used as the reducing agent, no conditions could be found where silicon could be distinguished from germanium and where phosphorus could be distinguished from arsenic (V). Such differentiations probably cannot be made by the selection of some other reducing agent. Under certain acidity conditions, it is possible to minimize the interference of Ge and Si on the phosphorus determination, especially when the organic reductant is used, but such procedures are not recommended.

The recommended procedure for the determination of phosphorus makes provision for the separation of microgram amounts of phosphorus from at least 1 mg each of AS_2O_5, GeO_2 and SiO_2. The phosphate in ocean waters is concentrated by precipitating $Al(OH)_3$, which serves as a carrier for the $AlPO_4$ formed. The small precipitate is treated with a small volume of solution containing HF, HBr, HCl, and H_2SO_4 to volatilize any coprecipitated As, Ge, or Si. The phosphate is then determined by the molybdenum blue reaction according to specific optimum conditions. The total P_2O_5 content of several samples of sea water collected from the Gulf of Mexico ranged from 1.8 to 5.9×10^{-6} percent.

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Studies of Evaporation

THE lack of a direct method of measurement of evaporation from large land and water areas constitutes one of the basic gaps in hydrologic inventory. The need for direct measurement of evaporation is particularly keen in the western states where problems of allocation and distribution of available water supplies require accurate accounting.

Ordinarily evaporation (aside from pan estimates) is determined by hydrometric methods, as the difference between measured inflow and outflow. However, the large body of untested theory concerning evaporation processes themselves gives some reason to search for more direct measurements that could be used at the large number of places where hydrometric methods are not applicable or sufficiently precise. Thus it is desired that methods be developed whereby the proposed geophysical principles can be depended upon for primary measurement of evaporation under field operating conditions.

The first step, therefore, was to verify these untested geophysical methods at a lake where it was possible to obtain an accurate determination of evaporation by known and familiar hydrometric methods. Lake Hefner near Oklahoma City, Okla., was chosen for this purpose after an extensive survey of western reservoirs and lakes. Studies were made in 1950 and 1951 in collaboration with the Bureau of Reclamation, the Weather Bureau, and the Department of the Navy. As a result of that investigation it was discovered that good estimates of evaporation can be made by using an empirical equation involving standard meteorological observations together with the surface-water temperature of the lake (embodying some of the principles of the mass-transfer theory), or by using the energy-budget method for periods of 7 days or longer. The Cummings Radiation Integrator was found to be a satisfactory instrument for use with the energy-budget method. Coefficients for evaporation pans were found to have a pronounced seasonal variation so that they are considered useful only for determining annual evaporation.

The results of the Lake Hefner investigation were sufficiently conclusive to permit the determination of evaporation from Lake Mead, the original incentive for the Lake Hefner experiment. These studies, however, led to investigation of new problems, one of which is determining evaporation from reservoirs in advance of construction. Model studies, involving a model of Lake Hefner in the wind tunnel at Fort Collins, Colo., are being made to see if such an approach will solve the problem. Also, a pilot study is being made to see if heat-budget and mass-transfer methods can be used to determine water losses from land areas, including transpiration as well as evaporation. Other studies on various phases of evaporation are planned, but field work has not yet begun.

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Developed and Potential Water Power of the United States and Other Countries of the World

THE development of water power in the United States as well as in the entire world has shown a phenomenal increase since 1920. At that time data on the installed capacity of water-power plants, with estimates of the potential water power available, were first compiled by the Geological Survey and published by the Department of the Interior in *World Atlas of Commercial Geology,* Part II: *Water Power of the World.* The average annual rate of increase in installed capacity from 1920 to 1945 was fairly uniform. The rate of increase has been considerably greater since 1945, and scheduled completions for the next few years indicate that it will continue into the future. The installed capacity of water power plants for the United States and the entire world for various years starting with 1920 and percentage comparisons are shown in Table 1.

The development of water power for the world as a whole increased 500 percent from 1920 to 1952, whereas the increase for the United States was slightly over 400 percent. This difference is naturally due to the fact that the United States had made more progress in water-power development than had the other coun-