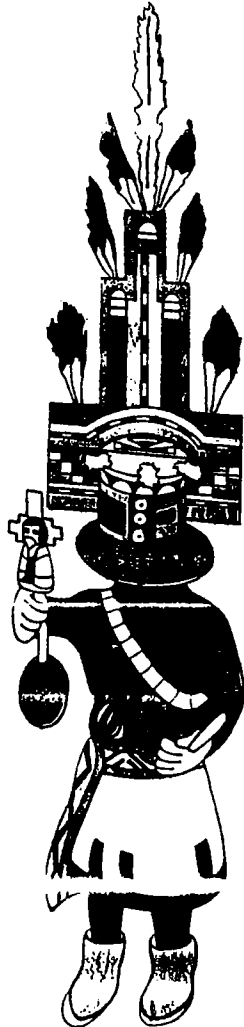


# PROCEEDINGS OF THE



*Annual*  
**HIGHWAY  
GEOLOGY  
SYMPOSIUM**



MARCH 16, 1962

PHOENIX,  
ARIZONA

## SPONSORS

ARIZONA HIGHWAY DEPARTMENT  
ARIZONA STATE UNIVERSITY  
CALIFORNIA ASSOCIATION  
OF ENGINEERING GEOLOGISTS

## OPENING ADDRESS

Honorable Paul E. Fannin

Governor of Arizona

On behalf of the people of Arizona, it gives me extreme pleasure to welcome you to our State for the 13th Annual Highway Geology Symposium.

Some of you have read recently of a slight difference of opinion between Arizona and the State of California concerning the Colorado River. That is why the sponsorship of this Symposium is of special interest. It is sponsored by the Arizona Highway Department, Arizona State University ... and ... the California Association of Engineering Geologists!

To the representatives from California we say, "Gentlemen, we are happy to have you with us, and, while you are here, you are welcome to all the water you can drink, bathe in, or carry home ... in your pockets!"

You know, there is a saying about Arizona that goes something like this, "All Arizona needs is more water and a better class of people". We've never figured out if this is complimentary or not, because, after all, that's all hell needs too.

In some respects, your meeting here today could be classed as something in the nature of a homecoming. It could be said that engineers and geologists were practicing in Arizona long before Columbus discovered America. This is evident in the extensive early-Indian irrigation systems, cliff dwellings and any other works, still enduring to this day.

Our State has been termed a "geologists paradise". Arizona has been richly endowed by the Creator with nearly every type of climatic zone, and

mineral and earth formation. It is indeed fitting that our State motto is "Ditat Deus"... "God Enriches".

You have our sincere thanks for holding your annual Symposium in Arizona this year. 1962 is a very significant year for us, it is our 50th anniversary as a state, and we are observing our Semi-Centennial.

In going over the history of your organization, I noted that your first meeting was held in Virginia. Your subsequent meetings were held in West Virginia, Ohio, Maryland, North Carolina, Pennsylvania, Georgia, Florida and Tennessee.

In fact, this is the first Annual Symposium you have held west of the Mississippi River, and we are indeed honored.

I note too, that the majority of your meetings have been held in Southern states. The Southerners in attendance should feel right at home here. As a matter of history, during the War Between the States, the Territory of Arizona was carried in the Confederate column, and it may come as a surprise to some of you to know that one battle of the war was fought on Arizona soil, at Picacho Peak, near Tucson.

Your organization is to be congratulated on its westward and national expansion. Additional congratulations are in order for your international expansion. I note also, that one of your delegates, and a speaker on this afternoons program, is representing our great and good neighbor to the south, the Republic of Mexico. I refer, of course, to Engineer JUAN B. PUIG, of the Mexican Ministry of Public Works.

We Arizonans enjoy an excellent relationship with our friends across the border. We constantly exchange information, ideas and trade, all in a

spirit of cooperation and mutual understanding.

Last year I attended a conference at Quertearo, Mexico, just northwest of Mexico City. The subject of prime importance was the Mexico-Canada Inter-American Routes. This route extends from the far northland in Canada, through the western United States, including Arizona, enters Mexico at Nogales, and continues south through Mexico City to Acapulco. Eventually it will join the Pan-American Highway, extending through every Central and South American country.

Surely, this is additional proof, to all concerned, that an "Iron Curtain" or "Wall of Fear", does not and will not exist in the free countries on this side of the world.

To Arizona, this route has other significance. It enters our State near Monument Valley and the famed Four Corners area on the Navajo Reservation. An alternate route enters Arizona just west of Shiprock and Gallup, New Mexico.

These fine, paved routes penetrate the vast, spectacular, but hitherto almost inaccessible territory of the Navajo and Hopi Reservations. These excellent highways are enabling our Indian citizens to develop the tremendous potential of their natural resources, and they are doing an outstanding job of developing those resources. For many reason, we are very proud of this new portion of our highway system.

In fact, we Arizonans are proud of our entire Highway Department. The teamwork and know-how of our engineers, geologists and other personnel has produced an enviable record of achievement.

Many of you have come a long distance to attend this Symposium. We hope that you will extend your stay, and visit some of the numerous attractions

in our state. Here in Phoenix, our famous World's Championship Rodeo is underway, and is well worth attending. Also, we are just a short distance from the border, and a visit to Mexico is one you will long remember. A tourist card or visa is not required to visit Nogales.

If my talk has seemed lengthy, please forgive me. You see, yesterday I rode in the rodeo parade, and to tell the truth, I'll welcome any excuse to stand up for the next few days. This is one of those times when the "seat of government" can be painful.

Again, a very sincere Welcome, enjoy yourselves, and ... as we say in the Southwest ... "Nuestra Casa Es Su Casa" ... "Our House Is Your House".

Presented At The 13th Annual Symposium  
On Highway Geology, 16 March 1962, in Phoenix, Arizona

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Bruce M. Hall  
District Geologist  
Sacramento District, Corps of Engineers  
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STATUS OF GEOLOGIC REGISTRATION

Synopsis

This paper opens with a discussion of the pros and cons of registration in the geologic field. Examples are used to illustrate the arguments.

Part two deals with the results of a nationwide questionnaire concerning the general professional "climate" on the subject of geologic registration. The questionnaire was directed to State Geologists who, of the total, returned a 79% complete answer.

Part three covers the current activity (1962) of the California Association of Engineering Geologists in their preparation of a bill for registration of Engineering Geologists.

## STATUS OF GEOLOGIC REGISTRATION

Registration together with its semisynonymous term, licensing, is generally accepted to be an expression of public control in a particular profession or craft. A review of the chronologic development of public regulation in professional fields indicates that such regulation exists when, and only when, public need could be proven to a legislative body. As an example, in colonial Virginia the medical profession consisted of physicians of two educational backgrounds. These were the colonial and European educated. Physicians having the European background felt that their medical training was the more thorough and offered the prospective patient better medical care; thus a higher degree of public welfare. For this reason a bill was passed by the Virginia legislature licensing physicians on this divided basis. However, the essential difference as prescribed was based on a divided system of fees, favoring those physicians of foreign education. Thus secondarily is illustrated one of the most controversial factors in the concept of registration. This is that registration normally incorporates a benefit to the regulated field as well as to the public it professes to serve.

The geologic field is currently in the throes of an oft repeated professional question: "Are we needful of and/or ready for regulation?" Basically, the question arises from two factors which have developed concurrently. The first is that the geologic field has, mainly in this century, diversified from the purely academic into several subdivisions showing practical application. These include petroleum and engineering geology as well as others which have evolved into sciences which, while using geology as a base, do not recognize it as the full parent. The

second factor is that these new fields overlap other technical disciplines which demand recognition of their separate characters and are often already regulated through registration. The presence of these two factors forces an immediate decision on the geologic profession as a whole. Essentially this decision is whether to apply regulation, internally or legally engendered, to the technical field. This question can be resolved through exploratory discussion of the fact of geologic diversification and that of technical infringement. In view of the writer's engineering geology background, this is most easily illustrated in this field. Here engineering geology overlaps with the civil engineering subfields of soils mechanics and structural engineering. Both possess technical knowledge of surface and subsurface construction requirements. Ignorance of geologic factors involved in design and construction is not always a deterrent factor to the resolution of geologic problems without recourse to geologic opinion. Additionally, even where geology is correctly understood and correctly applied, confirming geologic advice as to the correctness of techniques and implied engineering requirements often are bypassed as unnecessary. Engineering geology, then, is gradually being usurped. The reverse tendency is not true. The engineering fields involved are well organized. They recognize their prerogatives and are militant in their protection. Expansion under the magic umbrella of the term "professional engineer" is a constant theme and regulation through registration is a very strong arm in this accomplishment. To what body may the engineering geologist turn in seeking redress to a technical infraction in his professional field? There are none. His opposite number, the soils engineer, can and does refer "unethical procedures" to his local State registration board. This body can and does apply strong pressure

through technical and political means. Such action is assumed valid based on statewide control vested in legislative action on regulation of that technical field. In California for instance, civil engineering regulations allow full control over design and construction in all fields where "natural phenomena" are involved. For one, engineering geology needs legislative recognition and organization or time may eliminate the field per se.

In the practical application of fields of technical knowledge, regulation through registration is an effective acknowledgement of public recognition. Registration has come to be that which the bachelor of science degree was to the academic. Without such a formal acknowledgement of the status and importance of a technical field, an unregulated discipline will remain an undergraduate in the hard world of practicality.

#### NATIONAL SURVEY

In assessing the status of geologic registration, one simple answer would be to list those states already offering registration to the geologist. Of the nine states so classified, only one, Arizona, registers geologists as such. Oregon registers the applicant as an engineering geologist but only after he has taken two consecutive full-day examinations. The first, sadly enough, is the engineer-in-training examination. The second is in his chosen field of engineering geology. The other seven states offer certification as geological engineers. These are Nevada, Utah, Idaho, New Mexico, Oklahoma, Texas, and Kansas. Thus eight of the nine recognize geology only as it is applied to the field of engineering.

In gathering information from the remaining states, those offering no registration to the geologist in any category, a questionnaire was submitted to the respective state geologists. Questions were asked which were organized

to cover the fields of personal opinion, of existing opinion in the local technical organizations and in the legislative field. Of 39 states contacted, 31 answers (79%) were received.

Question 1: "Do you favor professional registration of geologists as a necessity or a desirability?" Pro - 17, Con - 9, Neutral or Mixed - 5.

Comment: An overwhelming majority of those answering favored registration outright. If those of mixed opinion and those not answering were to express themselves pro or con, and the average maintained, it would seem that a majority of our most prominent professional geologists favor legal registration.

Question 2: "What do you believe is the general attitude of the geologists within your area concerning registration?" Pro - 11, Con - 5, Mixed - 7, No statement - 8.

Comment: In general, no attempt is being made to accurately evaluate the opinion on registration of the mass of geologists. The "burning question" has not reached that level of investigation. Active consideration still remains local and individual.

Question 3: "What is the attitude, real or presumed, of those professions already registered toward registration of geologists?" Pro - 5, Con - 2, Mixed - 2, Neutral - 2, No statement - 20.

Comment: As in the prior inquiry, the mass question has not been asked. Before the technical professions already registered will respond to the status of the geological profession, we will have to carry the initiative to them. Individual areas have responded, both favorably and unfavorably, but the real proof is lacking.

Question 4: "Is there any active consideration being given in your state toward registration?" Yes - 8, No - 16, No statement - 7.

Comment: In view of the answers to questions 2 and 3, the positive answer is surprising. Those states with organizations actively pursuing geologic registration are California, Florida, Alabama, Idaho, Illinois, Washington, Georgia, and New Jersey.

Question 5: "Is there an organization of geologists in your state having membership requirements sufficiently stringent to be comparable to requirements for possible registration?--i.e., is there any attempt toward self-regulation of the profession in your state?" Yes - 6, No - 17, Mixed - 1, No statement - 11.

Comment: Though in the minority, a surprisingly large group (6 states) have geological organizations which have taken a strong stand in the field of self-regulation. Even more significant, such action has taken place in those areas where a relatively large population of practicing geologists exist. It would seem that where geologic practice is relatively heavy, geologists feel the need for technical regulation.

Question 6: "Is there any preference to registration by subdivisions of the practicing science?--i.e., engineering geologists, petroleum geologists, etc.?" Yes - 3, No - 16, No statement - 12.

Comment: While a small group have progressed to the point they feel strong, separate identity within their disciplines, the majority either do not favor the idea or have not considered it. This could be considered either as a mass opinion or a lack of opportunity of expression.

Question 7: "What do you believe is the attitude of your state

