

any one who dared to erase the writing or add his own name. Whether Kudda defied such a curse cannot be learned,

Prof. Stephens said, because the end of the inscription is missing.

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bulk; and he feels that the sign in Carlsbad cavern, giving an age of sixty million years based on such a calculation, should be removed.

Dr. Gardner's theory of limestone cavern origin begins with the fact that they are all in thick limestone strata where they slope toward, and not away from, the rivers into which they drain, and the further fact that the lowest point in a cavern is always above the water level in the river. The limestone strata usually continue on the other side of the river, dipping deeper into the earth where they contain static water in porous beds—but never contain caverns below the river level.

According to his explanation the river valley, cutting ever deeper into the earth, has at some time in the past sliced through the sloping limestone strata. This permitted the water with which the stone was saturated to drain into the river, and also allowed a constant circulation of water down from the surface through the stone into the river.

Century after century this has gone on, and always the water flowing through the porous limestone has dissolved some of it and carried it away. Slowly at first, then more rapidly, the porosity of the rock has been changed to cavities, and these have enlarged and run together, forming the cavern.

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#### PATHOLOGY

### Another Sinus Causes Trouble, Surgeons Told

**A**NOTHER sinus, besides the ones already so well known for the suffering they cause, can contribute its share of aches and pains, Dr. Chester H. Bowers of Los Angeles reminded members of the American College of Surgeons.

This sinus is known as the sphenoid. It is located far back of the nose, approximately in the center of the skull, lying close to the brain and perhaps in intimate relationship with half of the cranial nerves and important blood vessels. It is usually not involved in disease, but it may be the hidden cause of many disagreeable symptoms.

Headache, reflex pain over a canine tooth, pain or continuous burning in the throat, pain in the back of the head or even in the ear are among the symptoms which may be traced to trouble with the sphenoid sinus. Involvement of this sinus may also interfere with vision because the optic nerve is separated from it by a very thin wall.

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#### ASTRONOMY

## Cloud of Island Universes Added to Known Space

**A**DENSE cloud of island universes, each of them similar to our own Milky Way, but so far out in space that they can be seen only with the most powerful telescopes, has been located near the southern constellation Horologium by Dr. Harlow Shapley, director of Harvard College Observatory.

Evidence of their existence first appeared in the largest existing catalogue of external galaxies tabulated during the past five years by Mrs. E. M. Lindsay of the Harvard astronomical staff. Almost all of the 7889 galaxies in the Horologium area contained in the catalogue were previously unknown, and quite understandably so, since nearly all of them are fainter than the fifteenth magnitude.

From a survey of the long-exposure photographs taken with the powerful Bruce telescope at Harvard's southern observatory at Bloemfontein, South Africa, from which the catalogue was made, Dr. Shapley has estimated that the metagalactic cloud is populated about twice as densely as space in general. Several denser concentrations or clusters of galaxies within the cloud, he has estimated, are populated as much as three times as thickly as average space.

#### Celestial Congestion

Just how thickly filled with galaxies this area is can better be understood from the fact that all of the 7889 galaxies recorded in the catalogue are in an area covering less than one per cent. of the total sky. This entire area, according to Dr. Shapley, is "a congested region," one which, by his definition, contains one or more galaxies for every five thousand trillion cubic light years.

The catalogue is part of a general program for the surveying of external galaxies in progress at Harvard, two others having been published during the past five years for other regions of the sky. In all of them celestial bodies are classified according to position, brightness, diameter, form and structure.

Previous to this catalogue for the

Horologium area, the largest ever made was the famous "New General Catalogue," published in Ireland 50 years ago, containing tabulations for about 7000 bodies. This earlier catalogue, however, contains almost exclusively objects brighter than the fifteenth magnitude and covers the entire sky, while the Harvard one is limited to a very small area and deals almost entirely with bodies fainter than this magnitude.

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#### GEOLOGY

### Famous Great Caverns May Be Younger Than Supposed

**M**AMMOTH cave, Carlsbad Cavern and other subterranean wonder-places do not need to have their ages estimated in millions of years. Some scores of thousands of years will suffice, in the opinion of Dr. James H. Gardner, oil geologist of Tulsa, Okla.

In a communication to the Geological Society of America, Dr. Gardner advances reasons for believing that most of the great limestone caverns have been formed since the Ice Age, and he offers a new theory to explain their origin.

The age of a cavern can not be accurately estimated on the basis of its stalactitic formations, Dr. Gardner contends. Stalactites, and stalagmites that pile up under their dripping points, are necessarily younger than the caverns in which they form, he points out. They may have started much later.

Stalactites often show in cross-section series of rings like the annual growth-rings of trees. This suggests that they have had alternating cycles of faster and slower formation, depending on the rate of flow and acid content of the water that forms them; but whether these rings represent years, with rainy-season abundance and dry-season scarcity, or whether they represent longer climatic cycles, Dr. Gardner will not venture to state dogmatically.

In any case, however, he declares, it is misleading to estimate age of drip-stone formations simply from their