lowed the reports with interest, and regret most deeply that they should have been brought to a close largely by what appears to me to be personal reasons.

That this view is shared by most foreigners in China is clear from the editorial appearing in the American owned and edited *China Weekly Review* of September 10, copy of which is herewith enclosed. While I do not wish it to be thought that we endorse all the opinions expressed in that editorial, and I want particularly to dissociate myself from certain irrelevant statements about Dr. Andrews, it nevertheless serves to call attention to certain difficulties which confronted my associates but which they have not deemed necessary to place too much emphasis before.

I repeat from our statement that this Commission is always ready to promote scientific cooperation, if proposed on a fair and reasonable basis; but that it cannot accept responsibility for failures due to unfriendly attitude exhibited by other parties.

To this letter Dr. Henry Fairfield Osborn, president of the American Museum of Natural History, replied on November 14 as follows:

I have your letter of September 24th, regarding the closing of the Central Asiatic Expedition work in China. I agree with you that it is a most unfortunate breach in the cultural relations between your country and the United States.

The American Museum of Natural History entered upon its investigations in 1921 with a full understanding with the Geological Survey of China. It was agreed that we would confine our explorations to regions where the Geological Survey could not work. These districts were clearly specified by Dr. V. K. Ting, then director of the survey. In return, the survey agreed that we could work unhampered in Mongolia. We have satisfactorily carried out our part of the bargain. The Geological Survey, at that time representing the scientific men of North China, has not adhered to its part of the agreement.

Until 1928 the expedition had the most cordial relations with Chinese scientific men. In that year, when the Central Asiatic Expedition returned from Mongolia, its collections were detained at Kalgan without any legal or moral right for six weeks by order of the unofficial body known as the "Cultural Society." The American Museum was astonished at such treatment and naturally highly disturbed. It was charged by the Cultural Society that the expedition went into the field with only "hunting permits." That year the expedition had the same permits that it had had in all preceding years. The Cultural Society, the Geological Survey and the entire world knew exactly upon what work the expedition was engaged.

In 1929, the expedition was not allowed to proceed into the field because of demands made by your commission which we consider were exorbitant and without international precedent.

In 1931, Dr. Andrews came to Peking, at my request, to negotiate with your commission for further work in Mongolia, which had been made necessary by the discoveries of the 1930 expedition. To our great surprise, he was not even accorded the courtesy of an interview by your commission. Such treatment of the official representative of the American Museum can not be lightly passed over.

After mature deliberation, I decided in conference with the scientific staff that it was useless for the American Museum of Natural History to expend more time and money, trying to carry on scientific work under such obstructive conditions. It was unanimously agreed that the Museum should enter into negotiations with the new government of Manchukuo. It was hoped that a more liberal attitude toward international scientific work would be found among the authorities of the new state. Happily, such was the case, and Dr. Andrews was instructed to close permanently the museum headquarters in Peking and return to America until such time as we wish to resume work from the new base.

In the statement of the commission, which you enclosed, you intimate that Dr. Andrews was not empowered to take this action and that the American Museum of Natural History will deplore such a position. In reply, I may say that Dr. Andrews is vice-director, in charge of exploration and research, of the American Museum of Natural History, and has at all times officially represented the American Museum in China. His action was taken upon my instructions.

In regard to the editorial from the *China Weekly Review*, a copy of which you enclose, I must say that it is quite at variance with other editorials from foreign language publications which have been brought to my attention. I would suggest that you refer to the editorials in *Le Journal de Pekin, The Shanghai Times, The Shanghai Evening Post and Mercury, The China Press, The North China Star, The P. & T. Times* and *The China Journal*. It is my opinion, derived from these editorials and from many other sources, that the statement in *China Weekly Review* is by no means a true expression of the opinion existing among foreign residents of China.

The American Museum regrets as much as does your commission that the friendly relations which existed between Chinese scientific men and the American Museum of Natural History until 1928 should be thus severed. Such a condition is most unfortunate from every standpoint. I feel, however, that it has been brought about through no fault of ours. Dr. Andrews insisted upon the privilege of completing our work in Mongolia, which was entered into in 1921 under a definite agreement with the Geological Survey. Apparently this has made him unwelcome to your commission. I can not, however, agree that there was any other course open to him.

You state that your commission "is always ready to promote scientific cooperation if proposed upon a fair and reasonable basis." I feel that the proposals made to you by Dr. Andrews were both fair and reasonable. It is difcult to see how it would be profitable for this museum to conduct field work under any other conditions.

EARTH ROTATION AND RIVER EROSION

UNDER the above title SCIENCE for November 11 contains an interesting article by Professor Herman L. Fairchild. After pointing out the minuteness of the deflective force which arises from rotation of the earth, Professor Fairchild gives briefly the results of an examination of topographic maps for the state of

New York. His study reveals no evidence for any observable effect that can be attributed to rotation of the earth. The steeper right-hand banks of streams on Long Island, which have been regarded as evidence for this effect, he explains by the action of winds. My purpose in this note is to point out in a somewhat different way the kind and amount of the effect which I should expect the rotation of the earth to have on a river.

The force in question is that which is usually connected with the name of the French mathematician Coriolis. When a body moves freely over the surface of the earth in the northern hemisphere the Coriolis force leads to a deflection of its path toward the right. In the case of a river this force acts on all the water in the river, just as gravity does. In the northern hemisphere the result is that the right-hand part of the river is a trifle higher than the left. Any possible greater erosion of the right bank is to be connected with this greater depth of the water, and it does not depend on whether the river is straight or meandering.

It is not difficult to obtain numerical values for the difference in level to be expected on the two sides of the river. When a body is moving north or south the magnitude of the Coriolis force is $2mv\omega \sin \lambda$, where m stands for the mass of the moving body, v for the speed with which it is traveling over the earth, ω for the angular speed of the earth, and λ for the latitude. If the body is moving in any other horizontal direction the force is somewhat greater. When the body moves east or west the sin λ in the above expression is to be replaced by unity. For a river which flows north or south at five miles an hour in latitude 42° the deflective force turns out to be about 0.000,0223 of the weight of the water. If the river flows east or west the force is about 0.000,0334 of the weight.[1]

From a simple composition-of-forces diagram it is easy to see that this same quantity gives the ratio of the difference in levels on the two sides of the river to the width of the river. For instance, if the river is flowing south at five miles an hour and is a hundred feet wide, the difference in levels at the two banks would be less than 0.03 inch, and if the river is half a mile wide the difference would be about 0.7 inch. Any difference in erosion caused by such slight differences in level would doubtless be masked by other agents, so that the results which Professor Fairchild finds are to be expected.

ARTHUR TABER JONES

SMITH COLLEGE

[1] Professor Fairchild quotes Gilbert as quoting Bertrand in saying that for a river running at three meters per second in latitude 45° the force is 1/63,539 of its weight. This value is half what it should be, and was probably obtained by neglecting the factor 2 in the expression for the Coriolis force.

AN ODD OCCURRENCE FOLLOWING A TROPICAL STORM[1]

FOLLOWING the recent hurricane in Puerto Rico a peculiar phenomenon became evident in and about San Juan. The paint of many buildings began to show irregular patches of discoloration, and the intensity of this staining increased with time. The darkened areas were more frequently in positions where contact with water had been prolonged, and had the appearance of being caused by hydrogen sulfide. There were also many reports of the blackening of silver and copper articles in the homes of the city and its suburbs. The same conditions, though to a less extent, occurred in the San Felipe storm of 1928.

The Department of Health believed the results to be due to the action of hydrogen sulfide and offered the suggestion that the gas might have come from a tidal mangrove swamp located just south of the city. In order to test this hypothesis the writers collected several samples of mud from this mangrove swamp. In examining the area, the odor of hydrogen sulfide was noticeable, and 20 liters of air drawn through a glass tube, containing a filtering plug of cotton and then a second cotton plug moistened with lead acetate, gave a positive test by the darkening of the moistened cotton. Lead acetate solution, dropped into the salt water draining from the swamp, showed the characteristic formation of black lead sulfide.

The mud samples, collected over a distance of five miles, gave from 0.09 to 0.35 mgs of free H_2S and from 0.07 to 0.67 mgs of combined sulfides per gram of mud. In one case 380 grams of mud yielded 296 cc of gas calculated to standard conditions. The only conclusion possible is that due to the presence of sewage entering at various parts of the tidal stream that cuts through the swamp, large amounts of hydrogen sulfide are being produced. The hurricane undoubtedly helped to distribute sewage over a wide area and stirred up the mud by swaying the mangrove trees. Possibly the low barometric pressure helped in liberating some gas. The storm was followed by several warm, quiet days with faint land breezes at night that blew from the swamp over the city.

It is, of course, well known that sewage produces appreciable amounts of hydrogen sulfide, but it seems unusual to find a case with such a wide distribution and high concentration in the air as to affect paint and metal objects in a city that extends over six miles in length.

D. H. COOK

CARLOS CINTRÓN

SCHOOL OF TROPICAL MEDICINE

SAN JUAN, PUERTO RICO

[1] From the Department of Chemistry of the School of Tropical Medicine of the University of Puerto Rico under the auspices of Columbia University.