

**XXXII. UNSOLVED GEOLOGICAL PROBLEMS IN  
OKLAHOMA IN 1925**

**By Chas. N. Gould, Oklahoma Geological Survey**

Thirty years ago Mr. Joseph A. Taff of the United States Geological Survey began work on the coal fields of Indian

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<sup>1</sup>Udden, J. A., The Rim Rock of the High Plains, Bull. Assoc. Pet. Geol., Vol. VII, 1923, p. 72-74.

Territory. Twenty-five years ago the writer founded the Department of Geology at the University of Oklahoma. For more than half the intervening time there were relatively few working geologists in Oklahoma but during the last decade the number has increased.

The exact number of geologists living in Oklahoma is unknown but there are somewhere around 300 names registered from this state on the rolls of American Association of Petroleum Geologists, and this of course does not represent the entire number of geologists in the state.

It might appear to the casual observer that 300 men, some of whom have been working for at least a decade, should have solved practically all the geological problems in the state:

As early as 1905, when E. G. Woodruff and I were the only working geologists in Oklahoma, in order to attempt to outline the magnitude of the subject I prepared a list of the problems to be solved in Oklahoma geology. So far as I know this list was never published and I am not now able to find it. It has probably been destroyed.

In an abstract of an article published in the Bulletin of the Geological Society of America in 1910, I cited the following ten unsolved problems in Oklahoma geology as of that date:

- Petrology of the igneous rocks;
- Paleontology of the Ordovician formations;
- Age of the Woodford chert;
- Relations of the Stanley and Jackfork formations;
- Age of the Cretaceous in western Oklahoma;
- Cause of the thickening of the Pennsylvanian sediments southward;
- Source of the Pennsylvanian and Permian;
- Origin of the iron in the red beds;
- Origin of gypsum;
- Origin of the sandhills.

After a quarter of a century of geologic work at the university it is perhaps time to take stock. What has the 25 years of work by a large number of men added to the solution of the geologic problems of the State? How much do we know now that we did not know ten, or fifteen, or twenty-five years ago? Let us take the list published in 1910.

The petrology of igneous rocks. Not solved. We know practically nothing about the subject.

The paleontology of the Ordovician formations. There has

been very little advance in fifteen years.

The age of the Woodford chert. It has been settled two or three times, but show signs of becoming unsettled again.

Relations of the Stanley-Jackfork formations. Honess' work has probably solved the problem.

Age of the Cretaceous in western Oklahoma. Little real work has been done and unless Clifton knows, no one does.

Cause of the thickening of the Pennsylvania sediments southward. What do we really know? We assume Llanoria, but what do we absolutely know?

Source of the Pennsylvanian and Permian sediments. What do we know? Did the Permian come from Llanoria, from the Arbuckle-Wichita range, or from the Ancestral Rockies, or from where?

Origin of the iron in the red beds? Again what do we know?

Origin of gypsum. Because no one has proposed a better theory we tacitly, and by common consent, accept the popular theory of evaporation of inland seas, but no one has proved it. Is it true, as one prominent American geologist believes, that all gypsum was originally anhydrite, and that our 123,000,000,000 tons of gypsum has been formed by the hydration of anhydrite?

Origin of the sandhills? Twenty years ago I postulated the theory that the sand in the sandhills north of our western Oklahoma rivers was of Tertiary origin, and represented the vanishing remnant of a former Tertiary blanket which once covered the plains. No one has ever proved this theory to be false, and I have never been able to prove it true; and there you are.

During the past three years, five papers have appeared, each of which has had a district bearing on some problem of Oklahoma geology, namely:

Honess, on the Ouachitas;

Morgan, Stonewall quadrangle;

Morgan, Franks conglomerate;

Goldston, on the Glenn;

Gould et al, southwestern Oklahoma Permian.

Goldston's paper is scarcely off the press, however, before Girty and Roundy procede to criticize him. The same issue of the Bulletin of America Association of Petroleum Geologists that carries my article on the red beds, also has one by Sawyer, giving a different correlation. Some of the Tulsa geologists say that Morgan is wrong in his correlation in the Stonewall region.

and there you are again. As soon as one of us really tries to make a contribution to the solution of a problem some other little boy comes along and knocks down our play house.

At any rate there yet remains plenty to be done, for instead of geological problems becoming fewer as the years come and go, they are really becoming more numerous. Whereas in 1910 I recorded ten known geological problems in Oklahoma awaiting solution, I can now think of more than fifty.

Let me cite a few of the many problems, in the geology of our State which, in the year 1925, have not been definitely solved, any one of which would serve as a master's thesis, and the greater number of which would be fit subjects for a doctor's thesis.

1. The granite basement.
2. Wichita Mountain pre-Cambrian quartzite.
3. Relation of the various granite flows in the Wichitas.
4. Spavinaw granite. Is it a dike or the top of a buried mountain?
5. Are the axes of the Wichita and Arbuckles in alignment?
6. Why are the Wichitas eroded more than Ouachitas?
7. Is there a Duncan arch?
8. Age of Caney, Jackfork, Morrow, Wapanucka?
9. Relation of the Cherokee to the Winslow, and to the Atoka-Hartshorne-McAlester-Boggy series.
10. Interrelation of northern and southern Oklahoma Pennsylvanian formations.
11. Western margin of the Pennsylvanian sea.
12. Western limit of coal.
13. Pennsylvania-Permian contact.
14. Is the Permian Permian, or is it Permo-Carboniferous?
15. Is there Permian in Oklahoma?
16. The relation of Wichita-Clear Fork to the Enid.
17. Subdivisions of the Enid.
18. The southeastern extension of Blaine formation.
19. What is the Verden? What is its relation to the Dog Creek and Whitehorse?
20. Correlation of the dolomite at Greenfield. Is it Day Creek?
21. Is the Day Creek continuous?
22. The cause of slumping in the upper Permian of western Oklahoma.
23. Uneven stratigraphy of Quartermaster. Is it slumping?
24. Is there Triassic in Oklahoma?

25. The age of the Texas county red beds? Is it Clou:  
Chief?
26. The origin of the Tertiary of the plains.
27. Is there structure in the Tertiary?
28. What is caliche? Is cap rock caliche?
29. Sandhills, Tertiary or Pleistocene?
30. What is the Gerty sand?
31. Was there glaciation in Oklahoma?
32. Physiographic cycles in Oklahoma.
33. Parallelism of Oklahoma rivers.
34. Why the Washita Gorge and Otter Creek Gorge?
35. Western extension of the axis of Anadarko Basin.
36. Location of the Kansas-Oklahoma synclinorium.
37. Why the three rows of faults in east-central Oklahoma?
38. Age of the lead and zinc of Ottawa County.
39. Zinc in the Arbuckles.
40. Is there potash in the Permian?
41. Is there phosphate in commercial quantities in the Permian?
42. Relation of gypsum, salt and potash in the red beds.
43. Investigation of salt brines.
44. Why sand barite crystals?
45. Why green polka dots and streaks in red beds?
46. Why concretionary gypsum?
47. Why sandstone concretions in the Permian?
48. Why any concretions?
49. Study of the caves in the Arbuckle limestone.
50. Study of the bat caves in the Blaine formation.
51. Bat caves in Ozarks.
52. Oklahoma's rare minerals: celestite, diamonds, manganese, nickel.
53. Origin of copper in the red beds.
54. Big problem—Origin of sediments, eg., Stanley-Jackfork, red beds.

When the origin of the sediments is known, many of the other problems will have been solved.