and which gradually loses its oxygen by breathing and accumulates impurities, such as carbonic acid gas, shall be returned in a closed cycle for purification and restoration of its original composition. Gas filters would be used to take out impurities and effete gases, and new oxygen would be supplied in accordance with the advisability discoverable by gas tests, so that the same helium could be used over and over again for a great length of time without any considerable loss. In the same way, in a caisson, where the space is considerable, filters can be mounted within the caisson, through which the atmosphere can be circulated, filtering out the effete gases and impurities, and perhaps reducing the moisture by drying and returning the same to the caisson; while it is perfectly easy in this case to replenish oxygen by oxygen in pressure tanks or by using dioxide of barium or dioxide of sodium, to obtain any desired enrichment with oxygen to take the place of that which has been consumed. All of this can be put under automatic control, even within the caisson itself. An air-lock could also be constructed for saving as much as possible the helium from diffusion and loss when such lock is operated. Helium being a light gas, the exit from the air-lock should be in a downward direction and not upward. In other words, the trap door, as it were, should open outward in the air space in the form of a depending syphon, so that the helium necessarily escaping into the air-lock could be pumped out and recovered.

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BALL DANCING ON WATER-JET

A NOTE in *Science Abstracts* for January, 1927, reminds me that in the issue of SCIENCE for August 13, 1926, Mr. W. C. Baker discussed "The Retention of a Ball by a Vertical Water-Jet," reaching the conclusion that the "law of Bernoulli," sometimes referred to in this connection, has little if anything to do with the matter.

I reached a similar conclusion many years ago, writing in the *Youth's Companion*, probably about 1902. On page 166 of my "Elements of Physics," published in 1912, is a figure with the legend "Action and Reaction due to Adhesion," and the accompanying text reads substantially as follows: "If a spool carried on a flexible horizontal support is made to touch one side of a slender vertical jet of water, adhesion of the spool to the water deflects the stream, making it turn partly around [and above] the spool. The reaction for this action is a pulling of the spool toward and into the stream, so that it is presently hit on its under side by the rising water and is accordingly lifted. This phenomenon suggests an explanation of the fact that a small ball of cork or wood may be supported for a considerable time, perhaps many minutes, in such a jet of water as that just described, without falling out at the side."

The spool was carried by a rod on which it was free to turn, and it did turn briskly as the stream of water wound about it. The shape of the stream, drawn out into a thin web at the place of parting from the spool, plainly showed the action of adhesion. To allow sidewise motion of the spool the rod supporting it was carried by a piece of clock-spring.

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INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE

THE secretary of the International Commission on Zoological Nomenclature has the honor to announce the publication of Opinions 91 to 97 (rendered by the International Commission on Zoological Nomenclature) by the Smithsonian Institution in Smithsonian Miscellaneous Collections, volume 73, number 4, pages 1 to 30. The summaries read as follows:

OPINION 91. Thirty-five generic names of mammals placed in the official list of generic names: The following names are hereby placed in the official list of names: *Alces, Arvicola, Ateles, Bison, Bradypus, Canis, Capra, Cebus, Cervus, Choloepus, Condylura, Cricetus, Crocidura, Cystophora, Dasyprocta, Didelphis, Erethizon, Felis, Gulo, Halichoerus, Lepus, Lynx, Mus, Myrmecophaga, Nasua, Ovibos, Phyllostomus, Procyon, Putorius, Rangifer, Rhinolophus, Rupicapra, Sciurus, Sorex, Vespertilio.*

OPINION 92. Sixteen generic names of *Pisces, Amphibia* and *Reptilia* placed in the official list of generic names: The following names are hereby placed in the official list of generic names: PISCES: *Blennius, Echeneis, Esox, Ophidion.* AMPHIBIA: *Cryptobranchus, Desmognathus, Siren.* REPTILIA: *Alligator, Calamaria, Chelydra, Crotalus, Dermochelys, Eremias, Lacerta, Mabuya, Phrynosoma.*

OPINION 93. Twelve generic names of fishes placed in the official list, by suspension of the rules: The following twelve generic names of fishes are herewith placed in the official list of generic names, under the plenary power for suspension of the rules: *Conger* Cuv., 1817 (*Muraena conger* L.); *Coregonus* Linn., 1758 (*Salmo lavaretus* L.); *Eleotris* Bloch & Schneider, 1801 (*gyrinus* Cuv. & Val.); *Epinephelus* Bloch, 1792 (*marginalis* Bloch); *Gymnothorax* Bloch, 1795 (*reticularis* Bloch); *Malapterurus* Lacépède, 1803 (*Silurus electricus* L.); *Mustelus* Linck, 1790 (*Squalus mustelus* L. [=*Mustelus laevis*]); *Polynemus*

Linn., 1758 (*paradisaeus* L.); *Sciaena* Linn., 1758 (*umbra* L. = *Cheilodipterus aquila* Lacép. as restr. by Cuvier, 1815); *Serranus* Cuv. (*Perca cabrilla* L.); *Stolephorus* Lacép., 1803 (*commersonianus* Lacép.); *Teuthis* Linn., 1766 (*javus* L.).

Names now current are not to be discarded unless the reasons for change show a clear-cut necessity.

OPINION 94. Twenty-two mollusk and tunicate names placed in the official list of generic names: The following names are hereby placed in the official list of generic names: MOLLUSCA: *Anodonta, Argonauta, Buccinum, Calyptraea, Columbella, Dentalium, Helix, Limax, Mactra, Mya, Mytilus, Ostrea, Physa, Sepia, Sphaerium, Succinea, Teredo.* TUNICATA: *Botryllus, Clavelina, Diazona, Distaplia, Molgula.*

OPINION 95. Two generic names of *Protozoa* placed in the official list of generic names: The following names are hereby placed in the official list of generic names—PROTOZOA: *Endamoeba, Trypanosoma.*

OPINION 96. Museum Boltenianum: The commission accepts the Museum Boltenianum 1798 as nomenclatorially available under the international rules.

OPINION 97. Did Hübner's Tentamen, 1806, create monotypic genera?—Hübner's Tentamen, 1806, was obviously prepared essentially as a manifolded manuscript, or as a proof sheet (cf. Opinion 87), for examination and opinion by a restricted group of experts, *i.e.*, in *Lepidoptera*, and not for general distribution as a record in Zoology. Accordingly, the conclusion that it was published in 1806 is subject to debate. Even if the premise be admitted that it was published in 1806, the point is debatable whether the contained binomials should be construed as generic plus specific names. Even if it be admitted that the binomials represent combinations of generic plus specific names, they are essentially *nomina nuda* (as of the date in question) since authors who do not possess esoteric information in regard to them are unable definitely to interpret them without reference to later literature. If published with more definite data at later dates, these names have their status in regard to availability as of their date of such republication.

C. W. STILES, *Secretary*
U. S. PUBLIC HEALTH SERVICE

PROFESSOR BARUS AND COLLOID CHEMISTRY

On reading over a paper entitled "Remarks on Colloidal Silver" published by that sterling investigator Carl Barus, of Brown University, in the *American Journal of Science* for December, 1894 (Vol. 47, p. 451–4), I am struck by the remarkable manner in which in so small a space he has foreshadowed so many of the subsequent developments of colloid chemistry. Thus aggregation and dispersion methods and the colloidal zone are well indicated in the following:

"Suppose a solid is dropped into an excess of its solvent. In order that the system may become a solution, the disaggregation must at least reach the molecule. In electrolytes it may go further as is evidenced by Arrhenius's celebrated factor 2. But, under other circumstances, may not the separation stop short *before* the molecule is reached; or conversely, may not the process of growth be arrested in virtue of an equilibrium of when a precipitate is being formed out of individual molecules forces when the particles formed consist of 2, 10, 100, or even 1000 molecules? To answer affirmatively is to find a home for the family of colloidals, and they will more nearly resemble solutions in proportion as the particles are smaller. Certainly the beam of light is no longer an available criterion, for the whole phenomenon is mapped out on a scale which is small even in comparison with the wave length of light."

His experiments on ultrafiltration are thus referred to:

"In the endeavor to pass compressed air through a wet porous porcelain septum into water, I was struck by the magnitude of the pressures necessary. Supposing I waited long enough to insure the transpiration of liquid, no flow of gas through the septum occurred for pressures of even in excess of 100 lbs., excepting at isolated points which were obviously the seat of fissures . . . [the superior limit of] $r = 18 \times 10^{-6}$ cm nearly, making the diameter ($2r$) of the pores smaller than the wave length of violet light. Schneider showed however that colloidal silver passes readily through such a septum whereas the alcoholic precipitate fails to do so. The particles are therefore respectively smaller and larger than the diameter given. If 10^{-8} cm be taken as the order of molecular dimensions, the size in question is at least 1,000 times as large, showing the aggregates to consist of the enormous number of 10^9 molecules at least. There is thus an abundance of room for particles containing (say) 100 molecules to the aggregate, and forming suspensions in water (colloids) in their general aspects hardly distinguishable from true solutions."

It is interesting to ask how great a pressure would force the water out of a septum just large enough to let the particles of the size in question (5×10^{-8} cm) pass. It would take several thousand atmospheres, and it is therefore quite impossible to test finer septa like animal membrane to the extent in question. Nevertheless if the attempt be made to *grade* porous clay septa, prepared by successive vitrifications, by the method given, I dare say that a range of mean