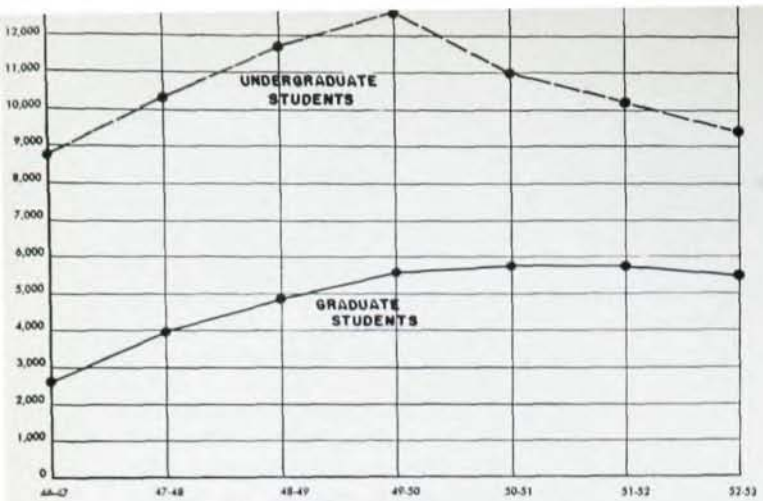

Fig. 1. Enrollments of physics majors

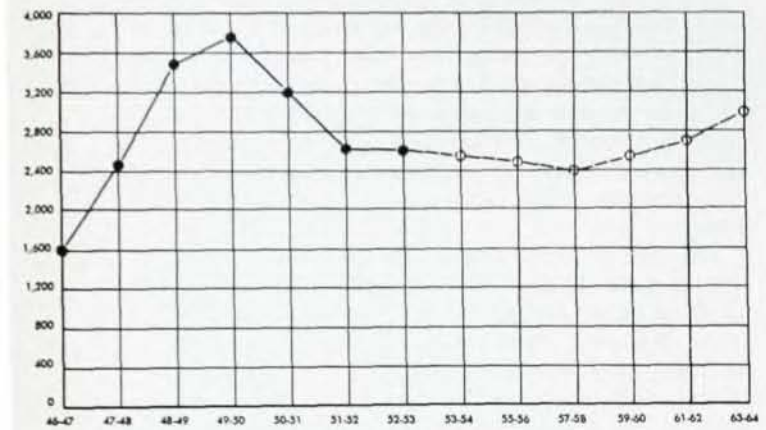

Fig. 2. Bachelor's degrees awarded to physics majors

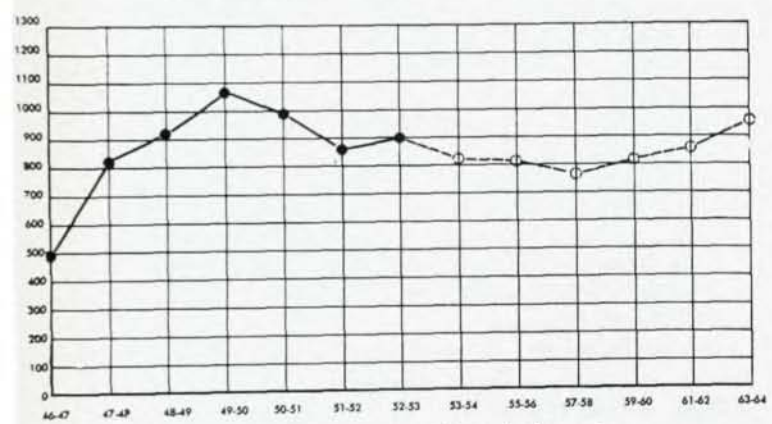

Fig. 3. Master's degrees awarded to physics majors

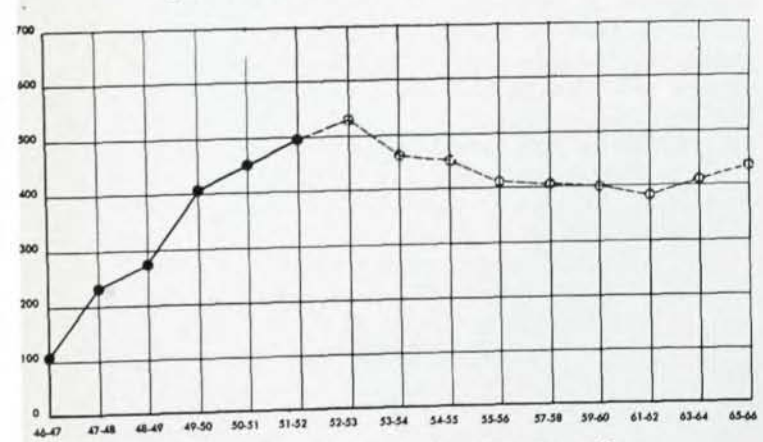

Fig. 4. **Doctor's degrees awarded to physics majors**

THE FUTUR

By ***Marsh W. White***

PHYSICISTS–IN–TRAINING have been declining in number since 1950. This decrease has been relatively sharp for undergraduate physics majors. The numbers of graduate students in physics have decreased only slightly, but this reduction seems likely to continue until about 1958. The production of doctorates in physics reached a peak in the academic year 1952–53 just closed. It is to be expected that physics PhD's will continue to be graduated in slowly diminishing numbers until about 1962, after which there should be substantial increases.

Data on the enrollments of physics majors at both the undergraduate and graduate levels are shown in Fig. 1 (no comparable pre-war figures are available). The sharp rise in enrollments since World War II is only partly a result of increased student populations. Another important factor is undoubtedly the growth of popularity of physics as a career. This is a result of the publicity concerning the recent spectacular advances made by physicists in the development of gadgets for the armed services during the war. The reduction in the numbers of undergraduate physics majors after 1950 is typical of the decrease in general collegiate enrollments. It is significant to observe the fact that enrollments of graduate students in physics have decreased proportionally much less than the decline of undergraduate physics majors.

The future supply of American physicists is determined to a considerable extent by the numbers of students who are awarded bachelor's degrees with a major in physics. Data concerning these physicists-in-training are shown in Fig. 2. After the peak academic year of 1949–50 there has been a sharp decrease in the numbers of majors receiving the BS in physics. This rapid decline ceased after 1951–52 and only moderate reductions are expected during the next few years. After 1957–58 the higher birth rate following World War II will result in steadily increasing student populations attending college. If the same fraction of these students select the physics major as has been the case in recent years the production of BS graduates in physics after 1957–58 should increase as shown in Fig. 2.

The business of forecasting numbers of students expected to graduate up to ten years in the future is obviously fraught with great uncertainty. There are too many variables which are unknown in such predictions to justify much confidence in this sort of crystal-ball gazing. The United States Office of Education has obtained reasonably reliable data on numbers of students now in the elementary and high schools. If the predicted fractions of these students enter college, and if the current ratio of physics majors to total numbers of graduates is maintained, the trend of production of physics bachelors shown in Fig. 2 may be fairly correct.

UPPLY OF AMERICAN PHYSICISTS

The numbers of master's degrees in physics awarded in recent years and the estimates for the next ten years are shown in Fig. 3. The estimates for 1953–54 were supplied by the physics departments. The data for later years were obtained by multiplying the number of BS graduates in physics (Fig. 2) by the average of the percentages of MS to BS degrees granted in recent years.

The production of professional physicists is largely determined by the number of PhD's granted in physics. Data for this group are shown in Fig. 4. Here also the estimates for 1953–54 have been made by the physics departments of the country which offer the PhD in physics. The numbers after 1953–54 were obtained by multiplying the number of MS degrees granted in physics by the average of the percentages of PhD to MS degrees in physics granted in recent years. It must again be emphasized that these estimates are necessarily quite rough, but it is believed that the general trends are as shown in these figures.

Since data on the production of doctorates have been collected for a much longer time than those for bachelor's and master's degrees in physics, the curve of Fig. 5 has been drawn to show the long-range variations in the numbers of PhD's awarded in physics. The shortages caused by the interruptions of World Wars I and II have now been overcome and we are continuing to turn out physics PhD's at a high rate.

During the current academic year about 535 colleges and universities awarded degrees in physics at the bachelor's level. Slightly more than 175 institutions gave master's degrees in physics and 72 departments produced one or more PhD's in physics.

There has been a significant shift in enrollments of undergraduate physics majors in the large and well-known universities. Prior to World War II the numbers of undergraduates in physics in most of these institutions were very small. Usually they were much exceeded by the numbers of physicists in training in many of the physics departments of the smaller liberal arts colleges. But in 1952–53 the largest numbers of bachelor's degrees were granted by the following institutions, all having large student populations: Massachusetts Institute of Technology 62, University of California (Berkeley and Los Angeles) 61, City College of New York 45, Harvard 37, University of Michigan 36, Rensselaer 30, University of Texas 29, The Pennsylvania State College 26, Cornell 26, and the University of Oklahoma 24.

There has been only one serious attempt in recent years to forecast the demands for professional physicists. The Bureau of Labor Statistics of the United States Department of Labor has recently issued a booklet concerning employment opportunities in physics as one of their Occupational Outlook series. The data which they cite serve to confirm the well-known fact that the present production of physicists is well below the requirements of the nation for these scientists. There is much reason to believe that this situation will continue into the indefinite future, unless there is a radical reduction in the government support of research, or a drastic industrial recession.

Marsh W. White is professor of physics at Pennsylvania State University and executive secretary of Sigma Pi Sigma, physics honor society. Raw data used in the present study were obtained from the heads of physics departments offering a physics major. The study was financially supported by Sigma Pi Sigma, as has been the case since 1946–47.

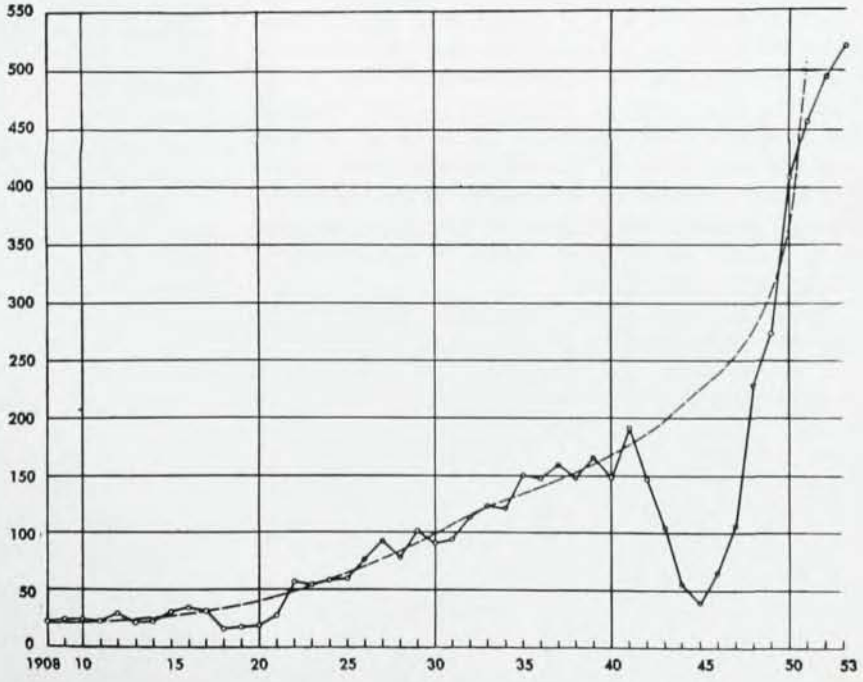

Fig. 5. PhD degrees granted in physics from 1908 through 1953. The sharp drop in the numbers of new PhD's during the war years and the rapid rise thereafter are likely to be followed by a gradual decline stretching over the next decade as suggested by the rough extrapolation shown in Fig. 4.