trusted that the Board would see that the necessary reforms were carried out; yet nearly six years have elapsed since this second report was published before anything in the nature of effective measures is taken, due, doubtless, to the energy and enterprise which Mr. Fisher is bringing to his arduous task. It is true that in July, 1914, a circular was issued, No. 849, giving effect to many of the recommendations of the Consultative Committee and inviting criticism and suggestions thereon, but leaving the important matter of finance undecided. The Board, however, announced in a later circular, No. 933, issued in December, 1915, that, in view of the situation caused by the war, its proposals embodied in Circular 849, in so far as they would involve expenditure by the Board, must remain in abeyance, which meant the virtual withdrawal of the proposals for reform.

Recently, however, under the ægis of the present President of the Board of Education, we have the issue of Circular 996, in which the Board definitely stated that it would bring into actual operation, with due financial arrangements, its scheme of July, 1914, Circular 894, on August 1, and that from that date the Board would undertake the functions and responsibilities of a co-ordinating authority for secondary-school examinations with the assistance of a body of persons to be called "The Secondary-School Examinations Council." The circular stated that the council would be comprised of nine representatives of the various university examining boards, four of the local authorities, four of the Teachers' Registration Council, and one of the standing committee which, it was proposed, should be formed from the various professional bodies, with a suggestion that the number might be increased by representatives of other standing committees, such as the chambers of commerce, interested in the council's work. The Board itself will be represented at the council meetings by such of its officers as it may choose to appoint to attend as assessors, who will have the right to speak, but not to vote.

This circular marks an important step in the endeavour to bring order into the chaos which now besets and gravely hinders the work of the secondary school in respect of the numerous and often conflicting external examinations to which its pupils are subject in the endeavour to proceed to the further studies for which it is the necessary preparation, and in so far as it succeeds in this it is a step to be commended. It is now generally accepted by those competent to judge and by all but interested persons and bodies that the proper work of the secondary school is to promote upon the basis of liberal studies the formation of character, the development of the imagination, and the due training of the intellectual faculties. The new Advisory Council does not appoint its own chairman, who is the nominee of the Board. Clauses 7 and 8 define the responsibilities and functions of the council, and give power to the officers of the Board who attend its meetings to require when they think fit that questions of principle or policy shall be referred to the Board.

The importance of this Advisory Council would appear to indicate that the representation of the universities should have been direct and not through the medium of their examination boards, and it would appear that neither in the case of the professional bodies concerned nor in that of the teachers is the representation adequate to the important interests involved. Surely so grave and dignified a body should have been left free to nominate its own chairman with the approval of the Board. The constitution of the new committee would appear to make it largely subservient to the Board and to deprive it of that independent character which the importance of its responsibilities demands.

It is surely worthy of consideration whether the time has not arrived with regard to the secondary schools, of which more than 1000 are approved as efficient by the Board, for a further step to be taken, thoroughly safeguarded by a sound and effective system of inspection, which would have the important effect of tending to extend the school life, now lamentably low, and raising the quality of the instruction. We refer to the introduction of the principle, first, that the school should be recognised by the university within the area of which it is situated as fully complying with a recognised standard as to its staffing, equipment, and the duration and quality of its courses of study; and, secondly, that the scholars passing satisfactorily through its courses year by year shall at the close of the final year be entitled to a certificate and be qualified to proceed to higher and more specialised studies in any university of the United Kingdom in any of its faculties, and shall also be eligible for entrance to the examinations leading up to membership of the various professional bodies and societies.

LOCUSTS.[1]

THE International Institute of Agriculture, Rome, has issued a memoir summarising published and communicated information relating to locusts; this has been compiled by Prof. Trinchieri, not only from literature, but also from information obtained by direct inquiry from countries adhering to the institute. The memoir will be valuable to all who have to do with fighting locusts, and the information collected is put in a form readily accessible and easily consulted. One criticism is possible, and it is one important to working entomologists: the term "sauterelles," or "locusts," has not been clearly defined to mean species that have the habit of migrating in swarms only; and while some countries have included non-swarming "grasshoppers" (*e.g.* all the Phasgonuridæ), others have deliberately omitted all but the real "swarm-migrating" locusts. There are probably not more than six-

[1] "La Lutte contre les Sauterelles dans les divers Pays." (Rome Institut International d'Agriculture, 1916.)

teen species of "locust" on the earth, but the memoir lists 112 of the family Acridiidæ (called Locustidæ). Allowing for this, the memoir provides an excellent summary of habits, life-histories, remedies, and international co-operation.

It is curious that human ingenuity has not succeeded in controlling locusts, or even in understanding why an insect, normally widespread in small numbers, becomes enormously abundant, packs into swarms, and migrates over really enormous distances. One reason is that no single observer in his lifetime can get a long enough experience to be able to estimate the value of the different factors that govern these outbreaks; they are probably so diverse that a very minute knowledge of local conditions is required, and in any one locality there may not be sufficient outbreaks during a single working lifetime. So we still know very little of the conditions producing outbreaks, or the means of anticipating them and preparing for them. The methods in use are most diverse and as a rule extremely simple. In India troops have been turned out to fire volleys of blank cartridge to divert a swarm; while in Morocco cultures of *Coccobacillus acridiorum* have been used with success. These two represent the extremes of simplicity and of scientific achievement; but a perusal of this memoir shows that the locust problem still remains and looks like doing so. As the author says, "Il existe toujours une question des sauterelles," and in the main the pest must be fought in every country with simple, homely methods devised to suit the local circumstances: the arsenic-treacle method succeeds in South Africa, but not in India; the method of "mopping up" hoppers in Bombay with a bamboo frame and bag is useless elsewhere; and there is no one method that stands out definitely as likely to be valuable.

To the economic entomologist, who is probably a member of an agricultural department, locusts present a serious problem, calling for whatever ingenuity he possesses. In 1903 there broke out in Bombay a plague of locusts of unknown habits, which actually flew about for eight months before laying eggs, and then suddenly the entomologist was called on for a means of dealing with hoppers about to hatch from eggs laid over 150,000 square miles of country. Such occasions are crises in the life of the entomologist, and we commend Prof. Trinchieri's summary as a welcome source of inspiration when faced with an outbreak.

In his last section the author discusses shortly the value of international co-operation, a matter that has been prominent since the Phytopathological Conference was held in Rome. Sixteen countries have answered in the affirmative the institute's query as to their willingness to co-operate against locusts. The value of such co-operation lies in the intelligence mutually given as to the occurrence of locusts, and this would be most valuable. It is useless discussing this at present. Locusts do not respect international boundaries or join the Entente; but it is a part of the valuable work done by the institute that we should have these memoirs and be prepared for international co-operation when other circumstances render it possible. H. M.-L.

BIRD MIGRATION IN CENTRAL SWITZERLAND IN RELATION TO METEOROLOGICAL CONDITIONS.[1]

THE relation of bird migration to meteorological conditions has been considered, of late years, an important part of the study of the movements of birds, and various theories have been advanced to explain their interrelations. In the memoir before us Dr. Bretscher deals very fully with the arrival in spring and departure in autumn of the summer visitors to Central Switzerland. In relation to these he treats of bird migration and atmospheric pressure, wind, atmospheric precipitation, temperature, etc., and under each heading he has tables of statistics in support of the statements in the text. By tables 1 and 15 he shows that the position of barometric depressions within the area has, as we should expect, no influence on the arrival of the summer migrants and their departure in autumn. In tables 3 and 4 he discusses the influence of direction and strength of the wind, and concludes that, in Central Switzerland, migration proceeds irrespective of the direction of the wind, and that, unless the force be so great as to be a hindrance, the influence of this, too, may be regarded as a negligible quantity. The fourth section deals with atmospheric precipitation in relation to bird migration; as the author tells us in Switzerland even keen ornithologists stay at home in wet weather, we are not surprised to find that they have few direct records of migration in rain, snow, or fog, and he himself says, further observations on this subject are wanted.

What strikes one as being the most interesting of any of the sections are those on spring and autumn migration in relation to temperature. Dr. Bretscher gives many interesting tables showing the number of observations on the movements of each species under each degree of temperature Centigrade. These indicate the maximum and minimum between which migration takes place, the gradual increase to the most favourable migration temperature, and the decrease after this is reached. Here we see that birds migrate between certain temperatures, which vary according to the species; thus, the blackbird and song-thrush perform their migrations at a lower temperature than the insect-eating warblers. Another aspect is presented on table 9, namely, the duration of the migration period in relation to the average temperature, and the author here comes to the conclusion that the two are not correlated; thus the warmest average temperature does not necessarily coincide with the shortest

[1] "Der Vogelzug im schweizerischen Mittelland in seinem Zusammenhang mit den Witterungsverhältnissen." Von Dr. K. Bretscher. Nouveaux mémoires de la Société Helvétique des Sciences naturelles, vol. li., mém. 2.