directions with practically the speed of light. This hypothesis might help in interpreting the mysterious fact of the maintenance of the earth's negative charge, but it meets with insuperable obstacles, I think, in explaining quantitatively the variation with altitude of the ionization in closed vessels. In any case, this hypothesis is, in its most important aspect, very much like the one represented above, for it, too, fills space with rays of one sort or another travelling in all directions with the speed of light. From some such conception as this there now seems to be no escape. And yet it is a conception which is almost too powerful a stimulus to the imagination. Professor MacMillan, of Chicago, will wish to see in it evidence for the condensation into matter out somewhere in space of the light and heat continually being radiated into space by the sun and stars, and the psychists will be explaining all kinds of telepathic phenomena by it.

In any event, our experiments seem to point to the following conclusions: (1) That these extraordinarily penetrating rays exist; (2) that their mass absorption coefficient may be as high as .18 per meter of water; (3) that they are not homogeneous, but are distributed through a spectral region far up above X-ray frequencies—probably 1,000 times the mean frequencies of X-rays; (4) that these hard rays stimulate, upon striking matter, softer rays of about the frequency predicted by the theory of the Compton effect; (5) that these rays come into the earth with equal intensity day and night and at all hours of the day or night, and with practically the same intensity in all directions.

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COORDINATION OF THE HEALTH ACTIVITIES OF THE FEDERAL GOVERNMENT[1]

THE government machine, like the human mechanism, requires an occasional physical inventory. Such a health examination is in fact now being performed on our national government and is producing some interesting results. Just as a human appraisal, made by a doctor of medicine, frequently brings out latent physical impairments, so too this survey of governmental health functions, made by doctors of political science and of public health, discloses many administrative defects. Just as health examinations of individuals, now so strenuously advocated by physicians and sanitarians, usually indicate possibilities for physical improvements, so too this political inspection points the way to the desirability of a more effective centralization or correlation of the public health and medical activities of the government of the United States.

The promotion of national vitality is conceded to be one of the principal interests of any sovereignty. In the United States the care of the public health is, under our form of government, vested primarily in the individual states as a part of their police power. The federal establishment does, however, have certain legitimate public health activities, sanctioned by the Constitution and imposed by Congress under that authority. These duties include the power over interstate matters, involving the prevention of the spread of disease from one state to another; a similar power of foreign quarantine, that is, prevention of the introduction of disease from without; the control of the health of the people of federal territories and reservations; health powers incidental to taxation; public health matters involved in treaties; and, finally, scientific research, popular health instruction and cooperation and counsel for state and local health authorities on request.

All these duties are now exercised by the national government without in any way conflicting with state autonomy in public health matters. Of the hundred or more major administrative units of the federal service, at least thirty bureaus, divisions or other branches of the government are concerned directly or indirectly with some phase of the public health. In many instances, of course, the health work may be only incidental to other more important functions, or the health activities may constitute a relatively minor issue. Only eight of these thirty bureaus may be said to carry on health duties as their major object. These eight bureaus are, nevertheless, located in five different executive departments, and all the health activities of the government are scattered throughout the ten cabinet departments and a number of independent establishments.

The eight government bureaus or divisions whose public health activities may be said to be of major scope are as follows:

Public Health Service, Treasury Department.

Children's Bureau, Department of Labor.

Medical Division, Office of Indian Affairs, Department of the Interior.

Division of School Hygiene, Bureau of Education, Department of the Interior.

Division of Vital Statistics, Bureau of the Census, Department of Commerce.

Bureau of Chemistry, Department of Agriculture.

Bureau of Home Economics, Department of Agriculture.

[1] Read before Medical Section, Southwestern Division, American Association for the Advancement of Science, Boulder, Colorado, June 10, 1925.

Bureau of Animal Industry, Department of Agriculture.

Among other federal bureaus having an important interest in public health there should be particularly mentioned the Bureau of Mines, recently transferred from the Department of the Interior to the Department of Commerce; St. Elizabeth's, the Government Hospital for the Insane, under the Department of the Interior; the Bureau of Dairying, and the Extension Service, both in the Department of Agriculture; and the Bureau of Labor Statistics, in the Department of Labor. Other bureaus having a real but less significant public health interest are the Consular Service, State Department; Customs Service, and Bureau of Internal Revenue, Treasury Department; Bureaus of Public Roads and Entomology, Department of Agriculture; Bureau of Fisheries, Department of Commerce; and Women's Bureau and Bureau of Immigration, Department of Labor. In addition, there are many other branches of the government which have a casual interest in the public health. The government also administers a number of activities which cover medical relief rather than public health, or preventive medicine, such as those of the Veterans' Bureau, the Employees Compensation Commission, the Alaska Division of the Bureau of Education (Interior), Freedmen's Hospital (Interior) and several of limited or special public health scope, such as the medical services of the army and navy.

These many health and medical activities are the products of political evolution. They have arisen from time to time during the last century and a quarter and have been deposited in this or that department as the opportunity has arisen. In the period of years since 1798 when an act was passed authorizing collectors of customs to assess every seaman of the American merchant marine twenty cents a month for medical relief, Congress has added nearly one hundred laws relating to national health to the statute books. These acts have imposed various duties and have required the establishment of bureaus or other administrative units to put them into effect. Out of the act of 1798, for instance, evolved the Marine Hospital Service, though it was not definitely organized as such until 1870. The scope of this bureau was gradually broadened until in 1912 its name was changed to Public Health Service in recognition of the domain of its work. To-day it is the chief health agency of the government, and, as indicated, in the Treasury Department for historical reasons only.

The Children's Bureau was created in 1912 to investigate and report on all phases of child welfare. It also administered the first federal child labor law until it was declared unconstitutional, and in 1921, when Congress passed the Federal Maternity and Infancy Act, the scope of the Children's Bureau was greatly extended by virtue of being charged with the administration of this law. Vital statistics, often called the book-keeping of public health, are used and interpreted by both the Children's Bureau and the Public Health Service, but they are collected by a division of the Bureau of the Census. The Children's Bureau concerns itself with the health and welfare of mothers and children through the preschool age. Studies of the health of school chilldren are undertaken by the Bureau of Education of the Interior Department, and also, it might be remarked, by the Public Health Service. Nutritional experiments are conducted by the Bureau of Home Economics, the Department of Agriculture having been authorized to make such investigations as early as 1894. The pure food and meat inspection laws of 1906 placed new responsibilities on this department, exercised by the Bureaus of Chemistry and Animal Industry, respectively.

The federal executive departments, as at present constituted, have been likened to an old rambling mansion, constructed in 1789 and added to ever and anon without any regard whatsoever to the architecture of the structure and with very little thought as to its utility. Every president from the time of Roosevelt has urgently recommended the reorganization of the federal executive departments; scientific surveys and reports have been made by official and extra-governmental agencies; but Congress has not yet seen fit to pass the necessary legislation, though it has held copious hearings on various bills relating to reorganization.

No really practical plan has been proposed in the past for the correlation of the federal health activities. In 1910 a group known as the Committee of One Hundred of the American Association for the Advancement of Science attempted to sponsor a national bureau of health, with a secretary in the cabinet. President Taft espoused the movement and endorsed it in two messages to Congress, but that body refused to adopt the suggestion. The country had some precedent for such a bureau, for at one time there was a National Board of Health. It was created in 1879 for a four year period, its duties restricted in 1882 to investigations of cholera, yellow fever and smallpox, and the law establishing the board was repealed in 1893 after it had been dormant for a decade. Many other bills and proposals for a national health department have been before Congress but have received scant, if any, attention.

Most of the schemes of the past relating to the glorification of national health activities have suggested a considerable expansion of them, with insinuations of larger appropriations. While nothing is

more important than the health of the nation, there is no urgent reason at the present time for insisting upon a great increment in either the scope or the expenditures for federal health. It is even of doubtful expediency to advocate a new executive department devoted to the subject, ideal as that might be. It is, however, eminently practical and entirely feasible to suggest that those bureaus already actually doing public health work should be more efficaciously coordinated. This would mean no branching out; if properly consummated it could demonstrate real economy, as well as more efficient production with the same facilities. Certainly we can agree that some form of correlation is desirable, in fact essential, and that whatever form of coordination appears best, it should be administered under central direction, possibly by an assistant secretary of public health. Such an official should be, moreover, a trained sanitarian.

To outline in detail a plan for this correlation of federal health resources would be premature. Such a proposal must come only after a most thorough examination of the existing organization and activities of the various bureaus concerned. An intensive survey of our present federal health work is now being made under the auspices of the Institute for Government Research of Washington, D. C., which has been studying the organization of the government for the past ten years. A report will be issued in the fall of this year. The next step will then be to formulate a practical plan, based on a complete knowledge of the facts. To accomplish this, the advice of many government officials, experts in political science, leading sanitarians, members of the medical profession, and scientists generally must be secured. After a plan has been agreed upon, as far as possible, the final step is to induce Congress to adopt it, and in adopting it not to amend it too drastically. This program may require several years, but the goal seems worth the effort.

Public health is of no less importance in the affairs of this nation than is commerce, labor, agriculture, public works, finance, foreign affairs, the common defense or justice. All these important aspects of government have been properly accorded the recognition due them, but the same can not be said for health or education. A deficient national vitality reduces the scope and significance of all these other elements, for an A1 nation can not be produced on a C3 vitality, and ours, advanced as it is, still leaves considerable to be desired. It seems not unreasonable, therefore, to hope and expect that the public health will be recognized on a plane equivalent to these other undeniably significant phases of government. When it is considered that some fifteen million dollars is expended annually by our national government on health matters, but that more than three times as much, or about fifty millions, is appropriated for medical relief, the thought will not down that possibly a more efficient system of prevention would reduce the amount needed for cure. This fifteen millions is, furthermore, only one half of one per cent of our total yearly budget of over three billion dollars. An economy which by curtailing funds for prevention makes necessary inflated grants for relief is a false economy.

Science has nowhere to its credit any greater achievements than in the domain of public health. The future in the age-long struggle for the prolongation of human life, the promotion of health and happiness and the enjoyment of living, and the enhancement of national vitality and virility holds out many alluring and fascinating possibilities. For the most effective accomplishment, a true type of scientific leadership is essential and this can best be furnished by a unified, efficiently organized, properly manned, adequately supported federal health service, which could, furthermore, supply this needed impetus, this scientific guidance, without interfering in any way with the autonomy of the states in public health.

"Give me health and a day," wrote Ralph Waldo Emerson, "and I will make the pomp of emperors ridiculous." And so the people of this country, paraphrasing the words of the great philosopher, may say to their Congress, "Give us health and a day and we will make this, the United States, the greatest and the most mighty of the nations in the history of civilization."

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JAY BACKUS WOODWORTH[1]

ON August 4, 1925, Jay Backus Woodworth passed away in the sixty-first year of his age, after a disabling illness of nine months. He was the son of the Reverend Allen Beach Woodworth and was born at Newfield, New York, January 2, 1865. As a boy, Woodworth became engrossed in the geological phenomena of his native state; on its hillsides was developed his love for outdoor nature, an enthusiasm for securing first-hand facts by observation in the field. This essential for a successful career in geology was always his own guiding principle and, with word and numberless self-sacrificing acts, he taught the principle to the thousands of Harvard men who took his courses.

[1] Minute placed upon the records of the Faculty of Arts and Sciences, Harvard University, at the meeting of October 27, 1925.