in many important respects.

The original observation was that one of the diamonds he had obtained from Prof. W. T. Gordon differed from all the others by not possessing the characteristic infra-red absorption of diamond at 8 μ. Abnormalities in the absorption of diamond had been noted before, in one case by Miller so far back as 1862, but their significance had not been realised. Sir Robert, however, with his collaborators, Dr. J. J. Fox and Dr. A. E. Martin, proceeded to examine many of the physical properties of diamonds and showed that the absence of the 8 μ band was completely correlated to striking differences in a number of physical properties, while in many other properties no differences whatever could be observed.

The characteristic differences are shown in the accompanying table taken from the paper. In electron diffraction, Raman spectrum, triboluminescence, dielectric constant, refractive index, colour and specific gravity, no differences were observable. There is no doubt that structurally both types of diamond are substantially alike. The observed differences are, on one hand, those affecting reaction with radiation, that is to say, electronic; and on the other, refer to the perfection of the crystal texture, crystals of Type 2 showing by their lamination and small primary extinction of X-rays that they are of a more marked mosaic pattern than those of Type 1. The two types of difference would appear to be closely correlated, but at first sight in a most unexpected way, because from the electronic point of view crystals of Type 2 would seem more perfect than those of Type 1, while from the textural point of view the reverse would appear the case. On the whole, however, the rarer type of diamond, Type 2, seems to be the normal type, as its properties agree more closely with prediction. The 8 μ band should be an inactive one and no compound containing only carbon single valency bonds should have ultra-violet absorption higher than *c.* 2200 A. The presence of an 8 μ absorption and complete absorption at 3000 A. in Type 1 diamonds suggests strongly the effects of an abnormality similar to that produced by strain or impurity.

	Type 1.	Type 2.
Occurrence . . .	The common type	Rarer.
Form	Derivatives of cubic system	Derivatives of cubic system, but with fine parallel laminations.
Isotropy	Considerable anisotropy between crossed nicols	Nearly isotropic.
Infra-red absorption-persisting at −170° C.	At 3, 4·1, 4·8 and 8 μ	At 3, 4·1 and 4·8μ No band at 8 μ.
Ultra-violet absorption	Not complete until 3000 λ; sequences of bands near this W.L. increasing in intensity down to − 170° C.	Not complete until 2250 λ. Faint absorption and diffuse bands near this W.L., disappearing at − 100° C.
Photo-electric conductivity . .	Small with even high voltages	Present with small voltages or none.
X-ray pattern . .	Normal. Ratio of intensity of 111/222 usually small	Normal. Ratio of intensity of 111/222 usually large.

The Type 2 diamonds in any event show properties of the greatest physical significance. The most fascinating are the photoelectric properties not shown in Type 1 owing to the heavy absorption in the activating region. Here the work of Gudden and Pohl has been confirmed and extended.

There are three types of reaction of diamonds of Type 2 to light of different wave-lengths. For

* "Two Types of Diamond." By Sir Robert Robertson, Dr. J. J. Fox and Dr. A. E. Martin. *Phil. Trans.*, A, **232**, 463; 1934.