range of temperature within narrow limits in the waters and throughout the earth. Even more exact is the regulation of the alkalinity of the ocean by means of carbonic acid, through its unique solubility and ionizing power. These are but two among many examples of maximal efficiency in regulation.

The renewal of matter and energy are not less highly favored. The properties of water ensure everywhere the highest availability of supplies in the greatest number and concentration. Further the three elements carry with them the possibility of maximal energy supplies. In some respects, indeed, the ubiquity and mobility of water and carbonic acid, their presence in the sea, in the lakes and streams, in the air, and in the soil, which depend upon the combined action of the unique solubility of carbonic acid, the unique vapor tension of water, and its unique surface tension, seem the most remarkable of all fitnesses.

I can not further develop these considerations here, for they are too numerous and too varied, but I have elsewhere treated them extensively.[8] In truth, all the properties of water, of carbonic acid, of the compounds of carbon, hydrogen and oxygen, of the ocean, and of the meteorological process, so far as the present state of science permits their analysis, need to be considered, for each adds to the argument. Each contributes to duration, or to activity, or to the phases, or compounds, or concentrations of possible systems. Each tends to increase rather than to restrict the possibilities of mechanism, and each is the best, or nearly the best, among all the known substances in the world. And the ensemble of these properties is perfectly and extraordinarily unique.

All of these relationships are merely physical, nothing about them is biological except their importance.

From such considerations there can be but one conclusion: the unique ensemble of properties of water, carbonic acid and the three elements constitutes among the properties of matter the fittest ensemble of characteristics for durable mechanism. No other environment, that is to say no environment other than the surface of a planet upon which water and carbonic acid are the primary constituents, could so highly favor the widest range of durability and activity in the widest range of material systems—in systems varying with respect to phases, to components, and to concentrations. This environment is indeed the *fittest*. It has a claim to the use of the superlative based upon quantitative measurement and exhaustive treatment, which is altogether lacking in the case of the fitness of the organism. For the organism, so we fondly hope, is ever becoming more fit. and the law of evolution is the survival of the fitter.

Yet it is only for mechanism in general, and not for any special form of mechanism, whether life as we know it, or a steam engine, that this environment is fittest. The ocean, for example, fits mechanism in general; also, if you will, it fits the whale and the plankton diatom, but not man or a butterfly. But, of course, as everybody has known since 1859, it is really the whale and the diatom which fit the ocean. And this leads to the true conclusion of our investigation.

Just because life must manifest itself in and through mechanism, just because, being in this world, it must inhabit a more or less durable, more or less active physico-chemical system of more or less complexity in its phases, components and concentrations, it is conditioned. The inorganic, such as it is, imposes certain conditions upon the organic. Accordingly, our conclusion is this: *The special characteristics of the inorganic are the fittest for those general characteristics of the organic which the general characteristics of the inorganic impose upon the organic.* This is the one side of reciprocal biological fitness. The other side may be similarly stated: Through adaptation the special characteristics of the organic come to fit the special characteristics of a particular environment, to fit, not any planet, but a little corner of the earth.

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[8] See "The Fitness of the Environment."

THE PITTSBURGH EXPERIMENT STATION OF THE BUREAU OF MINES

PLANS for the proposed $500,000 experiment station of the United States Bureau of

Mines to be located in Pittsburgh, Pa., have been approved by the commission appointed by congress for that purpose. The federal government now owns the property upon which will be erected a group of buildings, especially designed and adapted for the carrying on of the mine safety work and other investigations in which the Bureau of Mines is interested.

Congress a year ago, in the public buildings bill, authorized a new home for the Bureau of Mines to cost $500,000. It is now expected that congress in its present session will make a specific appropriation so that construction work may begin. It is hoped that contracts may be let by July 1. The director is hopeful that the buildings may be completed in the fall of 1915, when they will be dedicated with suitable ceremony, including a second National Mine Safety Demonstration, similar to that held at Pittsburgh in 1911.

The commission which has approved the plans consists of J. A. Holmes, D. C. Kingman, chief of engineers of the United States army and O. Wenderoth, supervising architect of the treasury. The state of Pennsylvania has appropriated $25,000 for cooperation in establishing this experiment station and has appointed a state commission consisting of James E. Roderick, chief mine inspector, Dean W. R. Crane, of the mining department, Pennsylvania State College, and W. H. Caverly. This latter commission has tentatively approved the plans.

The buildings which will constitute the experiment station of the bureau will form a part of a most remarkable and unusual group of monumental edifices devoted to educational purposes. On one side the bureau's buildings will face the great group of structures of the Carnegie School of Technology. On another side is the Carnegie Institute, in which are the art gallery, museum and library. Nearby is the imposing pile of buildings of the University of Pittsburgh. Other nearby buildings are the Memorial Hall, Pittsburgh Athletic and University Club and the Hotel Schenley. The site consists of nearly twelve acres of land, part of it on the higher level of the city streets and part of it on the level of the B. & O. Railroad, which railroad will furnish adequate facilities for passengers and freight traffic.

The group consists of three main buildings facing Forbes Street and the several street-car lines from the uptown district. The central building of the group, the mining building, will be three stories in height, flanked by two main buildings, one the mechanical and the other the chemical building. In the rear of these and inclosing a court will be the service building. Beyond the service building and spanning what is known as Panther Hollow and thus connecting the Bureau of Mines buildings with the Carnegie Schools, will be two buildings over the roofs of which will pass the roadway from Forbes Street to the Carnegie School buildings and Schenley Park.

Between the main group and the power and fuel group will be the entrance to a series of mine shafts. One of these will be used as an elevator to carry heavy material and passengers from the lower level to the upper; another will be for tests of hoisting ropes and similar mining appliances; another will be an entrance to tunnels extending under the buildings and in which mining experiments, such as fighting mine fires, will be conducted.

The portion of Panther Hollow above the power buildings will be arranged as a miners' field, the slopes of the ravine being utilized as an ampitheater which will accommodate 20,000 spectators who may assemble here to witness demonstrations and tests in mine rescue and first-aid.

The main or mining building will contain the administrative offices, and those of the mining force. In it will be an assembly and lecture hall, a library and smoke and other rooms for demonstrations and training in mine rescue and first-aid. The mechanical building will be for experiments and tests of mining machinery and appliances and the chemical building for investigation and analyses of fuels, explosives and various mineral substances.

The buildings now used by the Bureau of Mines as an experiment station at Pittsburgh

were loaned to the bureau by the War Department as an emergency measure when the bureau was created. The War Department has suggested that it now needs these buildings and it is felt the bureau can not retain possession much longer. The buildings are very old and are entirely unsuited to the needs of the Bureau of Mines work. It is said that the investigations have been seriously handicapped by the inadequacy of the structures now in use.

THE FUR-SEAL COMMISSION

THE President of the United States and the Secretary of Commerce have approved the recommendation of the Commissioner of Fisheries for the appointment of a special fur-seal commission, to visit the Pribilof Islands during the present season for the purpose of advising the government as to the condition of the seal herd and of making recommendations regarding the policy that should be adopted with reference thereto.

The members of the commission, in accordance with the suggestion of the Commissioner of Fisheries, have been selected by outside agencies and have had no previous connection with the fur-seal controversy.

In response to a request that a duly qualified assistant of the Department of Agriculture, versed in the breeding and other habits of wild and domestic animals, be designated to serve as a member of the commission, Mr. Edward A. Preble, assistant biologist of the Bureau of Biological Survey, has been nominated by the Secretary of Agriculture.

The Secretary of the Smithsonian Institution was requested to name, as a second member of the commission, a person duly qualified to make a critical study of the economic relations and obligations of the government toward the fur-seal herd, the natives of the seal islands, and the fur trade. Mr. Wilfred H. Osgood, of the Field Museum of Natural History, Chicago, has been chosen for this purpose.

The President invoked the National Academy of Sciences to nominate as a third member of the commission a person qualified to study the scientific and economic questions involved in the administration of the seal herd; and Dr. George H. Parker, of Harvard University, has been duly nominated.

Arrangements have been made for sending the commissioners to and from the seal islands on a revenue cutter; they will arrive in the latter part of June and will remain until the second week in August, thus covering the most critical periods of the land life of the seals.

SCIENTIFIC NOTES AND NEWS

THE spring meeting of the council of the American Association for the Advancement of Science will be held at the Cosmos Club, Washington, D. C., on the afternoon of Tuesday, April 21, at 4:45 o'clock.

AT the general meeting of the American Philosophical Society, held at Philadelphia from April 23 to 25, there will be presented to the society a portrait of the late Samuel Pierpont Langley, a former vice-president.

AS has already been noted in SCIENCE, the American Chemical Society is holding its spring meeting at Cincinnati, Ohio, during the present week. Each of the sections has a full and important program. At the general session on the first day, after addresses of welcome by the mayor of the city and the president of the University of Cincinnati, and a reply by the president of the society, Professor Theodore W. Richards, the following papers were announced: Arthur L. Day, "The Chemical Problems of an Active Volcano"; L. J. Henderson, "The Chemical Fitness of the World for Life"; W. D. Bancroft, "Flame Reactions"; Irving Langmuir, "Chemical Reactions at Low Pressures."

A PORTRAIT of Sir William Ramsay, painted by Mr. Mark Milbanke, has been presented to University College, London, by former colleagues and past students. Professor J. Norman Collie made the address. A replica of the portrait has been presented to Lady Ramsay.

PROFESSOR JOHN F. DOWNEY, dean of the college of science, literature and the arts, of the University of Minnesota and professor of