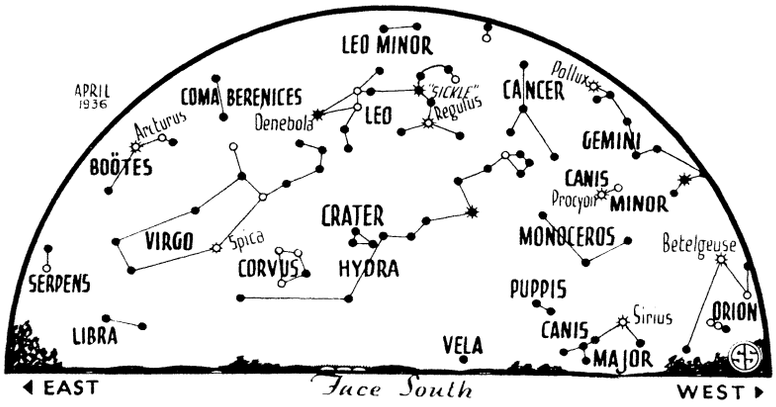

BIG AND LITTLE

Many of the celestial animals appear in twos—Major and Minor. Canis, the dog, and Leo, the lion are two of these

in parts of the sky containing no very bright stars.

Telescope Changed Maps

Since the ancients had nothing but their unaided vision with which to study the stars, these spaces were left blank, but after the telescope came into use, beginning in 1610, fainter stars were seen. Then, in the year 1685, a Polish astronomer named Hevelius published a book of star maps in which he introduced several new constellations. One of these was Canes Venatici, the hunting dogs, which is inside the curve of the handle of the great dipper. Another, Leo Minor, is above Leo, at the zenith for the times of the maps. The lynx was another; this is between Auriga and Ursa Major. The others were Sextans, the sextant; Lacerta, the lizard; Scutum, the shield, and Cerberus, which Hercules was holding. Only the last has not been retained to modern times.

Other constellations were added when astronomers began to visit the southern hemisphere and to observe stars that never rise for Europeans. Telescopium, the telescope; Fornax, the furnace; Octans, the octant; Pictor, the painter's easel, and Horologium, the clock, are some that date back to this period.

Thus our constellations have arisen from a number of sources. The modern astronomer, of course, pays no attention to the figures which they were supposed to represent, but regards them simply as areas, using the old names to designate them. Of course, the entire arrangement is a very unscientific one, and if it were being done over, a much more convenient system could doubtless be evolved. About a century ago there actually was an effort made to alter them. In his "Outlines of Astronomy," first published in 1849, Sir John Herschel, the famous son of an even more eminent father, expressed his opinion in no uncertain terms.

"Of course we do not here speak of those uncouth figures and outlines of men and monsters, which are usually scribbled over celestial globes and maps, and serve, in a rude and barbarous way, to enable us to talk of groups of stars, or districts in the heavens, by names which, though absurd or puerile in their origin, have obtained a currency from which it would be difficult to dislodge them," he wrote.

"This disregard is neither supercilious nor causeless. The constellations seem to have been almost purposely named and delineated to cause as much confusion and inconvenience as possible. Innumerable snakes twine through long and contorted areas of the heavens, where no memory can follow them: bears, lions and fishes, large and small, northern and southern, confuse all nomenclature. A better system of constellations might have been a material help as an artificial memory."

Old Names Permanent

But despite this opinion, which was and is entirely justified, the old names have been retained, and seem entirely permanent. A few years ago, however, a commission of the International Astronomical Union corrected part of the confusion. Before that, there had been no universal agreement as to the boundaries of the constellations. In 1930 the report of the commission was published. Eighty-eight were officially recognized, and their borders were made straight lines, running either east and west or north and south. There is thus no longer any ambiguity as to what constellation any particular star is in.

Phases of the Moon: full moon, April 6, 5:46 p. m. Eastern Standard Time; last quarter, April 14, 4:21 p. m., Eastern Standard Time; new moon, April 21, 7:32 a. m., Eastern Standard Time; first quarter, April 28, 6:16 a. m., Eastern Standard Time. Moon in apogee (farthest from Earth) April 6, distance —252,500 miles. Moon in perigee (nearest Earth) April 15, distance—222,400 miles.

Science News Letter, March 28, 1936

PHYSICS

Einstein Stresses Faith As the Basis of Science

By DR. W. E. DANFORTH, Bartol Research Foundation

WHEN grandfather is able to lay his hands on his reading glasses without organizing a general search of the house, when father remembers a wedding anniversary without a subtle hint or two from mother, and in numerous other instances of people behaving as they are supposed to, their associates show symptoms of surprise.

That we should likewise be surprised when the physical world behaves as it is supposed to is implied in an article by Dr. Einstein. (*Journal of the Franklin Institute*, March).

"The eternal mystery of the world is its comprehensibility," according to Dr. Einstein. The article in which he says this has been translated from the German by Dr. Jean Piccard, noted scientist and stratosphere balloonist.

Einstein was speaking, of course, not of everyday objects, but of the fact that laws of nature can be summarized by means of a few mathematical equations, and that these equations are always obeyed.

But the laws for which physicists write equations are also the laws which govern every day occurrences, the rising of the sun, the flow of water, and so forth. It is therefore but a short step from Einstein's statement to the idea that it is indeed wonderful that gasoline should burn tomorrow as it does today, that iron should continue to be attracted to a magnet.

All a matter of faith, and how lucky we are that the world is so dependable!

In the layman's view the seat of science is the laboratory. Mention that a scientist is seeking a hidden fundamental secret, and most of us will at once envision test tubes, microscopes, and huge vacuum tubes. But Dr. Einstein wishes to emphasize another phase of the mat-

ter. The really fundamental principles cannot be found in the laboratory, or, to quote him exactly, "cannot be obtained through distillation by any inductive method from the experiences lived through, but which can only be attained by free invention."

The basic laws are inventions of man's mind.

A scientist watches his apparatus perform, and then, very likely when he is least expecting it, his mind acts. A law appears which harmonizes all of the laboratory phenomena.

The science of thermodynamics is cited as an example of this. For centuries inventors have struggled to devise perpetual motion machines. All failed. And then came the brilliant flash in someone's mind.

Maybe perpetual motion is fundamentally impossible!

A simple idea? Yes, but it occurred in the mind of a genius who founded upon it the science of thermodynamics, the basic science of steam engines and electrical refrigerators.

Science News Letter, March 28, 1936

ARCHAEOLOGY

Earliest Psalm Inscribed On Clay Tablet From Syria

EARLIEST of all known psalms, is a cuneiform inscription which has puzzled scientists since the discovery of the clay tablet several years ago at Ras Shamra in North Syria. This was disclosed when Dr. Julian J. Obermann, professor of Semitic Languages at Yale University, presented the results of his work with the tablet to the Semitic and Biblical Club.

The inscription establishes the source of Hebrew psalmody which students of the Bible have sought for years in remote centers of influence such as Babylonia and Egypt. The origin of the literary expression of Hebrew prayer is traced "next door" to Palestine, Prof. Obermann stated.

Language of the tablet is that of the Canaanites, who possessed a flourishing literature about 1500 B.C. This was near the time when, according to tradition, Moses first molded into being the national religion of the Hebrews. Ancient literature of the Canaanites is being brought to light increasingly by excavations at Ras Shamra.

Puzzling at first as to its form, purpose and meaning, the text of the tablet may now be said to represent a transcription of an oral liturgy that served to accompany public worship at the great temple exhumed at the site of Ras Shamra, Prof. Obermann stated.

"Except for the fact that the cuneiform psalm is to the deity El, we would look for its identification in the prayer book of the Bible," he said. "In fact we would mistake the text both by its form, context and style for a Hebrew psalm if, instead of El, we would substitute Elohim and Jehovah. In this tablet we find in primitive form, antedating Hebrew psalmody for nearly a thousand years, all the characteristics of Biblical prayer text which the modern students of the Old Testament have endeavored to establish by methods of analysis and deduction."

Psalm Had Rhythm

It was by observing that each phrase of the psalm was accompanied by an antiphonal response that Prof. Obermann was enabled to recognize the form and purpose of the inscription.

"Recital and response are each time so construed as to parallel one another in expression, forming together a most effective kind of primitive rhythm," Prof. Obermann said. "In all probability the art of developing euphonic stanzas by means of metrical balance and the dramatic vehemence of expression by means of close parallelism of each utterance had already been established in the literature of which the tablet is evidence. In Biblical psalmody, too, it is parallelism of expression and metrical balance of rhythm that have been found to be its most characteristic peculiarities.

"To have these peculiarities recur in cuneiform script in a center of worship in Canaan itself all but revolutionizes the concepts hitherto held in respect to the development of the liturgical writings of the Hebrews.

"Roughly speaking, the psalm on the tablet as a whole falls into three sections: ritual, supplicatory, and hymnal. The hymnal section is comparable to the Hallelujah litanies in the annals of our own church."

Science News Letter, March 28, 1936

PHYSICS-PSYCHOLOGY

Colors Mean More to Women Than to Men

By CHARLES BITTINGER, Artist and Physicist, Washington, D. C.

WOMEN are much more interested in color than men are.

Of course, women have more scope for applying color, since they go in for make-up and for rainbow-colored clothes, and since women generally have a good deal to say about decoration of the home.

There is a physiological reason, besides. Women are rarely color blind. In fact, color blindness is ten times more common among men than among women. Women may be carriers of color blindness, perfectly capable of telling red from green and blue from yellow, and yet conveying to their male children some type of visual defect that prevents the boy from seeing all colors in their true light.

It is not remarkable that women often complain of difficulty in matching colors. The dye vats of the color industry turn out thousands of tints and shades of each color, and I have been told that it is theoretically possible to have approximately two million colors. At least, the eye is supposed to be able to detect a difference of hue, saturation, and brightness in two million colors.

Some people can carry colors in their minds with unusual success, but never to the degree of accuracy that a sound can be carried. A singer can produce what is called perfect pitch. That cannot be done in our minds with colors.

Light Changes "Match"

There is a popular belief that if colors match in daylight they will match at all times. But, in reality, two colors that match in daylight may be glaringly different under ordinary electric light, which ordinarily contains a good deal of yellow or orange.

Matching colors in different materials—a green ribbon bow to a green velvet frock, for instance—is often difficult, because the materials differ in a surface quality, which a physicist would call the specular reflection.

It amounts to this: Textiles that are flat or deep piled, dull or shiny, catch the light differently. Velvet contains thousands of little pockets that trap the light and prevent it from being reflected. So even though two kinds of textile are green, dipped in the same dye, this