Ankylosaurian dinosaurs are to be seen, but several remains of sauropods were found—some of gigantic size. Now as the Mesaverde and Judith River formations are fairly high up in the Cretaceous series it is determined that in the south, at least, climatic conditions of Jurassic times persisted well up into the upper part of the Cretaceous age, so that sauropods definitely extended through the Morrison Jurassic well up into Cretaceous times. It is our opinion that they did not exist to the very close of the Cretaceous as represented by Lance and Hell Creek times.

There is no doubt that the Glen Rose formation of Texas is Lower Cretaceous in age and in this formation we have found the first sauropod dinosaur footprints known. These tracks, of which there are several hundred, show distinctly that there were no claws on the front feet but they were unquestionably made by sauropod dinosaurs, probably an unnamed species, some of which are as large and larger than *Brontosaurus*. Similar tracks of the same character were found in Bandera County, Texas, and they have been found also in the Panhandle of Oklahoma. It is unfortunate that the article describing these tracks infers that they were made by a *Brontosaurus*. One of the characters distinguishing the genus *Apatosaurus* (*Brontosaurus*) is a single large claw on the first digit of the front feet. No tracks of *Brontosaurus* are known, but the Glen Rose tracks were definitely made by a sauropod dinosaur closely related to and of the same size as the mounted *Brontosaurus* in the American Museum and it is proposed to place a series of these tracks under the mounted skeleton in order to show the size and stride of the feet of a similar living animal.

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WESTWARD SPREAD OF EASTERN TYPE EQUINE ENCEPHALOMYELITIS VIRUS

ON the North American continent, two types of immunologically distinct viruses of equine encephalomyelitis have been recognized, Eastern type and Western type. The areas in which these virus types have been isolated have had a sharp line of demarcation defining their boundaries in the Appalachian chain of mountains. Until 1939, these limits were without exception, but in that year a few cases of both types were isolated in the state of Alabama.

On April 29, 1941, portions of a horse brain from a civilian owned animal were received by the Veterinary School, Army Medical Center, Washington, D. C., from Colonel Clifford O. Whitney, V.C., of Fort Brown, Brownsville, Texas. The specimen originated from that area southeast of Brownsville, Texas, bordering on the Gulf of Mexico and known as the "Boca Chica flats." Sixty horses had recently been reported in this area as having died of suspected encephalomyelitis.

Accordingly, 0.1 cc of a 1–500 dilution of an emulsion of portions of the cerebrum and hippocampus from the specimen were inoculated intracerebrally into 3 normal guinea pigs. Within 72 hours all three had developed typical symptoms of encephalomyelitis, one died and two were destroyed while moribund in order to recover their brains.

A 1–500 dilution of an emulsion of portions of these 2 brains was then inoculated intracerebrally in 0.1 cc amounts into 3 groups of guinea pigs, one group immunized against the Western type virus, the second group immunized against the Eastern type and a third group of normal control animals.

The animals belonging to the Western immune type and the normal controls succumbed within less than 72 hours with typical encephalomyelitis symptoms, while the animals of the Eastern immune type remained normal.

Since the Western immune type guinea pigs were affected while the Eastern remained normal, this combined with the short incubation period (3 days instead of the usual 4 days for Western type virus) are certainly indicative of an Eastern type of encephalomyelitis virus.

From the foregoing, it would seem that the geographical limitation of the virus entities has now been broken down.

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THE "MEANING" OF SCIENCE

IT is well for every worker in science to sometimes attempt to set up for himself his concept of the broad field of his interest. I was stimulated to such inquiry by the recent statement of L. K. Frank that there is need for definition of the "meaning" of science.

Subjectively, and from the point of view of the intension of the term: Science is the data of the relations between things; between states; and between events: and of the relations between things, states and events.

Inherent in the term "things" are qualities. Inherent in the term "states" are modes and conditions of being. Inherent in the term "events" are those happenings which occupy a restricted portion of four-dimensional space-time.

There is no need to introduce the term "ordered" as a qualifier of relations since the sense of order is inherent in relation.

If by "meaning" one wishes to mean intent, pur-

pose, aim or object, then the definition slides toward objectivity and becomes:

Science is the accumulation of data on the relations between things; between states; and between events: and on relations between things, states and events.

If one wishes to introduce the pragmatic element, the definition becomes still more objective and is:

Science is the accumulation and application of data on the relations between things; between states; and between events: and on relations between things, states and events.

And finally if one wishes to be both pragmatic and humanistic the definition becomes completely subjective and is:

Science is the accumulation and application of data on the relations between things; between states; and between events: and on relations between things, states and events, for the benefit of mankind.

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SCIENTIFIC BOOKS

ALGEBRAIC THEORIES

Introduction to Algebraic Theories. By A. ADRIAN ALBERT. viii + 137 pp.; index. Chicago: The University of Chicago Press. 1941. $1.75.

DOUBTLESS the greatest hurdle which a student of mathematics in the United States has to take is the adjustment between undergraduate and graduate work. The amateur student has been replaced by the professional, drill in mechanical skills has been replaced by rigorous thinking, and the attitude that "the proof of this theorem is too hard for us so we shall assume it without proof" is gone forever.

The traditional courses of the senior and first graduate years are critical in the development of a mathematician. It is at this point that keen interest and ambition should be aroused in the student of ability. If uninspired teaching causes him to become bored, he will transfer his interest to another branch of learning. On the other hand, it is only just to a mediocre student to allow him to find out at this point that he will not make a satisfactory graduate student. A mere drill course will not satisfactorily test his abilities.

Elementary courses are best taught from texts, of which there are enough for every taste. Graduate courses are seldom taught from a single text, for the interests of the professor as well as the subject itself are in constant flux. But how are these transitional courses, the "senior" courses, to be handled? Frequently the instructor is not a specialist in the subject, and more frequently he has not the time to work up an adequate set of notes. A good text seems indicated.

But a satisfactory text for a senior course must be more than a rehash of a dozen earlier books. It must be an introduction to modern mathematics. The author must be acquainted with present-day research and he must be able to present his subject in a modern manner, for otherwise the course will not be an introduction to graduate mathematics. A text which is not modern in content and terminology just won't do.

The book under review successfully meets the necessary conditions set forth above. It is specifically designed to serve as an introduction to the author's "Modern Higher Algebra" (which is distinctly a book for graduate students) but can be used effectively by seniors and graduate students who merely wish to know something about matrices.

The book is in two quite distinct parts. The first 108 pages constitute an introduction to the theory of matrices. The usual topics are considered, rectangular matrices and elementary transformations, equivalence of matrices and of forms, linear spaces and polynomials with matric coefficients. The method of elementary transformations is used wherever possible, even in the proof that the determinant of a product of two square matrices is equal to the product of their determinants. The treatment of determinants is sketchy, for the student is assumed to know how to handle them, but it is lucid and in the modern manner, and should help in dispersing some of the fog emanating from the traditional treatment of determinants. Bilinear and quadratic forms are briefly treated without reference to projective geometry. Linear spaces rationalize the subject of similarity of matrices. Invariant factors and elementary divisors, without which matric theory is not matric theory, are treated in Chapter V.

Even though the author states that the book is written for juniors and seniors, it seems to be on the graduate-student side of the fence. It is a fairly solid and comprehensive treatise on the algebra of matrices with no by-lanes or diversions. There is very little motivation for the material, very little to enlighten a student regarding the significance of quadratic forms or similarity of matrices, for instance. There are many new problems in the book, and these will be welcomed by all who teach the subject, but they are mostly drill problems which help not at all in rationalizing the subject to an undergraduate. This means that the text must be administered by an understanding teacher. At various places in the text are to be found summaries of further results not treated in detail. Teachers hold