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THE FELS PLANETARIUM

ON a sheet metal dome, 65 feet in diameter and perforated with millions of small holes, it will soon be possible to see reproduced the starry skies as they appear from any part of the earth at any time.

America's second optical planetarium opens about the middle of October as part of the Benjamin Franklin Memorial and the Franklin Institute, whose $4,000,000 building is nearing completion at a location close to the city's center. The planetarium, made by the Carl Zeiss optical works in Jena, Germany, is the donation of Samuel S. Fels. It will be known as the Fels Planetarium. The building will house also a technical museum similar in scope to the famous Deutsches Museum in Munich. The museum will open at a later date, probably in December.

Eighteen planetaria are now in operation in European cities. The Adler Planetarium, opened in Chicago three years ago, was the first in the United States. Planetaria have also been assured for Los Angeles and New York.

The projection device, the part of the apparatus imported from Germany, is a glorified stereopticon, and stands in the center of the hemispherical dome. Through 119 separate lenses, images of all the naked-eye stars and planets, as well as the sun and moon, are projected on the dome's white inner surface, where they are seen by the audience, seated below around the instrument. The entire machine is controlled by the lecturer through a complicated switchboard. A number of motors cause the various objects to move in their proper orbits, but at greatly accelerated speeds. It is also possible to show the sky of the southern hemisphere, picturing stars which never can be seen from the United States.

The Fels Planetarium will be the first to have a truly hemispherical dome. Previous planetaria projection surfaces were made of stretched cloth, forming a series of flat figures. In Chicago's Adler Planetarium the cloth is stretched from a series of wooden rings, so that the dome consists of zones, one above another, and each forming the frustum of a cone. The Philadelphia dome is made of sheets of stainless steel, each one formed to the proper curvature before erection. Each sheet is welded to its neighbors.

As a solid metal dome would produce objectionable echoes, the steel sheets are perforated with millions of holes, one sixteenth of an inch in diameter, and an eighth of an inch apart. Tests made by acoustic experts have shown that sound passes through such perforated metal as readily as through stretched cloth. The walls behind the dome are covered with sound-absorbing pads, so that the voice of the lecturer will not be reflected, and the effect will be the same as if he were speaking on an open plain at night. With most of the other planetaria echoes are avoided by a series of steel baffle plates hung behind the cloth dome. These reflect the sound in many directions, but do not absorb it. To keep the dome clean and the audience comfortable, all air supplied to the chamber will be cleaned and conditioned.

The astronomical section of the Franklin Institute Museum will include a public observatory, with two large telescopes, a reflector with a mirror 24 inches in diameter and a refractor with a lens 10 inches in diameter, as well as numerous models, astronomical photographs shown as transparencies, and historic instruments.

RESTORATION OF A HORNED DINOSAUR AT YALE UNIVERSITY

BEAKED like a tortoise, horned like a rhinoceros, its muscles and skin skillfully restored by anatomists, a twenty-foot dinosaur has just been placed on exhibition in the Peabody Museum of Natural History at Yale University. The monster is of the genus known to paleontologists as Monoclonius, and it lived a hundred million years ago, more or less, in the Cretaceous age.

The skeleton around which the restoration has been built was collected in the Red Deer region of Alberta, Canada, by Barnum Brown, of the American Museum of Natural History, and was purchased by the Peabody Museum. Almost all the bones were recovered.

When the skeleton was assembled at the Peabody Museum it was placed in a walking posture, its feet set to match certain three-toed dinosaur tracks on slabs of rock in the region where it was found; these tracks may possibly have been made by the same or a similar species.

The restoration of flesh and skin was undertaken for one side only, leaving the bony framework visible from the other side. The mount thus gives a graphic illustration of how scientists reconstruct the probable living appearance of a long-extinct animal.

Each muscle was modeled separately in plasteline, thus building up the entire contour of the head, body, limbs and tail. Part of a Monoclonius skin has been recovered, and is now in the American Museum of Natural History. Using this as a pattern, a mould was prepared, showing the studding of small bony plates that apparently gave the creature a partial armoring. Into this the plastic materials for the skin were pressed. After the restored skin was mounted on the specimen, the whole creature was painted a sort of general "reptile color," following the hues of animals of that class living to-day, but without imitating any particular one of them.

Monoclonius, in spite of his formidable appearance, was a vegetarian and probably not at all fierce. The wide frill that projected from the edge of his skull over the back of his neck afforded that vital region some protection, and possibly his forward-projecting horn could be used as a defensive weapon. There were four additional horn-like appendages to the bony skull-frill, whose usefulness, if any, has not been determined.

THE STRATOSPHERE ASCENT FROM CHICAGO

WHEN the stratosphere balloon takes off sometime this month for its flight into the unknown upper reaches of

the atmosphere, no one will know just where it will come down.

The balloon will take off in conventional fashion from the grounds of the Century of Progress Exposition, but it may come down in one of the Great Lakes, in some cotton field of Tennessee, or even in the Atlantic Ocean. Lieutenant-commander T. G. W. Settle, U. S. N., the pilot who will take the craft up in an attempt to reach a record altitude, will be able to predict at the time of his ascent the general direction in which his descent will be made, and he expects to land within 300 miles of Chicago if all conditions are favorable, but more than that no one can know.

The steering of a balloon is quite a different matter from the guiding of an airplane or dirigible. The balloon must travel wherever the currents of air carry it. When balloons are taking part in a race and attempting to reach a particular destination in the shortest possible time, the pilot watches the winds very carefully. Usually the direction and speed of the wind differs greatly at different altitudes, so that by selecting carefully the altitude at which he travels he can have some control over both direction and speed of the balloon. In case the winds for a time are unfavorable at all practical altitudes, he would select that layer having the lowest wind velocity, so that at least he would not be losing ground too fast.

But in the stratosphere ascent, the problem is quite different from that of the racer. The destination and speed are unimportant. The only purpose is to go up as far as man can go. All sorts of winds may be encountered before the ceiling is reached.

Lieutenant-commander Settle plans, however, to wait for wind currents which are mainly in a southeast direction with a low velocity. It is probable, therefore, that he will come down somewhere southeast of Chicago, and not too far away. The balloon is prepared to land on either land or water.

He will also wait for favorable weather conditions, so that there will be a minimum of danger from downward vertical currents or striking by lightning. He will also wait until there is no rain to freeze on the gondola and thus add weight to the craft. The condensing of moisture on the outside of the ship is not anticipated because no attempt to go up will be made when the air at lower altitudes is not clear. The moisture in the very high cirrus clouds, those wispy, "mare's tails" which are seen on clear days, is already frozen in hard ice particles, and will bounce off the surface of the ship's sphere, leaving it free. So far as the depositing of moisture on the interior surface and its consequent freezing is concerned, apparatus carried is expected to keep the humidity below the precipitation point.

METHYLENE BLUE AND CYANIDE POISONING

METHYLENE blue as an antidote for cyanide or carbon monoxide poisoning is now the subject of a heated controversy.

The blue dye received its first trial as a poison antidote in California. Several cases in which the treatment has been successful have been reported from San Francisco and elsewhere. Its use became routine in the Emergency Hospitals of the San Francisco Health Department for cases in which the patients were brought in apparently dying from the effects of one or the other of these two deadly poisons.

Strenuous objection to this use of the dye has been brought forward by other investigators within the last few months. Statements were made that the blue dye, instead of saving lives of carbon monoxide victims, might actually hasten death and that its use was at least decidedly limited in cases of cyanide poisoning. Experiments supporting these statements have been reported in scientific literature, as well as experiments supporting the value of the dye as an antidote for cyanide and carbon monoxide.

For a time the use of the dye was suspended by the Emergency Hospitals Service of the San Francisco Health Department. As a result of further consultation and clinical experience, however, the treatment has been resumed. In carbon monoxide poisoning the dye is used in addition to the standard methods of treating this condition. No deaths from the use of the dye in treating the two types of poison cases appear to have been reported, while there have been several instances in which lives have been saved.

The methylene blue treatment was the subject of a minor controversy earlier in its history. This centered over whether or not proper recognition had been given the first use in animals and for the first suggestion of its use in man in such poisoning cases.

STANDARDIZATION OF ERGOT

THE official standards for ergot and fluid extract of ergot, a drug once widely used in childbirth, have been revised. The new standards and methods of testing the drug have been announced by Dr. E. Fullerton Cook, of Philadelphia, chairman of the Committee of Revision of the U. S. Pharmacopoeia. The Pharmacopoeia is the legal standard for drugs and medicines in the United States.

The purity of the fluid extract of ergot marketed in this country was questioned several years ago by Howard W. Ambruster, New York importer, and became the subject of intense controversy and a congressional investigation. It is understood that Ambruster's charges, however, have nothing to do with the present revision.

Dr. M. I. Smith, pharmacologist of the U. S. National Institute of Health in Washington, devised a new standard for the drug and a method of standardization. The standard proposed by Dr. Smith is the same as the one being adopted by the Pharmacopoeia, though the new official method for making a drug that meets this standard is not the method he devised.

Physicians, pharmacologists and pharmacists have recognized for some time that the fluid extract of ergot, as manufactured commercially, was not up to standard. Believing that for this reason the drug might endanger the lives of mothers and new-born babies, many physicians stopped using the drug in confinement cases.

The new standards, which are expected to bring about

a more uniform and safer product, are merely part of the revisions which are constantly being made in the U. S. Pharmacopoeia to keep it abreast of the latest scientific developments. The entire book is revised once every ten years, and revisions such as the one for ergot are issued in the intervening years.

MEN OF THE OLD STONE AGE IN GERMANY

LIONS were among the beasts at which hunters of the Old Stone Age in Germany cast their spears. Evidence to this effect, in the shape of a fine skull of a lion, has been found at what seems to have been a hunting-place of Ice Age date near Wallertheim in the Rhine region. The discoverers, Professor Otto Schmidtgen, director of the Mainz Museum of Natural History, and Dr. Wilhelm Wagner, of the Darmstadt Geological Institute, have been conducting a systematic search for evidences of paleolithic populations in the Rhineland.

The hunting-place where the lion skull was found seems to have been a water-hole where the animals came to drink, and where consequently their shaggy hunters could lurk among the bushes with fair hopes of spearing a dinner. Tools of both stone and bone were discovered here, the latter a great rarity among Old Stone Age artifacts. The tools so far found are of such rough shape that their discoverers doubt whether they were the actual hunting weapons. They think it more likely that the hunters flung spears of pointed, possibly fire-hardened, wood.

Professor E. Wahle, of Heidelberg, has expressed the opinion that the Rhineland will eventually provide data for the study of ancient man that will rival if not surpass in value the information yielded by the famous pictured caves in France. The cave-dwelling men of France, he pointed out, lived for many successive generations and culture levels in the same caverns, so that there is no clear separation of their remains into distinct strata. On the other hand, the Rhineland hunters were dwellers in the open, and layers of earth accumulated between successive occupations of a site by different groups, which will make possible a study of their time-relations by the well-known geologic method of stratigraphy. The separation of different groups of human occupants in the Rhine Valley is sharpened by the fact that during the Ice Age there were several advances and retreats of the glacial front, with corresponding retreats of the human population and their later returns to the forgotten and buried camp sites.

ITEMS

MAN'S ever-present enemies, the crop-damaging insects, are attacking on many fronts as the year warms into the summer that is their most favorable season. Recent surveys by the U. S. Bureau of Entomology show that even at their present low values, the farmers' crops will pay heavy tribute to these alien enemies again this year. An extension of front is reported in the Mexican bean beetle sector. The beetles have been discovered at Monticello, Florida, and in southern Mississippi. This is the first southward extension of their holdings since their first discovery in northern Alabama in 1919. Among enemies of cereal crops, the chinch bug and the corn ear worm figure prominently; fruit aphids and plum curculio are raiding orchards, while the messy webs of the tent caterpillar are disfiguring roadside trees all the way from Maine to Maryland.

ACCUMULATING reports reveal that the past winter brought the worst damage in years to the Atlantic coast. Numerous buildings and shore structures were battered into a state of wreckage by stormy waves. Abnormal amounts of soil were stolen from the shore line by the sea. The damage is laid to a succession of extreme storm tides such as occur every 25 to 30 years. In intervening years it is the usual thing for damage to the coast to total millions of dollars, but in years of storm tides the losses pyramid. In editorial comment on this serious property loss, *The Engineering News-Record* calls upon coast states to take defensive action. Local protective measures against storms and tides are of little effect, it is pointed out, because resistance of any one section of the shore line is interwoven with the resistance of adjoining sections.

A METHOD of adding copper and iron salts and manganese to milk has been developed at the University of Wisconsin by Professor E. B. Hart and associates. This new treatment makes milk more nearly a perfect food on which man or other animals could live exclusively. Despite its tremendous food value, it was found several years ago that milk could not be relied on as a sole source of nourishment. Animals fed solely on milk died of anemia. Professor Hart and associates were among the first to discover that this was because milk was deficient in copper and iron salts, necessary for production of hemoglobin. Manganese has recently been found a necessary element of diet also. The effect of the milk which has been mineralized by Professor Hart's new process has been tested on experimental animals and on one of the students at the university. This young man lived for two months on a diet of this mineralized milk. He did not lose weight and he never complained of hunger. Yorkshire pigs kept on an exclusive diet of this milk and cod-liver oil for four and one half months averaged the same weight at the end of the period as pigs fed the usual full diet.

GERMAN physiologists have worked out an ingenious method for estimating the velocity of blood circulation, which depends on the peculiar light reaction of the dye-stuff fluorescein. The presence of this dye in the blood is indicated by a greenish color of the lips, viewed under pure blue light in a darkened room. In making a test, a small amount of fluorescein solution is injected into the blood stream, and the number of seconds it takes until the lips shine with the greenish light are noted. The method is being used in the study of various circulatory and cardiac disorders, and also in research on the physiological effects of sports. The minimum circulation time thus far observed has been seven seconds; an average circulation time is approximately twenty-one seconds.