the earlier ones. The dark mud rocks, therefore, are the shore equivalents in the east of the highest Oriskany limestones of the west, and not an independent unit in the time scale.[4]

But I must not carry my discussions further, since my time, unfortunately, is limited. I hope you agree with me—those of you, I mean, who are not stratigraphers, for stratigraphers require no conversion at my hands—that the study of the physical characters of the strata, even of the thickness of sections, gives, when rightly attacked, a view of the history of the earth, full of dramatic intensity, and that only by a careful study of such physical characters can we arrive at a true interpretation of the history of the earth.

A. W. GRABAU.

COLUMBIA UNIVERSITY.

EXTIRPATION AND REPLANTATION OF THE THYROID GLAND WITH REVERSAL OF THE CIRCULATION.

WE have successfully removed and then replanted a thyroid gland with reversal of the circulation on a dog.

A transplantation of the thyroid with anastomosis of its vessels to a suitable artery and vein was previously made in 1902,[1] but no permanent successful result was obtained, owing to the obliteration of the vessels by clots and the subsequent development of gangrene. A careful investigation of the literature has revealed no other mention of similar experiments having been performed hitherto. The present observation is also the first successful replantation of a gland with reversal of the circulation.

Summary of the Technique and of the Observation on the Results of the Operation.—The right thyroid gland of about a 20 K. dog having been dissected, all its vessels were ligated, except the superior thyroid artery and vein, which were cut near the carotid artery and the internal jugular vein. The gland was then extirpated and put in a glass of isotonic sodium chloride solution.

After a few minutes, the thyroid gland was placed in the wound in the neck, and the peripheral end of the thyroid artery was united to the central end of the thyroid vein, and the peripheral end of the thyroid vein to the central end of the thyroid artery.

The circulation was reestablished about half an hour after the extirpation. The circulation through the gland was in a direction reverse to the normal. The red blood entered through the thyroid vein, and the dark blood flowed from the gland to the jugular vein through the thyroid artery. The hue of the gland was normal, and the circulation very active.

Eleven days after the operation the wound was opened and the anterior portion of the gland directly observed. The gland was somewhat enlarged, but its hue and consistency were normal.

Twenty-five days after the operation it was again directly observed. It still appeared enlarged, and in hue and consistency the same as before.

Thirty-two days after the operation, the wound being almost closed, it was not possible to examine the gland directly. But by pressing it between the fingers through the skin, its systolic expansion was easily detected.

At the present time forty seven days after the operation the animal is alive and in good condition. The replanted gland appears to be practically normal, being only slightly enlarged.

ALEXIS CARRELL,
C. C. GUTHRIE.

THE HULL PHYSIOLOGICAL LABORATORY,
UNIVERSITY OF CHICAGO.

[4] A more detailed discussion of this problem appears in my forthcoming bulletin on the Schoharie Valley (Bull. N. Y. State Museum).

[1] A. Carrel, 'La Technique operatoire des anastomoses vasculaires et la transplantation des visceres,' *Lyon Medical*, 1902. 'Les anastomoses vasculaires, leur technique operatoire et leurs indications,' 2e Congrés des Médecins de langue francaise de l'Amérique du Nord, Montreal, 1904.

EXHIBITION OF EARLY WORKS ON NATURAL HISTORY.

FEW people are aware that the Natural History Museum in Cromwell-road contains one of the finest and most complete libraries on natural history ever brought together. The collection had its origin in the several libraries attached to the departments of zoology, geology, mineralogy and botany while these were

in Bloomsbury. After the removal to South Kensington, the four departmental libraries were considerably supplemented by extensive purchases, for which a special vote was obtained from parliament. At the same time a 'general library' was formed to receive those works the subject-matter of which concerned more than one of the departments. The collection has been further increased by many generous and munificent donations and by exchange.

The library, of course, contains many very early books on natural history; and from these a selection has been made for the purpose of an exhibition intended to illustrate the origin and progress of the study of natural history up to the time of Linnæus. The exhibition, which occupies two table-cases in the Central Hall, has been arranged by Mr. B. B. Woodward, the librarian of the museum.

We are told that the study of natural history began with the dawn of civilization, and doubtless had its origin, so far as animals and plants were concerned, in the primitive observations of the hunter and of the medicine-man, or priest-physician, while the search for stone, and subsequently for metals, with which to fashion weapons and tools, served to draw attention to the nature and structure of the earth. That the hunters of the stone age were not unobservant of the quadrupeds they pursued is evinced by the carvings and the incised outline representations on bone, as well as by the remarkable pictures, drawn in manganese and red ochre, on the chalk walls of the caves in the Dordogne. Examples of the carvings and reproductions of these drawings are shown in the present exhibition. Turning to books proper, we may note a copy of the oldest popular natural history book, the 'Historia Naturalis,' or 'Historia Mundi,' of Pliny the elder, printed by J. de Spira's press at Venice in 1469. This was one of the first, if not the first, of natural history books printed. It presents an epitome of the state of Roman knowledge on the subject, and in this connection it is of interest to note that the number of known plants recorded in it is about 1,000. Mention may also be made of a copy of Vincent of Beauvais's 'Bibliotheca Mundi,' compiled by that learned Dominican at the instance of Louis IX. of France. This work is not only one of the earliest of encyclopedias, but the greatest of the middle ages. It was first printed at Strasburg about 1473.

The Royal Society is represented by a copy of the first volume of the *Philosophical Transactions,* the earliest publication of any scientific society. It was issued in monthly numbers, of which the first appeared in March, 1665, and for the most part deals with physics.

A special interest attaches to an edition of the 'Stirpium adversaria nova' of Pena and L'Obel, printed at Antwerp by Plantin and finished in England in 1570–1. It contains one of the earliest figures of the tobacco plant and an illustration of the method of smoking of the North American aborigines. The pipe is drawn as being somewhat straighter than the Atlantic coast ones generally were.

The earliest illustrations of the potato plant are seen in a work by Charles de Lécluse, the 'Rariorum Plantarum Historia,' printed at Antwerp in 1601. Lécluse traveled extensively in western Europe making collections, and wrote several books on the botany of the districts he visited. The figures of the potato plant in the work named are from drawings made by him in 1589 from actual specimens. The plant, we know, was growing in Italy in 1586, about which time it was also introduced into England.

Harvey's doctrine that every living thing came originally from an egg, afterwards expressed by the aphorism,' 'Omne vivum ex ovo,' is symbolized in the engraved title-page of the second edition of his 'Exercitationes de Generatione Animalium,' printed at The Hague in 1680. The original edition was issued in London in 1651.

Space will allow us only to mention briefly one or two other works in this extremely interesting exhibition. Note should be made of John Ray's greatest botanical work, the 'Historia Plantarum,' published at London in 1686, containing the description of some 6,900 plants in systematic order. The museum copy was the property of Sir Hans Sloane, and has

his manuscript notes, with the references to the places of the plants in his herbarium. Then there is a copy of the second edition of Robert Plot's 'Natural History of Oxfordshire' (Oxford, 1705), the first edition of which appeared in 1677. This work was the forerunner of the numerous 'County Histories' that have been subsequently issued.

Finally, attention may be drawn to the earliest figure and description of that flightless bird, the solitaire, in a book by the French traveler François Leguat, printed at London in 1708. The solitaire formerly inhabited the island of Rodriguez, and became extinct about the end of the eighteenth century.

STATISTICS OF EASTERN, STATE AND FOREIGN UNIVERSITIES.

IN an address before the University of Michigan, printed in the *Atlantic Monthly*, Dr. Henry S. Pritchett showed a table giving data in regard to six of the older private universities in the eastern states, six western state universities and six foreign universities, which is here reproduced:

OLDER PRIVATE UNIVERSITIES IN EASTERN STATES.

Name.	Date of Founding.	Number in Instructing Staff.	Number of Students 1904.	Annual Budget 1904.	Annual Cost to University Per Student.	Annual Cost to Student.
Harvard	1636	525	5,143	$1,572,540[1]	$306	$150
Columbia	1754	551	5,017	1,438,638	270	$150 to $250
Yale	1716	343	3,138	800,000	255	100 " 150
Pennsylvania	1791	325	2,838	685,000	241	150 " 200
Princeton	1756	109	1,374	460,863	335	150 " 160
Brown	1764	85	988	180,000	192	150
Total		1,938	18,498	$5,137,041		

WESTERN STATE UNIVERSITIES.

Michigan	1837	292	4,136	$746,000	$180	$10 to $45
Illinois	1868	402	3,594	800,000	223	free
Wisconsin	1848	227	3,342	700,000	209	free
Minnesota	1868	290	3,895	497,000[2]	128	$20 to $100
California	1868	283	3,400	945 000	279	e
Nebraska	1869	193	2,513	419,750	167	ree
Total		1,687	20,880	$4.107,750		

FOREIGN UNIVERSITIES.

Berlin	1807	504	13,782	$880,500	$ 64	small fees
Leipsic	1409	216	4,253	716,000	170	" "
Paris	1100	420	12,985	934,000	72	" "
Vienna	1384	431	6,205	464,000	76	" "
Bonn	1818	177	2,970	361,000	123	" "
Edinburgh	1583	205	2,971	469,000	158	$10 to $20 a course.
Total		1,953	43,166	$3.824,500		

THE EIGHTEENTH SEASON OF THE MARINE BIOLOGICAL LABORATORY. 1905.

THE regular season for investigators opened June 1 and continued through most of September. During this period there were in attendance 71 investigators, of whom 63 occupied private rooms with an average period of attendance of about six weeks to two months.

Students receiving instruction were in session from June 28 to August 9, and the total attendance was 57, a much smaller number than in the years previous to 1903, owing to the raising of the standard of admission at that time. The work of collection of material was again under the charge of the curator of

[1] Omitting $875,575 in special gifts.

[2] Omitting $400,000 for buildings.