

## PHYSICS

# New High for Protons

Frequency modulation principle applied to atom-smashing is expected to accelerate protons to 350 million electron volts. Fifteen million volts have been attained.

► PROTONS, the nuclear particles which scientists are grooming as the most powerful puncher in atom-smashing, have been accelerated to a new high energy of 15,000,000 electron volts at the University of California.

Significantly, this top power was achieved in a pilot experiment in Prof. Ernest O. Lawrence's 85-ton cyclotron, which a little more than 10 years ago was the world's only big-league atom-smasher but has now been dwarfed by a succession of giant machines.

Fifteen million electron volt protons were achieved using the new frequency modulation principle, which will be applied to the 4,000-ton cyclotron now nearing completion. Eventually this machine is expected to be able to accelerate protons to 350 million electron volts.

Technical difficulties have always made it more difficult to speed up protons to the high energies of less temperamental nuclear particles such as deuterons (heavy hydrogen nuclei) and

alpha particles (helium nuclei). For this and other reasons, deuterons and alpha particles have been most widely used.

Frequency modulation, suggested by Prof. Edwin M. McMillan, makes it possible to adjust the timing of accelerating electrical impulses to fit the characteristic revolutions of protons as they are pushed around the circular orbit in the cyclotron chamber. This was proved in the pilot experiments with the 85-ton cyclotron.

One of the reasons the proton is considered to be the most promising atomic bullet for learning about the nucleus of the atom is that the proton itself is a basic particle of the nucleus. Deuterons and alpha particles are made up of neutrons as well as protons.

The experiments in which the new proton energies were achieved were conducted by Drs. J. Reginald Richardson, Kenneth R. MacKenzie, E. J. Lofgren, Fred Schmidt, and Byron T. Wright, of the Berkeley Radiation Laboratory.

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been reported to be from 7 to 11 days per woman in comparison with 2 to 7 days per man.

Studies of illnesses lasting one day and longer made by the U. S. Public Health Service show that the excess sickness in women is not due to the so-called "female diseases" but is true of almost all the diseases common to men and women. The chief causes of sick-absenteeism were: 1. Respiratory diseases, such as colds and 'flu, which accounted for about 50% of both the number of cases and the annual number of days lost. 2. Digestive diseases, which were responsible for almost 20% of the cases.

Married women in industry, burdened with household and family worries, present plant physicians with somewhat higher sickness rates than single women. Industries that aid their workers in finding transportation, recreation, nursery schools, and housing will probably reduce the sick-absenteeism of women.

Pregnant women who work because of economic needs have brought to industry many new health, production, and social problems. Federal and health agencies suggest that women be allowed a minimum leave of six weeks at the end of pregnancy, and from six to eight weeks after delivery.

The new book is issued under the auspices of the National Research Council by W. B. Saunders Co.

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## INDUSTRY

# Third of Women to Work

► BY 1950 one in every three women over 14 years of age, or more than 16,000,000 women, will be employed in nearly every type of industry in the United States.

This mass invasion of the man's world will bring to industry problems concerning the health and efficiency of working women that were not solved during the employment peak of the war years when 18,000,000 women were in industry.

"Women appear to be more critical of the working conditions than men," says Dr. Anna M. Baetjer, of Johns Hopkins University, in her new book, "Women in Industry." Adequate lunch periods, rest pauses, and sanitary facilities reduce fatigue and add to the happiness and efficiency of women at work as do proper working hours and accident prevention rules.

Since women are on the average only 85% as heavy as men and have only

about 60% as much physical strength, they have often been excluded from jobs that proper training would have enabled them to perform. The War Manpower Commission and the American Medical Association committee on the health of women in industry aided employers to plan normal training periods for jobs for women during the war.

Women have been found to be more satisfactory than men in work that requires accuracy and speed with the hands. One automobile manufacturer reports that women are especially suited for bench work, assembly, inspection, conveyor loading, packing, paint spray, spot welding, light punch press, and riveting.

Women are ill more frequently and lose more time from work because of sickness than do men, but their absences are shorter. The average number of days lost per year due to sickness alone has

## MEDICINE

# Tobacco Not Believed To Cause Cancer

► IF YOU have been scared by a recent popular magazine article suggesting that "tobacco may be the cause of widespread, terrible forms of cancer," you can relax with your pipe or favorite brand of cigarette if you wish.

That is what one scientist consulted did. When asked the question: does smoking cause cancer? He pulled out his pack of cigarettes. Then he settled down to tell what was obvious, that in his opinion there was no danger.

Pursuing the matter further, authorities at the National Cancer Institute were consulted. They advised that there is no experimental or clinical evidence which would indicate that tobacco smoke is a factor in the cause of cancer. There is some clinical evidence, meaning from studies of men, not mice, that tobacco tar may be a cause of cancer, but it is not very conclusive.

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