Naturelle, Faculté de Médecine, Institut Pasteur, École Normale Supérieure, and the various libraries of the laboratories of the Université de Paris and the Collège de France. Besides these rather specialized libraries there are others, such as the Bibliothèque Nationale and the Bibliothèque de l'Institut de France, which contain biological periodicals and books.

While the franc has been reduced to about one fourth of its pre-war value, the funds which these libraries receive for the purchase of books have in some cases remained the same as before the war, in others been but inadequately increased. This creates a very acute condition for these institutions. Were it not for the liberality of the Rockefeller Foundation, one could find almost no current American and English periodicals in France. As it is, the current issues of certain journals, such as the *Anatomical Record,* the Proceedings of the Society for Experimental Biology and Medicine, *Genetics,* etc., are not found at all in public libraries. Others, such as the *Biologisches Centralblatt, Archiv für mikroskopische Anatomie und Entwickelungsmechanik, Journal of Morphology and Physiology, Journal of Comparative Neurology, Quarterly Journal of Microscopical Science, Nature, Die Naturwissenschaften,* SCIENCE, etc., are found only in one or two libraries.

American scientists could do much, if they would, to alleviate this temporary curtailment of scientific literature. In many American institutions several members of the biological departments get the same journals and, after reading them, lay them aside unbound, often not to be consulted again, since those journals are kept also in the department library. If such journals were regularly sent to some library in Paris or some other part of France they would have a thousandfold value for science. Duplicates of SCIENCE, the Proceedings of the Society for Experimental Biology and Medicine, the Proceedings of the National Academy of Sciences, the Wistar journals, etc., would be most welcome. Such journals could be sent to the biological libraries of the Université de Paris (Laboratoire d'evolution des êtres organisés, Anatomie comparée, Zoologie, Biologie expérimentale, Physiologie, Botanique), to the other Parisian libraries enumerated above and to those in other university towns.

Another scheme which, however, would entail some sacrifice on the part of publishers, would be to adopt the plan recently put into practice, for *Isis,* by its eminent editor, Dr. G. Sarton. This would consist in giving special temporary low rates of subscription to countries with a low exchange. To the honor of French editors it may be said that, even under the difficult financial conditions in which they find themselves at the present time, they have adopted this plan for countries whose exchange is lower than France's, such as Roumania and other Balkan states. If such a plan were adopted in America, it would permit French libraries to subscribe to American journals, which it is impossible for them to do at present. One must remember that French journals can be had for about half the price which must be paid for corresponding American, English or German publications.

Finally, a system of exchanges could be started between American and French universities and scientific libraries. French scientists would gladly cooperate in such a scheme.

No greater good could be done to French science than to help rebuild its libraries. While the war has left almost no harmful trace on American science, French scientists are laboring under the double load of decreased personnel and very small funds. The present state of science absolutely requires international cooperation; much could be done for France by America in helping it to keep a position in which it can again produce a Lamarck, a Pasteur, a Claude Bernard.

RAOUL M. MAY,
Parker Fellow, Harvard University
UNIVERSITÉ DE PARIS,
PARIS, FRANCE

ANALYZED SOUND

LAST year I submitted a communication under the title, "Analyzed sound in nature,"[1] consisting of a series of descriptions of musical echoes from natural sounds, such as waves and waterfalls, in which so many pitches were included as to give no impression of musical sounds when directly heard. In this communication the reports of five individuals were included. Since then similar observations have been reported in SCIENCE by Professor Yandell Henderson (September 26, 1924) and Professor C. Macfie Campbell (May 22, 1925).

This spring a report has come to my notice which seems to me of exceptional interest in connection with my own observation, included in the communication of July 4, 1924. That observation was that on July 27, 1903, while walking along the shore of the river near the middle of the Big Horn Canyon, I heard a loud howl beginning at a high pitch and ending in a low pitch, and that the howl reversed itself when I stepped back over the same ground. The howl proved to be nothing more than the roar of the river, something in my surroundings placing the notes of high pitch in one place and those of a low pitch in

[1] SCIENCE, July 4, 1924.

another. In a book entitled "Locating the Iron Trail," by Edward Gillette (Christopher Publishing House, Boston, 1925), three trips through the Big Horn Canyon are described. Besides Mr. Gillette's trip on the ice, there is the account of the trip in which my observation is mentioned (see pages 110 and 111), and the description of one of the two previous trips by boat, written by J. W. Newell. That trip was made in August, 1893. The following passages from Mr. Newell's account seem to me of great interest in connection with this problem of analyzed sound. On page 92, in the description of their passage down the river before reaching the canyon, there appears the following:

As we approached the ferry, a group of men came down to the bank and hailed us. They had heard through the newspapers that a party of Sheridan men were out on an excursion with its itinerary including a passage through Big Horn cañon on a boat, and they wanted to know if we were "it." With the very best of intentions they warned us to turn back and abandon the proposed passage in a boat, and particularly such a boat as we had. They said it was too heavy and clumsy to be safely taken over the numerous rapids; that it would be dashed to pieces on the rocks and that we would all be drowned before we had proceeded a mile. They repeated some of the stories we had heard before leaving home, and told of unearthly noises that were reported to have come out of the cañon on the wings of the wind—howls and screams which made the hair stand on end—and could have emanated from no human being or animal known to exist at that day and age of the world.

One of them was sure that some supernatural beings or forces which nothing human could withstand would be encountered in the depths of the cañon, and that if we persisted in going we would never be heard of again. He kindly volunteered to inform our folks at home of the day and date of our passing in case we never came out. Later we imagined we could explain the sounds that had been heard, as being produced by perfectly natural causes.

On pages 95 and 96, apropos of shots fired at mountain sheep, there appears the following:

Our shots echoed and reverberated from the wall on one side to the opposite wall until it seemed as though a dozen shots had been fired. . . .

While the report of a rifle is so magnified in the cañon, a shot fired up the mountain side is not heard below. The unearthly sounds in the cañon which chill the blood and almost cause nervous prostration, no doubt came from the roar of the rapids being reflected by the walls of the cañon acting as a sounding board in places. The sounds are startling, being unusual, and cause one to imagine them as coming from an unknown animal of enormous size.

I had heard nothing of these early traditions and observations when in July, 1903, I heard the howl arising from the roar of the river and was therefore not on the lookout for it. It is interesting, therefore, to see that similar sounds in this canyon had created such a profound impression on early settlers and that an observation so similar to my own was recorded ten years earlier by one of the parties that traversed the canyon in a boat.

ALEXANDER FORBES
HARVARD MEDICAL SCHOOL

LOSS OF VIRULENCE IN FUNGI

THERE is a general idea among plant pathologists that many fungi lose their virulence, at least in some degree, when grown in culture. Definite and authentic cases of this phenomenon appear to be not easy to find. Burkholder[1] has recently studied a strain of Fusarium, which was originally isolated from a bean plant, and which after six years in culture had largely lost its power to infect beans. When grown for a month as a parasite on beans, it regained its old virulence. This change in physiological behavior was accompanied by certain morphological changes.

The manner in which a fungus can be so changed requires explanation. At first glance it looks like the inheritance of environmental effects. But changes due to environmental factors have been found not to be inherited in other plants, and many of us do not believe in the inheritance of acquired characteristics. Cases similar to the one noted by Burkholder have been cited by some writers in support of the idea that external influences may affect the genetic constitution of organisms. Before such evidence can be accepted careful investigations should be made of some of these cases. In an extensive series of trials the author[2] found that he was unable to affect a change in the spore characters of *Pestalozzia Guepini* by selection. More recently he has found selection within pure lines of a species of Helminthosporium equally ineffective. This indicates that the genetic constitution, of some fungi at least, is not readily affected by external factors.

As a tentative theory explaining the loss of virulence in culture, the following is proposed. Mutations have been found to occur in several species of fungi which have been carefully studied. Stevens[3] has found them in Helminthosporium, Bonar[4] in Brachysporium and the author[2] in Pestalozzia. When a fungus, normally parasitic, is grown as a sapro-

[1] *Amer. Jour. Bot.*, 12: 245–253, 1925.
[2] *Genetics*, 7: 142–201, 1922.
[3] *Bull.* Ill. Nat. Hist. Survey, 14: Art. 5, 1922.
[4] *Amer. Jour. Bot.*, 11: 123–157, 1924.