BOOKS RECEIVED.

ANTHROPOLOGY: An Introduction to the Study of Man and Civilization, by EDWARD B. TYLOR, D. C. L., F. R. S. With Illustrations. D. Appleton & Co., New York, 1881.

The present volume is one which will be very acceptable to a large class of scientific readers, for it places before them within the compass of a book of three hundred pages, the principles on which the science of Anthropology is based, and a synopsis of the mass of facts collected and arranged by Anthropologists, which are scattered in some fifty standard works and hundreds of independent papers on the subject.

As an introduction to the science of Anthropology, Dr. Tylor's work is a great success, and if carefully studied will save a vast amount of desultory reading on the part of the student, and as strictly technical details are carefully avoided, the author has succeeded in bringing the subject within reach of readers who have received or are receiving the ordinary higher English education.

The work opens with a brief but sufficiently comprehensive survey of the varieties of men, their language, their civilization and their ancient relics, thus showing by vestiges of man's early existence, what proofs we have of his first appearance and ultimate development.

The most common observer cannot fail to notice the broad distinction among races of men, but it is only within modern times that these distinctions have been worked out by scientific methods. One of the first questions which arise in tracing the history of mankind, is, did man originate from one stock in some primitive centre, and afterwards spread far and wide, or are the Negroes, Mongolians, Whites and other races distinct species, each sprung from a separate origin.

Dr. Tylor favors the views propounded by modern zoologists, which is against the several origins of mankind, for two principal reasons. First, that all tribes of men, from the blackest to the whitest, the most savage to the most cultured, have such general likeness in the structure of their bodies and the working of their minds,—as is easiest and best accounted for by their being descended from a common ancestry, however distant,—and secondly, that all the human races, notwithstanding their form and color, appear capable of freely intermarrying and forming cross races of every combination, which appears to point to a common ancestry. The author therefore advises the acceptance of this theory of the unity of mankind as best agreeing with ordinary experience and scientific research.

Any decision on this subject, however, must be considered provisional only, as our means of judging what man's progenitors were like, both in mind and body, before the forefathers of the present negroes and Tartars and Australians were separated into distinct stocks, is at the best most imperfect. Nor is it yet clear by what causes these stocks or races passed into their different types of skull and limbs, of complexion and hair.

We find no aid from the study of ancient inscriptions and figures, as to the condition of races at the beginning of historic times.

Figures of Egyptians drawn more than 4000 years ago, describe features very similar to those found in Egypt at the present day. The celebrated inscription of Prince Una, dating back 2000 years B. C., makes mention of the *Nahsi* or Negroes who were levied and drilled by ten thousands for the Egyptian army; and on the tomb of Knumkept of the 12th dynasty there is represented a procession of *Amu*, who are seen by their features to be of the race to which Syrians and Hebrews belonged. In fact all the evidences derived from ancient monuments, geography and history, prove that the great race-divisions of mankind are of no recent growth, but were already settled before the beginning of the historical period. We must then look to the prehistoric period as the time when the chief work was done of forming and spreading over the world the races of mankind.

We might expect that "language" would tell of man's age on the earth, but the reader of this work will find that although there is evidence that all recent language was derived from one primitive language, the most patient research shows that all trace of that primitive language is lost.

The first chapter of Dr. Tylor's work includes a history of the civilization of man and his gradual development in the appreciation of Art. The first traces of man in the stone age is described, dating back from twenty to a hundred thousand years, presenting evidence that, even at that remote period, man possessed all the attributes of humanity in a savage and rude condition.

In the second chapter man is compared with the brute creation. To show how man may have advanced from savagery to civilization is a reasonable task and is worked out to some extent by the author. But the evidence is wanting for crossing that mental gulf that divides the lowest savage from the highest ape.

The general conclusion advanced by the author in this branch of the subject is expressed by Dr. Tylor as follows: "On the whole the safest conclusion warranted by facts is that the mental machinery of the lower animals is roughly similar to our own, up to a limit. Beyond this limit the human mind opens out into a wide range of thought and feeling which the beast mind shows no sign of approaching. If we consider man's course of life from birth to death, we see that it is, so to speak, founded on functions which he has in common with lower beings. Man, endowed with instinct and capable of learning by experience, drawn by pleasure and driven by pain, must like the beast, maintain his life by food and sleep, must save himself by flight, or fight it out with his foes, must propagate his species and care for the next generation. Upon this lower framework of animal life is raised the wondrous edifice of human language, science, art and order."

To the many who have yet to master the principles of this, the latest of sciences, "*Anthropology*," we commend this book as one which will be read with much satisfaction and profit, for the study of man and civilization is not a matter of scientific interest only, but at once passes into the practical business of life. We have in it the means of understanding our own lives and our place in the world, vaguely and imperfectly, it is true, but at any rate more clearly than any former generation.

The knowledge of man's course of life from the remotest past to the present, will not only help us to forecast the future, but, says the author, guide us in our duty of leaving the world better than we found it.

CORRESPONDENCE.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.*]

FIRE BALLS.

To the Editor of "SCIENCE":—

The interesting instance, narrated in a recent number of "SCIENCE," of the descent of fire balls as observed by Henry O. Forbes, calls to mind two occurrences which I have witnessed under circumstances favorable for accurate observation.

One sultry summer day, at sea, I was lying on the deck of a small schooner, watching in the sky the gathering clouds of a sudden and violent thunder shower. I was looking over the main mast, whose top was in the centre of my field of view. As the first scattered drops of rain began to fall, and in advance of any lightning or thunder, there appeared upon the top of the mast a brush of fire

remarkably like that which is often produced on a small scale in electrical experiments. This brush shone very distinctly against the heavily overcast and darkened sky; and it looked about as large as the hand of a half-grown child, with the fingers spread moderately apart. After one or two seconds it seemed to change into a ball of fire, of smaller size but greater intensity, and distinctly round in outline, which glided smoothly down the surface of the mast and across the wooden deck, until it passed over the stern of the boat and entered the water with an explosion not unlike the report of a large pistol. There was no lightning-rod upon the vessel, but the wood of the mast and of the deck was quite wet by the time the ball passed over it. The electrical disturbance did not approach the mast with a visible flash, and the sound of the explosion, the only sound noticed, was decidedly from the direction where the ball entered the water. The ball left the mast in a line at right angles to a tangent at the point of departure, while the nearest course to the sea would have been in the direction of the tangent; but having once commenced to cross the deck it took a perfectly straight course. The wood over which it passed was slightly discolored in several places, but not at all charred.

On another occasion I was standing, with several companions, in a carriage-house, in the country, having taken refuge there from a sudden shower. Through an open door we were gazing intently upon a large barn near by, discussing the safety of occupying that more commodious retreat, when a flash of lightning, in the usual zigzag form, passed obliquely from the clouds to the barn, striking the ridge at the very summit of the roof. Thence it passed, as a distinct ball of fire, over the wet shingles down the surface of the roof to the eaves and there entered the barn. We thought there was a report as the ball entered the barn, which had been recently filled with freshly gathered hay, but were not certain, owing to the nearly, if not practically, simultaneous arrival of the thunder sound. The nearest door of the barn was opened within a very few seconds, and the interior was found filled with fire and smoke; although the roof over which the ball had passed remained unaffected until destroyed by fire breaking out from within the building. Although I had been the only one in the party to insist in taking refuge in the carriage-house instead of the barn, there seemed to arise on the part of the majority a considerable unwillingness to further dwell upon the reasons for preferring the latter place of safety.

R. H. WARD, M. D.

To the Editor of "SCIENCE."

Allow me in reply to R. C. S. again to tell him, most emphatically, that I have never entertained, for a moment, the idea of "reviving" or advocating the theory that motor cells can be distinguished from sensory ones by their size. In order to "revive" a theory it must be restated in some form. In the "transactions" of the American Neurological Association, published in the *Journal for Nervous and Mental Disease*, July, 1880, p. 476, I am correctly reported as stating that "so far as sensation went, it had nothing to do with the subject of the paper." My theory relates exclusively to the nuclie in so-called motor cells. They are called motor not by any means on account of their size, but from their evident connection with motor filaments. In spite of my denial, R. C. S. still asserts the wrong thing, and shows none of the customary regret at having possibly misunderstood me.

Prof. Stieda is referred to by me not to "polemize" against him, but to show that, while he had measured their cells and their nuclie in the spinal cord of turtles, he had not anticipated me in attributing difference in size to difference in energy. Stieda's expression is; Physiologische Dignität, which I translate physiological importance. As neither sensation nor sensory cells are here mentioned by him, it seemed plain that he, like myself, referred solely to cells of the spinal cord which, by their close relation to motor filaments, are supposed to have a motor function.

The careful reader for whom R. C. S. so dogmatically responds, is respectfully requested to bear in mind that the three brief articles which I have published, relate throughout to Reptiles and Batrachians, and not to mammals. With this reminder he will have, I think, no difficulty in reading, in some places, between the lines.

As to the auditory nerve centres, it remains for me to state that the paragraph which R. C. S. quotes was offered as a mere suggestion to one who seemed also to think that the large cells in the vicinity of the roots of the auditory nerve, in the iguana, bore some relation to my theory. As his communication was stated to be preliminary in character, and had nothing to do with my subject, I decided to make no personal reference, suggesting that these cells (as claimed fourteen years ago by Deiters) were of doubtful function, and that the cells related to vision and olfaction were (in reptiles, etc.,) all very small. This, I believe, is true, but it revives no theory.

I leave my unknown critic to the contemplation of this clause which appears in his last publication: "Notwithstanding the construction which Dr. J. J. Mason now desires to see placed upon his words," doing him the justice to suppose that he knows what he insinuates, and that being mortal, he will hasten to admit that he may have misunderstood me.

JOHN J. MASON, M. D.

NEWPORT, R. I., July 2, 1881.

DECOMPOSITION OF WATER.—In decomposing water by discharging Leyden jars through platinum electrodes, Dr. Streintz finds that, with very small electrodes giving passage to a series of discharge currents in one direction, and then left to themselves, a remarkable reversal of E.M.F. occurs, but only when the discharges do not exceed a certain number. Dr. Streintz made use of a quadrant-electrometer in his experiments.

SIMPLE METHOD OF DETERMINING THE TEMPORARY HARDNESS OF WATER.—In order to ascertain the alkalinity of springs on the spot, with samples not exceeding 10 c.c., and with a single reagent, the author makes use of a tube of 30 to 40 c.m. long, closed at the bottom, and with a mark showing the capacity of 10 c.c. From this mark upwards the tube is graduated into 0.1 c.c. To determine the temporary hardness the tube is filled to the lowest mark with the water in question, and a little piece of filter-paper, which has been previously steeped in extract of logwood and dried, is thrown in, thus giving the water a violet color. Centinormal hydrochloric acid is then added from a dropping bottle, till the color of the liquid inclines to an orange. The tube is then closed with the thumb and well shaken. The greater part of the carbonic acid escapes, and the liquid becomes red again. Acid is again added, and the shaking repeated until the next drop of the acid turns the liquid to a pure lemon-yellow, a point which a little practice is easily reached. The amount of acid used is read off on the tube itself. The author proposes to express the alkalinity of a water by the number of c.c. of centinormal acid needed to neutralise 10 c.c. He thinks that this method will be found useful both for sanitary and geological purposes.—V. WARTHA.

CHEMISTRY OF THE PLATINUM METALS.—Contrary to the prevalent view, all the platinum metals, if precipitated by zinc in a state of very fine division, are soluble to a considerable extent in nitric acid, whether weak or strong, so that palladium cannot be separated from such a mixture by means of nitric acid. The solubility appears to depend on the relative proportion of one or other of the metals in the

mixture (mass action.) Pure palladium, even in thin leaves, is not easily soluble in nitric acid, whilst all the other platinum metals are perfectly insoluble if in a moderately compact condition. Palladium cannot be isolated by agitation with mercury from a solution which, along with the platinum metals contain base metals, such as copper, lead, &c., since the mercury precipitates, not merely the palladium, but all the other platinum metals, forming probably amalgams. From the platinum metals thus precipitated by mercury, metal free from mercury cannot be obtained by distillation and subsequent ignition, since a part of the mercury forms a stable compound with the platinoids. —THEODOR WILM.

GLYCERIN.—Notwithstanding the low price which prevails for almost every description of raw produce and manufactured goods, there are a few articles which form notable exceptions. Perhaps one of the most remarkable of these is refined glycerin, which, within the last two years, has advanced from about £30 to £130 per ton avoirdupois for 30° B. This enormous advance is due partly to increased consumption, diminished production and the influence of speculation working on a market devoid of stocks. In view of the present position of the article and the prospect of a continuance of high prices for a considerable time to come, the attention of soapmakers is now being turned to the utilization of their waste "leys," and various new processes for recovering the glycerin contained in these liquors have lately been tried with more or less successful results. Apart from minor impurities, waste soap "leys" are generally found to contain glycerin, carbonate of soda or caustic soda, chloride of sodium, gelatin and albumen. One of the processes for recovering the glycerin which promises to be the most economical and the most successful begins with concentrating the liquor until the salts contained therein begin to crystallize. The liquid is then cooled and filtered to rid it of gelatin and albumen. It is afterwards made to absorb carbonic acid, which precipitates bi-carbonate of soda, and which is separated from the liquor in the usual way. After undergoing this process the liquor is then made to absorb gaseous hydrochloric acid until what remains of carbonate of soda has been converted into chloride, and further, until all, or almost all, the chloride of sodium has been precipitated and separated from the liquor in the usual manner. Arrived at this stage, the liquor contains water, glycerin and hydrochloric acid. The acid is then evaporated entirely and absorbed in water for using afresh. The dilute glycerin remaining can be purified by filtering it through animal charcoal or by concentrating and distilling it in the usual way.

AN INDUSTRIAL AND TECHNOLOGICAL MUSEUM. —An Industrial and Technological Museum of a very comprehensive character is in course of organization at Sydney. It is to include animal, vegetable and mineral produce in the crude and in the manufactured states: waste products, of whatsoever origin, foods with their constituents, and that necessary shadow side of the picture, their adulterations; educational appliances; sanitary apparatus and systems, models, plans, machinery, etc., for mining; agricultural machinery and manures; models, drawings, and descriptions of patents; a department of economic entomology; ethnological specimens, etc. One remark in the prospectus may call up a smile. The museum is intended to occupy a similar position to the South Kensington Museum. This might be construed to mean that it is to occupy a site as far out of the way of merchants, manufacturers, patentees, etc., as possible. We need scarcely say that the project has our best wishes.

METEOROLOGICAL REPORT FOR NEW YORK CITY FOR THE WEEK ENDING JULY 9, 1881.

Latitude 40° 45′ 58″; Longitude 73° 57′ 58″; height from ground, 53 feet; above the sea, 97 feet; by self-recording instruments.

JULY.	BAROMETER. MEAN FOR THE DAY. Reduced to Freezing.	BAROMETER. MAXIMUM. Reduced to Freezing.	BAROMETER. MAXIMUM. Time.	BAROMETER. MINIMUM. Reduced to Freezing.	BAROMETER. MINIMUM. Time.	THERMOMETERS. MEAN. Dry Bulb.	THERMOMETERS. MEAN. Wet Bulb.	THERMOMETERS. MAXIMUM. Dry Bulb.	THERMOMETERS. MAXIMUM. Time.	THERMOMETERS. MAXIMUM. Wet Bulb.	THERMOMETERS. MAXIMUM. Time.	THERMOMETERS. MINIMUM. Dry Bulb.	THERMOMETERS. MINIMUM. Time.	THERMOMETERS. MINIMUM. Wet Bulb.	THERMOMETERS. MINIMUM. Time.	MAXI'M In Sun.
Sunday, 3	29.974	30.100	0 a. m.	29.898	12 p. m.	77.3	67.3	87	5 p. m.	71	6 p. m.	65	5 a. m.	60	5 a. m.	139.
Monday, 4	29.861	29.898	0 a. m.	29.800	5 p. m.	71.6	67.6	85	1 p. m.	72	1 p. m.	70	5 a. m.	66	5 a. m.	136.
Tuesday, 5	29.850	29.906	9 a. m.	29.790	7 p. m.	77.3	70.7	85	5 p. m.	75	5 p. m.	68	3 a. m.	66	3 a. m.	138.
Wednesday, 6	29.828	29.902	12 p. m.	29.750	4 a. m.	82.7	75.0	88	4 p. m.	79	7 p. m.	74	5 a. m.	70	5 a. m.	147.
Thursday, 7	29.983	30.002	9 a. m.	29.892	12 p. m.	76.0	69.3	83	3 p. m.	71	3 p. m.	70	5 a. m.	68	5 a. m.	143.
Friday, 8	29.927	29.998	12 p. m.	29.836	6 a. m.	67.0	65.0	71	7 a. m.	69	7 a. m.	64	2 p. m.	63	2 p. m.	85.
Saturday, 9	30.059	30.090	12 p. m.	29.998	0 a. m.	70.3	66.6	80	4 p. m.	72	4 p. m.	63	6 a. m.	62	6 a. m.	140.

		Dry.	Wet.
Mean for the week	29.926 inches.	74.6 degrees	68.8 degrees.
Maximum for the week at 0 am., July 3rd	30.100 "	at 4 pm. 6th. 88. "	at 7 pm 6th, 79. "
Minimum " at 4 " 6th	29.750 "	" 6 am. 9th. 63. "	at 5 am 3rd, 60. "
Range	.350 "	" " 25. "	19. "

JULY.	WIND. DIRECTION. 7 a. m.	2 p. m.	9 p. m.	VELOCITY IN MILES. Distance for the Day.	FORCE IN LBS. PER SQR. FEET. Max.	Time.	HYGROMETER. FORCE OF VAPOR. 7 a. m.	2 p. m.	9 p. m.	RELATIVE HUMIDITY. 7 a. m.	2 p. m.	9 p. m.	CLOUDS. CLEAR, 0 OVERCAST, 10. 7 a. m	2 p. m.	9 p. m.	RAIN AND SNOW. DEPTH OF RAIN AND SNOW IN INCHES. Time of Beginning.	Time of Ending.	Duration. h. m.	Amount of water	OZONE. 0 10
Sunday, 3	w. s. w.	w. n.w.	w. s. w.	180	2½	1.20 pm	.416	.558	.585	69	49	55	2 cir.	2 cir. cu.	2 cu. s.	-----	-----	-----	--	4
Monday, 4	n. n. w.	e. n. e.	w.	104	4	6.30 pm	.581	.644	.654	72	85	85	3 cir. s.	9 cir. cu.	9 cu.	1.30 pm	7.15 pm	5.45	.80	0
Tuesday, 5	n. e.	s. s. e.	s. w.	94	2½	8.30 pm	.622	.650	.717	85	59	70	9 cu.	3 cir. cu.	5 cir. cu.	-----	-----	-----	--	2
Wednesday, 6	w.	n. n. e.	n. n. w.	141	2	2.40 pm	.690	.836	.773	70	65	71	0	4 cir. cu.	2 cir. cu.	5.00 pm	5.15 pm	0.15	.04	1
Thursday, 7	n. e.	s. e.	s. e.	180	3	2.00 pm	.641	.610	.631	76	56	80	2 cir.	3 cir. cu.	10	-----	-----	-----	--	0
Friday, 8	s. e.	e. n. e.	n. n. e.	202	6¾	11.40 am	.682	.562	.536	90	94	84	10	10	10	9.00 am	2.00 pm	5.00	.06	4
Saturday, 9	e. n. e.	s. s. e.	s. s. e.	102	1	4.00 pm	.529	.648	.622	89	73	85	9 cu.	7 cir. cu.	10	-----	-----	-----	--	0

Distance traveled during the weeek	1,003 miles.	Total amount of water for the week	90 inch.
Maximum force	6½ lbs.	Duration of rain	11 hours.

DANIEL DRAPER, PH. D.

Director Meteorological Observatory of the Department of Public Parks, New York.