THE results of a nutrition survey of Palestine are described in *The Lancet*. The survey shows that there is little obvious undernourishment in Palestine. A Health Department Survey has already shown that part of the urban population is suffering from malnutrition due to poverty. The rural population is believed to be better off now than ever before. The survey is covering the whole country and taking account of both Jewish and Arab communities; it is linked with the school-feeding scheme for Arab children in the larger towns. Children of both groups have suffered more from malnutrition than adults. The most serious dietary deficiencies are of fats and calcium, especially among Arab children. The Jewish school-feeding scheme has improved the nutrition of poor Jewish children and it is hoped that the government plan for providing school meals for Arab children will have an equally good effect. There was less vitamin deficiency than had been expected, since vegetables and fruit in season offer a good source of many of them. Iron deficiency is commoner among the Jews than among the Arabs, who use more iron-containing plants in cooking. An educational campaign, to encourage vegetable growing and conservative cooking, is proposed. Poor housing and high rents contribute to poverty and hence to malnutrition.

DISCUSSION

A NOTE ON THE SEROLOGICAL ACTIVITY OF DENATURED ANTIBODIES

ERICKSON and Neurath have recently given a brief account[1] of their studies of the change in activity, as shown by the precipitation reaction with the homologous antigen SSSI, of horse antipneumococcus antibody when subjected to the denaturing action of guanidine hydrochloride. They observed that their preparations after treatment with the denaturing agent were able to form precipitates with the homologous antigen. They attributed this ability to the regeneration of antibody in the absence of antigen, and suggested that this indicates that "the difference between antibody globulin and normal globulin is not merely one of steric arrangement but probably one of amino acid composition." We believe that a reasonable alternative interpretation of the experiments can be given.

The argument of Erickson and Neurath depends on the implied assumption that in their experiments all the antibody activity of the preparation was initially destroyed by the denaturing agent. This assumption, however, is not supported by direct experimental evidence. Our interpretation of the observations, which does not include this assumption, is the following: We assume[2] that parts of the antibody molecules have such a folding of the polypeptide chains as to give them structures complementary to the homologous antigen, and that the specific activity of the antibody resides in these parts. Under the influence of a denaturing agent such as guanidinium ions an antibody molecule may undergo structural change (unfolding of polypeptide chains, breaking of hydrogen bonds, "denaturation") in any one of many different ways, some of which may and others may not affect the parts of the molecule with specific combining power for antigen; thus the molecule may undergo "denaturation" either with or without destruction of its specific combining regions. Unfolding of polypeptide chains, whether or not it affected the specific combining regions, would lead to some polymerization and decreased solubility; and accordingly it is not a sound assumption that, if antibody structure is due to specific folding of polypeptide chains, decrease in solubility must be accompanied by loss of antibody activity.

On this interpretation the "regenerated antibody" of Erickson and Neurath would consist of those antibody molecules which had escaped extensive unfolding under the action of the denaturing agent, whereas the "irreversibly denatured antibody" would consist of aggregates of partially unfolded molecules, of such size as to be insoluble in saline solution at the isoelectric point but soluble in 2 per cent. sodium thiocyanate solution. The power of combining with antigen shown by each of these fractions we attribute to the presence of undestroyed specific combining regions on the molecules or aggregates. Evidence indicating that the process of destruction of the specific combining regions of antibody molecules by denaturing agents is slow has been obtained in an experimental study of the destruction by urea of the antitoxin activity of diphtheria antitoxin which has been in progress in these laboratories during the past year; an account of the results obtained so far will be published soon.[3]

This picture of the phenomenon suggests that changes should occur in the combining ratio of antibody and antigen, as observed by Erickson and Neurath. It is clear from this point of view that the amount of specifically precipitable protein in a treated antibody preparation can not be taken as a true mea-

[1] J. O. Erickson and H. Neurath, SCIENCE, 98: 284, 1943.

[2] See L. Pauling, *Jour. Am. Chem. Soc.*, 62: 2643, 1940.

[3] G. G. Wright, *Jour. Exp. Med.*, in press.

sure of the number of undestroyed specific combining regions, that is, of the remaining antibody activity. It is our opinion that methods such as the neutralization of toxin by antitoxin are more satisfactory than the precipitation reaction for following the destruction of antibody activity.

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GENERAL BIOLOGY

THE discussion of Report number 15, of the U. S. Office of Education, in a recent number of SCIENCE,[1] brings into contrast two points of view about "biology." Professor Alexander no doubt believes that biology is some sort of unit in the fields of knowledge. Biology has often been represented to be a subject similar to chemistry, with various aspects, to be sure, just as in the case of chemistry. All the discussion of general biology, as contrasted with other sciences, shows a fundamental misconception of its nature. The existence of the word "biology" does not mean that there is a well-unified science which can be so designated. Biology can not be set down beside chemistry, physics, mathematics, etc., as on an equal footing with them. The term which is correlative to "the biological sciences" is "the physical sciences." Would it be an improvement to the teaching of physics, chemistry, mathematics, meteorology, geology, astronomy, etc., to concoct an extraction of all of them, and present it as a preferred introduction to those fields?

Most of us from our own experience must believe that it is necessary to treat mathematics by itself, as perhaps the most fundamental science; and that the other physical sciences are best presented in major courses dealing with their own material in their own way. They do not neglect mathematics, but supplement it, and put it to use in innumerable ways. The biological sciences have long been sinned against, even by our highest bodies of scientists, by trying to coerce them into some kind of hodge-podge unit. It is an encouraging sign that the U. S. Office of Education has found courage to print the report of the committee. Too long have the courses in general biology been a fraud against the student. Botany is a unified subject, coordinate with chemistry. Zoology also is a unified subject coordinate with chemistry. Either of these life sciences has as many subdivisions of its material as are found in *Chemical Abstracts*, for instance.

A better day will dawn for the biological sciences when it is fully recognized that there is no such thing as a science called "biology," any more than there is a science known as "physical science." These expressions represent great groups of sciences, and it is no wiser to present "general biology" instead of botany and zoology, than to present "physical science" in lieu of mathematics, physics and chemistry. The general biologists have been fooling themselves and the world of education far too long.

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[1] SCIENCE, n. s., 99: 78–80, 1944.

APPEARANCE OF MENDEL'S PAPER IN AMERICAN LIBRARIES

THERE has been considerable interest among geneticists since the turn of the century in the "rediscovery" of Mendel's epoch-making studies of the laws of inheritance. Mendel's well-known paper, "Versuch Ueber Pflanzen Hybriden," was published in Volume 4 of the Naturforschender Verein, Brünn, Austria, in 1865. It would be interesting if we knew all the reading Mendel did of the writings on inheritance and also the contacts he made both personally and by letter with contemporary scholars interested in heredity. Morgan (SCIENCE, page 262, 1932) rightly places emphasis upon what had been learned as to the inheritance of characters in the pea by Goss and Knight 42 years before the above paper by Mendel was published. Naudin's studies also antedate Mendel's work by two years or so.

Mendel's paper apparently remained unknown to most of that group of European workers in near-by countries who would have best understood the significance of his results. It remained for the geneticists of a later generation to find and evaluate Mendel's work. Frequent mention has been made of the "rediscovery" of Mendel's paper in 1900 by deVries, Correns, Bateson and Tschermak. To the credit of American geneticists note should be made of the fact that L. H. Bailey included a reference to Mendel's work in a paper on cross breeding and hybridizing in 1892. DeVries learned of Mendel's work from this bibliography (see "Plant Breeding," by Bailey and Gilbert, page 155, 1915). Bailey was using the Harvard Library from 1881 to 1885 while working with Asa Gray but had learned of Mendel's work from reading Fooke rather than from seeing Mendel's paper direct.

Since one sometimes detects a slight note of reproach from American geneticists because European workers had overlooked Mendel's work for so long it occurred to the writer that it would be of interest to know when and where Mendel's paper might have been available in American libraries before 1900. To this end it was noted that in the second edition of the Union List of Serials (1943) 21 libraries list Volume 4 of the Brünn Society. Inquiry by letter to each of these libraries as to the date Volume 4 was available