

PHYSICS

Shortage of Physicists

► A 12-YEAR shortage of the most essential scientists for war and industrial research as the consequence of the non-technical use of scientists and science students in the fighting forces is forecast by Dr. Gaylord P. Harnwell of the University of Pennsylvania, writing as editor of the *Review of Science Instruments* journal.

In this war with radar, airplanes, and other such devices, the nation's technical superiority is due to research in the field of physics, Dr. Harnwell points out, although chemistry played the chief role in the first World War. Figures show, however, that the number of physicists in training in this country has dwindled alarmingly.

The number of physicists who were granted the doctor's degree has dropped markedly in the war years, with only 55 in 1944 compared with a peak of 191 in 1941. Dr. Harnwell takes 26 as the average age at which a doctor's degree is received, 1941 as the last year in which a normal number of degrees were awarded,

and finds that even with a revival of training of 18-year-old students in 1945 there will be a gap of 12 years during which very few physicists will be available.

The nation will be short 1800 graduate physicists in 1953, compared with present 2833 Ph.D. physicists listed in the National Roster of Scientific and Specialized Personnel. The situation is made worse by the demand expected for physicists to conduct researches for industry in the postwar era.

Unlike colleges in the United States, British and Soviet technical schools have been allowed to keep up their enrollments as a war and postwar measure. An authoritative British report states that their output of engineers and physicists has more than doubled during the war.

Because many professors have been drawn away from the colleges for war research, the problem now and in the immediate future is not merely a matter of getting students into the colleges, but of reorganizing the teaching staffs to teach them.

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Ice forms on the leading edges of the wing, propeller blades, on the radio antennae, on the windshield and on the air-speed indicator as well as in the carburetor of the engine. If ice forms at any of these points it will affect the flying performance of the plane, and in some cases render it unfit for flight. Today aircraft are equipped with mechanical devices such as rubber boot de-icers for the wings, de-icing fluid for propellers and windshield, and heaters for the air speed indicator. In the final analysis, however, the knowledge and judgment of the pilot are the greatest factors in determining whether he will beat the ice or crash.

The most dangerous of all icing conditions is caused by freezing rain. We are all familiar with ice storms on the eastern seaboard when tree branches break and power lines snap under the sheer weight of ice that adheres to them. A plane can ice-up just as heavily, and naturally it won't withstand the ice load. In a freezing rain the trick of outsmarting this dangerous adversary is to go up

higher, where warmer temperatures protect the plane from icing.

Military flyers taught to be weather experts know how to avoid these bad weather flying conditions and at the same time how to accomplish their missions in spite of them. Weather service bases are located in the far corners of the world, in the arctic and tropics where weather is born. Reports from these stations are transmitted to Washington D. C., where military weather maps are drawn and sent to our armed forces all over the world.

Weather servicing units accompany every military force, to provide on-the-spot short-range forecasts on which commanders base their tactical operations. Often these weather stations are mounted on vehicles. At Salerno a jeep fitted with weather observing equipment was one of the first units to land. Airplanes, fitted as weather laboratories, fly long distances to gather weather data before military or aerial operations are undertaken.

The uncanny ability that these weather men in our armed forces possess is illustrated by an attack on Wewak, New Guinea. Our planes were based at Port Moresby. Between the base and the target lies the towering Owen Stanley Range of mountains, usually crowned by 40,000 foot thunderstorms which blocked the way for our attack. The commanding general ordered the weathermen to predict a cloudless, stormless day. About 24 hours in advance of proper conditions, the weathermen issued a favorable forecast. Our attack, timed precisely to the forecast, enabled us to bag, at one time, 309 Jap planes without losing a single one of our own planes to our other enemy, bad weather.

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