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FACING THE EROSION PROBLEM¹

By H. H. BENNETT

DIRECTOR, SOIL EROSION SERVICE, U. S. DEPARTMENT OF THE INTERIOR

THE productive agricultural lands of the United States are being seriously impaired and even destroyed on a vast scale. The plant nutrients and the soil body itself are being removed from fields and over-grazed ranges at an ever-increasing rate under existing methods of unwise land usage, with the effect not only of impoverishing and even destroying the uplands but of covering fertile lower slopes and productive alluvial plains with poor subsoil material washed out of the hills. Moreover, the products of erosion are filling stream channels and costly reservoirs; increased runoff from soil-stripped, gully-riddled slopes is increasing the hazard of floods; and many streams muddied with silt and colloidal clay have been deserted by valuable species of fish. This irreparable damage is increasing at an accelerated

rate. Centuries would be required to build back the soil swept out of the fields and overgrazed pastures of the nation by this process that continues with every rain heavy enough to cause water to run downhill. We have been maintaining our agricultural production at the expense of the substance of the land.

The average citizen is unacquainted with the gigantic proportions of this devastating agency of uncontrolled erosion by wind and water. Educators, business men and statesmen, even our specialists—many of our engineers and agricultural experts—do not yet realize that more than 75 per cent. of the country consists of sloping land, all of which is subject to erosion in some degree where used for clean-tilled crops or where subjected to unwise grazing. Nor is it generally known that the average depth of the more productive topsoil of these erosive lands is only about 7 or 8 inches, or that this thin covering, representing the farmer's principal capital, is being swept

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"The most radical alteration has been made in the phylogeny and classification of the vascular plants. As commonly presented in elementary courses this subject has for some time been in need of a thorough revision. The remarkable discoveries of recent years with regard to the character of the earliest known land plants, the Psilophytales of the Devonian, have provided us with a basis from which to derive the three main lines of vascular plants which are now so clearly distinguishable, and which for some time have been designated as the Lycopsidea, the Sphenopsida, and the Pteropsida. The evolution of the modern seed-bearing plants—the Gymnosperms and the Angiosperms—from the last of the three is universally admitted, but the name Spermatophytes for these plants is evidently a misnomer, since the seed-bearing habit has evidently arisen a number of times and in other groups. The time-honored terms Pteridophyta and Spermatophyta and the groupings which these designate have therefore been discarded in favor of a more natural classification and a more appropriate nomenclature. For the vascular plants as a whole the term Tracheophyta is here proposed, as cognate with Thallophyta and Bryophyta. In revising his classifica-

tion of the higher plants the author has been guided primarily by the conclusions and suggestions of Professor Arthur J. Eames of Cornell University, the outstanding authority in this field, to whom he wishes here to express his sincere thanks for frequent counsel.

"The other important innovation in the present revision is a chapter on Morphogenesis, or experimental morphology. This field of botanical science is progressing so rapidly and seems destined to occupy such an important place that even the beginning student should become acquainted with the point of view which it presents. The most characteristic feature of living organisms is their possession of specific shapes, and the factors which are responsible for the development of these shapes are thus of great importance biologically. Morphogenetic problems are of significance not only to morphology, but to physiology, cytology, and genetics, as well.

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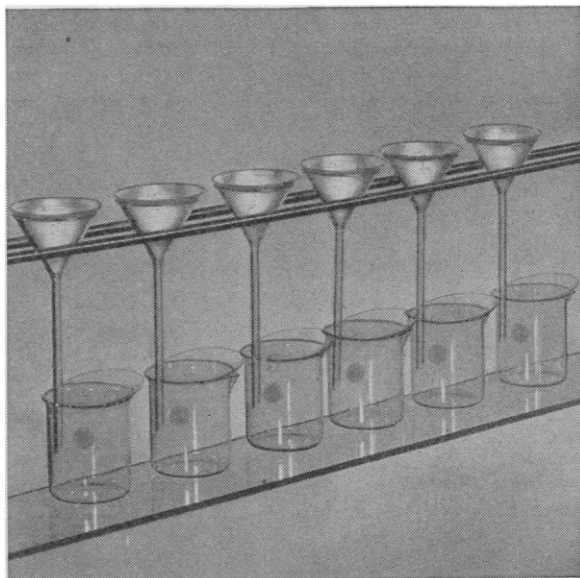
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