GENERAL SCIENCE

Science's Sex Desegregation

Effective use of women in science could increase the world's "manpower" by hundreds of thousands within a few years. The fair sex has the necessary brains, Ann Ewing reports.

➤ THE SCIENTIFIC MANPOWER of the world can be increased by hundreds of thousands of scientists within a few years if these steps are taken:

The world must be willing to apply desegregation to the sexes.

Womanpower should be included more effectively in the term "manpower."

Intelligent and highly trained women should be encouraged to work part-time, both before and after raising families.

The Russians have made greater use of women in science, medicine and technology than the U. S. More than 76% of Russian doctors are women, contrasted with about six percent in the U. S.

But the U. S. is far ahead of many countries in utilizing the skills and intelligence of the fair sex. In a nation like Japan, the scientific professions include very few women.

In the U. S., educational opportunities are equal for both girls and boys. As for brains, they are equally distributed. Obviously there are some psychological differences between men and women, but many of those that once were thought to be innate have been found to be the result of home environment or tradition.

Only recently, with an added spur from the Russian launching of Sputnik and the Space Age, have more and more young women turned to science as a career. What was traditionally a "men only" field is now attracting women at an increasing rate.

Microscopes Replace Dolls

It was once thought that it was not "natural" for a girl to possess scientific talents, as it was for a boy. Now girls are taking an interest in science to a greater extent than ever before, putting aside their dolls for microscopes.

One indication of this trend is the high percentage of girls—about half as many as boys—entering the local science fairs all over the country. Even in the stiff competition for the National Science Fair, many of the top winners are girls.

And in the 21st Science Talent Search this year, 25% of the entries were from female teen-agers in their senior year of high school. The Science Talent Search to pick the country's top young scientists is conducted by Science Clubs of America, an activity of SCIENCE SERVICE.

A survey of 31 women who participated in the first and second Science Talent Searches of 1942 and 1943 showed only three did not hold college degrees 15 years later, and even these three followed their scientific interest into some form of science after high school training. Of the 28 who finished college, more than half hold degrees beyond the bachelor's and almost one-fourth have achieved the doctorate.

Interest in becoming scientists was sparked among these women from the earliest memory to as late as high school. The influence of teachers also began early. Among those teachers reported as influential, almost as many were in the elementary grades as in high school, and these teachers taught English or Latin, not necessarily science.

Of the 31, 20 were married while 11 remained single. The study showed that although the single women were happy in their careers, they yearned for marriage either in addition to or in place of a job. The married women showed clearly that the satisfactions of science notwithstanding, marriage was of first importance to fulfillment as a woman.

Most of the women married men from their own field of science. One-third of them are continuing some professional job activity plus their home duties and raising families.

Perhaps typical of the modern generation of women scientists is Jane Blankenship Gibson. She was a Southern Appalachian Science Fair winner while a student at Oak Ridge High School, Oak Ridge, Tenn. During summers while attending the University of Tennessee she worked at the Oak Ridge National Laboratory where her father, Dr. F. F. Blankenship, is a physical chemist.

After graduating with a bachelor's degree in chemistry in June, 1958, Jane Blankenship became Mrs. Carl Gibson that fall. She and her husband now live in Stanford, Calif., where Mr. Gibson is a chemical engineer who will earn his Ph.D. soon. Mrs. Gibson works as a spectroscopist for Lockheed Aircraft Co., Palo Alto, Calif., and expects to earn her master's degree in the physics of quantum mechanics this year.

Although their advanced studies currently keep them both very busy, they plan to start raising a family in the near future.

Insufficient Training

The National Science Foundation in a survey of women in scientific careers found that the low proportion of women in science stems from insufficient training. The lack of training is based on a whole series of complex psychological social and economic factors interacting with each other.

The key in all of these, however, is that women bear the children and their role in our society centers around this.

COMBINED CAREER—Mrs. Carl Gibson, who as Jane Blankenship won high science honors in school, combines her scientific work with advanced studies and homemaking.

Nevertheless, the National Science Foundation concluded, women with the aptitude and desire to become scientists should be given ample opportunity and encouragement to consider careers in science. Even if science is not a career for them, however, "a general familiarity with matters scientific would seem to be of importance to the wife and mother meeting family responsibilities in an economy with growing dependence upon science and technology."

Even though women are becoming an ever larger proportion of the total labor force, relatively few women enter science. The loss of potential talent begins early, when course choices are made in high school. Further losses occur at later stages—between high school and college, in college, and between college and employment or graduate school—and later still when women leave the labor force for marriage and child care.

Although more girls than boys graduate from high school, numerically and proportionately fewer of them continue to college. The loss of talent between high school and college shows up particularly when high-ability boys and girls are considered separately.

A study by the Educational Testing Service showed that less than half of the upper 30% of the high-ability girls continue their education, although some 60% of the boys of the same ability level do so. This, the National Science Foundation reports, is one place where it is possible to gain some measure of the loss of potential talent in science among women.

The factors accounting for so few women in science are complex and mutually interacting. In our advanced industrial society, most scientific and technological jobs require long and rigorous training, and women generally have found employment mainly in those fields where less training is required.

During the last 20 years, the distribution of employed women by occupational groups has not changed greatly, except that there has been a reinforcement of the trend toward an increasing proportion of clerical workers and a declining importance of private household workers.

Professional, technical and kindred workers as a group have constituted about 13% of all women workers during this period.

Of the eight women born in the U. S. whose biographies appear in "Women of Modern Science," author Edna Yost notes that five had no intention of majoring in science when they entered college. This, Miss Yost points out, is a "high percentage in a group whose outstanding talents were undoubtedly in this realm." Each of the eight is now an outstanding and respected leader in her chosen field.

Three of the five had omitted physics and chemistry completely, and mathematics except for the minimum, from their high school curricula. Something in their environment, according to Miss Yost, had made it easy for these girls to remain ignorant of their own high gifts and potentialities.

With today's increased emphasis on science, it is likely that each of these five women would have discovered her own talent for science at least in the early years of high school if not before.

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SPACE

Satellite Observatories

➤ THE UNITED STATES will launch its second astronomical satellite soon.

It will be called the orbiting solar observatory, or OSO, and will look at the sun with its instruments to detect the ultraviolet and gamma ray radiation in space since these radiations do not penetrate the earth's atmosphere. Gamma rays are believed to hold the secrets about the elements making up the universe. They are the products of collisions of cosmic ray particles in outer space.

When cosmic rays strike atoms, the atoms fly apart, producing small particles that also pop apart and leave gamma rays. Such rays travel in straight lines through untold billions of miles of interstellar space, unaffected by magnetic fields or other influences. By determining their origin, scientists can learn about the source of cosmic rays.

The first astronomical satellite was Explorer XI, launched April 27, 1961. It carried a gamma ray telescope and was the first step in a U.S. program to use orbiting observatories to study the moon, sun, other planets, other stars, the Milky Way galaxy and other galaxies.

After the second astronomical satellite is launched, the U.S. plans to keep them coming regularly, Dr. Nancy G. Roman, director of the geophysics and astronomy programs for the National Aeronautics and Space Administration, said in Washington, D. C. The third astronomical satellite will also be a solar satellite, she told the Astronomical Colloquium meeting at Georgetown University. After that, solar satellites are expected to orbit at the rate of about one a year.

A major undertaking, expected within the next two or three years, will be the launching of a two-ton satellite with an optical telescope 36 inches in diameter. It will be capable of tracking stars very accurately.

Before that, however, the U.S. will launch several satellites carrying telescopes with diameters from eight to 16 inches.

The EGO, or eccentric geophysical observatory, scheduled for launching in 1963, is expected to carry a low frequency radio receiver for detecting radio waves from the sun and other heavenly sources in the two to four megacycle range. Such radio waves are blocked by the earth's atmosphere. The Ego will have an orbit taking it as far as 60,000 miles from earth, then back again close to earth.

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