

RECORDING SPEEDOMETER AND AUTOMATIC GEAR SHIFT TO SIMPLIFY AUTO DRIVING.

An automatic gear box for automobiles that will do away with all manual gear shifts and greatly simplify the art of driving, and a self-recording speedometer that will settle all arguments between supposed speeders and traffic officers are two of the latest Swedish inventions that have been perfected at the plant of the S. K. F. Company in Gothenburg, Sweden.

The first contrivance is the personal invention of Dr. Sven G. Wingquist, founder of the firm, and in 1921 named honorary doctor of engineering at the Stevens Institute of Technology in the United States. Exactly how it is constructed is still a secret, but from various patents granted him during the years he has been working on the problem, it has been inferred that the device utilizes both mechanical and hydraulic principles.

At any rate the new gear box has been installed in a closed motor car of American make and tested out in heavy traffic and under all possible driving conditions. It has also been shown to motor engineers in England, where it has attracted great attention. By automatically throwing into gear more and more wheels as the resistance increases and conversely taking them out as the "load" grows less, it leaves the driver free to watch the road and regulate the speed only by means of the gas throttle and brakes which reduce the risk of accidents. It also is supposed to preclude the stalling of the engine.

The self-recording speedometer has been warmly recommended by the Swedish police authorities and for the purpose of testing its workings under various conditions it has recently been installed in five different kinds of vehicles, a taxi cab, a passenger bus, a large freight truck and a light one, and a private automobile. At regular intervals the records of these five motor cars will be inspected by the police and the wear as well as reliability officially determined. Chief of Police Haarleman of Stockholm is personally interested in these tests, as he maintains that in case of accidents it is of the utmost importance to be able to determine exactly how fast each car had been travelling. So far the new speedometer has functioned perfectly in all tests.

HARVARD ASTRONOMERS STUDY MILKY WAY STRUCTURE

A hundred years ago the English astronomer, Sir William Herschel, showed that all the stars visible in the heavens formed a system the shape of a watch or a grindstone, with the sun near the center. When we look out along the diameter of the grindstone we see a great mass of stars which appear like a continuous stream of light to the unaided eye. This is the Milky Way, or "Galaxy", as the astronomer calls it; and to learn more of it, and hence of the universe of stars of which the sun and its attendant planets form such a minute part, astronomers at the Harvard College Observatory are now engaged in making an extensive series of photographs of these star clouds.

The method used depends on a fact discovered by Dr. Harlow Shapley, director of the observatory, that certain kinds of variable stars, which periodically diminish in brilliance and then grow bright again, change more rapidly, the greater their average brightness. This permits the astronomer to find out how bright they actually are. By looking at them with his telescope he can find out how bright they seem, and from the relation of the actual and apparent magnitudes he can find their distances. These stars, called Cepheid variables,

are the ones being employed in the Milky Way studies.

"The Cepheid variable stars, and to a lesser extent the long period variables, afford valuable means of measuring great distances," explains Dr. Shapley. "With the perfection of photometric methods, it becomes possible to analyze any part of the stellar system in which variables occur, outlining its extent in various dimensions and the frequencies of certain types of stars. The problem of the structure of the galactic system has been of special interest to me for several years, and we have now perfected plans to place on a systematic basis one part of the analysis of the Milky Way.

"Three belts in the galaxy are being photographed continually at Cambridge and at our branch station at Arequipa, Peru, with exposures of sufficient length to show stars to the seventeenth magnitude. Each one of the two hundred fields, which completely cover the Milky Way, will be photographed over a period of four or five years from five to forty times annually. The accumulated material will be sufficient, in general, to determine the light variations of all variable stars to the sixteenth magnitude, or fainter. More than a hundred new variable stars have already been found during the early stages of this work. We are particularly able to do this for we have suitable telescopes and an extensive collection of early photographs, and our staff has had long experience in measuring stellar brightnesses."

The first photographs ever made of stars in the United States were made at the Harvard Observatory in 1850, and ever since the work has been continued, so that now the observatory has a file of thousands of plates which are not duplicated at any other institution.

Some of these are direct photographs, others are spectra, which reveal the composition of the stars and which were used in the compilation of the great Henry Draper Catalog. This monumental work lists over 225,000 stars, and gives their brightness, position, and spectral type. Most of the work on it was done between 1911 and 1924, largely by Miss Annie Jump Cannon, the first and only woman to receive an honorary degree from Oxford University, in England, which was conferred in honor of her scientific achievements.

YOUTH OF NATION ASKED TO FIND HEALTHY CHESTNUT TREES.

Chestnut trees of the future, if there are any, may owe their existence to the energies of some boy or girl of today.

The Department of Agriculture is receiving the aid of the youth of the land, particularly boy and girl scouts, in scouting out chestnut trees that are resistant to the blight that has wiped out most of the chestnuts of eastern American in the region north of Virginia.

G. F. Gravatt, of the Office of Forest Pathology, said that there is no means of saving the present growth of chestnuts. All hope is concentrated on the starting of a new growth of blight resistant trees. Some species have been introduced from China and Japan, but occasionally there is found a resistant native tree which is still sound in spite of the epidemic that has killed its companions.