## Correspondence.

### The San Blas Sea Level Canal.

To the Editor of the SCIENTIFIC AMERICAN:

Great and useful projects never die. They are talked over and discussed from year to year, from generation to generation, until public confidence justifies the outlay. The requisite capital, labor, and engineering skill are procured, the work is accomplished, and then we wonder why it was not done before.

Such was the case of the Suez Canal, the Atlantic cable, the St. Gothard and Mont Cenis Tunnels, our great continental railroads, and such will be the case with a sea level ship canal across the American isthmus, through which the trade of the Pacific Ocean is destined to pass and renew commerce on the grandest possible scale.

The advantages claimed for the San Blas route over all others proposed are the following:

1st. The San Blas route is about 30 miles long, the Panama is 46 miles long, and the Nicaragua route is about 170 miles long. Every one familiar with transits must see at a glance that a short route in every respect is decidedly better than a long one.

2d. The San Blas route has at both ends good, natural harbors, requiring no improvements. The Panama route has fair harbors, while the Nicaragua route has, on the Pacific side, an open roadstead, which, to protect from violent winds, it is necessary to build an expensive breakwater. On the Atlantic side an entire new harbor will have to be made, the cost of which it is impossible to determine in advance, with any degree of certainty as to time or money.

3d. The San Blas route is a direct, straight line from sea to sea, while the other two routes are very crooked, and, in consequence, it would be difficult for large ships to pass through the canal without striking its banks, which will have to be lined with something more firm and durable than earth to keep them from washing and falling into the canal during the rainy season, as the annual rainfall on the Atlantic side of the isthmus is about 123 inches.

4th. The San Blas route, as above stated, is 30 miles long, including the Bayano River, 10 miles of which, with but little dredging, can be made ample for ship navigation, thus leaving only 20 miles of canal excavation. Of this, however, 7 miles would be a tunnel, 120 feet high above canal bottom to the crown of the arch and 80 feet wide at the water line, which would give ample room to pass the largest ships, by striking their topmasts and hauling yards around, so often done when in ports. The open or remaining portions of the canal are to be 125 feet wide and 28 feet deep throughout, which would enable two ships to pass each other with safety and ease outside of the tunnel.

5th. The San Blas route is remarkably free from floods, especially on the Pacific side, where the longest slope of open cutting and heaviest work will be done, while on the Panama and Nicaragua routes it is quite the reverse, as their works will be chiefly on the Atlantic side, where the heavy rains and flood waters rushing down the Chagres and San Juan valleys would be a constant menace to the safety of the locks and dams proposed on those routes.

6th. The San Blas is a sea level route, while the other two routes contemplate at least six dams and locks on each, which are very expensive structures to build and keep in order. Even if one lock should, from any cause, fail to work, the passage in the canal would be blocked until it was repaired, which might take ten days or ten months. An earthquake heavy enough to destroy the San Blas tunnel would destroy the locks and dams on those routes.

7th. The San Blas Canal would be fed by the never-failing waters of the oceans, while the Panama route, with its recently proposed locks, does not solve the problem of controlling the flood waters of the Chagres River, nor does it remove the fear of an inadequate supply of water on the summit, during the dry season, to feed the canal for the passage of large ships, the size of which is being continually increased, as the Pacific Ocean is where steamships are destined to achieve their greatest triumphs.

8th. The great advantages of a short, direct sea level canal like the San Blas, through which ships can pass quickly, on an even keel, over one incumbered with locks and dams, so liable to get out of order in the rainy isthmus climate, are so well known to all who have studied the question it seems like a waste of time to discuss in a brief letter like this.

9th. The total quantity of material to excavate on the San Blas route, including the tunnel for a canal 125 feet wide at the water line and 28 feet deep throughout, would be about 30,000,000 cubic yards; while on the Panama route for a canal of that size and character it would require the removal of 130,000,000 cubic yards of rock and earth.

10th. The only objection that can be urged against the San Blas route is the tunnel, but that in these days of steam and compressed air drills and modern explosives, by the use of which the expense of tunneling is being reduced nearly one-half less than the old mode of hand drilling, should not be considered a very serious undertaking.

11th. The success of the St. Gothard Tunnel, over 9 miles long; the Mont Cenis, 7 miles long; the Simplon Pass Tunnel (being built), 13 miles long; and seriously planning one under the British Channel, 20 miles long, should encourage us to build the San Blas Tunnel, especially in view of the fact, it will give us a sea level canal across the narrowest part of the isthmus, through which the ships of all nations can pass quickly on an even keel.

12th. All the leading trunk lines of railroads in our country are gradually lowering their grades and shortening distance regardless of tunneling, which they do not fear on account of the cost, as by means of these improvements the roads gain large reduced running expenses, time, and economy—the essential elements of success in trade all over the world. To pass a ship through the San Blas Canal, towed at the rate of 3 miles per hour, would take but ten hours; while to pass a ship through the Nicaragua Canal, towed at the same speed, would require sixty hours.

13th. Estimating the cost of the heading in the San Blas Tunnel at $20 per cubic yard, the breakdown below at $8 per yard, the open rock cutting at $3 per yard, earthwork at from 50 cents to $1.50 per yard, masonry at $15 per yard, concrete at $7 per yard, pumping at $3,000,000, lining the tunnel throughout, if found necessary, at $32,000,000, contingencies at $20,000,000, the cost of the canal complete, from ocean to ocean, would be about $130,000,000.

This would give us a short sea level canal through the narrowest part of the isthmus, to pass the largest ships on an even keel, and accommodate the ever-expanding demands of commerce for all time.

I wish to call your attention to the Darien route, examined a short time ago by Mr. G. A. Harvill, of Louisville, Ky., who claims it is about 24 miles long from deep water in the Gulf of San Miguel, on the Pacific, to the Bay of Candilaria, on the Atlantic Ocean, although the total distance through the isthmus at this point is about 90 miles. Including a tunnel of only 2½ miles in length, he believes a sea level canal can be built there for $60,000,000. It is very important that this route should be thoroughly surveyed, in order to test the accuracy of his estimates of quantities and cost.

FREDERICK M. KELLEY.

487 Hudson Street, New York, April 18, 1895.

### Comments on "An Answer to Strindberg."

To the Editor of the SCIENTIFIC AMERICAN:

Perhaps, in behalf of those women who have not yet spoken for themselves, you will publish this letter.

In the issue of the SCIENTIFIC AMERICAN for April 13, I find a reply to Strindberg's article on the "Inferiority of Woman," written by Mrs. A. S. Rudy. I would like to say that I believe the above mentioned article would have been better answered if that reply had never been written. In the first place, it is hardly right for a woman to take up the cudgels in her own behalf in this special case; there is always the danger of internal evidence in her defense bearing weight against what she wishes to prove, because she is from the nature of the case partial, and the more vigorous she is in her arguments the more excited she becomes, and so, not so just a controvertist. Had she waited, no doubt some man who believes in the equality of the sexes would have expressed himself forcibly in our defense, and calmly and justly, and less partially than any woman; for, as said before, the question does not touch him so closely as, ex natura, it touches a woman.

As to the reply itself, if I may be permitted, the internal evidence there is against exactly what Mrs. Rudy would defend, the equality and advancement of woman. She does not believe in evolution; she would "rather" believe in Genesis. It is precisely that fact, that she believes what she prefers to believe rather than the truths disclosed by science. No one now who has any general knowledge—except a few of the equal-woman kind—believes that the first of Genesis is aught but a beautiful legend; so her arguments based on that creation of woman not only do not tell, but they count against her on Strindberg's side.

Also please allow me to say that if there is anything nauseating under the sun, it is the spectacle of a woman who stands before the public and cries: "Love me, venerate me, adore me; I am God-given!" Imagine any one saying such a thing as that in a small circle. Alas! that is what these "hysterical and passionate outbursts" lead to when women talk before they think. Mrs. Rudy's article is an excellent example of Strindberg's woman "when refused something it wants."

Her arguments are no arguments; her vituperation is idle; her excitement is, alas! a sample of Strindberg's woman.

It is with no maliciousness that I write these words; it is simply because so much has been written and spoken about "woman" that it has become disgusting and sickening, and the women who have not written and spoken are getting tired of being dragged up before the public and posed as saints and superior creatures, when they know that they belong to the same human family to which men belong and are also subject to human frailties.

FANNY S. EDGERTON.

1634 Michigan Boulevard, Chicago, April 14, 1895.

### Amylotryose—A New Sugar.

At a recent meeting of the Chemical Society in London, A. R. Ling and J. L. Baker read a paper in which they stated that they had examined the hydrolytic products of starch when acted on by diastase. The diastase was obtained from different sources and prepared by different methods. The authors confirmed the previous results recorded by Brown * and Morris, since they obtained maltodextrin, the physical constants of which were determined and found to agree with those given by Brown and Morris. "Isomaltose," another product of the hydrolysis of starch, was also isolated, and the osazone on examination possessed the same melting point as that recorded by Lintner.† The isomaltose was purified by crystallization and precipitation from methylic alcohol solution by absolute alcohol. The isomaltose thus obtained agreed in these respects with that obtained by Lintner, but on treatment with sodium acetate and acetic oxide, a mixture was obtained from which octacetyl-maltose was separated and identified. The isomaltosazone was also proved to be a mixture, since maltosazone was separated and identified. Further experiments on the action of diastase and the determination of its reducing power showed that isomaltose is not a homogeneous substance, but a mixture of maltose with probably two other substances. One of these was separated, and from examination of the osazone is probably a new sugar—$C_{18}H_{32}O_{16}$—for which the name amylotryose is proposed. The other substance present in isomaltose appeared to be a dextrin, which, however, was not identified. H. Brown, F.R.S., stated that experiments in progress in his laboratory confirmed the conclusions recorded above as to the non-homogeneity of isomaltose so far as that it was not a pure substance nor an isomer of maltose. Dr. Kipping suggested that a better name for the new sugar would be triamylhexose.

### Recent Earthquake in Europe.

A series of severe earthquake shocks were felt in southern Europe on April 14 and 15, during which many people were killed or injured, and much other serious damage was done. The shocks were particularly severe throughout Austria and in northern Italy. At Laibach near Trieste thirty-one distinct shocks were felt, and the churches, business houses, and dwellings of the town were badly damaged. Many people were severely injured and some killed by the falling walls. Slight seismic vibrations were also felt in Vienna, and reports were brought by those arriving in Vienna during the day of disasters in adjoining cities. Thousands of people had been seen camping in the open fields, having been driven from their homes. Severe shocks have also been felt at Venice and Verona. Many buildings were injured and a number of people were killed. In Venice people fled from the houses to the open squares, and many travelers and many residenters have left the city.

During the past year Europe has been visited by a number of more or less violent earthquakes, several of which have done great damage. The principal earthquakes were felt in Greece and Turkey. These, it will be remembered, lasted for more than a week, causing the death of over four hundred people and rendering 20,000 people homeless and destitute. Later in the year two other earthquakes were felt in Greece of a less dangerous character. Severe shocks were also felt in Turkey. Great damage was done at Constantinople; some two hundred lives were lost and the injury to property was estimated at $30,000,000. During the year there were also several shocks felt in Great Britain, but apart from the general alarm caused by them they seem to have done little actual damage.

### Lenz, the Missing Wheelman.

A dispatch received by Dr. Worman, of Outing, states that Frank Lenz, the missing tourist, had been traced to the village of Chilgani, in the Alasgird plains outside the Delibaba Pass. A native of Chilgani says that Lenz arrived there on May 9, just before sundown, and became the guest of Avak Parsegh. He was in good health and spirits, and held a sort of reception that evening, when many of the natives came to see his machine, in which they seemed to take much interest. He spoke a few words of Turkish and they seemed to like that. The next morning he left Chilgani, and a month later a report was circulated among the villages that he had been killed in the vicinity of Koord Ali. There are four villages in the neighborhood, Chilgani, Koord Ali, Zedikan, the last of the Armenian villages of the plain, and Delibaba, at the foot of the pass of the same name. The pass is seventy or eighty miles from Erzeroum. Koord Ali is about five miles from Zedikan, so that this last report is that Lenz was killed before he reached the mountain pass. Dr. Worman thinks that he is held a captive.

* Trans. Chem. Soc., 1885, p. 561, cf. Herzfeld, B. XII, 2120.

† Zeit. Brauwesen, XV, 145.