

Hydrology to save him from disaster. They come lamely to his aid. They give him some inkling of what heights to expect and warn him at least a few hours in advance of the arrival and duration of flood-peaks.

If only man would learn from experiences and profit by them! If only he would ask Hydrology where it is safe to build and then build in the safety zones indicated! If only he could learn some respect for Ole Man River and give him room according to his strength! If only he would not emulate the one of whom Robert Browning wrote:

"Oh he who draws a circle premature,
Heedless of far gain,
Greedy for quick returns of profit, sure
Has made a bad bargain."

The Grammarian's Funeral

This war will not last long. Rehabilitation of blighted areas, the construction of delayed facilities, and the conversion of industrial plants to peace-time production will demand a greater expansion of the practical aspects of Hydrology than Hydrology was able to give to this war effort: First, because Hydrology is an ever-growing science and, second, the value of its services to mankind is gaining greater recognition. The war taught many a skeptic what of value Hydrology can render if only given the opportunity.

Spalding Building,
Portland, Oregon

HYDROLOGY'S PART IN THE WAR EFFORT

Merrill Bernard

War and water on the African Front have been matters of relatively small amounts of the latter, laboriously distributed over great distances, under the difficulties imposed by active combat. War and water on the Home Front relate themselves less spectacularly, but with decided emphasis.

The past decade has witnessed a striking change in the Nation's attitude toward water. Devastation by flood is no longer considered the unavoidable result of an Act of God, and there is now a well-established national policy on flood-control. Much has been accomplished toward the ultimate reduction of flood-damage in those localities where social and economic justification can be made for the investment in flood-control works. Even in cases lacking these qualifications the damage-potential will be substantially reduced through a greater preparation-opportunity as modern flood-forecasting methods are placed in operation. Water-conservation has likewise evolved as a national responsibility, for which active policies and programs have been established.

Water is abundant in our country and we have used it wisely in bringing into production Western valleys which otherwise would never emerge from their desert state. Abundant water and land have meant abundant food in normal times. What of a future in which three-quarters of the Earth's population look hungrily toward our fertile, well-watered fields?

The American hydrologist has a vital part in helping to meet unprecedented demands on our water- and soil-resources. Concentrations of industrial war effort on the flood-plains of our great rivers must be protected from damage and interruption to production, with resort to every available means. Ground-water sources must still further be drawn upon in localities where depletion is already a serious problem. An overburdened system of transportation will insist that food be grown as near as possible to points of consumption or ports of embarkation. This, in some cases, will bring many acres into temporary production which, having no assurance of a continuing water-supply, must be returned to range or unproductiveness before populations are lulled into a false sense of security created by a fortuitous series of years of adequate rainfall or above-normal volumes of water stored in the snow-fields and reservoirs.

Other accomplishments to which hydrologic planning has been the key could be listed. Vast blocks of hydroelectric power, depending upon the hydrologist's assurances of adequate stream-flow, have been made available to industry within planning and construction periods that, four years ago, would have been considered ridiculous. The hydrologist has given valuable aid in the selection of equipment for mountain troops; his knowledge has been important to the designer of

air-fields; his opinions have had much to do with the design of snow-removal and other engineering equipment; and he is being called upon to interpret hydrologic data for the operational planner in foreign theaters of war, which more often than not, are meager and inconclusive.

Experience has taught the value of continuity of record in the modern use of hydrologic data. The broken record is branded as a "statistical outcast", never wholly regaining its reputation. Those who are engaged in gathering hydrologic data are making it their business to keep observational stations in operation in spite of the difficulties imposed by war. The Corps of Engineers, Geological Survey, Soil Conservation Service, Tennessee Valley Authority, Weather Bureau, and other organizations and individuals are active in safeguarding our sources of data. The Section of Hydrology of the American Geophysical Union has reacted to the stimulus of war, and rather than "hole-in for the duration", has undertaken an active campaign for new members.

Yes, the hydrologist is in war, as in peace, proving worthy of the important element assigned him--water.

U. S. Weather Bureau,
Washington, D. C.

DISCUSSION

GEORGE H. CANFIELD (District Engineer, United States Geological Survey, Portland, Oregon)--Although there may be no discussion at this time, I do not want this moment to pass without expressing appreciation for the very fine presentation by J. C. STEVENS and MERRILL BERNARD on the functions performed by hydrology in the war effort. When first I saw this subject on the program I appreciated the fact that careful thought and study would be required to show this relationship adequately, which we all realize, and in a forceful way which would be understood by the public. I believe the others present will agree with me that both speakers have handled this assignment in a very creditable manner.

Mr. BERNARD'S statement mentioned the importance of no break in continuity of basic hydrologic data during this war. I am particularly interested in this thought as the United States Geological Survey is obtaining basic data as regards river-flow. We have been hit rather hard by induction of our men into the armed services or by the calling to active duty of our employees who were Reserve Officers, but it has been my thought, and also that of State Engineer STRICKLIN, with whom we cooperate, that we endeavor to maintain existing stream-flow measuring stations throughout the war even though there might be a delay in the computations of the records thereat. That is a somewhat different policy than occurred during the first World War, when several gaging-stations were temporarily discontinued and continuity of record interrupted. We plan and hope to obtain continuous records without interruption during the present war.

ELMER FISHER (Unit Supervisor, United States Weather Bureau, Portland, Oregon)--At the present time there are 280 stations in Region No. 7 equipped with recording precipitation-gages. Our losses in this type of station due to observers quitting or moving out of the community for high-paying positions has been less than five per cent. In many cases we have been able to secure new observers. Three new stations have been established. Considerable effort has been put forth by Hydrologic Inspectors, Unit Personnel, and other interested Weather Bureau officials to encourage observers to improve chart-records and it is believed that we can report some progress.

IMPROVING STREAM-FLOW PREDICTIONS BY THE USE OF PAST RECORDS

C. H. Niederhof

Since 1926 the management of the International Power and Paper Company, Ltd., has been forecasting stream-flow for the Grand Lake Basin in western Newfoundland. (Appreciation is extended to ERIC HINTON of Bowater's, Newfoundland Pulp and Paper Mills, Ltd., for furnishing the data upon which this paper is based.) As the company operates its paper-mill at Corner Brook exclusively by hydroelectric power, it is interested in the magnitude of the spring-flood which produces the major portion of the annual stream-flow. Accordingly, predictions of flood-magnitudes have been obtained in the early spring of each year since 1928 by means of snow-surveys and precipitation-records. The predicted runoff each year consisted simply of the water-content of snow calculated from a snow-survey made about the middle of March, plus precipitation measured until the end of March, plus a constant average figure--based on past records--expressing the