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AGRICULTURAL SCIENCE AND THE PEOPLE'S WELFARE[1]

By Dr. E. C. AUCHTER

RESEARCH ADMINISTRATOR, U. S. DEPARTMENT OF AGRICULTURE

I AM going to talk to-day not as a citizen of one country addressing the citizens of other countries, but rather as one scientist talking to other scientists. The concepts and methods of science, including our own agricultural sciences, are still international; they cut deep under the conflict that has now spread over the world. And the faith of science is international; it is that the truth, which science is forever seeking, must ultimately prevail. If it does not prevail now, it is partly because we do not yet know enough of the truth and not enough people are convinced, or even aware, of that which we do know. Meanwhile the scattered fragments of truth that science has discovered can be perverted, and are perverted, to cruel and brutal ends—as when modern technology, a clean-cut product of science, is used to bring whole peoples under the domination of a small group of power-hungry men and to destroy millions of human beings.

But I think there is not a scientist in this audience who would not agree that this *is* a perversion, and who does not feel horror and shame, deep down in his being, that science is so perverted. It is not what we, as agricultural scientists, want. We want to do everything we can to prevent this kind of perversion in the future. We want science to be used to serve the welfare of the people of the world. We know that it is a

[1] Address given at the Second Inter-American Conference of Agriculture, Mexico City, July 6, 1942.

BIVALENT TYPHUS VACCINE OF HIGH IMMUNIZING VALUE

BASED on immunologic differences found between endemic and epidemic typhus strains, some authors recommend the production of "epidemic" vaccines as means of practical protection against the infection. Such vaccines have little if any value against "murine" and closely related strains which have been found to originate outbreaks of typhus fever of considerable extent and great severity. On the other hand, by increasing the antigenic content of our "murine" vaccine it is possible to immunize against both types of the infection as shown by Veintemillas,[1] who has found that complete protection can be obtained in men vaccinated against the experimental inoculation by both Mexican endemic virus and Bolivian epidemic typhus.

The results of practical vaccination with "murine" vaccine have not been carefully studied. A considerable number of persons has been vaccinated, but we may draw information from only 5,000. All these cases were potentially exposed to the infection and we know that at least seven developed typhus after being properly vaccinated. From a large group of physicians, nurses and medical students, two vaccinated persons developed mild typhus, while two non-vaccinated students died of the infection. The possibility that the indicated failures might have been due to insufficient cross-protection against some epidemic strains encouraged us to improve our monovalent "murine" vaccine by addition of "epidemic" antigen.

The cultivation of murine virus in the lungs of rats produces amounts of rickettsiae which are far superior to the yield of ordinary bacteria growing in artificial media if we compare lungs and media by weight, but, so far, we have not been able to obtain practical "lung" cultures of the "Breinl" strain, not even in mice. However, we have found that a Mexican epidemic strain is suitable for the production of considerable growth of rickettsiae in the lungs of mice. Pure suspensions of organisms thus obtained have a high protective value against both the "Breinl" and the homologous strains, although it is not satisfactory against endemic typhus. Suspensions which are water-like in appearance have a definite protective effect against the "Breinl" strain. The bivalent vaccine has a final concentration, when ready for human use, equivalent to a turbidity intermedial between Nos. 1 and 2 of the McFarland scale. This amount of antigen produces local and sometimes general reactions in vaccinated persons, but it is well tolerated. When tested in guinea-pigs, it shows a high degree of protection against both "murine" and "Breinl" strains. Since the organisms can be obtained in pure suspensions, the antigenic content of the vaccine can be modified at will. For instance, for field work we distribute a suspension containing 10 times more rickettsiae than that required for human vaccination. Therefore, 50 cc of such stock vaccine is sufficient to start the immunization of 1,000 people. Before use, the concentrated vaccine is diluted in the same syringe with 9 parts of steric isotonic NaCl solution administering a first dose of 0.5 cc and 2 subsequent doses of 1 cc each at weekly intervals. However, this treatment is insufficient for laboratory workers, who require at least 5 doses of vaccine to be fully protected.

The cost of production of the bivalent vaccine is relatively low since the mouse vaccine is only a minor part of the mixture.

In selecting the strain for the preparation of the murine vaccine we found the "L" strain most suitable for the production of large quantities of rickettsiae in the lungs of rats, and the epidemic strain called "42," which has properties equal to the "Breinl" strain, is readily adapted to grow in the lungs of mice. Further modifications in the antigenic composition of the vaccine depend on the results of its application to men.

M. RUIZ CASTANEDA

THE TYPHUS LABORATORY OF MEXICO,
MEXICO, D. F.

[1] F. Veintemillas, Suplementos del Instituto Nacional de Bacteriología, June and November, 1941, La Paz, Bolivia.

BOOKS RECEIVED

BAYLIS, H. A. and C. C. A. MONRO. *Instructions for Collectors. No. 9A. Invertebrate Animals Other Than Insects.* Illustrated. 12 Plates. Pp. vi + 73. British Museum (Natural History). 1 s.

COLE, WARREN H. and CHARLES B. PUESTOW. *First Aid, Surgical and Medical.* Illustrated. Pp. xxiii + 351. D. Appleton-Century Company. $3.00.

DE LA TORRE, CARLOS, PAUL BARTSCH and JOSEPH P. E. MORRISON. *The Cyclophorid Operculate Land Mollusks of America.* Pp. iv + 306. Bulletin 181: Smithsonian Institution; United States National Museum.

DIEUAIDE, FRANCIS R. *Civilian Health in Wartime.* Pp. vi + 328. Harvard University Press. $2.50.

EDWARDS, F. W. *Mosquitoes of the Ethiopian Region. III: Culicine Adults and Pupae.* Illustrated. 4 Plates. Pp. viii + 499. British Museum (Natural History).

HAMBURGER, VICTOR. *A Manual of Experimental Embryology.* Illustrated. Pp. xvii + 213. University of Chicago Press. $2.50.

HYMAN, LIBBIE HENRIETTA. *Comparative Vertebrate Anatomy.* Illustrated. Pp. xx + 544. University of Chicago Press. $3.50.

KHARASCH, NORMAN and HELEN S. MACKENZIE. *Essentials of College Chemistry.* Illustrated. Pp. vii + 513. D. Van Nostrand Company, Inc. $3.50.

LANE, ERNEST PRESTON. *A Treatise on Projective Differential Geometry.* Pp. ix + 466. University of Chicago Press. $6.00.

MOLINA, E. C. *Poisson's Exponential Binomial Limit.* Tables: Individual Terms and Cumulated Terms. Pp. 47. D. Van Nostrand Company, Inc. $2.75.

SMITH, ELMER G. *Heat Requirements of Intermittently Heated Buildings.* Pp. 64. Agricultural and Mechanical College of Texas, College Station.

UHLER, HORACE S. *Original Tables to 137 Decimal Places of Natural Logarithms for Factors of the Form* $1 \pm n.10^{-p}$, *Enhanced by Auxiliary Tables of Logarithms of Small Integers.* Horace S. Uhler, New Haven, Conn.

of the valuable minerals and float them to the surface. This process of "froth flotation" has been used for many years, but E. I. du Pont de Nemours and Company announces the development by themselves and others of new chemicals which improve the process and make it more economical. The precious minerals are skimmed off the surface and subsequently smelted and refined, thus adding to the supply for our war implements.

To insure production of the highest quality of dehydrated foods for the armed forces of the United Nations, the U. S. Department of Agriculture announces the opening at Albany, N. Y., within the next few weeks of the first school to train commercial manufacturers in improved methods of processing developed in government research laboratories. Because of the urgent need to conserve shipping space and to prepare foods in a form which will keep indefinitely in any climate, the training program will be expanded sometime this fall to include a school at Rochester, N. Y. The training program is being jointly conducted by the Agricultural Research Administration and the Agricultural Marketing Administration, which is the Lend-Lease purchasing agency. Subjects included in the courses will be selection of vegetable varieties, storage problems, processing, packaging and laboratory control, to provide maximum quality for this fuel for the fighting men of the United Nations. Recent improvements in dehydration processes make possible the shipment of dry vegetables, milk, meat and other foodstuffs in only a fraction of the space formerly required. Yet when mixed with water at the battle front, they are reconstituted with nearly all the nutrient value and fresh flavor still intact.

THE death rate from tuberculosis in the United States continues to decline, despite an upswing of cases in European countries, according to the report of the National Tuberculosis Association. Last year 44 persons died of tuberculosis for every 100,000 population, compared with 46 the previous year. This totals 59,173 persons dead and 105,714 new cases reported. Despite continued improvement in the death toll, there is slowing up of the downward trend of cases in this country. Dr. Kendall Emerson, managing director of the association, points out that under wartime conditions tuberculosis may show an increase here, just as it already has in warring countries of Europe. Various theories have been offered to explain the increase abroad. Among them are decreased resistance, due to longer hours of work, strain, anxiety, inadequate diet, broken rest, overcrowded homes and shortage of medical and nursing personnel. There is every reason to believe that, as the war goes on, these factors will operate in this country unless voluntary and public health authorities are able to use all their resources. Every effort is being made to keep tuberculosis out of the armed forces. Army doctors are fully equipped for x-raying and are authorized to reject all those who may have or who have had the disease.