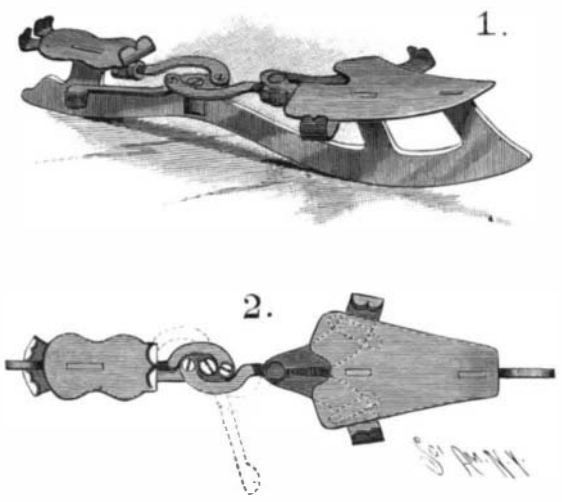
AN IMPROVEMENT IN ICE-SKATES.

In the accompanying illustration we present a skate which is provided with an improved lock for the heel and sole clamps, the lock being so constructed that either of the clamps may receive an initial or broad adjustment without disturbing the adjustment of the other clamp.

Fig. 1 is a perspective view of the skate, and Fig. 2 is a top plan view in which the clamps are shown in closed position by positive lines, and in open position by dotted lines.

The runner, in order to offer as little friction as possible, is arched, so that it bears on the ice only beneath the heel and sole plates.



FILOR'S IMPROVEMENT IN ICE-SKATES.

Upon the heel plate a clamp is held to slide, and upon the sole plate diverging clamps pivoted together at their rear ends are held to slide. Between the sole and heel clamps a lever is fulcrumed. Oppositely curved links pivoted to the lever, one at each side of the fulcrum, are adjustably connected by means of screw shanks with the sole and heel clamps. The pivotal connections between the links and the lever are out of alinement with the center of the fulcrum, so that when the curved portions of the links are brought close together by the movement of the lever, they will lock themselves in this position.

As each link is independently adjustable upon its clamp, the throw of the clamps may be separately regulated to change the locking action of the lever. The skate is the invention of Charles F. Filor, care of S. S. Moore, Trenton, N. J.

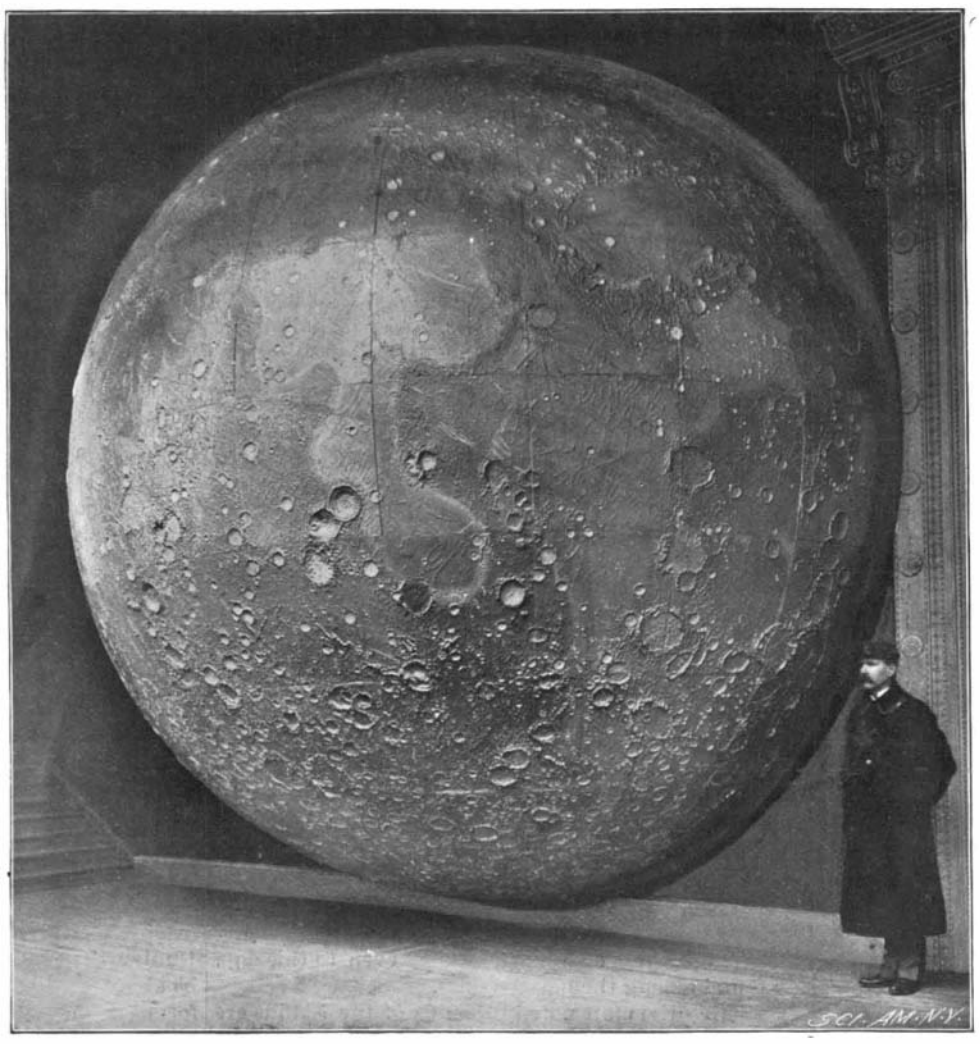
A GIGANTIC ARTIFICIAL MOON.

BY OLIVER C. FARRINGTON.

Under the above heading, the SCIENTIFIC AMERICAN of April 9, 1881, urged the attendance of its readers upon an exhibition at Steinway Hall, New York city, of a model of the moon 16 feet in diameter. The article closed by expressing the hope that the model might ultimately find a permanent abiding place in "some of our public institutions." After a lapse of nearly eighteen years, this wish has been realized, and the model is now permanently installed at the Field Columbian Museum, Chicago. Students of science, whether casual or professional, may well rejoice over the opportunity thus afforded them to become familiar with the physiography of the earth's satellite with but a tithe of the labor and equipment required to study it by means of a telescope. What was said of the model by the SCIENTIFIC AMERICAN then is true still: "It is by far the largest, most elaborate, and expensive portrait of the moon ever made, and, seeing that it was constructed for and under the immediate direction of one of the most eminent selenographers, Dr. Schmidt, Director of the Observatory at Athens, Greece, we may safely accept it as a faithful portrait." The model is a hemisphere 19·2, not 16 feet in diameter. It is made up of 116 sections, 15° in length by 15° in breadth, which serve to mark upon the surface parallels and meridians. The horizontal scale is 1 : 600.000, the vertical 1 : 200,000. The elevations are therefore exaggerated but three times, a much smaller increase than is usually necessary to bring out features of detail on relief maps of the earth's surface. By means of this scale the various features of the moon's surface have been accurately and vividly portrayed. The extraordinary volcanic activity which our satellite has undergone impresses one at the first glance, while the mountains, plains, cliffs, and chasms, surpassing in grandeur anything to be found upon the earth, are vividly shown.

Here, for instance, are Copernicus with its vast crater 46 miles in diameter, its interior marked by terraces formed by huge landslips which took place along the mighty ramparts; here are the awful chasms, a mile wide and 100 miles long, radiating from Triesnecker; the magnificent group of Theophilus, Cyrillus and Catharina, with craters 60 and 65 miles in diameter merging into one another; the walled plain Schickard, 153 miles in diameter, with ramparts several miles in height; the "thin cheese" of Wargentin, apparently a crater that has been filled with lava to the brim which remains in place cold and hard; the mighty "seas" of Oceanus Procellarum and Mare Crisium, which are in reality vast plains, covering areas of 90,000 and 78,000 square miles; and all the other objects to the number of twenty thousand, which it has been the labor of astronomers from the earliest times to measure and describe. Later discoveries are not likely to add much detail necessary to the completeness of such a model, for the features sufficiently large to be shown by it have been agreed upon by astronomers for many years. The impression gained of the condition of the moon's surface by looking at the model is that it is a scene of utter desolation and ruin—a globe without life or comfort for beings such as man. This is undoubtedly what one would find could he make a trip to the moon itself, and a view of this model is perhaps the best substitute for such a journey which has yet been devised.

Mr. Lewis Reese, of Chicago, was the donor of the model to the Museum.



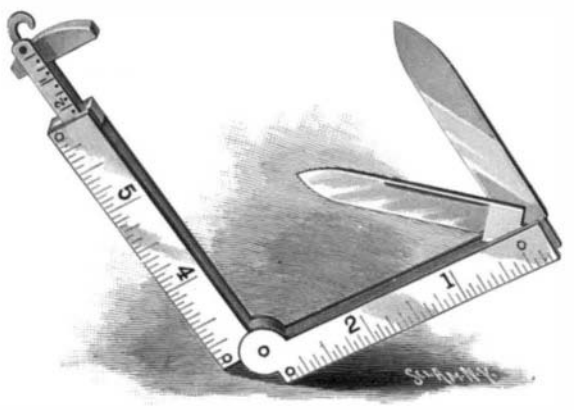
MODEL OF THE MOON NINETEEN FEET IN DIAMETER RECENTLY INSTALLED IN THE FIELD COLUMBIAN MUSEUM.

Cloth from Pineapple Fiber.

In an article on "Possible Fiber Industries of the United States," in Appleton's Popular Science Monthly (November, 1898), C. R. Dodge tells us the leaf of the pineapple contains a very fine silky fiber that may be utilized in the manufacture of textile fabrics. He says: "A pineapple plant matures but one apple in a season, and after the harvest of fruit the old leaves are of no further use to the plant, and may be removed. The leaves have the same structural system as the agaves—that is, they are composed of a cellular mass through which the fibers extend, and when the epidermis and pulpy matter are eliminated the residue is a soft silk-like filament, the value of which has long been recognized. Only fifty pounds of this fiber can be obtained from a ton of leaves, but, as the product would doubtless command double the price of Sisal hemp, its production would be profitable. How to secure this fiber cheaply is the problem. The Sisal hemp machines are too rough in action for so fine a fiber, and, at the rate of ten leaves to the pound, working up a ton of the material would mean the handling of over twenty thousand leaves to secure perhaps three dollars' worth of the commercial product. Were the fiber utilized in the arts, however, and its place established, it would compete in a measure with flax as a spinning fiber, for its filaments are divisible to the ten-thousandth of an inch. The substance has already been utilized to a slight extent in Eastern countries (being hand-prepared) in the manufacture of costly, filmy, cobweb-like fabrics that will almost float in air."

A COMBINATION-TOOL.

An ingenious combination-tool has been invented by Beniamino Ibelli, 139 Hudson Avenue, Brooklyn, New York city, which comprises essentially a rule, a penknife, a gage, and a weighing-scale.



IBELLI'S COMBINATION-TOOL.

Referring to the annexed illustration, it will be seen that the tool consists of a rule formed in two sections, hinged together, each section being recessed at one side. Within the recess of the first section and between the side walls are pivoted two knife-blades, the backs of which are adapted to be received by the recess of the second section when the tool is folded and the blades are closed.

Behind the rear-wall of the recess in the second section, a chamber is formed, which receives the graduated bar of a weighing-scale, controlled by a retractile spring. On one of the outer surfaces of the section a gage is adapted to slide in guideways, and is designed accurately to caliper shorter diameters when the two rule-sections are closed.

Kitchen Bacteriology.

According to The Dietetic and Hygienic Gazette, a Königsberg doctor, Privat-docent Dr. Jäger, recently gave a course of hygiene and bacteriology for ladies, which included practical exercises in applied bacteriology, for instance, in the preparation and preservation of food by methods used in bacteriological work. At the close of the lectures the hearers were allowed to invite their friends to an exhibition of kitchen products — some raw and some cooked—that had remained in a warm room for periods varying from five to sixteen days, and which were all found perfectly fresh and quite unchanged in appearance and taste. Nor had any complicated procedure been required to obtain this result.

The method simply consisted in: 1. The use of vessels with well-fitting, overlapping lids, instead of the inside lids used in kitchens the world over, which allow stray bits of matter that may adhere to their rim to fall into the food. 2. Avoidance of opening the vessels in which the food was kept, or, where this was indispensable, careful manipulation as in bacteriological work. 3. The use of cotton wool as a covering. Cotton-wool lids had been specially prepared to fit the wide tops of the food vessels; they consisted of a circular disk of cotton wool, tightly held between two metal rings, the outer of which formed the overlapping rim of the lid. The Gazette says that it is to be hoped that Dr. Jäger will find imitators, and that "kitchen bacteriology" may become a study with ladies. Certainly there is much room for improvement in the old-fashioned kitchen methods to which our "family plain cooks" cling with such desperate energy, and which they seem to regard with an almost superstitious reverence.

The Progress of the Trans-Siberian Railway.

For a long distance toward the Pacific Ocean it is expected to lay the rails of the Trans-Siberian Railway at the rate of four miles per day. The road is now being built without foreign employes, except for a number of Italian stone cutters. The rails are being turned out by subsidized Siberian foundries. Every seven miles a side track is being built, so that the entire route may be cleared for military trains, should it become necessary. A train de luxe now runs once a week from Moscow as far east as Tomsk. From that point a second-class passenger train runs three times a week as far as Irkutsk. The cost of a second-class ticket from Moscow to Lake Baikal, where the government is now laying rails, is about $40, and the journey lasts some twelve days.

AN IMPROVED WOOD-WORKING MACHINE.

A machine for doing a variety of work is a necessity in any factory where there is not a full line of machinery, and the universal wood-worker, which has just been redesigned and patented by the Egan Company, Nos. 327 to 347 West Front Street, Cincinnati, O., is well adapted to meet the various requirements of the wood-worker. The machine will make glue-joints, will chamfer, tongue, and groove, raise panels, miter, rabbet, flute, and bead.

The column is cored out, cast in one piece, and is heavily braced. The connected and movable bearings are laterally adjustable across the machine in square gibbed slides. When the operator has his fence set for doing work, he can adjust the head with the greatest rapidity to the exact line desired.

The spindle has an outside bearing which can be instantly removed by loosening one hand bolt, to give free access to the head. All cutter-heads used are adapted to run at the highest speed.

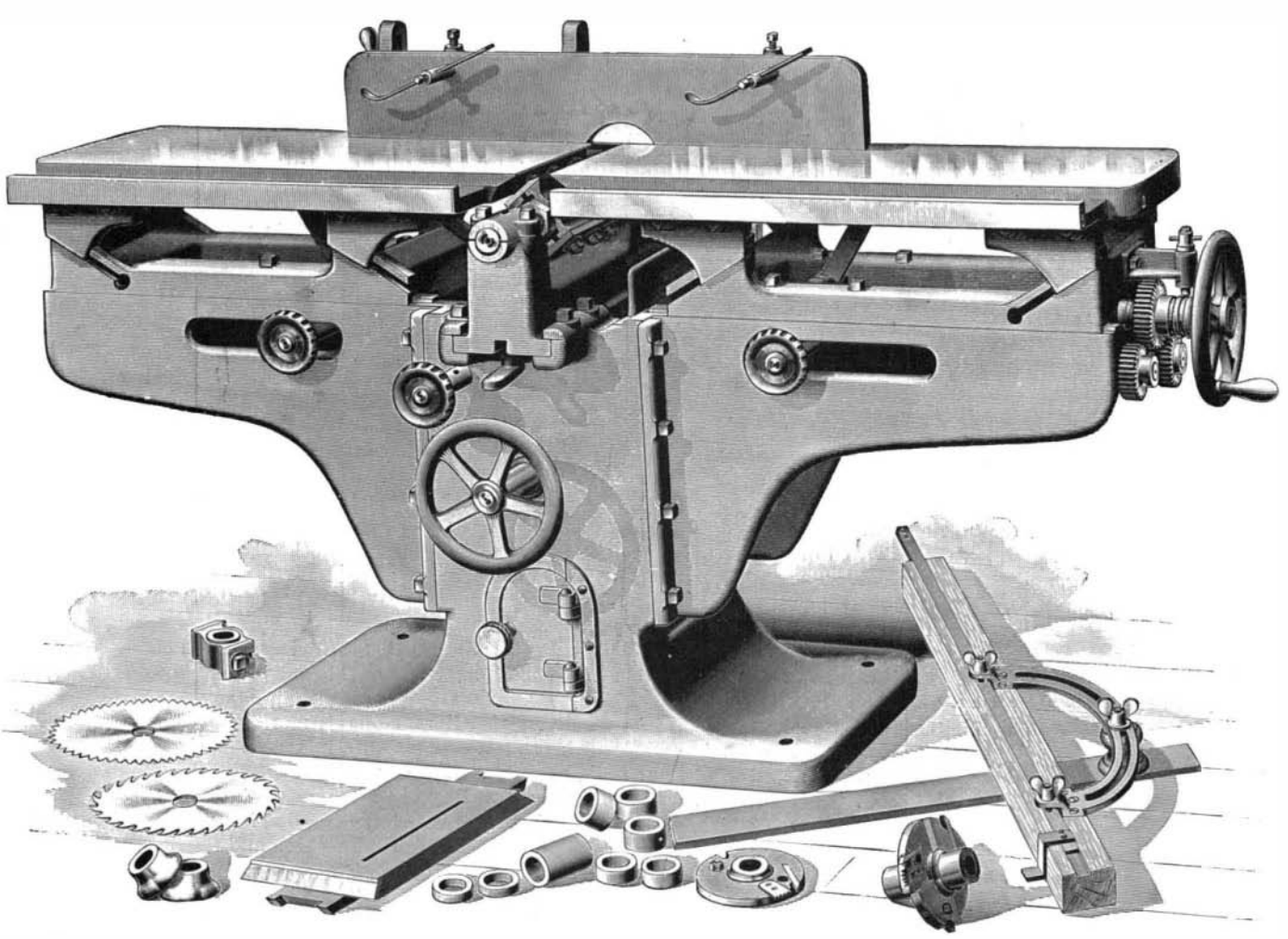
Both tables may be adjusted vertically, horizontally, and to the circle of the head independently, or may be drawn clear back from the cutter-head, to give free access to the mandrel in order to put on any cutters, heads, or saws, by means of the hand wheel at the working end of the machine. Both tables may be raised and lowered together, following the circle of the head. By the large hand wheel at the front both tables may be raised and lowered together vertically. The relative positions of the tables are not changed, and the adjustment is accomplished in either instance by means of a single hand wheel. There are four inclines to each table, one at each corner, so arranged that all wear may be taken up and the tables always kept in perfect alinement, notwithstanding any wear that may take place.

For panel-raising, two panel-heads, with a special fence, are used. Both sides of any door-panel of any shape can be raised at the same time.

An adjustable bevel-fence is provided which can be set to any angle desired by loosening one clamp bolt, and which has a free movement across the table for the different kinds of work to be done. The face of this fence is planed perfectly true.

The boring side can be used for all kinds of boring or routing. The table is raised and lowered independently by the cranks shown in the cut. A fence for angle boring is fitted on the table, with stops for spacing the holes and routing.

The Egan Company's wood-worker was awarded a medal at the Cincinnati Industrial Exposition October 3, 1882; October 6, 1883; at the Cincinnati Centennial Exposition, 1888; at the World's Fair, Chicago, 1893; at Antwerp, Belgium, 1893; and at Santiago, Chile, 1894, for convenience of adjustment and originality of construction and the trustworthy and thorough workmanship displayed throughout.



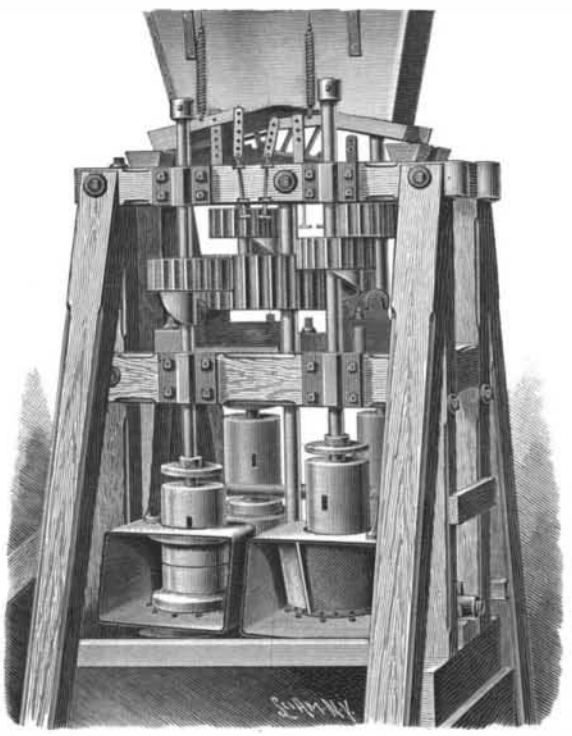
PLANING AND JOINTING SIDE OF AN IMPROVED WOOD-WORKING MACHINE.

A ROTARY ORE-STAMPING MILL.

In many of the gravity ore stamping mills no small percentage of values is lost in slime. Moreover, these mills are provided with stamps having only reciprocating motion. In the mill which forms the subject of the accompanying engraving the slime losses are considerably reduced, and the stamps are moved not only vertically, but are also rotated.

Mounted in the lower portion of a heavy frame is a horizontal shaft, driven in any desired manner, and geared to a vertical shaft extending upwardly to the top of the casing. At its upper end the vertical shaft is provided with a wide-faced cog-wheel meshing with four other cog-wheels provided on their under surfaces with cams adapted to engage rollers. The four cog-wheels are carried by vertical shafts having iron plungers or stamps at their lower ends. These stamps have chilled iron shoes and move vertically within crushing shells resting upon cast iron bases recessed to receive chilled iron dies. A wire screen, funnel-shaped in form, is fitted within each crushing shell. The ore crushed by the stamps will be gradually forced through the screens when it has been reduced to the requisite degree of fineness.

As the cog-wheel driven by the central shaft revolves, the stamp shafts will be rotated by their cog-wheels, and will rise and fall as the cams respectively engage and pass over the rollers. It is, therefore, evident that the stamps are enabled not only to crush, but also to grind the ore, by reason of the movement of rotation imparted by the cog-wheels.



PARKER'S ROTARY ORE-STAMPING MILL.

The inventor of this mill, Mr. A. A. Parker, of Ridgway, Col., informs us that his apparatus has been used with gratifying results. A battery of four stamps driven by a ten horse power engine, it is said, will crush twenty-five tons of ore in twenty-four hours with screens of sixty-mesh fineness.

American Capital in Brazil.

An article on the resources of Brazil, written by L. Lipman, a prominent local authority, at the request of Consul-General Seiger, at Rio Janeiro, has been published by the Department of State. Supplementing the writer's observations, Consul-General Seiger says:

"I regard with much favor the proposition of organizing an American syndicate for business operations in Brazil. While the present financial and commercial depression is unfavorable to new industrial ventures and to rapid increase in the sale of American merchandise in Brazil, it offers, on the other hand, excellent opportunities for the investment of capital in industrial enterprises already established on terms much more favorable than could be obtained when the country is once more placed on a solid financial basis.

"European capitalists, especially British, are for these reasons making investments here. American capitalists ought to combine to send financial and technical experts to this country, men of experience and mature judgment, who speak the French and Portuguese languages, and let them look around in Rio, in Minas Geraes, in Parana, in Santa Catharina and Rio Grande do Sul. There is no lack of opportunity for good investments. This is also a good time for the preparatory work that may lead to permanent commercial relations at the time of a general trade revival, which is sure to come sooner or later.

"A great deal of harm has been done lately by adventurers who come here from the United States with a great flourish of trumpets, but without any means, experience or knowledge of French or Portuguese. They bring a great variety of 'samples' (easily convertible into cash) from manufacturers anxious to extend their trade in Brazil. Such unscrupulous and ill-prepared agents can only harm American prestige in this market.

"I would advise our export associations to quit sending circulars here, which are never read, and to establish a monthly American trade paper in Rio, printed in the Portuguese language. Such a paper could easily be made self-sustaining, and, if properly conducted, would pave the way to closer business relations between the United States and Brazil.

"A profitable business might be done in the shipment of Brazilian hard woods to the United States. This business is at present, so far as my observation goes, almost exclusively confined to rosewood; but there are many other fine cabinet woods in Brazil, some of which are much cheaper and even more beautiful.

"Lately the immigration into Brazil has fallen off very considerably, that of Teutonic and Anglo-Saxon origin having almost entirely ceased. This fact is due to the extremely hard times now prevailing in Brazil and also to the fact that the national government, as well as the state governments in the south, are at present financially unable to grant substantial assistance to immigrants.

"The overproduction of coffee is now forcing the Brazilian agriculturists to diversify agriculture so as to produce the foodstuffs necessary for home consumption." In this connection Mr. Seiger gives the figures of the crop for 1897-98 at about 11,000,000 bags of 132 pounds each, while that for 1898-99 is estimated at from 7,000,000 to 9,000,000 bags.