To Attack Wilderness

Especially was the method feasible only in fairly well-populated regions of the earth where the chances of finding the balloon, after its descent, were reasonable. The use of the method in the regions near the magnetic poles of the earth—in far northwestern Canada and in the Antarctic—was impractical and yet those regions hold some of the most pertinent secrets of high altitude cosmic rays research.

Trying to learn sufficient facts about cosmic rays to build a really complete theory of their origin is handicapped because the observation must be made on an earth which is, in part, guarded from the rays. Not only does the air itself stop some of the cosmic rays and decrease their energy in an amount equal to a foot of lead, but, more important, the magnetic field of the earth bends the electrical particles in the rays and in some cases prevents them from reaching the surface of the earth at all.

Near the magnetic equator, for example, only the most piercing high-energy rays of all can get through to the instruments of scientists. Farther north and south from the equator more and more of the so-called "softer" or weaker rays can be observed. And at the magnetic poles of the earth very weak rays should be observed at not-too-great altitudes.

Thus the hope of scientists to study cosmic rays near the magnetic poles is like a man who seeks to pierce the weakest point in the "armor" which guards the earth. The magnetic pole regions are the Achilles' heel areas in cosmic ray study.

But no one is going to transport large $185,000 balloons far north into Canada where the chance of landing successfully and without injury to human pilots or apparatus is extremely minute. Robot radio balloons appear to be the only way out.

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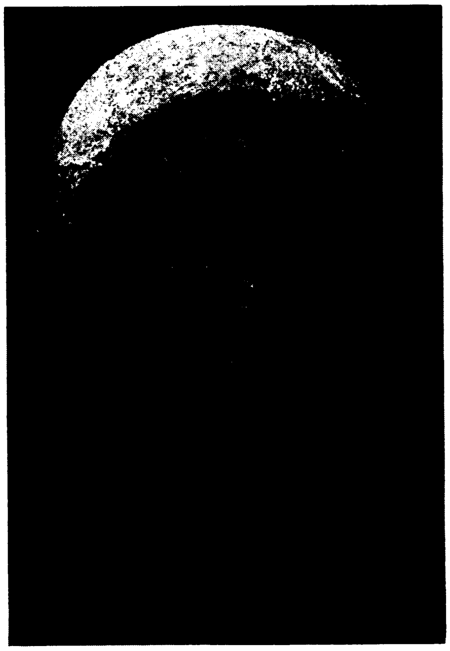

SAVED BY DEFECT

This early Greek sculpture, which paradoxically survived 2400 years because it was thrown away, has come to adorn the Boston Museum of Fine Arts. Finding his marble imperfect, the Greek sculptor apparently abandoned the head unfinished; and in its obscurity the head escaped serious ravages of war and time.

CONSERVATION

Sciences Put Heads Together Over Flood Control Problems

FLOOD control problems motivated a three-cornered scientific get-together at the summer meeting of the Ecological Society of America, at Rochester, N. Y., where three lines of scientific activity—forestry, soil conservation, and engineering—pooled ideas and suggested ways and means for combating the national menace of great waters broken loose.

Participants in the symposium were Ferdinand Silcox, chief of the U. S. Forest Service, Dr. W. C. Lowdermilk, associate chief of the Soil Conservation Service, and Dr. Morris L. Cooke, head of the Rural Electrification Administration.

"Eyes unto the Hills"

The speakers were unanimous in the opinion that flood problems in the great stream valleys can not be met wholly on the spot, but that the ultimate effective efforts must be put forth far upstream, where the "little waters" are.

To achieve flood control, said Mr. Silcox, we must "lift up our eyes unto the hills;" in them lies the danger, and from them must come the help. For there our little waters rise; there man may restore and protect that vegetative cover which forms nature's own great reservoirs and settling basins, dams, revetments, and levees.

And there, he pointed out, are the National Forests. Flanking the Appalachians from New Hampshire to Georgia; abutting the Great Lakes and dotting headwaters of the Mississippi; blanketing the Rockies from Canada to Mexico, the Cascade, Sierra, and Coast Range mountains from north to south; they offer an opportunity and a challenge to ecologists, foresters, and engineers alike. Maintenance of their forest, forage, and other vegetative cover is vital to flood control.

Foresters believe that if each drop of water is held for a time in the soil where it falls, there will be lesser volumes of water than now pile up in lower reaches of our rivers; that man's mighty engineering works alone can not wholly prevent death from stalking through the lowlands; that to do this, conditions which serve to hold back rains at the headwaters must be restored, improved and maintained. Flood control must start, not with raging torrents of the lower Mississippi, but with raindrops and rivulets in places far from the haunts of man.

Lessons from Raindrops

From single falling raindrops man can learn the beginnings of wisdom regarding soil conservation, Dr. Lowdermilk told his audience. When a drop falls, it splashes into a spray of clear water if it strikes a leaf or grassblade or anything else than bare, unprotected earth. The spray settles upon the soil and is absorbed, with little or no surface runoff.

But if the drop falls on bare earth, it splashes up not clean but muddy. The fine particles in the muddy spray, as it falls back to earth, "filter out at the surface to form a thin film which chokes up the surface pores of the soil. Only a part of the drop goes into the soil, another part flows over the surface, and by the accumulation of infinite drops, superficial flow is formed. As streamlets enlarge, the waters are released from surface frictional forces; the velocity of flow rapidly accelerates and generates erosive power. The rampant waters become gully-washers, to coalesce into raging torrential flows."

Another thing that prevents the soil from absorbing its proper quota of water is the presence of imprisoned air. In the aggregate these air bubbles imprison tremendous quantities of soil and keep it dry, when plenty of water is available. Roots, stems of plahts, and other organic objects act as innumerable air-shafts to let this trapped air escape and permit down-soaking water to seep in behind it. Very little attention has as yet been paid to this function of roots and stems, said Dr. Lowdermilk, and a great deal of careful study is therefore needed to understand it and take practical advantage of it.

Upstream Engineering Needed

Engineers no less than biologists and earth scientists must look upstream, declared Dr. Cooke, himself an engineer. Largely because of immediate business demands, but partly through lack of vision, engineers have always concentrated on enormous works on the big waters and they have let the little waters go unheeded and untamed. This policy, quite understandable but none the less dangerous, has contributed to historic flood disasters. Engineers have frantically thrown up higher and higher levees — and the great rivers have eventually met and broken all their challenges.

Now engineers are realizing more and more the necessity of taming the little waters before they become too great to tame. Engineering begins to look upstream.

Business for Health

Such widespread attack on the origins of the problem that masters all human effort if permitted to concentrate in the great valleys must involve a different economic outlook from that which has always governed engineers and their private employers, Dr. Cooke pointed out. Businessmen say they are "not in business for their health," and they are justified in saying so. But the community at large is not in business for anything else but its health, and for this reason intangible values must be taken into account when the cost of a given large-scale project in control engineering is being reckoned. Engineers must become accustomed to looking out over a terrain that is nation-wide, and to seeing things in the large. Piecemeal engineering is doomed to be beaten piecemeal by the unbridled forces of nature. But engineering conceived and executed in regional and national terms has a chance to conquer.

Science News Letter, July 4, 1936

Half a million acres of Arkansas land have been added to the Ozark National Forest.

ORNITHOLOGY

NATURE RAMBLINGS

by Frank Thone

America's Own

TODAY is the day when, according to the tradition of the Fathers of this Republic, the American eagle screams his proudest. The bald eagle, chosen by our early statesmen to be our national crest, is a truly noble-appearing bird, with his stern, piercing eye glancing out from a pure white head. For the term "bald" is a puzzling misnomer; the only explanation that can be guessed is that it is due to these snowy feathers, a feature unique among eagles. The bald eagle's tail also is white, but the rest of the body and the wings are clothed with feathers so dark brown that they are sometimes said to be black.

Another eagle found in America, which has by inadvertence replaced the bald eagle on at least one American coin, the half-dollar, is the golden eagle. He is an even larger bird than the bald eagle, for his wing-spread averages seven feet or more, and the spread of the bald eagle is a little less than this, as a rule. This eagle also is brown, but his tail is white-and-black instead of all white, and the feathers on the back of his head and neck have a yellowish tinge, which accounts for his name. The outstanding mark of distinction between the two species, however, is the "trousered" leg of the golden eagle, as contrasted with the total absence of feathers on the shank of the bald. Only the young of the bald eagle have these leg-feathers, and this sometimes causes juvenile bald eagles to be mistaken for the golden species.

Since we have settled upon an eagle to be our own bird, it is perhaps more appropriate for us to take the bald eagle, since it is strictly American in its habitat, whereas the golden eagle is known from Europe and Asia as well as from this continent.

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ECOLOGY

Shade of Trees Measures "Ripeness" of Timber

WHETHER a stand of timber is "ripe" enough for cutting can be judged by measuring the degree of shade the treetops cast, W. G. Morris of the Society of American Foresters indicated before the meeting of the Ecological Society of America, at Seattle.

The method is very simple. The forester walks through the forest, carrying in his hand a pocket-size electric photometer, of the type used by photographers to gauge the light they have to work by. This shows the amount of sky light passing through the forest canopy, in terms of figures on a dial. From time to time he notes down the readings, and at the end of his trip he averages them up. The density of the forest canopy thus measured is an expression of the maturity and harvest-readiness of the forest.

They Don't Like It Hot

Desert-dwelling reptiles are no fonder of the hot sun than are any other cold-blooded animals. The old-time notion that rattlesnakes and Gila monsters like to bask on a hot rock—the hotter the better—was shattered by Dr. Walter Mosauer, University of Southern California zoologist.

"Diurnal lizards and nocturnal snakes alike are killed by a short exposure to desert sunlight," he said, "especially if they are placed on the sand which reaches temperatures of 70 degrees Centigrade and over, around noon during the spring months. But even if they are suspended freely five feet above the ground, the direct insolation alone is lethal."

Northwest Forests Mapped

Forests of the states of Oregon and Washington, among the most important of surviving American timber stands, have been accurately mapped by the U. S. Forest Service, and the maps are now being lithographed by the U. S. Geological Survey. This work, important both scientifically and economically, was outlined before the meeting by T. T. Munger of the U. S. Forest Service.

Twenty-six distinct types of forest are to be represented on the finished map, each type shown in a distinctive color. Logged-over and burned-over areas will also be shown.

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California oranges now reach Alaska five days after picking.