the atom must have volume if it has mass, and that equal elementary masses imply equal volumes; when he attempts to disprove the possibility of a vortex atom in a homegeneous fluid; when he tries to prove the conception of atoms as centers of force inconsistent with the idea of mass; and in many details of his argument.

With greater success he exhibits the inconsistency and incompleteness of molecular theory in chemistry; shows the inadequacy of the hypothesis of a single ether or a multitude of ethers to explain action at a distance; of the hypothesis—'that scandal of atomistics'—of molecular atmospheres to explain attraction and repulsion; and, in general, of any hypothesis of an indivisible element to explain elasticity and other properties of matter. He compels us to see that our analysis only draws out of the atom what we have put into it; that, indeed, the atom of modern physics is a little world, almost organized, upon which are assembled all the properties and dynamic relations which it was to have been their mission to explain.

E. A. Strong.

Ypsilanti, Mich.

SCIENTIFIC JOURNALS.

THE AMERICAN JOURNAL OF SCIENCE.

The leading article of the May number is a biographical paper about the late Professor Hubert A. Newton, by J. W. Gibbs. It presents a brief account of his life and estimate of his personal character, and besides gives an extended and thorough summary of his contributions to astronomical science. This paper was read before the National Academy of Sciences at the recent meeting in Washington.

A. G. Webster discusses a method of producing constant angular velocity in cases where a considerable amount of power is needed, as in driving a large telescope or siderostat. It is based upon the use of a tuning fork which interrupts an intermittent current and thus regulates an electric motor. Some experiments show that the method is a practical one up to more than one and a-half horse power. The same author also discusses a method for rapidly breaking powerful electrical currents. The end is accomplished by making the break under water while the mercury surface employed is kept clean by being continuously elevated by means of an aspirated pump. By this means the jet is kept cool and presents a continually fresh surface of mercury, this being washed by the flowing water. The apparatus was found satisfactory in a current of twelve mean ampéres carried on for the course of an hour.

John Trowbridge, following out the line of discussion involved in the paper in the April number, discusses the 'Electrical Conductivity of the Ether.' By the method employed the author thinks he obtains an estimate of the energy required to produce the Röntgen rays and also a measure of resistance of sparks in air and different media. He closes thus: "It shows conclusively that the discharge in a Crookes tube at the instant when the Röntgen rays are being emitted most intensely is an oscillatory discharge. In popular language it can be maintained that a discharge of lightning a mile long under certain conditions encounters no more resistance during its oscillations than one of a foot in length. In other words, Ohm's law does not hold for electric sparks in air or gases. Disruptive discharges in gases and in air appear to be of the nature of voltaic arcs. Each oscillation can be considered as forming an arc. It is well known that a minute spark precedes the formation of the voltaic arc in air. The medium is first broken down and then the arc follows. I believe that this process occurs also in a vacuum and that absolute contact is not necessary to start the arc. My experiments lead me to conclude that under very high electrical stress the ether breaks down and becomes a good conductor."

T. W. Richards and John Trowbridge discuss the effect of great current strength on the conductivity of electrolytes. Experiments were made with copper sulphate and zinc sulphate, and the conclusion is reached that the conductivity is not essentially affected by great changes in the strength of the current.

H. S. Williams has a paper on the Southern Devonian formations, especially in southern Virginia, Tennessee and Kentucky, where he has recently carried on personal observations. He shows the remarkable contrast which exists between the formation as known in New York State and that as developed in the South, where

it is characterized by a uniform black shale with even sedimentation. An hypothesis is advanced to account for this difference and some broad fundamental principles laid down which apply to such problems in general. C. D. Walcott gives a brief description of a new species of *Lingulepis* from the Middle Cambrian, in the Yellowstone Park.

A. W. Duff discusses the secondary undulations of the water surface noted in tidal observations on the Bay of Fundy. At Indiantown, near St. John, New Brunswick, slight fluctuations of level were noted on a calm day, which had a fairly constant period of thirty-five seconds. There was found also a series of larger undulations obtained in the record which had a period of from thirty to forty minutes. Both series ceased at about the same time—about half an hour after high water. In connection with these, the author reviews observations made by various authors on the *seiches*, particularly those of Forel on Lake Geneva. It is shown that Forel's formula gives with fair accuracy the proper period for the secondary undulations, but while the Swiss *seiches* are regarded as connected with the abnormal conditions of the barometer, no such relation appears to exist in the case here described.

S. L. Penfield and H. W. Foote describe a new silicate from Franklin Furnace, N. J., to which they give the name Rœblingite, which is remarkable in containing sulphur dioxide (SO_2) and lead.

THE AUK.

THE April number opens with two papers on the spring plumage of the bobolink, respectively by Arthur P. Chadbourne and Frank M. Chapman, the first being illustrated with a colored plate. Dr. Chadbourne describes a case of the change of color in a caged male bobolink to the spring dress without any loss or renewal of feathers, whereupon he claims that 'color change in the individual feather is fact, not theory,' and that "the change to the breeding dress in the male bobolink sometimes takes place without a so-called 'moult.'" Mr. Chapman's paper is to some extent in the nature of a rejoinder to Dr. Chadbourne's, especially in respect to a specimen of a moulting spring bobolink from Corumbá, Brazil, which Dr. Chadbourne regards as acquiring the breeding dress partly by moulting and partly by change of color in the feathers themselves, an interpretation, which, Mr. Chapman claims, is quite without basis in fact as regards the feathers alleged to be changing color.

Charles W. Richmond describes ten new species of birds from the Kilimanjaro region of East Africa, collected by Dr. W. L. Abbott; A. W. Anthony describes several new birds from Lower California; W. W. Price describes a new pine grosbeak from California, and Leonhard Stejneger a new guillemot from the Kuril Islands. Harry C. Oberholser discusses at length the characters and relationships of the Western forms of the long-billed marsh wren, describing a new subspecies. William Leon Dawson gives an interesting annotated list of the birds of Okanogan county, Oregon; and A. W. Butler writes of various rare birds occurring in Indiana, including an account of the recent remarkable occurrence of Brünnich's murre far inland.

The department of 'General Notes' includes, as usual, a large number of notes on rare or little known species, and a number of important nomenclatural notes; 'Recent Literature' contains sixteen pages of reviews and notices of recent ornithological publications; 'Correspondence' and 'General Notes' complete the number, which is much larger than usual and is filled with matter of unusually varied interest.

SOCIETIES AND ACADEMIES.

BIOLOGICAL SOCIETY OF WASHINGTON—275TH MEETING, SATURDAY, APRIL 10.

DR. THEO. GILL and Mr. C. H. Townsend presented by title, 'Diagnoses of New Species of Deep Sea Fishes.'

Dr. Jonathan Dwight, Jr., under the title, 'A Species of Shearwater (*Puffinus assimilis*, Gould) New to the North American Fauna,' noted the occurrence of this species as a straggler, on Sable Island, on September 1, 1896.

Mr. Sylvester D. Judd spoke on 'Antennal Circulation in Crangonyx.'

Mr. Charles T. Simpson read 'Notes on the Classification of *Unios*,' being a brief sketch of the anatomical work of Lea, Agassiz, Kirtland