and the results, if they are not due to some obscure barometric effect which has escaped me, are most directly referable to changes of pressure within the atmosphere, the number of the colloidal nuclei specified being greatest when the pressure is least. This view, moreover, would not be incompatible with the persistence of terminal coronas referred to above. It is also compatible with the following. If among the initial nuclei entrapped (which lie very near the region of ions) the ions actually preponderate, the observations would then mean that increased ionization accompanies the falling barometer. Under these conditions, however, radioactive emanation is known to be withdrawn from the stagnant air within the porous ground and the earth generally. Hence the data could now be interpreted as evidence of the necessary fluctuation of such emanation with the barometer.

I may add that I have since installed a second apparatus side by side with the first and that the data, though differing in their details, show the same dependence on the barometer in their broader time variations.

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USE OF THE TERM PERMIAN IN AMERICAN GEOLOGY.

FOR over fifty years the Permian question has been one of the moot problems of American geology. Of late it has been quite generally agreed that the title should not, at least, be applied to any American formation having the taxonomic rank of period or system, coordinate with such terms as Carboniferous or Cretaceous.

Division is now upon the point whether the so-called Permian section as represented in Kansas should be called by Murchison's title and given the rank of series, or whether the name should not be abandoned altogether as a designation for any American formation.

Upon this point Professor Prosser has recently made a summary of opinion. Among the statements is this: "There is still a difference of opinion among American geologists in regard to the correlation of the Upper Paleozoic formations of Kansas with the Russian Permian. The *Journal of Geology*, published in 1898 'A Symposium on the Classification and Nomenclature of Geologic Time-divisions,' in which Dr. Williston, Professor Calvin and Dr. Keyes reported adversely both as to the identification of the Permian in Kansas and as to its recognition as a period coordinate with the Carboniferous or Devonian; while Dr. William B. Clark stated that for the later divisions of the Paleozoic he should employ the chronologic terms Carboniferous and Permian."

Professor Prosser further observes: "No one has, perhaps, insisted as strenuously as Dr. Keyes that the name Permian should be dropped from American geology. In 1897 he attended the sessions of the International Congress of Geologists at St. Petersburg and participated in the excursions to the Carboniferous and typical Permian of Russia. Later he prepared a paper on the 'American Homotaxial Equivalents of the Original Permian,' and quotations from this can not be regarded as from one favoring the retention of the name 'Permian.'"

It is quite manifest that Professor Prosser has objected to my usage of the title of 'Oklahoman series' for the so-called Lower Permian of Kansas. My repeated use of the term Oklahoman has been made advisedly. It had been thought quite desirable to have the title of this section distinctive, irrespective of what age might be eventually assigned to it.

The recent discovery in New Mexico and Texas of a great formation (Guadalupan series) having a thickness of more than 2,500 feet, that appears to be intercalated between the Carboniferous Red Beds (Cimarronian series) and the equivalent of the Oklahoman series, indicates that the Kansas section of the latest part of the Paleozoic is not nearly so complete as it was thought to be. It also suggests that in Kansas there are no formations below the Red Beds that can be considered of late Carboniferous age, or that might be paralleled with the Permian at all. This, it would seem, would almost put an end to the contention for a Permian age of such Kansas beds as the Neosho, Chase and Marion formations.

Tschernychew, who is one of the best au-

COMPARATIVE TABLE OF CARBONIFEROUS FORMATIONS.

	Age.	Mississippi Province.	Southwestern Province.	Ural Province.
Carboniferous	Late	Cimarronian Wanting?	Cimarronian Guadalupan	Tataran (Upper P.) L. and M. Permian
	Mid	Oklahoman Missourian Des Moines Arkansan	Maderan Manzanan Wanting Ladronesian	Artinsk Upper Carboniferous } Middle Carboniferous
	Early	Mississippian	Socorran	Lower Carboniferous

thorities on the Russian Permian formation, and who has visited the Kansas localities, places the Marion beds, which are immediately beneath the Red Beds, on a level with the Russian Artinsk terrane. Personal observations in both fields point strongly to the correctness of this correlation. The Artinsk formation is older than any terrane of the original Permian sequence. Girty, who quite recently has also rather critically examined the Guadalupan section in Trans-Pecos Texas, concludes that if this fauna is Permian then certainly that of Kansas is not.

It would seem then that our conceptions of the American Permian formations must undergo very radical changes. Our scheme of comparison with the original Permian section of Russia would then be about as in the table given above.

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QUOTATIONS.

PROFESSOR M'KENDRICK AND THE PROGRESS OF PHYSIOLOGY.

The valedictory address delivered by Professor J. G. M'Kendrick, at the close of the summer session of the University of Glasgow, on the occasion of his resignation of the professorship of physiology, provides a striking account of the progress of physiological science during the past thirty years. In 1861, when Professor M'Kendrick attended a course of lectures at Aberdeen, there was no attempt at demonstration except by diagrams and a few microscopes on a side-table. There were no experiments, and the only instrument displayed was a sphygmograph. But a little later Goodsir, of Edinburgh, brought from continental schools of physiology to the University of Edinburgh such instruments as myographs, kymographs, electrical appliances and other apparatus, and the teaching of practical physiology was soon firmly established under Argyll Robertson. Professor M'Kendrick himself installed similar teaching in the University of Glasgow in 1876, the date of his appointment to the chair of physiology. The requirements of modern physiological teaching are shown by a statement in the address that while Professor M'Kendrick has worked and taught for thirty years in five rooms, twenty-five are apportioned to physiological work in the new buildings. Reviewing the progress of physiology, Professor M'Kendrick detailed the advances made in histology and expressed the doubt whether much more progress can be expected. Graphic methods have been elaborated during the same period, and the action of electrical stimuli on muscle and nerve elaborately worked out. The study of the functions of living isolated organs, modern vivisectional methods, our knowledge of the nerve paths in the central nervous system, and the subject of internal secretions, are all among the triumphs of physiological science during the past thirty years, and were each passed in review. In conclusion, Professor M'Kendrick indicated physiological chemistry as the direction in which progress will be made during the next few decades.—*Nature.*

ASTRONOMICAL NOTES.

THE SYSTEM OF CASTOR.

Castor was one of the first close double stars known and one of those which led Sir William Herschel to the belief that such stars form real binary systems.