down almost to an even 13 years for those born in 1918. This march toward ever earlier menarchial age seems to be a world-wide phenomenon no longer subject to question.

The earlier development of menstrual functions has been accompanied by a steady and marked improvement in growth and adult stature, an improvement found in practically every population mass for which growth statistics have been examined in recent years. In animals, also, it has been pretty well established that the time of onset of sexual functions is determined more by the stage of physical development than by chronologic age. More rapid growth in animals, as in girls, is associated with earlier onset of sexual functions.[5, 6, 7, 8] The change in menarchial age so universally observed in many countries and races may therefore well be regarded as only one phase of the general world-wide quickening and improvement in the physical development of man.

In the light of this more general view of the facts available, would it not perhaps be better to place more reliance on the observations of MacDairmid and Cook, even though they are unsupported by actual statistics? It may be that the menarchial age for these Eskimos did change from nineteen down to fifteen and a half years during the last half century. Such would be an 18 per cent. reduction, as against the 11 per cent. witnessed in Germany up to 1920.

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ERYTHROCYTES OF SLOTH

IN a recent article appearing in SCIENCE,[1] entitled "Elliptical Erythrocytes," Dr. M. C. Terry has expressed hope "that some one who is in a position to do so will tell us who is right about the erythrocytes of the sloth." The point in question concerns the actual shape of the erythrocytes.

During the past year while a research fellow in the laboratory of histology under Dr. H. E. Jordan, we had an opportunity to study the blood elements of the two-toed Panamanian sloth (*Choloepus hoffmanni*). A number of these animals had been secured and transported to Virginia for study by Dr. S. W. Britton, who in turn furnished us with material for future investigations.

Study of freshly drawn blood, blood smears and bone marrow smears has reassured us that Jordan was correct in his statement that "among mammals the shape of the red blood corpuscles is uniformly that of a circular biconcave disk, except in the Camelidae, where these elements have an elliptical shape." In smear preparations of blood, as well as in stained sections of various tissues of the sloth, erythrocytes are frequently distorted, while many of the less distorted ones present an elliptical shape. In blood smears of both the cat and rat, similarly distorted erythrocytes having an elliptical shape are frequently observed. Any deviation from the circular shape of red blood corpuscles among these animals, as observed in prepared material, is unquestionably due to external factors.

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SCIENCE IN THE OLD SOUTH

IN an article entitled "Science and Society in Ancient Rome," Dr. William Salant[1] in advancing the view that society determines the growth or the decline of science, states: "As Kofoid[2] pointed out in a recent article, science worthy of the name scarcely existed in the South before slavery was abolished."

Dr. Kofoid's article is a review of a book entitled "Scientific Interests in the Old South," by Dr. Thomas Cary Johnson, Jr., associate professor of history in the University of Virginia. Dr. Kofoid states: "The author's theme is the *refutation of the summary indictment* of Morrison in 'The Oxford History of the United States,' volume 2, page 15, of the 'non-existent intellectual life' of the South, due to the cultivation of cotton, the neglect of men and the blight of slavery. *The data assembled support his defence,* for they display a wide-spread and active interest in the physical, chemical and medical fields, and a considerable though desultory activity in the natural sciences." (Italics mine).

Among the little-known facts brought out by Professor Johnson are the following: William Barton Rogers, founder and first president of the Massachusetts Institute of Technology, which opened its doors to students (including women) in 1865, succeeded his father, P. K. Rogers, in 1829 as professor of natural philosophy and chemistry at William and Mary College, and from 1835 to 1853 served as professor of natural philosophy and geology at the University of Virginia. On December 11, 1787, James Rumsey of Virginia ran a steamboat of his own invention against the current of the Potomac River at a speed of four miles per hour. Cyrus McCormick, of Pocahontas County (then in Virginia), invented, made and sold his reaper on his father's farm there from 1839 to 1844. Immediately following the opening of the Baltimore and Ohio's first division in 1830, came the Charleston-Hamburg (S. C.) line, with the *Best Friend of Charleston,* the first locomotive made in America for

[6] Carl G. Hartman, SCIENCE, 74: 226, 1931.

[7] Frank K. Shuttleworth, Monographs of the Society for Research in Child Development, National Research Council, Vol. II, No. 5 (Serial No. 12), Washington, 1937.

[8] Cordelia Ogle, *Amer. Jour. Physiol.*, 107: 628, 1934.

[1] SCIENCE, 88: 475, November 18, 1938.

[1] *The Scientific Monthly,* December, 1938.

[2] SCIENCE, 88: 109, 1938.

regular and practical use. "Maury of Virginia, pondering the results of deep-sea soundings, discovered the Atlantic plateau and suggested the Atlantic cable to Cyrus Field." Among the many other Southern scientists mentioned by Professor Johnson are J. Lawrence Smith, John James Audubon, H. W. Ravenel, John W. Mallet, F. P. Venable, Lewis R. Gibbes, Wm. C. Wells, John and Joseph Le Conte. The National Museum Report (Washington, 1897) links Thomas Jefferson with Agassiz as having done so much for science in America, mainly by the immense weight given science by their advocacy.

It seems to me that any unprejudiced person, looking through this book and considering the facts about the South, will agree that Dr. Salant's sweeping statement is unwarranted. Perhaps he was misled by what Dr. Kofoid said in commenting on the *arrangement* of the subject-matter of the book: "Details of evidence of educational interest abound, but a synthesis of accomplishment in the several disciplines is not achieved. There is a noticeable absence of evidence of sustained activity by productive investigators in scientific fields."

For a number of years past I have been trying to accumulate data as to what scientists of the South did to aid the Confederacy in the face of a stringent blockade. The sunken Merrimack was raised and converted into an ironclad, the Virginia. The Charleston submarine, Little David, repeatedly went down with all hands, only to be raised again to damage a Federal ship before her last plunge. The gunpowder made by Colonel Rains was so excellent that what was left after the war was used in the gunnery school at Fortress Monroe and was declared by a British officer to be equal to the best British powder. I will welcome any data showing what scientists did for the Confederacy.

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SCIENTIFIC BOOKS

CRYPTOGAMIC BOTANY

Cryptogamic Botany. By GILBERT M. SMITH. Vol. I, $4.00; Vol. II, $3.00. McGraw-Hill, 1938.

ANY thorough-going review of G. M. Smith's "Cryptogamic Botany" would require that each of the several sections of the two volumes be separately considered by a specialist in the field concerned. With the first volume dealing with algae and fungi and the second with bryophytes and pteridophytes, the author has covered so wide a field that a critical appraisal of all the diverse parts would demand the services of a phycologist, a mycologist, *et al.* It is certain, however, that this work is of major importance in the general field of plant morphology and phylogeny, both because it does cover so extensive a field, because of the scholarly quality and workmanship, and because it represents an attack on general problems in plant science which have received far too little attention. Without attempting to be thorough in any particular field, the present reviewer would like to call attention to certain aspects and implications from the standpoint of a biology teacher.

What is meant by the standpoint of a biology teacher may perhaps deserve some definition. While it is still broadly true, as noted by Thaxter some years back, that most "biologists" are zoologists who teach something about plants in courses and text-books designated as "biological," there are a number of "biologists," like this reviewer, whose antecedents are botanical, and some biology texts which have joint zoological and botanical authorship. Without any definite figures as support, the opinion is ventured that the vast majority of students make their first acquaintance with organized plant and animal science in biology courses and biology texts. Long experience in such courses, with a total approaching fifteen thousand students, makes this reviewer certain that there is such a thing as a "biological" point of view, even if no more is granted to biology courses than the success of a foundling cowbird, that of survival and multiplication.

The term "biology," first used by Lamarck and Treviranus in 1800, was coined to give expression to the idea of the essential unity of plant and animal phenomena, of which these men, whose work was biological in the truest sense, had gained some preliminary appreciation. Verified in the succeeding century, through the cell and protoplasm doctrines, through evolution and genetics, and through the physico-chemical analysis of living things, the implications of the broadest biological point of view are still often misunderstood. Too often, a biology course may mean an introduction to plant structure in terms of possible "dorsi-ventrality," or to plant functioning in terms of an assumed "physiological gradient"—in other words, on the kind of analogical reasoning basis by which Aristotle and Cesalpino interpreted plant structures and activity from their acquaintance with animals. The converse is sometimes true, when terms, exactly applicable only in a restricted botanical sense, like tropism, are applied in the zoological field to a wide diversity of different phenomena, as H. S. Jennings has pointed out.

In a general biological sense, the Smith text is important because it represents one of few attempts