

## Communications.

## Our Washington Correspondence.

To the Editor of the Scientific American:

The second extension case, that of H. Voelter, wood pulp machine, authorized by Congress, as mentioned in my last letter, has been decided in favor of the applicant, provided he will enter a disclaimer to the third claim of his patent, as re-issued June 6, 1871. It appears from the papers in this case that the present rate of manufacturing pulp by the machines covered by this patent is about 60 tons daily, with a steady increase in prospect, as paper made from pulp so manufactured is found to be peculiarly suited for the web newspaper presses. The evidence presented by the applicant shows that this pulp is manufactured at from 2½ to 3 cents per pound, while similar pulp from rags would cost 6 cents. As there were 75,000 tons of Voelter pulp made last year, at a cost of \$4,500,000, and the same quantity of rag pulp would cost \$9,000,000, it follows that one half of this amount, or \$4,500,000, was saved by this process last year, to say nothing of the increase of the price of rag pulp which would result if the competition of the wood pulp were withdrawn; for before this process of wood pulp making was introduced, rag pulp was worth 10 cents per pound—part of this decrease, however, is probably chargeable to the general shrinkage of values.

Our Consul at Liverpool has sent to the State Department a dispatch, which should be considered as a strong warning to American mechanics against going abroad for employment unless under contract, and even then they will find themselves in the disagreeable position of taking the places of men who have struck for wages which are barely sufficient to enable them to maintain themselves and families in comfort, as is the case with the thirty-five carpenters who recently landed in England, who were simply brought over to fill the places of English carpenters on strike. Referring to these men, and to the published statement in some American newspapers that fewer men are out of employment in England than in the United States, the Consul particularly warns our mechanics against the danger and loss of putting these statements to the test, which reports have induced many American mechanics to leave their country to better their condition, and the result has been a large amount of suffering and destitution. To avoid any further augmentation of this suffering, the Consul requests that public warning be given to American workmen not to go to England unless under positive contract with responsible parties. Able-bodied American mechanics are calling upon the consulate daily for relief, and are greatly disappointed when they learn that consuls have no money for such relief purposes. Under these circumstances the Consul deems it his duty to inform the Department that neither skilled nor unskilled laborers who come from abroad can readily find employment in England, except in cases where they are engaged to fill the places of British workmen while on strike.

A dispatch has been received by the Secretary of State from the United States Chargé d'Affaires, at Paris, announcing that the immense exhibition buildings on the Champ de Mars and the Trocadero are nearly completed, and the foreign commissioners are about to take possession of the positions assigned them. It is stated that great solicitude is felt by the administration of the exposition in regard to the intention of the United States Government, no official notice having been received as to whether any commission will be sent to Paris or not. The legation is in daily receipt of letters from the United States, applying for information as to space, etc. The Chargé d'Affaires has been assured by the Commissioner General that the portion reserved in the original designs for the United States will be still retained to last possible moment, but that the time is rapidly approaching when the commissioners must know whether the United States will do anything in the matter or not.

There seems to be considerable doubt here about the Administration taking any steps to have the United States represented officially at the exhibition, except in response to a direct order from Congress, as it is stated that many persons of influence, having an interest in a full representation of American industry at Paris, have called upon the President and Secretary Evarts, and desired them at least to appoint a provisional commission, but no steps have been taken to do even this much, nor do they appear likely to be. This, it is stated, may be owing to circumstances connected with the Philadelphia exhibition, in which neither the action of the French Government nor its exhibit was such as the United States Government had a right to expect. Instead of sending, as other nations did, special commissioners of high rank and experience, France entrusted her exhibit to subordinate attachés of the French Legation, one of whom was so objectionable to President Grant that he is said to have refused to accept an invitation to a public dinner at Philadelphia until he was assured that this person would not be present. The letters attacking the United States, which caused so much stir, although disclaimed by the supposed author, were believed to have been written by one of them. In addition to this, certain of the French exhibitors were found attempting to defraud the revenue, which made it necessary for our customs officials to submit all foreign exhibitors to very annoying restrictions. But independent of these minor matters, the character of the exhibit itself was not what might have been expected from France, and this was believed to be caused by the lack of interest, if not opposition, of the French Government. Secretary Fish, therefore, when the invitation to participate in the exposition

was received, transmitted it to Congress without recommendation; and it is reported that he gave substantially the above reasons to the Committee on Foreign Relations, when consulted on this subject, why he was unwilling to urge Congress to accept the invitation. This feeling is believed to be shared to some extent by the present administration, and may explain why it has been unwilling to assume any doubtful authority for the purpose of securing the representation of the United States at the Paris Exposition. Notwithstanding this, it is thought that the matter will be brought before Congress at an early day, as so many American manufacturers are desirous of exhibiting specimens of their wares; and in the present depressed condition of our industries, the administration wishes to do all it can to open new markets for our productions.

The United States Consul at Munich has forwarded to the State Department circulars announcing an exhibition of hops, and of tools and implements used in their cultivation, to which all nations are invited to contribute. The exhibition will be held in Nuremberg, from the 7th to 15th of October, and may possibly help to open a market for many of the appliances connected with hop growing that have been patented of late.

From a letter just received in this city from our Chargé d'Affaires at Madrid, it appears that Spain has reduced her tariff on imported goods, but has excepted England, France, and this country from the benefits of the reduction, so that hereafter English, French, and American manufacturers who send goods to Spain will have to pay from 30 to 50 per cent more than those of Germany, Switzerland, and other European nations.

Commander Rodgers, of the United States steamer Adams, reports to the Navy Department that he has discovered a bank of considerable extent in 17° 6', south latitude, and 36° 44", west longitude. It is situated about 135 miles east of the coast of the province of Espirito Santo, Brazil, and 130 miles northeastward of the Island of Abrolhos, in the South Atlantic Ocean. It is right in the course of vessels bound southward and northward from Rio de Janeiro. One of our papers here expresses a hope that it will be a long time before there is a run on the bank.

Washington, D. C.

OCCASIONAL.

## Reforms Needed in Railway Bridge Construction.

To the Editor of the Scientific American:

It seems as if the recent railway accidents, and particularly the one near Des Moines, Iowa, might call attention to some of our engineering mis-constructions. In this case a masonry culvert is built on short piles. The water washes away the earth that holds the piles in an upright position, and they go down like a row of bricks. To simplify it, drive your cane in the earth three inches, put your hat on the head of the cane, dig or wash away the earth at the bottom of the cane, and it falls. Short piles may be a handy method of holding a structure up, but it is a sure method of letting it down in a water way. At the ditch to which these short piles are driven a concrete foundation can as easily be laid (or at least concrete can be put around the piles, holding them together). On such a foundation masonry can be securely built, or, what is better, make the whole structure a monolith of béton. The structure then holds itself securely together, there is no thrust. If a part is undermined, the rest supports it. The weight may be distributed over a large surface, or the culvert may be made in the shape of a pipe, forming its own invert which becomes its foundation. In a thousand years there seems to have been no improvement in masonry structures. We have copied to an extent the old superstructures, and have gone without foundations. The Washington monument is a sad specimen of our national skill as engineers, and the cracking and falling specimens of architecture in New York city are evidences that we should begin at the bottom.

JOHN C. GARDRIDGE, JR.

## Operating Canal Lock Gates.

To the Editor of the Scientific American:

The subject of opening and shutting canal lock gates is being considerably discussed here owing to the aggravating interference of drift, mud, etc., with the working of the machinery of the lower gate of lower lock of the Des Moines Rapids Canal. I would suggest an effective and simple means of accomplishing the opening and shutting, namely, to employ a strong jet of water through two way nozzles, to be placed permanently in the toe of the gates, and there may be other jets along the foot of the gates to clear away mud, drift, etc., in the passage of the gates, while a greater number of the nozzles playing from the opposite side of the gate would propel it in the required direction.

Keokuk, Iowa.

ALEX. BLACK.

## Defective Rubber Hose.

To the Editor of the Scientific American:

N. D. in your issue of August 18 complains of the inferior quality of rubber hose as at present made. He thinks that, with more care in its manufacture, its value would be at least double what it is. I beg to inform him that though the greatest care is taken in its construction it will remain in its present defective state just so long as it continues to be handmade. Let us review the process of making hose, and in doing so I think I can show plainly where its weakness lies. Any one acquainted with the nature of rubber is aware of its great expansion during the process of vulcanization. To control this expansion within proper limits is to

add strength, to be unable to control it is to weaken it. A long hollow mandrel or pole is taken and around it is wrapped a thin coat of rubber in sheet form. This constitutes the inner lining. Then a strip of cotton duck saturated with rubber is wound around, one, two, three or more times, according to the number of ply required. A coating of rubber like that used on the interior is then put on the outer side. It is wrapped up in cloth, vulcanized, and the hose is made. When it comes to putting the wrapper around, if one twist is slacker than another or one edge does not evenly overlap the other, when the expansion takes place at that place there will be a loose spot or blister; after a short time in use the continual bending backwards and forwards will further rupture these already weak spots. From its imperfect make, it permits the water to circulate between the layers of cotton duck which soon becomes rotten.

Cleveland, O.

H. J. MERREUS.

## A Reply to the Question of Axial Change of the Earth.

To the Editor of the Scientific American:

The earth's axis and its inclined position seem to depend upon attraction of gravitation, or magnetism in the direction of the north star. Such an attraction to be permanent must be exerted upon the mineral portion of our globe, and we find the greatest amount of land in the northern hemisphere; but the corroding agencies before alluded to are gradually wearing it away, and, in obedience to the law of centrifugal force, this debris is gradually finding its way to the periphery or equator; hence we find our northern shores rock bound coasts, and as we approach the equator, sandy flats. The same peculiarity exists in the southern hemisphere. The diameter of the earth at the equator is 20 miles greater than at the poles. The water exhibits the greatest parts of this distention, and forms a belt from 5 to 10 miles in depth around the earth at the line. To what extent the mineral deposits have accumulated there we cannot tell; but whenever they shall have accumulated to such an extent at any point of the equator as to exceed that in the northern hemisphere, that part will gravitate toward the north or polar star, opposite points on our present equator will become the new poles, or axis in doing so, this great belt of water in finding its new position will sweep over one half the globe, a quarter upon each side, thus causing another deluge, throwing up new mountain ranges, burying continents and elevating others, bringing arctic regions into tropical climes and portions of our present equator into arctic frosts. This, like all the preceding revolutions of our planet, will be sudden and violent.

Philadelphia, Pa.

ALEXANDER BOND.

## ANCIENT LIFE IN AMERICA.

Professor O. C. Marsh, of New Haven, recently delivered before the American Association for the Advancement of Science an address on the "Introduction and Succession of Vertebrate Life in America." According to present knowledge, he stated, no vertebrate life is known to have existed on this continent in the archæan, Cambrian, and silurian periods, yet during this time more than half the thickness of American stratified rock was deposited. Fishes are known in the upper silurian of Europe, however, and there is therefore a probability that they will be yet discovered in our strata of the same age, if not at a still lower horizon. Passing through the various geological periods, Professor Marsh noted the extinction or increase of various orders of fishes, and then, referring to the amphibia, stated that the latter are so nearly allied to the ganoid fishes as to leave little doubt of their descent from some member of that group. The earliest evidence of their existence on this continent is in the sub-carboniferous, where footprints have been found which probably were made by labyrinthodonts, the most ancient representatives of the class.

## ORIGIN OF THE BIRDS.

During the mesozoic period some of the strangest forms of reptilian life made their appearance and became extinct. Then came the dinosaurs, true reptiles, yet having characteristics peculiar to birds of the ostrich order, so that it is possible that they were the parent stock of all birds. Professor Marsh's account of the great saurian monsters of the cretaceous strata is wonderfully interesting. He told of vast lizards, some sixty feet in length, which inhabited the inland cretaceous sea when the Rocky Mountains were just beginning to rise above the waters. In a valley of this old ocean bed he had seen seven different skeletons of these monsters in sight at once. There were also the huge plerosauria, the veritable dragons, having a spread of wings of from ten to twenty-five feet, and one colossal dinosaur, when erect, stood thirty feet in height.

## BIRDS WITH TEETH

existed in that strange world. The aquatic hesperornis, nearly six feet in height, had teeth set in grooves in its jaws. It was a carnivorous, swimming ostrich. The ichtyornis, a small flying bird, had teeth set in sockets, while strange enough, the companions of these ancient toothed birds were pterodactyls, without teeth.

There came a period at last when the dinosaurs and other mesozoic vertebrates disappeared, and mammals henceforth became the dominant type. Then lived a great sloth, which, after the elevation of the Isthmus of Panama, crossed over from the northern to the southern continent of America, there found a more congenial home, and there in time became extinct. In the middle eocene, west of the Rocky Mountains,