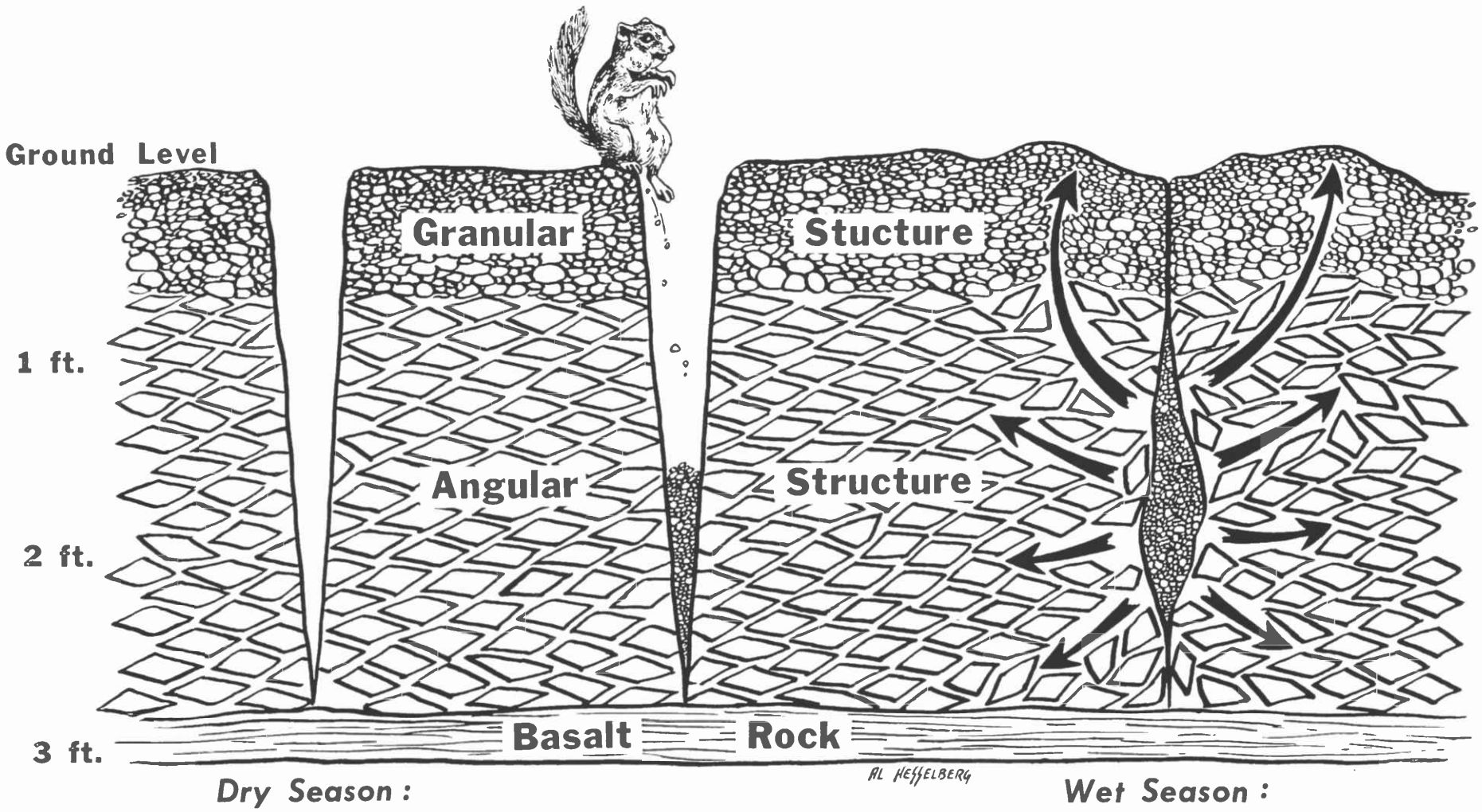

SCHEMATIC SKETCH, above, shows how the Grumusols react during a wetting-drying cycle. Incidentally, these cracks during dry weather can make hazardous footing for saddle horses.

NORTHERN ARIZONA'S GRUMUSOL SOILS

S. W. Buol

Some of the most interesting and dynamic soils known to man are developed on old basalt and cinder areas in various parts of north-central Arizona. These are the heavy clay-textured soils called Grumusols.

Because of their characteristic habit of vertical churning, these soils are often referred to as "self swallowing" soils. This peculiar habit of churning is the result of two factors—a high content of montmorillinite clay and a seasonal wet-dry climate.

Crack in Dry Season

During the dry season of the year (May, June and July) these soils become almost completely dry. During this drying, the montmorillinite clay shrinks, causing wide cracks to form at the soil surface. These cracks, often 4 to 6 inches wide, may extend to a depth of 3 or 4 feet. Wind, water and animals disturbing the soil surface cause some surface soil material to fall into these cracks.

The summer rains, and later the winter moisture wetting the soil, cause the clays to expand. The "extra" soil material now present in the subsoil as the soil wets up is compensated for by the formation of small mounds at the soil surface.

Most of Arizona's Grumusols are classified in two soil series. They are the black-colored McNary series and the brown-colored Springerville series. The McNary series takes its name

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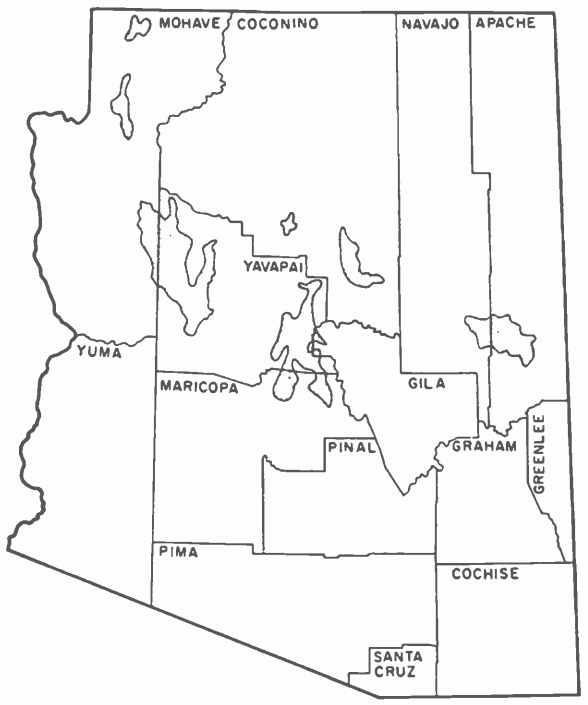


MAP OF MAJOR Grumusol areas in Arizona as presented by Johnson and others in the Soil Science Society of America "Proceedings."

This is second article in a series by Dr. Buol, member of the Department of Agricultural Chemistry and Soils. Dr. Buol is a member of an inter-agency team now engaged in classifying Arizona soils.

ABOVE, PHOTO OF Grumusols, showing typical cracking.

(Continued from Previous Page)

from McNary, Ariz., and the Springerville series is named for Springerville. These soils occur in areas from 4,000 to 7,000 feet above sea level.

Largely Grazing Areas

Grumusols in Arizona are used primarily for grazing but also may serve as an important watershed, especially during the winter and early spring when the surface cracks are sealed and the heavy clay-textured soils have a slow infiltration rate.

Vegetation on Arizona Grumusols commonly consists of Tabosa grass, sand dropseed, ring muhly, western wheat grass and blue grama. Many areas also have stands of Juniper which are thought to have invaded during the past 200 years. Ponderosa Pine do not grow well on these heavy-textured soils.

McAlister, Carruth Named to NSF Screening Panel for Scholarships

Two members of the U of A Agriculture faculty have been asked, by the president of the National Academy of Sciences, to serve on a panel which screens applicants for National Science Foundation fellowships.

The two are Dr. D. F. McAlister, head of the Agronomy Department and Assistant Experimental Station Director, and Dr. L. A. Carruth, head of the Entomology Department.

"This is an honor to these two men and also to this college," said Dean Harold E. Myers in commenting on the selection. For Dr. McAlister, this is the second year of service on this panel.

The National Science Foundation boasts that federal support of basic scientific research includes "freedom of scientific inquiry and strict accountability of public funds."

During this past school year more than 2,200 high-ability college and university students were aided in graduate study in the sciences, mathematics and engineering. As Dr. McAlister explains it, some 80 scientist-scholars spend a period of days in Washington closely evaluating the applications of scholarship applicants. That process takes place each winter.

The examiners—such as Dr. McAlister and Dr. Carruth—will be assigned to study applications from their own fields. The two U of A men, when they go to Washington on this assignment, will handle applications in the biological sciences, being part of a panel of 30 or so, and assigned from 1,000 to 1,500 applications to evaluate.

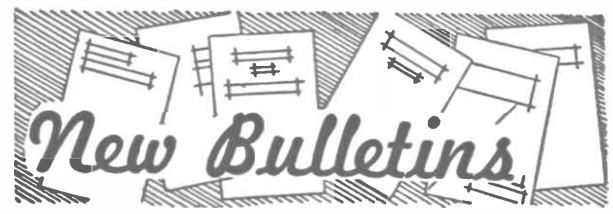
Much of the evaluation—scholarship records and such—is previously evaluated by computers, "But the computers can go only so far," said McAlister. "We also go over the letters of application which each applicant furnishes, and also his proposal—the study plans for which he wants the scholarship support."

Applicants may be undergraduates from any of the 180 cooperating colleges, or they may be young men and women already started in graduate work, or even adult students planning post-doctoral study.

This year graduate awards included 236 grants in mathematics, 332 in engineering, 483 in the physical sciences, 146 in the life sciences and 129 in the social sciences. To these 1,326 awards, most of them for two-year scholarships, are added 908 summer fellowships for teaching assistants. These 2,200 or so awardees are sifted from nearly 6,000 applicants, indicating that awards are not automatic.

"Actually," said McAlister, "we go over these applications, recommendations and proposals closely, with three men assigned to each applicant. Then the three of us get together and agree on the recommendation. Naturally, we do not judge the application of students from our own college, so the whole thing is very rigorous and impartial."

The National Science Foundation philosophy holds that America's strength relies largely upon large numbers of highly educated citizens, especially in the multiple fields of science, and that federal grants for scholarships are a sound national investment.



Folder 68 Revised—List of Available Publications.

Folder 107—Fertilizer Recommendations for Arizona.

Bulletin A-35—(Reprint) Arizona Range Resources II—Yavapai County.