from anything within the reflections of a Roman leader that this modern development must be ascribed to its own modern origin. The outcome of some of the modern origins of engineering is nowhere seen more strikingly than in household affairs. Instead of skinning (by the exertion of main strength aided with crude tools made of chipped stone) the wild boar brought in on the back of her brute of a man, and burning the laboriously recovered meat over the open fire at the mouth of her cave, the woman of the dwelling now preserves her cherished rugs by passes of the vacuum cleaner, supervises the electric sewing machine, the electric washing machine, the electric mangle, and sets the temperature regulator for the oven of the gas or electric cooking-range. Thus, the practicable life of the house-woman has been revolutionized as an outcome of scientific discovery and invention and become one of light but highly skilled labor associated with physical and mental freedom and available time for reflection, recreation and not uncommonly for special service to society. Another homely but graphical example which serves to illustrate changes in only fifty years that have resulted from engineering of modern origins is the group of automobiles quiescently awaiting their worshipping masters around the country churches of a Sunday, where horses (with their buggies) formerly stood in fly-pestered impatience.

It is my hope that the foregoing sketch has convinced you that the origins of engineering lie in man's knowledge of the forces of nature and their application to man's convenience. Each fact discovered regarding those natural forces carries its own possibilities of useful application, and as the facts have been detected and identified with the course of time the scope of engineering has been correspondingly widened until it now possesses a very comprehensive influence on human life.

Man wishes to secure protection from the weather (that is, shelter and clothing), plenty of satisfactory food, safety for his person, sociable contact with his kind, and comfort in all his affairs. Engineering contributes to satisfying all these desires. It is worthy of the fullest development for the purpose of enlarging this influence. As science discloses the facts, engineering is able more fully to meet these desires in substantial degree for every one. Engineering is thus an inextricable thread in the fabric of the civilized world's social organization. Natural phenomena are not all understood; the facts have not yet all been observed and new ones are detected from day to day. Out of each one of these may spring new origins for engineering processes, and the scope of engineering may be expected to expand as long as man remains mentally of investigative character and corporally with a fondness for convenience.

SCIENTIFIC EVENTS

THE SOIL EROSION SERVICE

AMONG the numerous activities of those now enrolled under the Civil Works employment plan, it is reported from north-central Missouri that a group of 163 men are building rock dams across destructive gullies and mining limestone to correct soil acidity. These men are employed on a 200,000-acre erosion control project being carried out in the rolling part of the Missouri-Iowa corn belt by the Soil Erosion Service of the Department of the Interior.

The continuing destructive effects of soil washing in this extensive region of highly productive corn land has already largely stripped off the fertile topsoil from four and a half million acres. Nearly half a million acres have been essentially destroyed by gullying. These lands were all cultivated at one time, producing in good years around 75 bushels of corn per acre. Now much of this eroded land will not yield more than 15 or 20 bushels per acre, and in dry years the yields dwindle to nothing.

It has been shown at the soil erosion experiment station in this region that land sloping about eight feet in a hundred loses every year in the neighborhood of 85 tons of soil an acre, where continuously planted to corn. According to measured results 35 per cent. of all the rain runs off into the streams under this unwise system of land use. Where alfalfa is grown, on the other hand, the soil losses from the same kind of land are less than two fifths of a ton per annum, and the runoff of rainfall amounts to only 2 per cent. of the total precipitation. Clover and timothy are also effective in controlling erosion and runoff in this region.

In order to produce a good crop of clover or alfalfa it is necessary to "sweeten" the soil by applying ground limestone rock. The crushed rock will be scattered over the steeper sloping areas, which are to be planted with clover, alfalfa and various grasses. Erosion-control treatment will be applied to every acre of land over the 200,000-acre watershed in accordance with its particular needs.

Part of the Civil Works force now engaged on this project is making use of rocks and brush to close up the gullies which have been steadily cutting to pieces the sloping lands. The specialists of the service assert that men could not be put to more useful work, for the reason that, regardless of crop surpluses, the nation can not afford to lose any more of its high-

powered agricultural land, such as these rich prairie soils. It is recognized by the erosion specialists that many millions of acres of land now in cultivation are so steep and erosive that it is futile to continue their use along lines of present agricultural practise. These lands must be taken out of the clean-tilled crops, under which wastage of soil by erosion is most rapid. They must either be planted to trees or soil-saving, thick-growing crops, such as alfalfa, grasses and clover, or protected from grazing long enough for voluntary growth of weeds and grasses to take care of the problem.

THE TENNESSEE ACADEMY OF SCIENCE

THE thirty-third meeting of the academy was held on Friday and Saturday, December 1 and 2, at the George Peabody College for Teachers, Nashville, Tenn. Discussion of the Tennessee Valley Development was the chief feature of the meeting. A symposium on "The Tennessee Valley Development Project" constituted the program for the Friday afternoon session, as follows:

"The Geological Phases of the Project," by Dr. Walter F. Pond, state geologist, Nashville.

"Transportation and Other Geographical Problems," by Dr. Albert E. Parkins, George Peabody College.

"General Engineering Features," by Professor Fred J. Lewis, Vanderbilt University.

"Agricultural and Sociological Aspects," by Dr. Kary C. Davis, George Peabody College.

The subject of the academy address on Friday evening, by Dr. Walter D. Cocking, Tennessee state commissioner of education, was "The Educational Implications of the Tennessee Valley Authority."

At the business meeting on Saturday, amendments to the constitution and by-laws were adopted, providing for the management of the Reelfoot Lake Biological Station by a director and a board of trustees chosen by the executive committee.

Resolutions were adopted approving the presentation of the Tugwell bill for adequate control of the advertising claims and the contents of proprietary medicines, and the general plans for the development of the work of the Tennessee Valley Authority and its freedom from political guidance and its efforts toward enlivening the social order and improving the industrial, natural and educational resources of the South.

The president, Dr. Francis G. Slack, presided at the sessions on Friday morning and afternoon, and the vice-president, Dr. Charles W. Davis, on Friday evening and Saturday morning.

Officers for the year 1933–1934 are:

President, Walter F. Pond, Tennessee state geologist, Nashville.

Vice-president, George M. Hall, professor of geology, University of Tennessee, Knoxville.

Secretary-treasurer, John T. McGill, professor emeritus of organic chemistry, Vanderbilt University, Nashville.

Editor, Jesse M. Shaver, professor of biology, George Peabody College, Nashville.

The librarian is Miss Eleanor Eggleston, Vanderbilt University. Dr. A. Richard Bliss, Jr., director of the research laboratories of the William A. Webster Company, Memphis, will be the director of the Reelfoot Lake Biological Station. The secretary-treasurer of the academy, Dr. John T. McGill, was elected to represent the academy at the meeting of the American Association for the Advancement of Science, Boston, December 27, 1933. The spring meeting of the academy for 1934 will be held at Knoxville.

THE WORK OF PROFESSOR WILLIS LINN JEPSON

PROFESSOR WILLIS LINN JEPSON, of the department of botany of the University of California, was recently appointed faculty lecturer for 1934.

Professor Jepson is a native of California and an alumnus of the University of California, having been born in Vacaville, on August 19, 1867, and having rereceived the degrees of bachelor and doctor of philosophy in 1889 and 1899. His first appointment to a teaching post came in 1891, when he became a student assistant in the university.

In announcing his appointment the academic senate outlined his contributions as follows:

Beginning as a boy, and later under Edward Lee Greene, he has devoted himself to a study of the flora of California. He established the journal *Erythea*, for the expression of ideas and discoveries in California botany. He has published innumerable shorter articles dealing with various aspects of the botany of the state, taxonomic, morphologic and distributional. His more considerable contributions began with his first edition of his book, "Flora of Western Middle California." His next undertaking was to bring together the flora of the entire state, which meant a laborious monographic study of every genus of flowering plant in the state. Outstanding in this series of monographs were those on Allium, Eriogonum, Arctostaphylos, Godetia and the family Umbelliferae. His work on the genus Eschscholtzia is regarded as a classic in the handling of difficult polymorphic genera. The preliminary draft of these studies resulted in the publication of the "Manual of Flowering Plants of California." Meanwhile, the monographic work has been appearing in parts, as "The Flora of California." This work is still going on, and although a considerable number of parts have been published, the manuscript already prepared and awaiting publication will greatly extend this monumental work.

Professor Jepson has concerned himself not only with the flora of California in general. His name will ever