drawn as any on the physical and financial side. It should be designed to bring back to the campuses to complete their training all those whose courses were interrupted, including those not yet discharged from the services, and it should provide for selection and training of our ablest youth. Above all, it should be a well-rounded program which should set as its goal the provision of well-trained and adequate leadership in all fields, not only scientific but also in such fields as the social sciences, the humanities and the fields of social and ethical leadership. America has come face to face with the need to assure higher education for its ablest youth. We need a program of selection and training of our best brains. It will be fatal to avoid the challenge. I am glad the Westinghouse Science Talent Search so ably dramatizes the need for this and points to the method to be used in its realization. I am very happy to have had this small part in this great undertaking.

Science News Letter, March 16, 1946

PUBLIC HEALTH

Vaccine Can Increase Food

Developed to defend the United States and Canada against germ warfare, it can provide more nourishment for a hungry world.

By JANE STAFFORD

➤ MORE FOOD for a hungry world, particularly those regions most frequently visited by famine, can come from a vaccine developed to defend the United States and Canada against germ warfare.

The vaccine is for protection of cattle against rinderpest, or cattle plague. This highly fatal cattle disease has never existed in the United States or Canada and is now non-existent in the Western Hemisphere.

Even before those mysterious paper balloons from Japan began descending in regions close to the great cattle-grazing areas of western United States and Canada, however, military authorities were seriously concerned over the possibility of the virus of this disease being introduced by accident or by enemy action. If that had happened, the disease would have spread like wildfire through the herds. Lack of any previous contact with the disease makes our cattle highly susceptible to it.

To fight this war disease threat, a joint U. S.-Canadian commission was appointed by the Secretary of War and the Canadian Minister of National Defense. Members of the commission were: Dr. J. Craigie of the University of Toronto; Dr. R. E. Dyer, director of the U. S. National Institute of Health; Dr. E. B. Fred, President of the University of Wisconsin; Brig. Gen. R. A. Kelser of the U. S. Army Veterinary Corps; Dr. C. A. Mitchell of the Canadian Ministry of Agriculture; Prof. E. G. D. Murray of McGill University, Montreal; Dr. J. B. Reed of Queen's University, Kingston, Ont.; and Dr. H. W. Schoening of the U. S. Department of Agriculture.

On Grosse Isle in the lower St. Lawrence River, isolated island site of a former quarantine station, this commission early in 1942 assembled a group of scientists and technicians and gave them a two-part mission. First part was to prepare a vaccine to provide rapidly the means of surrounding an epidemic, should it occur, with a ring of immunized animals. The second part was to develop a more efficient or cheaper vaccine against rinderpest than those then available.

Almost a year before an atomic bomb dropped on Hiroshimo, the scientists were able to report: Mission accomplished. Now, with the war over, the first victims of Jap aggression will get the peacetime benefits of the mission.

The commission turned over to UNRRA one million doses of the vaccine for use in China. This will be shipped as soon as personnel and facilities can be established there for doing the vaccinating job, Dr. Irving G. Cashell at UNRRA headquarters states. Rinderpest is the Number One cattle disease in China today, Dr. Schoening told me. This plague attacks cattle of all kinds and interferes with agriculture because cattle are used in China as draft animals and beasts of burden. Rinderpest epidemics cut down the supplies of both meat and crop foods. UNRRA has a report of a severe one in one locality in China now, and the disease exists there always.

The vaccine which in time should free China and also India and Africa of this plague and famine threat was developed at Grosse Isle by the following scientists: Capt. James A. Baker, V. C., U. S. Army; Capt. H. K. Cooper, V.C., U. S. Army; Capt. Henry Griffiths, General List, Canadian Army; Lt. Col. M. W. Hale, V. C., U. S. Army; Capt. Dubois L. Jenkins, V. C., U. S. Army; Maj. Fred D. Maurer, V. C., U. S. Army; Capt. Thomas C. Robey, V. C., U. S. Army; Comdr. Richard E. Shope, M. C., U.S.N.R.; and Maj. R. V. L. Walker, P.L.D.G., Canadian Armored Corps.

Rinderpest, though it does not attack man, has been one of the most important maladies of livestock from earliest times. It has caused tremendous losses of cattle, killing from 70% to 100% of the animals in various epidemics. Several hundred years ago it spread from its earliest home in Egypt to European countries, where it raged almost constantly until the 1870's.

Extensive outbreaks were always associated with wars. In one three-year period one and one-half million cattle were stricken. The disease broke out in Belgium in 1921 after the first World War, but was eradicated. It still exists in Asia, India and East and South Africa, though in South Africa the well-organized veterinary police are able to keep it under a certain amount of control.

The Philippines, also, have been affected by rinderpest which attacked the carabao, important draft animals there. It was in the Philippines that Gen. Kelser, who was a member of the joint U. S.-Canadian commission, developed a vaccine against the cattle plague.

This vaccine and another similar one were made from the rinderpest virus obtained from cattle and inactivated by chemicals, such as formalin. It successfully protected animals, but only relatively small quantities could be made, since it had to be obtained from cattle. It also carried the danger of containing germs of other diseases that might have been present in the cattle from which the virus was obtained.

The scientists at Grosse Isle therefore turned to fertile hen's eggs, which have been used for production of yellow fever, typhus fever, influenza and other vaccines. They had some failures at first, but finally succeeded in growing the virus on the eggs in such a way that it lost most of its disease-producing power but kept its ability to give the cattle resistance to rinderpest.

In one crucial trial, 10 vaccinated and four non-vaccinated calves were put into the same pen where for 23 days they milled around together, drinking from the same water trough and eating from

each other's feed boxes if they wished. Then one more non-vaccinated calf was added to the group as a control and all of them were given shots of virulent rinderpest virus. All the vaccinated animals proved to be immune to the disease. All the non-vaccinated ones developed the disease and died or were destroyed at the point of death.

At one stage of the work, the possibility of chickens and other birds being a reservoir of the disease, which might be spread from them by blood-sucking insects, was considered. This developed from the unique finding that embryos which had been infected with the virus would develop into chickens. This has never occurred in embryos infected with other viruses. The baby chicks had the virus in their bodies for as long as five days, but fortunately it did not get into the blood where it would have been available to insects for possible transfer to cattle.

The scientists at Grosse Isle worked not only under strict military secrecy but under constant and most vigilant precautions against possible escape of the virus from their island laboratory. The danger of accidentally starting an epidemic of rinderpest in Canada or the United States was so great that, as one of many precautions, no hay was fed to any of the animals. This was because of the difficulty of disposing of the remnants, since even a shred of infected hay might cause a disastrous epidemic.

Calves vaccinated with the egg virus are solidly protected against rinderpest within 10 days after vaccination. The vaccine causes a mild disease in the calves but this mild form of the disease does not seem to be contagious.

The undried virus keeps well at temperatures well below freezing, but rapidly loses its potency at room temperature. It therefore has to be dried from the frozen state. For their first practical drying apparatus, the scientists used a defective depth bomb casing which happened to be available in their island locality. Early in 1945 they obtained a commercial experimental dessicator.

The dried vaccine packed in vacuum keeps as long as 15 months at temperatures close to freezing, but should be given to cattle within 12 hours after reconstituting it from the dried state.

Science News Letter, March 16, 1946

• Books of the Week •

BIOLOGY AND CONTROL OF THE AMERICAN DOG TICK—Carroll N. Smith, Moses M. Cole and Harry K. Gouck—*Government Printing Office,* 74 p., diagrs. and illus., 20 cents. U. S Technical Bull., No. 905.

BURMA SURGEON RETURNS—Gordon S. Seagrave, M.D.—*W. W. Norton,* 268 p., illus. and maps, $3. The story of Dr. Seagrave's medical mission in Burma after the Japanese occupation. He writes of the medical problems and achievements of his unit and of the future of medicine and missions.

COMMON-SENSE BUSINESS LEADERSHIP: A Manual of Human Relations—G. E. Fosbroke—*Duell,* 177 p., $2.50. A definition of business leadership and suggestions about how it may be developed with a knowledge of the basic principles of human relations and liberal applications of common sense.

THE ELECTRON MICROSCOPE: An Introduction to Its Fundamental Principles and Applications—E. F. Burton and W. H. Kohl—*Reinhold,* 325 p., diagrs. and illus., $4. A presentation of the physical principles upon which the operation of the electron microscope is based, making no assumptions in regard to the technical knowledge of the reader.

ESSENTIALS OF GENERAL CHEMISTRY—B. Smith Hopkins and John C. Bailar, Jr.—*Heath,* 520 p., tables and illus., $3.50. A textbook for use in college freshman classes.

AN INTRODUCTION TO EDUCATIONAL STATISTICS—C. W. Odell—*Prentice-Hall,* 269 p., tables, $4.67. A textbook pre-supposing no preparation in mathematics beyond high school algebra and geometry and designed to cover a one semester's course.

AN INTRODUCTION TO HUMAN ANATOMY—Clyde Marshall, M.D., revised by Edgar L. Lazier—*W. B. Saunders,* 418 p., illus., $2.50, 3rd ed. A textbook for use in colleges.

LET'S FIND OUT: A First Picture Science Book—Herman and Nina Schneider—*William R. Scott,* 39 p., illus., $1.25. Experiments with very simple equipment to be found around the house. For 6 to 9 year olds.

LISTENING TO MUSIC CREATIVELY—Edwin J. Stringham—*Prentice-Hall,* 479 p., illus., $5. An introduction to the broad world of music, revealing some of its inner workings, its historical traditions, its vocabulary, and establishing a practice for general listening.

MARINE MICROBIOLOGY: A Monograph on Hydrobacteriology—Claude E. ZoBell, *Chronica Botanica,* 240 p., tables and illus., $5. Foreword by Selman A. Waksman.

THE PRINCIPLES OF HEREDITY—Laurence H. Snyder—*Heath,* 450 p., tables and illus., $3.75, 3rd ed. An introductory textbook developing the principles of heredity as far as possible on the basis of organisms with which the reader is familiar. This revised edition includes material on the Rh factors, the bearing of these factors on feeble-mindedness, etc.

SUNSPOT CHANGES AND WEATHER CHANGES—H. H. Clayton—*Smithsonian Institution,* 29 p., diagrs. and tables, 20 cents. Smithsonian Miscellaneous Collections, Vol. 104, No. 19.

WOMAN AS FORCE IN HISTORY: A Study in Traditions and Realities—Mary R. Beard—*Macmillan,* 369 p., $3.50. A survey of the relationship between men and women from earliest times to the present and of what history shows of the way in which men and women have actually lived and worked together.

Science News Letter, March 16, 1946

MEDICINE

Production of Hemoglobin Speeded After Hemorrhage

➤ PRODUCTION of hemoglobin, which gives blood its red color, may be speeded after severe hemorrhage by doses of a vitamin and another chemical derived from a vitamin, it appears from studies by Dr. M. L. Scott, Dr. L. C. Norris and Dr. G. F. Heuser, of the Agricultural Experiment Station and School of Nutrition at Cornell University.

Hens that had lost about one-third of the blood in their bodies made up the loss with hemoglobin quantities back to normal within eight to nine days when given the two vitamin-chemicals, the scientists report. (*Science,* Mar. 8)

The two chemicals that produced this speedy hemoglobin regeneration in the hens are the L. casei factor, which is a form of the vitamin, folic acid, and pyracin, also called pyrodoxic acid and derived from another vitamin, pyridoxine.

Science News Letter, March 16, 1946

France is the first of the liberated countries to start *penicillin* production.