FANGS OF SERPENTS.

BY C. FEW SEISS.

The venomous serpents are divided into two groups, namely, *Solenoglypha*, including the rattlesnakes, vipers, etc., and *Proteroglypha*, embracing the cobras, coral or bead snakes (*Elaps*), and venomous water snakes of the East (*Hydrophidæ*). Fortunately, harmless serpents are, throughout the world, by far the most numerous. In the States north of Maryland, there are only two species of poison-fanged serpents (the rattlesnake and copperhead), while the non-venomous number eighteen species.

The fangs of serpents vary in number, shape, and size. In the viper, *Pelias berus*, the only venomous one of the three species of serpents found in Great Britain, the fangs are two in number, and are situated in the superior maxillary bones. There are no other teeth in the maxillæ, but there is a row of small teeth in the palatine bone on each side. The bite of the viper is often extremely painful, but rarely if ever fatal. The viper is not found in the United States. I remember on one occasion, in Maryland, a gentleman conducted me to a wood to show me a "viper" he had a short time before killed, and gravely informed me it was an "extremely poisonous species." It, however, proved to be a harmless hog-nose snake, *Heterodon platyrhinus*.

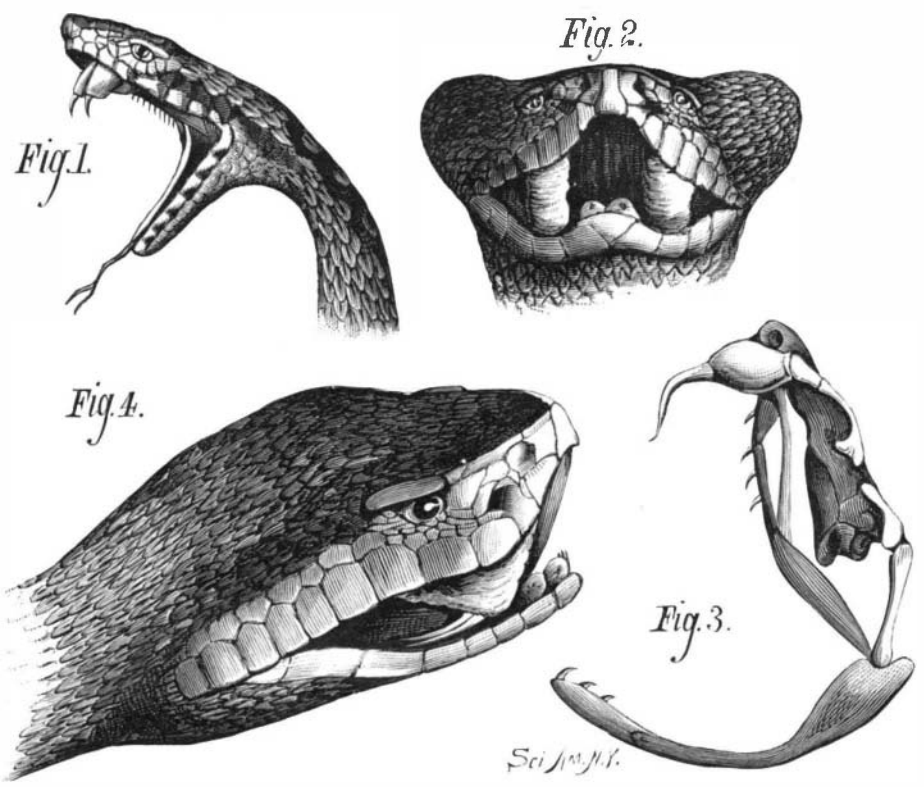
Fig. 1 shows the head of a viper, with fangs thrown forward in a position to strike.

The fangs of the rattlesnake (*Crotalus*) are also two in number, situated as in the viper. They are curved backward, and hollow, save at the tips, where they are solid, and turned slightly forward. The minute opening through which the venom is ejected is in front, about one twelfth of an inch from the needle-like point. The glands in which the venom is secreted are oval or almond-shaped, two in number, situated one on either side of the upper jaw, behind the eye. Each gland has a duct connecting with the base of its fang. These poison ducts are kept closed by an arrangement of muscular fibers when the fangs are not in use, but at the moment when the snake strikes these ducts are forced open by certain muscles of the head, and the poison shoots through the ducts and out of the openings near the points of the fangs into the wound. When not in use the fangs lie upon the gums in the roof of the mouth, buried in the folds of mucous membrane.

Fig. 3 represents half of the skull of a rattlesnake, viewed from the side, with the fang thrown outward and forward, ready for action.

The deadly machuca, of Nicaragua (*Bothrops atrox*, Wagler), has four great fangs in the upper jaw, two on each side. Fig. 4 is the head of the machuca, two thirds natural size, drawn from a large specimen in the Academy of Natural Sciences, Philadelphia. Fig. 2 is a front view of the head, showing the mucous folds covering the basal portions of the fangs. On the right side of the jaw of the specimen examined, one fang is drawn back against the roof of the mouth, while the other is thrown forward. This seems to show that the fangs are capable of independent motion, but we have no proofs of this fact. It may be they were thus forced apart when the serpent was killed, yet they seem to lie in a natural and easy position. In view of the serious results which have followed the bite of our *crotalus* and moccasin, armed with only two fangs, how much more deadly must be the machuca, driving venom into four wounds at once!

The beautiful harlequin or bead snakes, *Elapidæ*, are provided with two or more nearly permanently erect, grooved fangs in the upper jaw. These are generally small, not greatly curved, and project only slightly below the basal membrane. The poison glands of our Southern species of *Elaps* are small when compared with the above mentioned serpents. They are generally considered harmless snakes.



FANGS OF SERPENTS.

Salt River, Arizona.

It was long supposed that the brackishness of Salt river, Arizona, was caused by the stream running over a bed of salt somewhere along its course. Its waters are pure and fresh from where it heads in the White Mountains to within 50 miles of where it empties into the Gila. Fifty miles from its junction with the Gila there comes into it a stream of water that is intensely salt. This stream pours out of the side of a large mountain, and is from 20 to 30 feet deep. It is very rapid, and pours into the Salt river a great volume of water. Here could be easily manufactured sufficient salt to supply the markets of the world. All that would be necessary would be to dig ditches and lead the brine to basins in the nearest deserts. The heat of the sun would make the salt. Were there a railroad near the stream its waters would doubtless soon be turned and led to immense evaporating ponds. It is supposed that the interior of the mountain, out of which the stream flows, is largely composed of rock salt.

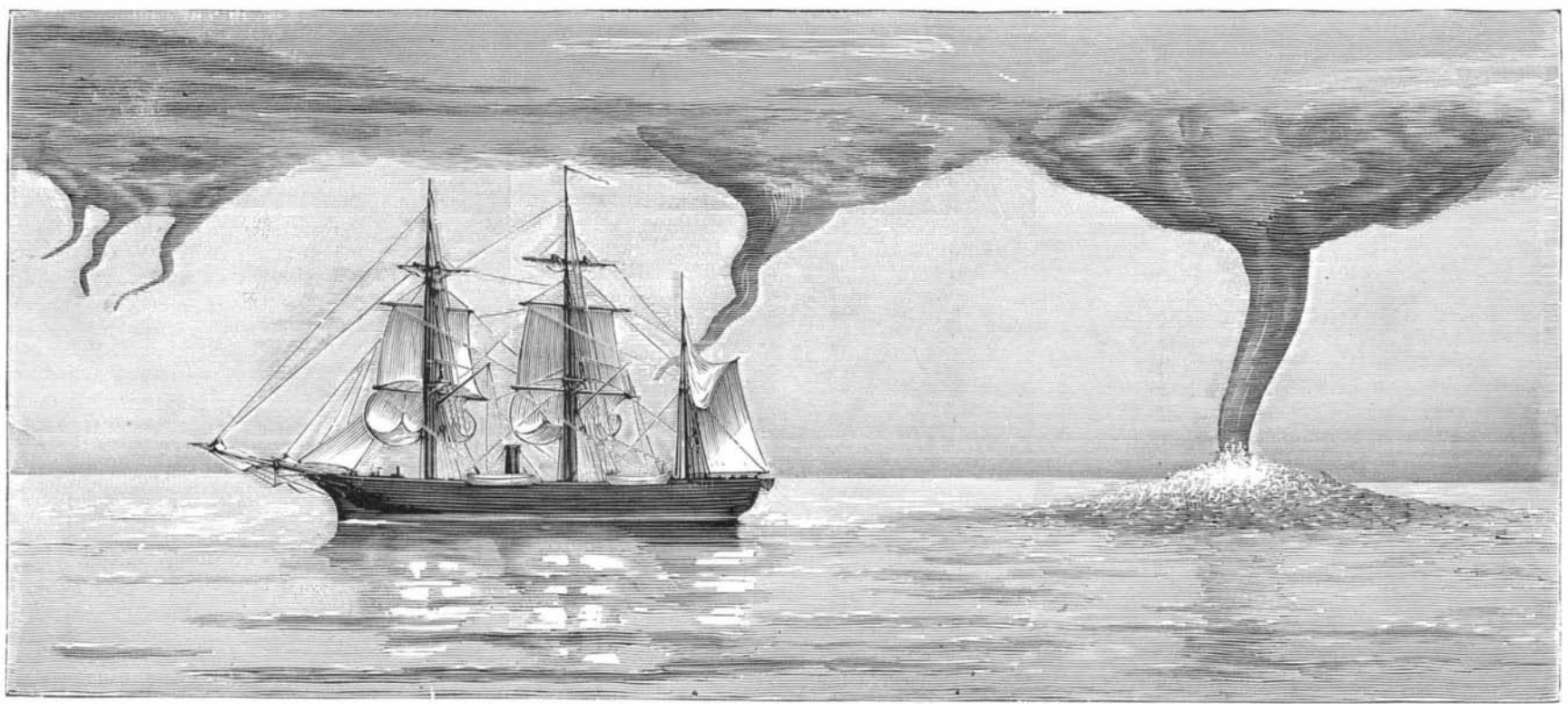
WATERSPOUTS.

The theory of the waterspout is still somewhat unsettled, notwithstanding the numerous observations which have been made. Generally it appears as a diminutive whirlwind, lasting from a few seconds to an hour, and reaching down from the under surface of a cloud to, or nearly to, the surface of the earth or sea. In the center of this whirlwind appears a slender column of water or of dense vapor, probably hollow, and the air whirling around it is sometimes an ascending, but more generally a descending current. The cloud bursts of Eastern Nevada, which have at times caused much damage, are of the latter type. Certain portions of the globe are peculiarly subject to waterspouts, which thus, like cyclones, have somewhat of a local character. Our engraving, for which we are indebted to the London *Graphic*, represents the British ship Boxer surrounded by waterspouts during a recent cruise on the west coast of Africa, when unusual facilities for studying the character of such phenomena were offered.

Progress of the Electric Light.

The Cleveland (Ohio) *Herald* lately witnessed a trial of the electric light at the establishment of the Union Steel Screw Company, in that city. The apparatus used has been constructed for the illumination of a large carpet mill in Philadelphia. It consists of a Brush dynamo-electric machine of 12,000 candle power, arranged to give four separate currents, each running an electric lamp of 3,000 candle power. Two of the lamps were placed on the third floor and two on the fourth floor of the immense building, and when the engine was started up the machine started at the same time, and, without the slightest manual interference, the lamps flashed out their light in all its magnificence. The effect was most brilliant. The rooms were flooded with a pure white light like the light of the sun, and it streamed out at all the windows, illuminating houses and streets for a long distance in every direction. The light was very uniform and steady, free from the flickering that used to be an accompaniment of electric light, and, considering the enormous illuminating power, the light was unexpectedly soft and endurable to the eyes. An opportunity was afforded to test the character and whiteness of the light. Worsteds, scarfs, afghans, etc., of brilliant shades, were hanging against the wall at one side of the room, and it was noticed that the colors were brought out as clearly as by the full light of the sun. Estimates were made as to the amount that the light furnished by this apparatus would cost, if used by the Screw Company as it was used on this occasion, and it was ascertained that the total cost of the whole light from the four lamps, including the items of consumption of carbon in the lamps, interest on the investment, and wear and tear, would not exceed thirty cents an hour. The light produced was photometrically equal to 800 gas burners, burning five feet of gas per hour each. This amount of gas would cost $8 per hour.

PEAT PRODUCTS.—The ultimate elements of peat are essentially those of wood and coal, viz., carbon, hydrogen, oxygen, and nitrogen. If, therefore, peat be distilled, the resulting products are the same; and in this way peat has been made to yield ammonia, acetic acid, pyroxylic spirit, tar, naphtha, oils, and paraffin—all of great value in the arts.



THE BRITISH SHIP BOXER SURROUNDED BY WATERSPOUTS.

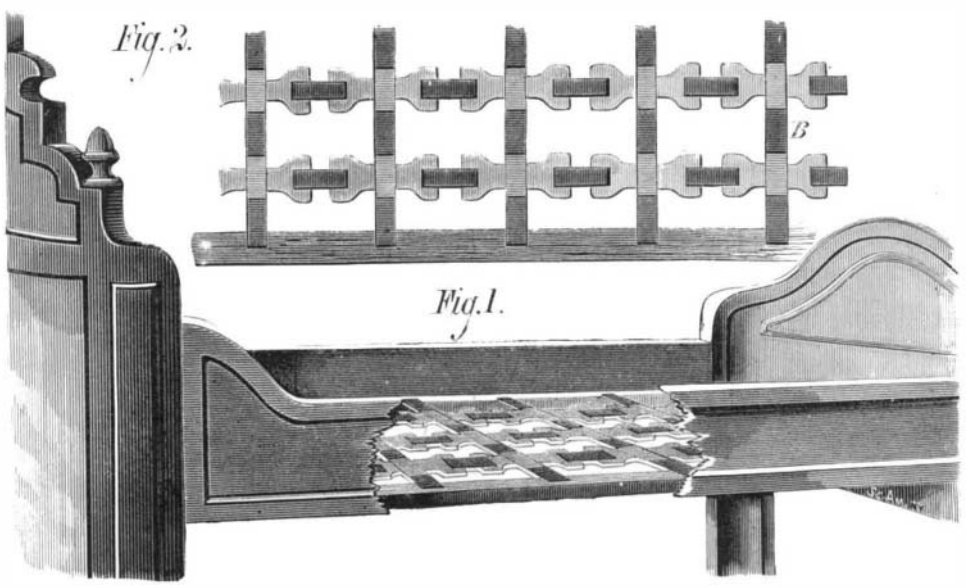
Coloring Principle of Wines.

The solid residue deposited from wines in the process of fermentation is treated while still fresh with four or five parts of alcohol at 60°, and allowed to macerate for about a fortnight; it is then filtered under pressure, and the filtrate distilled in a water bath, so as to get rid of the alcohol; what remains behind is evaporated under a vacuum, at a moderate heat, the residue of this last evaporation, refiltered, forms the natural coloring principle of wines. This is readily miscible with white or nearly colorless wines, imparting a pleasing natural hue, without introducing any injurious ingredient

IMPROVED SPRING BED.

We illustrate herewith a simple form of spring bed, constructed of wood, in pieces shaped as represented in Fig. 2, at A, and connected by bands of rubber, B. The rubber is fastened to the wood by rivets, a piece of sheet iron being put over that part of the rubber which is joined to the wood, so that the former is tightly pressed and prevented from tearing away. The advantages claimed are that the springs can be fitted to any bedstead of any shape or make; its elasticity can be increased or diminished by increasing or diminishing the thickness of the rubber. It is durable, easily cleaned, and comfortable.

For further particulars address the inventor, Mr. Henry S. Cate, Millerstown, Butler county, Pa.



CATE'S IMPROVED SPRING BED.

A Hundred Years' Progress in Piano Making.

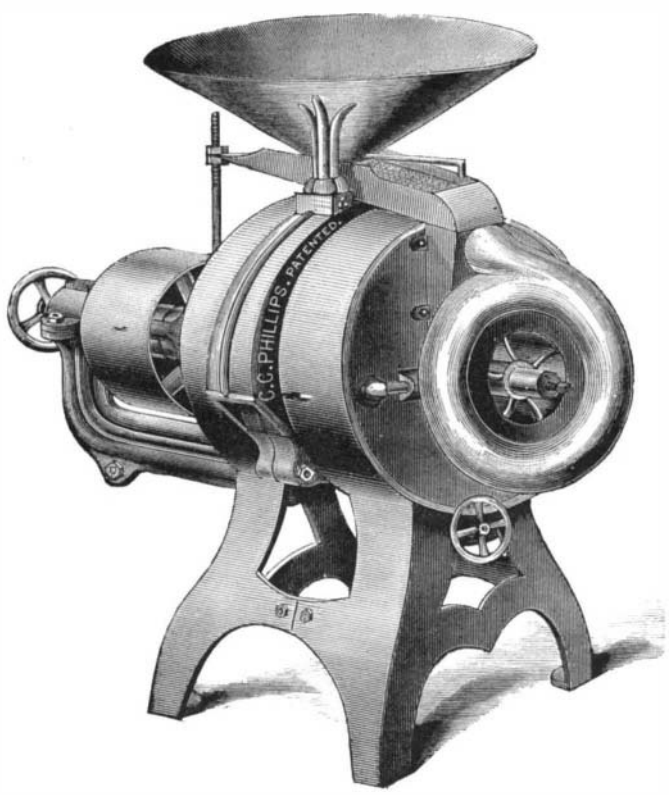
A harpsichord, said to have been played upon by Mozart, and bearing the date 1776, was lately offered for sale in this city at an auction of old furniture. As a musical instrument it was of small account, and the evidence of Mozart's use of it was too weak to give it much value as a relic; nevertheless it was a notable curiosity as an index of the past century's progress in the evolution of the piano. It was doubtless one of the best instruments made in that day. It had four and a half octaves, and the case is described as looking like a badly shaped coffin resting on a common table. The pedal was a plain piece of wood, the connecting string from which ran on the outside of the case. It could probably be made to-day for $50; its original price was about ten times that sum.

The recent development of the piano has been very rapid. Forty-five years ago, when Jonas Chickering began to make them in Boston, the best pianos were of five and a half and six octaves in compass and were made entirely of wood. The first American grand was made in 1824. The invention of the iron frame, in 1837, revolutionized the trade, and now our leading manufacturers have branch warehouses in Europe and export largely. The patented improvements have been numerous, the Steinways having secured fifteen, some of great importance. Weber has now a piano in his wareroom valued at $5,000, nine tenths of the value residing in the elaborate case. First rate grands are rated from $1,750 down to $1,000; squares from 1,000 down to $650; uprights, the same. Very good instruments, however, can be had at much lower prices.

IMPROVED GRINDING MILLS.

The accompanying engraving represents an improved twenty-two inch mill, adapted to grinding quartz, feldspar, foundry facings, chemicals, paints, and all kinds of grain. The shaft is placed horizontally, and the runner is rigidly secured to it, admitting of high speeding. Both runner and head stone are inclosed in a heavy case, cast in two parts. Each half is cast with its respective part of the frame and boxes, in which the shaft is journaled. On the outer faces of the cases trunnions are provided, to which the trunnion jack may be applied for taking the mill apart in making repairs or dressing. The inner portions of the case fit together with overlapping joints, and form a scroll extending around the burrs for ventilation and for the discharge of the product. The end of the shaft which receives the thrust in grinding is journaled in a partitioned bridge-tree box, in which there is an oil chamber in which the end is more or less submerged. The box fits in a sleeve formed in a very strong bracket arm, and is operated by a hand wheel in adjusting the burrs at either end of the mill. The shoe conveying the grain from hopper to stones contains screens, through which a strong current of air is forced by the fan attached to and operated by the shaft, making a final separation and cleansing of the grain. The shaft has a transverse slot through the end, in which a wrist pin can be adjusted for operating a reciprocating bolter.

The machine is strongly built of the best and most substantial materials. The husk case is sufficiently deep to receive the heaviest imported solid twenty-two inch French burrs. It makes from 500 to 1,200 revolutions per minute, requiring from eight to thirty horse power, and grinding, we are informed, from fifteen to seventy-five bushels per hour. For further particulars address the patentee and manufacturer, Mr. C. C. Phillips, 4,048 Gerard avenue, Philadelphia, Pa.



PHILLIPS' IMPROVED GRINDING MILL.

The Metric System in Practice.

Surgeon-General Woodworth, of the United States Marine Hospital Service, has issued an order relative to the adoption of the metric system of weights and measures, which will hereafter be employed for all official medical and pharmacal purposes by the officers of that department. Official indorsement and authorization of this kind will doubtless in time, little by little, result in the general introduction of the system. It is certain that without some such practical measures its common use would be indefinitely postponed, owing to the difficulty of supplanting the existing system (or rather want of system) of weights and measures, however incoherent and inconvenient, by so decided an innovation, notwithstanding the unquestioned advantages of the latter.

The order referred to prescribes that in expressing quantities by weight, the terms "gramme" and "centigramme" only will be used, and in expressing quantities by measure, the term "cubic centimeter." The metric system has already, under the act of July 28, 1866, been adopted by the Marine Hospital Service for the purveying of medical supplies, and the weights and graduated measures, as well as the glassware, hereafter furnished the medical officers, will be in accordance therewith. Simple rules for the ready conversion of terms of the United States apothecaries' weights and measures into their respective equivalents in metric terms are appended to the order, which, for all medical and pharmacal purposes, will afford sufficiently accurate results. Suggestions are also given as to the mode in which metric medical prescriptions might be constructed, and in relation to the preparation of requisitions for medical supplies in metric terms.

THE Norwegian Government has constructed a telegraphic line, 200 kilometers in length, composed chiefly of submarine cables, by means of which the fishers along the whole coast are enabled to gather at once on the approach of a shoal to any particular fiord.

Custard a Cholera Producer.

If the conclusions which Dr. W. R. Sevier, of Jonesboro, Tenn., has reached relative to a cause of cholera are substantiated by the experience of other observers as well as of himself, they are of the highest importance, and in any event worthy of careful examination. During 1875 a severe cholera outbreak occurred in the above named town, some thirty deaths taking place in a population of 1,500. Upon his analysis of the disease and its symptoms, Dr. Sevier, while attending the sufferers in that locality, reached the opinion that the malady was due to true blood poisoning, and undertook to combat it with chlorine instead of the usual specifics, opiates, quinine, brandy, etc., which had given unsatisfactory results. After some trials he obtained excellent effects from doses of sesquichloride of iron with hydrochloric acid and opium, losing but two out of fifty cases; and he attributes his success to the disinfecting properties of the chlorine as affecting the secretions of the stomach. In other words, his theory, expressed in general terms, is that decomposing food in the stomach is just as likely to cause cholera as a highly poisoned condition of the atmosphere. If the amount of animal food is in excess of the acid present, decomposition ensues and septic poisons are generated, and the alimentary substances most to be feared are custards and cheese. To these seemingly innocuous foods Dr. Sevier has traced cases of severe poisoning, and this although the preparations themselves showed no offensive properties. The poison existed, nevertheless, in the products of fermentative action. Custards, he says, are especially dangerous, and after they are prepared "should be kept at a very low temperature, and never be used after they have become in the least degree sour, or even insipid. I have seen them in the latter condition when an occasional bubble of gas arising to the surface was the only evidence of the mischief transpiring beneath, but, as demonstrated in the cases cited, intensely poisonous." The same invisible and destructive poison constituting the cholera miasm exists in the toxical principle of decomposing meat or cheese or fermenting custard.

As regards the existence of aeriform poison, Dr. Sevier regards the same as an epidemic influence as due altogether to the absence or to the deficiency of ozone in the atmosphere. When this element is present in sufficiency, it does not and cannot exist. The effect upon the system, he further considers, will depend on the amount of muriatic acid in the stomach. If the supply of this agent is sufficient to meet the demand, as heretofore suggested, no detriment to health from this poison will follow any amount or degree of exposure.

The Right Sort of Southern Spirit.

At a recent entertainment given by the Commercial Club, of Boston, to the visiting senators from the South, Senator Gordon said:

"These Southern friends and myself have come to look at your great factories, your manufactures, your great industries, and wonderful material developments, and to gather inspiration from that proverbial energy and enterprise which have enabled you to conquer unfriendly nature and to convert the bleak hills of New England into productive farms to support your commerce and your manufactures. We have come also to put you upon notice, and I take this occasion to serve that notice, that we of the South intend to enter the race with you in some of those branches of industry which hitherto have been yours peculiarly and almost exclusively. We have water powers unexcelled, which we are going to utilize, and even now are utilizing. We have a climate most balmy and genial and healthful. We have rich mines of coal and iron, and we intend to wake from their long sleep in their mountain beds these twin sons of Hercules, and set their arms to work in securing the great industrial wealth which awaits us. And if your people of the East are not alert and active we intend to overtake you in the race, to strain along abreast with you, and I am not sure but that on the homestretch we shall yet lead you on some of these lines of enterprise."

It is but a few years since the great West arrived at a similar conclusion, and to-day the vast agricultural resources of the West are surpassed in value by the newly created manufacturing interests. Before the waning nineteenth century comes to an end the same may be true of the South. The old time planter's ignorant prejudice against labor, particularly mechanical labor, is fast dying out. Raw cotton is no longer king. Possibly in the new regime the spinning jenny may be queen.

GLACIAL MOVEMENT.—The daily motion of the great Swiss glacier, the Mer de Glace, is from 7 to 36 inches, depending upon the season and the point of measurement. The motion of its tributary glaciers is less rapid.