treatment at times. Sometimes it gives a statement of intentions and ideals rather than of achievements; some of the accounts of science-teaching are clearly derived from those of other nations, and at times we do not get a clear idea of what is meant by secondary education. The vagueness of the official statement which does not want to commit itself to well-defined terms seems to be common to many countries. An example of this (which could be multiplied many times throughout the book) taken from the United Kingdom (England and Wales) Section will show the difficulties of the compiler: "Natural Science teaching is sometimes optional. It is left to the discretion of the individual school. The same importance is given to Natural Science in comparison with other subjects in promotion examinations and the Secondary School leaving examination".

The book is a sequel to an "Introduction to Natural Science in Primary Schools", prepared by the International Bureau of Education for the Twelfth International Conference on Public Education, held in 1949. The teaching of physics and chemistry is reserved for a later inquiry, and so the present work is confined to biology and its branches, physiology and anatomy, geology and mineralogy. To take away physics and chemistry from a report on science teaching would seem to be unfortunate. A definition of natural science which purposely excludes the fundamental studies of the physical sciences is unwise, and in any event they are not excluded in the reports which are sent in by some of the ministries. The information was given under a number of headings: the place of natural science in the curriculum, the aims of natural science teaching, syllabuses, teaching methods (including visual aids and text-books), teaching staff and future intentions. It is impossible to summarize further the results of the inquiry as they are set forth in the general survey in the early part of the book; but much of the information sent from forty-eight countries would have been grasped more readily had it been set out in tabulated form. It is evident that the countries concerned are unanimous in wishing to make natural science teaching more experimental and to bring it into closer touch with life, and that there is an increasing emphasis on the biological aspects of the subject. Science teaching in nearly all countries is related to human needs—individual, national and social. Some countries, including Germany, stress the ethical and philosophical aspects of science, its disciplines and opportunities for patience and criticism; the United Kingdom mentions its interest and hobby values; other countries indicate its relation to geography and its value as a means to a better understanding and use of the natural resources of the country.

The account of science teaching in England and Wales is disappointing, and does not do justice to work which is being carried on. To a foreign reader it must seem unimpressive. A clear statement should have been given of the division of secondary education in Britain, since the 1944 Act, into 'grammar', 'technical' and 'modern'. The report is chiefly concerned with modern schools (the old 'central schools'); grammar schools are only mentioned in passing, and secondary technical schools not at all. Although it is important that all citizens should leave school with some knowledge of biology, particularly in regard to the nature and needs of mankind, the fact remains that in Britain it is the grammar and public schools to which we must look for the type of science teaching which in the end produces scientists and technologists. The national and international value of the science teaching in these schools from 1902 until 1944 cannot be over-estimated. The need of the future for the type of scientific worker who comes from these schools is greater than ever before; indeed, there will be no future for Britain unless its life is sustained by an increasing number of workers thoroughly trained in the skills and disciplines of science. With the best will in the world, the modern schools do not meet these needs, in spite of the fact that they cater for the majority of children. Some of them do not teach science, many of them have no adequate course for the important age-group of 14–15 years, and, in spite of the optimistic Ministry of Education booklets mentioned in the report under review, some of these schools have not yet given adequate thought to their schemes of work. So far as the scientific life of the nation was concerned, the grammar and public schools laid the golden eggs; but they have been inhibited in their work by factors which could have been foreseen in 1945. No science graduate with a good honours degree needs to consider teaching as a career unless he has strong vocational leanings. Recruitment for the science staffs of grammar schools is suffering in both the quantity and quality of applicants to fill the vacancies. This has its repercussions on the attainments of students reaching the universities and on their subsequent value to society. Nor is this improved by feeble official attempts to assure us that the position is not unsatisfactory.

The document makes no attempt at appraisal of the various aims and methods, nor does it stress particularly good or original points where they appear. It will be of more interest to the student of comparative education than to the practical science teacher, who will find that it does not touch the fringe of most of the matters so admirably dealt with in the report on the "Teaching of General Science", prepared by the Science Masters' Association in 1950.

W. L. Sumner

SOCIAL ANTHROPOLOGICAL STUDIES OF LATIN AMERICA

Throughout Latin America there is a desire to improve conditions and to overcome difficulties which hinder national development, the greatest being the low estate of the Indian. In order to do this the first necessity is adequate information about things as they are, and the Institute of Social Anthropology of the Smithsonian Institution is helping to provide it by publishing a series of descriptive studies, of which Nos. 10–14 have been published during the past two years or more*. The policy of the Institute is to co-operate wherever possible with the various national organizations, and the present series owes much to students of the Mexican Escuela

* Smithsonian Institution: Institute of Social Anthropology. Publication No. 10: Nomads of the Long Bow; the Siriono of Eastern Bolivia. By Allan R. Holmberg. Pp. iv+104+7 plates. 65 cents. Publication No. 11: Quiroga, a Mexican Municipio. By Donald D. Brand, assisted by José Corona Núñez. Pp. v+242+35 plates. 1·75 dollars. Publication No. 12: Cruz das Almas, a Brazilian Village. By Donald Pierson and others. Pp. x+226+20 plates. Publication No. 13: The Tajin Totonac, Part 1, History, Subsistence, Shelter and Technology. By Isabel Kelly and Angel Palerm. Pp. xiv+369+33 plates. 2·75 dollars. Publication No. 14: The Indian Caste of Peru, 1795–1940: a Population Study based upon Tax Records and Census Reports. By George Kubler. Pp. vi+71+2 plates. 75 cents. (Washington, D.C.: Government Printing Office, 1950–1952.)

Nacional de Antropología e Historia, the Brazilian Escola Livre de Sociologia e Política of São Paulo, and the Peruvian Instituto de Estudios Etnológicas.

The author of No. 10 spent about eighteen months studying the unacculturated remnants of the Siriono, a very primitive naked tribe living in the tropical forests of Eastern Bolivia. For a third of this time he and a Bolivian companion lived alone with a small group. Conditions were very difficult, and his time was cut short by the entry of the United States into the Second World War in 1942, so he is not satisfied that he really understood the Siriono ; but he collected a lot of information about their material culture, activities, beliefs and social organization, which is set forth in a good straightforward description. In the final chapter, he analyses their culture in terms of "drives", of which the chief is hunger.

No. 11, dealing with a municipality of mixed white, mestizo and Tarascan Indian population near Lake Pátzcuaro in Michoacan, Mexico, is by a human geographer. It is a detailed and interesting description of selected aspects of life in Quiroga, with emphasis on land settlement, government and economy, little attention being paid to sociology because a colleague was studying it in a neighbouring town (No. 6 of the series). The area is well known to ethnologists from the survival of primitive methods of hunting birds on the lake, and is at present the scene of a Unesco welfare project.

A detailed account is given in No. 12 of a village near São Paulo, to which the imaginary name of Cruz das Almas was given to preserve anonymity. It was picked out as a typical Brazilian rural community of mixed European, Indian and African descent, depending mainly on agriculture. It proved to be homogeneous and stable, with no very striking features and practically no vestiges of aboriginal Indian culture.

By contrast, No. 13 deals with the district around Tajin, a Mexican area of great historical and archæological interest, with a rich material culture about which it is a mine of useful information. The population is Totonac, and their culture is a living one compounded from old and new elements. The historical background is particularly necessary to its understanding, and a good deal of the report is devoted to this, Isabel Kelly, as an archæologist, being well qualified to deal with it. This first part, covering history, subsistence, shelter and technology, makes a substantial volume ; and clothing, with several other aspects of material culture, together with what is described as non-material culture, will form Part 2.

No. 14, "The Indian Caste of Peru, 1795–1940", is a product of Dr. George Kubler's researches among the official archives of Peru while working in Lima during 1948–49. Although the word 'caste' is used in the title in association with the Indians, the Spanish word *casta* was generally used in Peru to refer to mestizos, albeit rather loosely as the author explains in detail. The work is a study of the variations in the percentage of Indians in the total population since just before the Independence. It seems that the Indian proportion rose during the first few years of the period studied, thus reversing a trend that had existed since the Spanish conquest, but that the fall afterwards continued, so that Indians now form about 40 per cent of the population. The problem is much complicated by the difficulty of defining an Indian, since the definition depends not wholly on biological factors but very considerably on social ones also.

ACCELERATING EFFECT OF AN EXTRACT OF VERNALIZED EMBRYOS OF WINTER RYE ON FLOWER INITIATION IN UNVERNALIZED EMBRYOS

By O. N. PURVIS and Prof. F. G. GREGORY, F.R.S.

Research Institute of Plant Physiology, Imperial College of Science and Technology, London, S.W.7

THE theory that flowering requires the presence of some specific flower-forming substance is rejected by some writers on the grounds that the application to uninduced plants of extracts of induced plants has not led to flowering or at best given inconclusive results. This argument is not, however, valid, since the active materials, which are known to move about in the plant and to pass a graft union, may well be inactive in a plant extract. Possible causes of failure are manifold : the solvent may fail to extract the substance, or may inactivate it ; it may not be absorbed by the test plant in sufficient quantity to produce a determinable effect, or it may only be active in association with the living protoplasm.

Small effects of plant extracts have been reported from time to time. Bonner and Bonner[1] induced flowering in *Xanthium* by applying an aqueous extract of the stem apex of *Washingtonia robusta*. Loehwing[2] and Behrens[3] report activity of extracts of *Zea mays* and *Sempervivum*, respectively. Sironval[4] obtained an oil from leaves of induced strawberry plants which, applied to leaves of young plants, led to normal flowering in a proportion of the plants treated, while the control plants produced rather fewer inflorescences and no fully developed flowers. Roberts[5] found that extracts of various plants in a flowering condition had a slight inductive effect on *Xanthium*. On the other hand, Melchers and Lang[6] report that careful experiment has failed to extract any florigenic substance.

In these examples the extracted plants were brought into the flowering condition by photoperiodic treatment. It therefore seemed necessary to determine if extracts of vernalized grain could confer the vernalized condition on plants which had not received this treatment. In 1951, embryos were removed from rye grain which had been vernalized for ten weeks, and were extracted with water, chloroform, ethyl alcohol or ether. The extracts, after removal of the solvents, were added to a sucrose agar medium[7]. Unvernalized embryos were excised and grown for six days on this medium, at a concentration which presented to each test embryo the extract of ten vernalized embryos. A control series was germinated on medium without extract. The seedlings were planted out in sand culture.

The results of this experiment are given in Table 1. Unfortunately a single plant in the control series flowered in 118 days : such early flowering had not been encountered in unvernalized plants grown from excised embryos, though it is fairly frequent when intact unvernalized grain is used. In the table it will be seen that despite the inclusion of this obviously aberrant plant the 'score', that is, progress to flowering[8], of the control series is more than six points below that of the series treated with chloroform