

New Fields for Rock Hunters

geology education is branching out
to keep pace with a changing industry

By CARL C. BRANSON
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A FEW years ago, the ink was hardly dry on the geologist's diploma before he found himself the most sought-after of college graduates. In many cases he had the job lined up long before he got the degree. His grades, aptitude and training made little difference. If he could accumulate enough hours to graduate, high-paying employment was practically automatic.

Oil companies were desperate for men. They didn't have time to wait for the M.S. or the Ph.D. They didn't feel that they could even afford to be too particular about the men they were hiring with only bachelor's degrees. They needed petroleum geologists immediately, and it was left to the schools of geology to supply them. Many of those we supplied were capable, well-qualified geologists; many were not.

Then the bottom dropped out of oil production—and it's no secret what happened to the jammed geological staffs of the oil companies. The marginal geologists—those with only bachelor's degrees and inadequate training—suddenly found themselves without jobs. And those just emerging from geology schools were faced with a choice between working outside geology or not working at all. The oil industry had an unfamiliar problem—unemployment. It was a shock, but not a totally unexpected one to the staff of the School of Geology at the University of Oklahoma.

For several years, the School of Geology had been studying a change in the curriculum, a shift of emphasis which would better prepare our graduates for a wider range of employment. The tremendous demand for petroleum geologists had made this approach impossible before domestic oil pro-

duction was curtailed. Since that time it has become mandatory that we do something in this direction.

Our new course of study for the bachelor's degree, which goes into effect in September, does not de-emphasize petroleum geology. Instruction in petroleum geology will always be a vital part of the O.U. School of Geology. But if we are to best serve the petroleum industry, and our students as well, we must turn out graduates who are thoroughly grounded not only in geology but in the fundamental sciences that are basic to every phase of geology. By slightly reducing the number of hours of geology required for the bachelor's degree, we have allowed for more work in the allied sciences, which will include mathematics through integral calculus, 12 additional hours in physics, chemistry and the biological sciences and 6 to 7 hours in related fields, such as engineering and the history and philosophy of science.

Along with this strengthening of the curriculum, the School of Geology is experiencing a great change in teaching conditions—a situation which had become almost unmanageable at the peak of the oil industry's employment boom.

At that time in our more advanced geology courses, where the maximum in individual instruction and attention is demanded, our professors were handling several sections of the same courses with as many as 90 to 100 in each section. Sections of graduate courses were being filled on the first day of enrolment each semester, and graduate students were finding themselves unable to get into these classes—which is practically unheard of at this level of study.

On the undergraduate level, we had an even more difficult situation confronting us. The glittering opportunities in the oil industry were attracting many who were not really gifted in the field. The low employment standards encouraged laziness on the part of the student geologists. Why should they exert themselves for an "A" when barely passing was enough to get them the job they wanted? For those with real ability, the advantages in going on to graduate study were overshadowed by the money to be made immediately without the time, expense and drudgery of graduate work.

Then came the cutback in oil production, which started in this country about three years ago, the effects on employment opportunity reaching Oklahoma about a year later. Those students already studying geology, for the most part, completed their work rather than change majors; therefore the big drop in enrolment is being felt this year.

In 1950 O.U. granted 235 bachelor of science degrees in geology and 73 in geological engineering. By 1958 the number of bachelor degrees was down to 125 geologists and 43 geological engineers. This year we expect 50 degrees in geology and 16 in geological engineering. With the prospect for employment considerably dimmer, the number of sophomores entering the School of Geology dropped drastically—which will inevitably lead to a condition in which demand will again exceed supply, but at a lower level.

We feel that the adjustments in our curriculum will help solve this problem by giving our graduates preparation in many

No oil rigs loom in the future for paleontologist Chuck Rowett, who will go into teaching and research upon completion of Ph.D. work. He is pictured at right with a monkey skeleton.

areas of geology largely neglected by O.U. prior to the decline in the oil industry. Before this decline, 95 per cent of O.U. geologists went into the oil business. Now only 65 per cent are being absorbed by the oil companies. If the balance wish to remain in geology, they must be prepared to go into such allied areas as geochemistry, carbonate petrography, palynology, ground-water geology, clay mineralogy, teaching and research laboratories. The hiring in these allied fields is being done by the federal government, the park service, soil conservation agencies, the U. S. Geological Survey, the Corps of Engineers and civilian agencies attached to the military.

The oil companies themselves are setting up extensive research laboratories which will be manned by the highly trained geologist. For these research posts, as for other positions throughout their companies, they will be demanding the better quality geologist—and they will be able to pick and choose among the candidates. The students who are serious about geology are aware of this. There will be little laziness in their approach to a profession in which they must compete for every job available.

The importance of graduate study in geology education has increased enormously. While undergraduate enrolment has dropped, the number of candidates for the master's degree at O.U. has remained about the same and the number of Ph.D. candidates has grown. The professional (or hiring) level in geology, which was the bachelor's degree a few years ago, is now the master's degree, whereas the teaching level is the Ph.D. Some time ago we increased

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the difficulty of the graduate program, requiring in-state students to have a 2.75 overall grade average, and out-of-staters, a 3.0 to go into graduate study. They must pass a national advanced geology test.

To supplement the stronger schedule of subject matter which the School of Geology will be offering its students, we will now be able to supply them with all the equipment necessary for teaching and research. Acquisition of this equipment, required by the great increase in instrumentation in geology in recent years, has been virtually completed with the help of oil companies and the National Science Foundation.

The improvement in curriculum and facilities in geology education at the Uni-

versity of Oklahoma corresponds directly to the improvement in standards demanded by geologists all over the country, both those in education and those in industry. They are coming to the realization that a large part of the profession's difficulty in adjusting to the unemployment problem stems from the shallowness of education which geologists have been requiring for professional standing.

Dr. Lewis G. Weeks, president of the American Association of Petroleum Geologists, summed it up back in 1959 when he said: "Too long we have been content with mediocrity. We all know that many take geology because of inadequate capacity to handle chemistry, physics, physical chem-

istry, mathematics, dynamics, etc. Yet these disciplines are basic to a really sound understanding of geology, of geologic processes of every kind, and of geologic environments, an understanding of which is fundamental to every conceivable process in earth science."

This is the attitude which has been lacking for too long within our profession. It is also the attitude which the University of Oklahoma intends to reflect in the training—and educating—of today's geologist. Turning out a large quantity of graduates in geology is not enough. It never has been—unless each of the graduates fulfills in every way the highest standards which we can maintain.

an oilman analyzes the change at o. u.

Not all educators are in agreement on the correct formula for producing the best geologist. There is some feeling that O.U. is and should remain primarily a petroleum school. Likewise within the oil industry there are those who feel that the new degree requirements de-emphasize petroleum geology—in spirit if not in actual reduction of courses or hours offered. But there are also many within the professional petroleum circles who view the strengthening of the basic geology program as the only way

to provide oil companies with the calibre of petroleum geologists they must have.

Such a view is expressed here by A. Rodger Denison, a petroleum geologist who has gone with this industry through 40 years of change and who has long been urging that his school keep pace with this change.

Denison's intense interest in the O.U. School of Geology began during his undergraduate days as a laboratory instructor. After receiving his B.S. in 1921, he accepted

a year's teaching fellowship at O.U. He went to Amerada Petroleum Corporation of Tulsa in 1922, returning to the University for a semester in 1925 to complete his master's work. Denison served as district, division and chief geologist for Amerada before becoming vice president in 1950. Throughout his career, Denison's main activity has been in the location of new oil and gas deposits, both foreign and domestic. He was president of the American Association of Petroleum Geologists in 1943.

By A. RODGER DENISON

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The new program for geological education at the University will, I believe, train the kind of geologists who can compete in today's highly selective hiring conditions. It will train men to apply geology to any field and at all levels of competence, in contrast to the narrow field of lower competence of many former graduates of the School of Geology.

Geology, being the science of the earth, must make use of all the sciences to explain the processes and conditions present in the earth. My basic viewpoint is that a geologist is a *scientist*. This view is in spite of the fact that the majority of geologists are working for oil companies where the application of their science is largely directed toward the *art* of prospecting. Since I view a geologist as a scientist, it follows that I strongly advocate his training in all the fundamental sciences. Weathering of rocks is a chemical process. Folding of rocks is a physical phenomenon and involves dy-

namic principles. Mathematics is fundamental to understanding all chemical and physical principles. How then is it possible for a geologist to be competent in his (earth) science without a working knowledge of physics, chemistry, mathematics, and other subjects primarily in the engineering field?

Too many of Oklahoma's graduates in the hectic, overcrowded post-war years emerged with bachelor's degrees, but with training that would not permit them to fully apply the principles of geology. Many were really only qualified to be technicians—men who could do routine tasks. This was adequate to hold a job when they were plentiful, but inadequate to face the stiff competition for jobs brought on by the reduction of geological personnel and the decline in exploratory activity of the past few years.

The new program will, I firmly believe, correct this condition.



A. Rodger Denison
Vice President
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