Pacific side and their ejecta built a dam across the outlet of the gulf, thereby forming the lake basin. As this dam increased in height the waters behind it were raised until they overtopped the continental divide and escaped to the Atlantic, forming the present San Juan. The region has suffered a recent depression by which the rivers were drowned, and their estuaries thus formed have since been silted up.

Wm. F. Morsell.

DISCUSSION AND CORRESPONDENCE.

MATTER, ENERGY, FORCE AND WORK.

To the Editor of Science: In the generous and appreciative review by Professor Mendenhall (in Science, p. 24, January 6) of my book on 'Matter, Energy, Force and Work' there occurs a line to which I would like to advert briefly. "'The something' which distinguishes *substance* from *matter* is *energy*. 'A designated quantity of substance consists of a definite quantity of matter in permanent association with a definite quantity of energy or motion.' The two words 'or motion' render this statement somewhat obscure. What is meant by a 'definite quantity of motion?' Professor Holman's definition of motion is that of nearly all writers, namely, 'change of relative position.' It is a curious but common practice to define it in this way and then to define its 'quantity' by associating with it something (matter, mass) absolutely unlike it in every respect. It is certainly not in this sense that he means to use it in the phrase above quoted."

I desire to express my assent to this comment and to reply to the query therein contained, or rather to remove, if I may, the obscurity. This result will, I think, be effected if for the words 'of motion' in the description of substance be substituted the phrase: *or permanently endued with some definite mode of motion.*

May I also add, to preclude possible misapprehension, that the proposition 'Continuous, uniform, and permanent occupancy of space,' quoted at page 25, is one which I do not advance as a definition of matter, or as a logical deduction from known premises, but only as a possible view of matter if the *unproved* hypothesis of the kinetic nature of all energy be adopted as a step in the inference.

With sincere thanks for your courtesy in presenting this review, I am

Yours truly,

Silas W. Holman.

Brookline, Mass., January 17, 1899.

ZOOLOGICAL BIBLIOGRAPHY.

To the Editor of Science: Dr. Dall's 'tolerably active and rather long experience' has been singularly blessed if he has never met with an advance copy of a paper issued at an uncertain date, not offered for sale, and conflicting in its contents with some other paper offered for sale at a known date about the same period; if he or the libraries he frequents have always been able to purchase without a delay of more than one year the new books or pamphlets that he wanted to see; if he has always had so much as a printed postcard in reply from authors whose works he has sought in exchange for his own; and if he has always been able to find the address of every writer with whom he wished to communicate. A restricted and short experience has acquainted me far too thoroughly with all these difficulties, but, as this is not an autobiography, the details need not be inflicted on your readers. Dr. Dall shall have them if he wishes.

Apart from his scepticism, Dr. Dall appears to agree, at least in spirit, with the proposal that he has now twice criticised. But two remarks of his seem to call for reply.

My committee has not yet definitely pronounced on the question: What constitutes publication? But it is safe to say that it does not regard printing as publication, and therefore sees no great value in placing 'the actual date of printing' on every signature. This, too, may be said: That a *British* Association Committtee would never recommend an author to sell his papers without an express agreement with the society that has been at the expense of setting up the type, and perhaps of drawing the plates. In our country this may be done, but it is not regarded as particularly creditable to the author that does it. Customs are, no doubt, different elsewhere; but our proposal was an attempt to render the speediest possible publication compatible with commercial morality as recognized here. Perhaps it is this

difference in the point of view that has made our report (as reprinted, not 'abstracted,' in SCIENCE), so unintelligible to Dr. Dall. Another argument for due recognition of the publishing society may be found in such facts as this: A scientific library recently purchased three separate papers, which had been advertised as independent publications and enquired for by readers; all these have since arrived in the regular manner in the report of a society, and the library has as good as thrown away seven shillings through no fault of the librarian. The constant recurrence of this kind of thing renders the authorities very chary of purchasing separately-issued pamphlets, and the workers, few of whom can afford to buy for themselves, have to suffer. Surely any proposal to remedy this should meet with support.

F. A. BATHER.

BRITISH MUSEUM (NAT. HIST.),
January 10, 1899.

NOTES ON INORGANIC CHEMISTRY.

A PAPER was read by Dr. Morris W. Travers before the Royal Society, November 24th, on the origin of the gases evolved in heating mineral substances, meteorites, etc. According to the theory of Professor Tilden these gases are enclosed in minute cavities at high pressure. It is known that some minerals, as quartz, contain liquid hydro-carbons and carbon dioxid, enclosed in cavities, but from a series of exhaustive experiments Dr. Travers concludes that this cannot be the case with the more permanent gases, such as hydrogen, carbon monoxid, nitrogen, helium and argon. He proposes the theory that in the majority of cases where a mineral substance evolves gas under the influence of heat the gas is the product of the decomposition or interaction of its *non-gaseous* constituents at the moment of the experiment. In cleveite and other minerals which contain helium only about one-half this gas is evolved by heat, and hence it would seem that it exists in the form of a compound which is only partially decomposable by heat.

IN a series of analyses of atmospheric air from different sources Armand Gautier, in the *Comptes Rendus*, finds that combustible gases containing carbon are present to a variable degree; on high mountains and over the ocean only traces are found, but a decided quantity in the air of cities. More remarkable, and contrary to previous observers, Gautier finds hydrogen as a constant constituent. The amount he gives is 1.5 volumes in 10,000, or half as great as that of carbon dioxid. Fuller particulars are promised in a later article, which will be looked forward to with no little interest.

THE confusion which attends the use of the sign % for both per cent. of weight and per cent. of volume is patent to all chemists as well as others. At the Congress of Applied Chemistry at Vienna it was proposed by Otto Bleier to confine the use of the sign % to per cent. by weight and to use $^0/_v$ for volume per cent. This was opposed in the discussion by Weinstein. In a recent *Chemiker-Zeitung* Bleier makes a number of proposals, some one of which he hopes will so commend itself to chemists that uniformity may be secured. The proposals, in addition to his original one, are as follows: a. $^0/_g$ or $^0/_p$ (or $^{\cdot}/_g$ or $^{\cdot}/_p$) for weight per cent., and $^0/_v$ (or $^v/.$) for volume per cent.; b. $^g/_0$ or $^p/_0$ (or $^g/.$ or $^p/_0$) for weight percent., and $^v/_0$ (or $^v/.$) for volume per cent.; c. $^g\,|_g$ or $^p\,|_p$ for weight per cent., and $^v|_v$ for volume per cent.; d. % for weight per cent., and $^{\cdot}/.$ for volume per cent., or *vice versa*; e. $^0\,|_g$ or $^0\,|_p$ for weight per cent., and % for volume per cent. Since the sign % is used so much more frequently to indicate per cent. by weight, it would seem that Bleier's original proposal, which is to confine the use of % to weight and to adopt $^0/_v$ for volume, would be most simple and would speedily reduce the present confusion to a minimum.

THE bacteriological test for the presence of arsenic proposed by Gosio has been further investigated by F. Abba and the results published in the November number of the *Centralblatt für Bakteriologie und Parasitenkunde*. The method consists in growing *Penicillium brevicaule* close to the substance to be examined for arsenic. arsenic is present a strong garlic odor is developed. The method was found to be successful in testing a series of over a hundred dried hides. As regards its delicacy it was found far superior to Marsh's test, as was shown in one