has proved short-lived in so many cases that *a thorough comparison of all parts of the skull and skeleton* seemed absolutely necessary, and was undertaken by the writer with the valuable aid of Dr. J. Howard McGregor. It was found that the grouping suggested by the temporal arches is confirmed by a large number of characters unnoticed hitherto in this connection. On December 29, 1902, a joint-paper * was presented before the American Association in Washington in which the Reptiles were subdivided into two sub-classes as follows:

SUB-CLASS *Synapsida*.†	SUB-CLASS *Diapsida*.
I. e., Primarily with single, or united temporal arches.	*I. e.*, Primarily with double or separated temporal arches.
Cotylosauria.	*Rhyncocephalia:*
Anomodontia:	*Proganosauria.*
Dicynodontia.	*Pelycosauria.*
Cynodontia.	*Mesosauria*, etc.
Gomphodontia.	*Dinosauria.*
Theriodontia.	*Ichthyosauria.*
Placodontia.	*Phytosauria.*
Testudinata.	*Pterosauria.*
Plesiosauria.	*Squamata:*
	Mosasauria.
	Ophidia.
	Lacertilia.
	Crocodilia.
Giving rise to the Mammalia from some unknown member of the Anomodontia.	Giving rise to the Birds through some unknown type transitional between Proganosauria and Dinosauria.

In the ancestral *Synapsida:* (1) The roof of the skull is solid (Cotylosauria), or there is a single large supratemporal opening, the infratemporal opening being rudimentary or wanting; (2) the squamosal is large, coalescing with the prosquamosal and more or less covering the quadrate; (3) the quadrate is reduced and never movable; (4) the coracoid and procoracoid are separate, or united by suture; (5) the phalangeal formula is 2, 3, 3, 3, 3 or less than 2, 3, 4, 5, 3.

In the ancestral *Diapsida:* (1) The roof of the skull is open, with two temporal arches and openings; (2) the squamosal is small, frequently separate from the prosquamosal; (3) the quadrate is large, free and secondarily movable; (4) the coracoid and procoracoid are early coalesced into a single bone; (5) the phalangeal formula is 2, 3, 4, 5, 3–4.

These are the most striking of a series of characters which separate these groups. The grounds for placing the orders of Reptiles as they are in the above table will require fuller statement elsewhere.

HENRY F. OSBORN.

* Read before the biological section of the New York Academy of Sciences, February 9, 1903.

† The names *Protherosauria* (for *Synapsida*) and *Archosauria* (for *Diapsida*) were used in this communication. The former was abandoned because of its similarity of sound to *Proterosauria* Seeley. The latter was abandoned because Cope proposed *Archosauria* as a superorder to include only two-arched forms, whereas *Diapsida* is given *sub-class* rank and made to include the *Ichthyosauria, Phytosauria* and *Squamata.*

SCIENTIFIC NOTES AND NEWS.

DR. WILHELM WUNDT, the eminent psychologist, has been elected an honorary member of the Academy of Sciences of St. Petersburg.

PLANS have been inaugurated in Great Britain to secure by subscription a portrait of Lord Rayleigh. The treasurers are Sir Andrew Noble, Sir Oliver Lodge and Professor Arthur Schuster.

DR. A. E. ORTMANN, of Princeton University, has accepted the position of curator in invertebrate zoology in the Carnegie Museum, Pittsburgh.

M. EDMOND PERRIER has been appointed professor of comparative anatomy and M. Pierre Marcellin Boule, professor of paleontology in the Paris Museum of Natural History.

DR. M. VON RUDZKI has been made director of the observatory at Cracow in place of Professor Karlinski, who has retired.

PROFESSOR FORSYTH, of Cambridge University, was elected president of the Mathematical Association which held its annual meeting in London, on Saturday, January 23. The Association has 351 members.

DR. T. S. CLOUSTON has been elected president of the Royal College of Physicians, Edinburgh.

THE Royal Meteorological Society held its annual meeting on January 21, when Mr. W. H. Dines, the president, made an address entitled 'The Method of Kite-Flying from a Steam Vessel, and Meteorological Observations obtained thereby off the West Coast of Scotland.' The society now has 666 fellows. Captain D. Wilson-Barker was elected president for the ensuing year.

SIR MICHAEL FOSTER has reconsidered his intention to resign his seat as representative of London University in the House of Commons. He proposed to resign, because he did not wish to continue to vote with the unionist and conservative party, but he received assurances from graduates which lead him to retain his seat.

THE prize of $200, annually given by Dr. Frederick Peterson for the best original essay on the etiology, pathology and treatment of epilepsy, was awarded this year to Dr. Julius Donath, of Budapest, Hungary, for his paper on 'The Presence of Cholin in Epilepsy and its Significance in the Production of the Convulsive Attack.'

THE American Museum of Natural History has sent Dr. E. O. Hovey to the Lesser Antilles again to supplement the studies which he made last summer on Martinique and St. Vincent. Dr. Hovey left New York by the steamer *Caribbee,* of the Quebec line, on February 4, and will remain in the Windward and Leeward Islands two months or more. After studying the changes which have taken place on Martinique and St. Vincent as a result of the great eruptions which have occurred since last July, he will visit all the other important volcanic islands of the chain to photograph their craters, solfataras and boiling lakes, with the object of making his final report upon the eruptions of 1902 in the West Indies comprehend the entire series of Caribbean volcanoes. He will make collections of volcanic rocks and other materials for the museum.

THE Danish government is about to send a commission to the Danish West Indies to investigate their condition. Professor Ehlers, of Copenhagen, will accompany the commission to investigate the diseases prevalent on the islands.

Two members of Baron Toll's polar expedition, Lieutenant Matissen, commander of the yacht *Zaria,* and Lieutenant Kolchak, have just arrived in St. Petersburg with nine men of the *Zaria's* crew after an absence of two and a half years.

PROFESSOR HERBERT OSBORN, of the Ohio State University, gave an illustrated lecture on entomology before the Biological Club of DePauw University at Greencastle, Indiana, on the evening of January 28.

SIR WILLIAM BROADBENT will give the third Hughlings Jackson Lecture before the Neurological Society of London during the present year.

A MEETING in memory of the late John Wesley Powell will be held under the auspices of the Academy and affiliated scientific societies of Washington, at the Columbian University, on the evening of February 16, beginning at 8:15 o'clock. On this occasion the following addresses will be given:

'Powell as a Soldier,' by Hon. D. B. Henderson.
'Powell as an Explorer,' by Mr. Chas. R. Van Hise.
'Powell as a Geologist,' by Mr. G. K. Gilbert.
'Powell as an Ethnologist,' by Mr. W J McGee.
'Powell as a Man,' by Mr. S. P. Langley.

THE sum of $1500 has been collected to erect in the Hunterian Museum of the University of Glasgow a memorial of the late Professor John Young. He had been since 1866 keeper of the museum and professor of natural history and lecturer on geology in the university.

A COMMITTEE has been formed in Germany to erect a memorial at Munich to Professor Pettenkofer in recognition of his important contributions to sanitation and hygiene.

SIR GEORGE GABRIEL STOKES, the eminent mathematician, died on February 1, in his eighty-fourth year. Born in Ireland, he was educated at Cambridge, where he was senior

wrangler in 1841, and became Lucasian professor of mathematics in 1849. He was fellow of Pembroke College, was compelled to resign, by his marriage, but was reelected under the statute of 1869 and became later president of the college. He was secretary of the Royal Society from 1854–1885 and president from 1885–1890, president of the British Association in 1869, and member of parliament from Cambridge University from 1887–1892. He was made a baronet in 1889 and was a knight of the Prussian order 'pour le mérite.' Sir George Stokes' contributions to mathematics and mathematical physics have given him a foremost place among the men of science of the world.

Dr. Morrill Wyman, one of the best known American physicians, died at Cambridge on January 29, in his ninety-first year. He had made important contributions to medical science including the recognition of the disease known as hay fever. He was a member of the board of overseers of Harvard University, and received from it the degree of LL.D. in 1886.

It is reported in the daily papers that Mr. John D. Rockefeller will build in New York City, for the Institute for Medical Research, which he has established, a research laboratory to cost with the ground about $1,000,000. It is said that the buildings will be situated on the east side of the city in the neighborhood of Eightieth St.

The German government has appropriated $15,000 for research for the study of the relation between tuberculosis in man and cattle.

A bill has been introduced in the House by Mr. Slayden, of Texas, appropriating $50,000 to aid in the suppression of the bubonic plague in Mexico, and to prevent its spread in the United States. For this purpose the bill authorizes and directs the President of the United States to send a commission of three medical officers of the army and navy to investigate and report the conditions as to this disease there prevalent.

The Pennsylvania Legislature has repealed the Fow Anti-hospital Law, and Philadelphia can now accept the Henry Phipps proposed gift of $1,000,000, and erect near the center of population an institute for the study, treatment and prevention of tuberculosis.

Robert E. Woodward, of Brooklyn, has given $25,000 to the Brooklyn Institute of Arts and Sciences, in memory of his brother, the late General John B. Woodward, and an additional $25,000 in memory of his wife.

The *British Medical Journal* states that the sum of £10,000 has been vested in trustees by Mr. T. Sutton Timmis, for the purpose of systematic investigations into the origin and cure of cancer, which it is intended shall be carried out in the Liverpool Royal Infirmary and the new laboratories of experimental medicine in the University College, Liverpool.

An international conference to discuss the question of erecting an international seismic observatory in Europe will be held at Berne in May. The principal European governments have agreed to send representatives.

The Wisconsin State Board of Agriculture is considering the preservation of a group of three mounds located in State Fair Park at West Allis near Milwaukee. The Wisconsin Natural History Society is to see that these mounds are labeled. There are about one hundred large and several hundred small collections of antiquities in Wisconsin. The society is making efforts to have these placed in various libraries, museums and schools.

The Department of Superintendence of the National Educational Association holds its meeting at Cincinnati from February 24 to 26. Among the addresses and papers are 'How to utilize fully the plant of a city school system,' President Eliot of Harvard University; 'The University of Oxford and Rhodes Scholarships,' Dr. W. T. Harris, commissioner of education; 'Some problems in manual training,' Professor C. R. Richards, Columbia University; and 'Coeducation in high schools and universities,' Professor Albion W. Small, University of Chicago. The National Society for the Scientific Study of Education, The Association of College Teachers of Education and the Educational Press Association meet at the same time and place.

ON February 3, the following papers were read before the Mineralogical Society of Great Britain and Ireland, at Burlington House, London, England: 'On a meteoric stone seen to fall on August 22, 1902, at Caratash, Smyrna': by L. Fletcher, Esq., M.A., F.R.S.; 'Note on the history of the mass of meteoric iron found in the neighborhood of Caperr, Patagonia': by the same; 'On the crystalline forms of carbides and silicides of iron and manganese': by L. J. Spencer, Esq., M.A., F.G.S.; 'The refractive indices of Pyromorphite': by H. L. Bowman, Esq., M.A., F.G.S.; 'Note on quartz crystals from De Aar': by T. V. Barker, Esq. The following dates have been arranged for the meetings for 1903: February 3, March 24, June 9, November 17, anniversary.

'WHY Salt Lake has fallen' is the subject of a paper by L. H. Murdoch, section director of the U. S. Weather Bureau in Salt Lake City, in the *National Geographic Magazine* for February. The rapid decline in the water level of Great Salt Lake during the past few years has caused the people of northern Utah, and more especially those of Salt Lake City, to feel considerable apprehension lest this remarkable body of water will soon be a thing of the past. The reading of the gauge at Garfield Beach on December 1, 1902, was 3 feet 5 inches below the zero of the scale, showing a fall of 11 feet 7 inches since the close of 1886, the year in which the last rise terminated. The present area of the lake is about 1,750 square miles, and its drainage basin is about twenty times that area. The writer feels confident that irrigation can not be charged with more than three or four feet of the last decline in the lake level as irrigation began in 1848, and was in operation during the years that the lake rose rapidly and maintained a high level. From 1887 to 1902 a dry cycle has prevailed, the average precipitation during this period being 14.80 inches or 1.85 inches below normal. The fall in the lake level has been much more rapid during the past three years than for any like period during the preceding years of drought. This is mainly due to the fact that the deficiency in precipitation has been greater during this period than during any similar period of the present dry cycle. The deficiency for the last three years alone was over 13 inches. The lake is not alone in showing the effects of the drought. Streams, springs and artesian wells are drying up, and those which continue active are discharging much less water than a few years ago. It seems to the writer that the large deficiency of 29.60 inches in precipitation during the past sixteen years, as shown by the Salt Lake City records, must be far more of a factor than any possible loss of water resulting from irrigating 609 square miles of land. With precipitation continuing at about 15 inches, no further fall in the lake will occur, and if the annual precipitation is as much as 15 inches for the next three years, a slight rise may be expected. A wet cycle like that which began in 1865 may begin next year, or it may not begin for fifty or more years. When it does occur the lake will respond rapidly and reach levels nearly as high as those recorded in the sixties and seventies.

THE Mathematical Association (London) has received a report from its committee to consider the subject of the teaching of elementary mathematics. According to the abstract in the London *Times* the report of this committee stated, with regard to geometry: "It is desirable (1) that a first introduction to geometry should not be formal, but experimental, with use of instruments and numerical measurements, and calculations; (2) that public schools in their entrance examinations should set a fair proportion of questions requiring the use of instruments, and the obtaining of numerical results from numerical *data* by measurements from accurately drawn figures; and that in their entrance scholarship examinations the same principle should be recognized; (3) that elementary geometry papers, in examinations such as University local examinations, the examinations of the College of Preceptors, Oxford responsions, and the Cambridge previous examination, should contain some questions regarding the practical use of instruments; (4) since pupils will have been already familiarized with the prin-

cipal constructions of Euclid before they begin their study of formal geometry, it is desirable that the course of constructions should be regarded as quite distinct from the course of theorems. The two courses will probably be studied side by side, but great freedom should be allowed to the teacher as to the order in which he takes the different constructions." The report proceeded to deal with the course of constructions, the course of theorems, and the importance of riders. The committee recommended the following general order in teaching the theorems of the first three books, and thought that examiners should be requested to recognize this order:—Book I., Book III. to 32 inclusive, Book II., Book III. 35 to the end; and detailed suggestions were given. As to arithmetic and algebra, the committee considered that there was considerable danger of the true educational value of arithmetic and algebra being seriously impaired by reason of a tendency to sacrifice clear understanding to mere mechanical skill. In view of this they recommend—(*a*) that easy *viva voce* examples should be frequently used in both arithmetic and algebra; (*b*) that great stress should be laid on fundamental principles; (*c*) that, as far as possible, the rules which a pupil uses should be generalizations from his own experience; (*d*) that, whenever practicable, geometry should be employed to illustrate arithmetic and algebra, and in particular that graphs should be used extensively; (*e*) that many of the harder rules and heavier types of examples, which examinations alone compel us to retain in a school curriculum, should be postponed. With these as guiding principles the committee made various suggestions. In view of the great amount of time now required for teaching the various rules connected with our complicated system of weights and measures, the committee recorded its unanimous opinion that the interests of education demanded the early introduction of a decimal system of weights, measures and coinage.

UNIVERSITY AND EDUCATIONAL NEWS.

THE Duke de Loubat has given $100,000 to Columbia University for the establishment of a chair of American archeology. Mr. M. H. Saville, curator at the American Museum of Natural History, has been elected to the professorship.

OBERLIN COLLEGE has received an anonymous gift of $50,000 from the same donor who recently gave $50,000.

MR. ALEXANDER C. HUMPHREYS was installed as president of the Stevens Institute of Technology on February 5. Addresses were made by representatives of the trustees and faculty, by President Charles S. Thwing, of Western Reserve University, by President Henry S. Pritchett, of the Massachusetts Institute of Technology, and by Mr. Andrew Carnegie. The alumni offered a dinner and reception to President Humphreys in the evening.

AN extension of the work of the College of Physicians and Surgeons, Columbia University, is about to be inaugurated by the establishment of summer courses. Practical instruction will be given in general medicine by Drs. Sumner and Draper; in neurology by Drs. Pearce Bailey and Cunningham; in gynecology by Drs. W. S. Stone and Bradley; in obstetrics by Dr. Lobenstine; in ophthalmology by Drs. Clairborne, Holden and Tyson; in laryngology by Drs. Simpson and Frothingham; in dermatology by Drs. Hodgson and Dade; in diseases of children by Drs. La Fetra and Huber; in genito-urinary diseases by the senior assistants in the department; in diseases of the stomach and intestines by Dr. Fischer; in clinical pathology by Dr. Jessup; and in physical diagnosis by Dr. Dow. Each course continues for a period of from three to five weeks, and the work will be adapted to the needs of undergraduates of the third and fourth years, and of practitioners of medicine who desire to pursue further special studies.

DR. K. ALFRED OSANN, of Mülhausen, has been appointed associate professor of mineralogy at the University of Freiburg.

SIR WILLIAM TURNER has been appointed principal of the University of Edinburgh. He has been demonstrator of anatomy in the university since 1854 and professor since 1867.