Correspondence.

How to Secure Trade with South American Countries.

To the Editor of the SCIENTIFIC AMERICAN:

I have taken an interest in your consular reports to further American trade abroad, which are published in the SCIENTIFIC AMERICAN SUPPLEMENT. They keep American merchants informed of where they are likely to find an outlet for their merchandise, but they do not inform the foreign consumer where he can buy the best and cheapest.

Speaking for this part of the coast (Chile), I can say that a lot of money is spent on price lists, catalogues and correspondence which produces but little business for the United States. The Germans are gradually getting the greater part of the trade, owing to their peculiar business methods. A number of German firms generally club together and send a commercial traveler to this coast, who is able to speak Spanish, English, French, and German. These men are, as a rule, capable of explaining the use and advantages of their employers' wares, and bring samples of the smaller articles with them.

They take note of the commercial standing of desirable clients or customers, and when taking an order make special inquiries as to shape, color, or weight of articles required and then allow from four to six months' time from date of invoice for payment.

Our American merchants send out catalogues with prices, as a rule, very much higher than the German quotations, and with a complicated system of discounts expect their customers to take the trouble to work out what an article will cost, when the most natural thing would be that the compilers of the price list or catalogue should ask only what they expect to get for their wares, so that when comparing two lists it will be possible at a glance to see what is the difference, if any, between them. There is no quotation, as a rule, as to the probable cost of expenses and freights to port of destination, and the terms are usually cash.

Most of the houses on the coast receive their merchandise from Germany, and dispose of a great part of them before payments are due; but, when dealing with the States, payment must be made long before the merchandise is even seen.

If the Americans wish to compete with the Germans in this market, they must either do as good or better. As a rule, very few rich foreigners remain here in trade; when they get a competence, they generally go home or change business, and give their juniors a chance. Business is done here generally on a credit basis, and there is not so much risk with moderate credit as might be imagined. JOHN H. FRANZ.

Tocopilla, Chile, May 6, 1900.

[Our correspondent is correct. Many houses in the United States seem incapable of doing business with the great Spanish-American countries which lie at our very doors. Other firms who have advertised in export journals printed in Spanish, who have issued Spanish catalogues, and who have conducted their business in the same language, are reaping their just reward. Our consuls all over the world are constantly giving advice of the same tenor as our correspondent, and if our manufacturers and merchants do not heed them, they can hardly hope to achieve success in the export trade. The Bureau of American Republics and the Philadelphia Commercial Museum have done good work in telling us how to sell goods, and the Pan-American Exposition of 1901 will, doubtless, be a most valuable object lesson in the same line.—ED.]

Moving a Telephone Switchboard.

A telephone switchboard at Detroit was recently cut in two and moved 15 feet without interfering with the service. Forty-two electricians besides many other workmen prepared for the move for ten weeks, and it was accomplished in ten hours, says The Electrical World. The western wing of the board was first swung around a distance of fully 20 feet, after which the other half was drawn 8 feet toward the center of the room. The wing was swung by the jack-screws, and then the other half of the board was drawn by means of wires fastened to the board at short intervals and extending from it to long iron rods which had been threaded. Large nuts turned by wrenches in the hands of over twenty men worked slowly on the rods, drawing them forward until it had been moved the entire 8 feet, the cables containing nearly 100,000 wires being slipped under the floor.

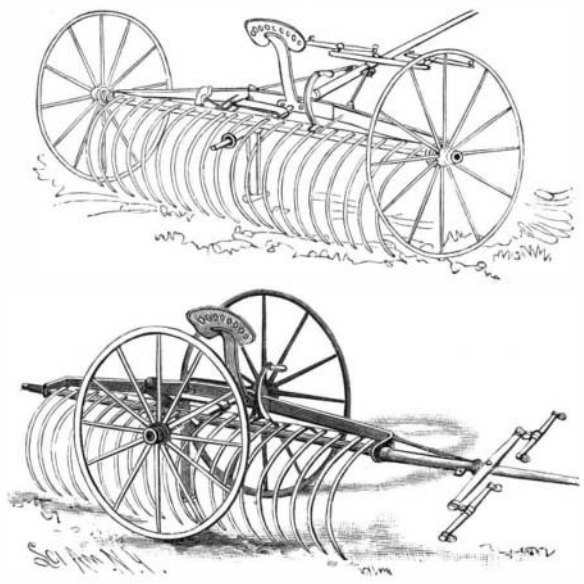
The Peary Relief Expedition.

The Peary Arctic steamer "Windward" was ready to come out of the dry dock on June 9, at St. John's, Newfoundland, the repairs which have been in progress for several months having been fully completed. It will soon leave Sydney in command of Capt. Samuel W. Bartlett, to take on coal and supplies for the voyage to the north. It was hoped that the "Windward" could be newly engined, but it was found that the builders could not take up the contract. A new shaft and propeller were put in and the old engines were thoroughly overhauled and put in the best possible order, so that her speed will be increased by at least a knot and a half. She will then be as fast as the "Kite" of the expeditions of 1891-92 and 1895. The hull has been thoroughly rebuilt, and the "Windward" is now in far better condition than she has been for years, new boilers having been installed by Mr. Harmsworth before he turned over the vessel to Lieut. Peary. The "Windward" will this year sail as an American ship, Congress having passed a bill; consequently the "Windward" will be the first Arctic expedition steamer to carry the Stars and Stripes since the "Polaris" started on her ill-fated expedition in 1871. The expedition will sail from Sydney about the first of July and go to Etah, North Greenland, after calling at Disko. At Etah, Lieut. Peary's winter quarters, instructions will probably be found, and if not, they will be waited for. The "Windward" will carry coal, lumber, arms, provisions, scientific instruments, etc. If Lieut. Peary has succeeded in carrying out his plans, that is to say, if he has discovered the North Pole, he will return with the ship. If not, the supplies will be landed. It is possible that the "Windward" will bring back the Robert Stein party, which, was landed near Cape Sabine by the "Diana" in August last.

A TRUCK ATTACHMENT FOR SULKY-RAKES.

To provide a means whereby a hay-rake of great length can be so mounted that it will readily pass through a comparatively narrow space, is the object of an invention for which a patent has been granted to Charles E. Foreman, of Center, Colo.

This object is attained by the use of a long main and a short auxiliary axle, arranged at right angles to each other and provided with the usual spindles to receive the ground-wheels. The pole or tongue at its inner end is provided with a tubular portion which can be made to fit over any desired spindle. A jack is carried



THE RAKE IN OPERATIVE AND INOPERATIVE POSITION.

by the frame, so that it is possible to raise the implement.

In hauling the device through narrow lanes, the wheels are fitted on the spindle of the short auxiliary axle; and the tubular portion of the tongue is slipped over a spindle of the long main axle. The implement will then appear as we have pictured it in our lower illustration, the rake, it will be observed, being longitudinally disposed, so that it can be hauled through narrow openings. When the field is reached, the jack is used to raise the rake. The wheels and tongue are then removed, the former being applied to the spindles of the long main axle, and the latter to one of the spindles of the short auxiliary axle. The rake will then be in operative position and will appear as shown in our upper figure. Detachable braces are employed to hold the axles in adjusted position.

The International Automobile Cup Race.

M. Charron, representing the Automobile Club of France, won the great International Automobile Challenge Cup race on June 14, the course being from Paris to Lyons, 351 miles. His time was 9 hours 9 minutes, his average speed being 38·4 miles per hour. The Paris-Lyons express railroad train covers a shorter route (318 miles) in 9 hours, but M. Charron would have made the same distance in 8 hours 16 minutes. MM. René de Knyff, Charron and Girardot represented France, M. Jenatzy, Belgium, and Mr. Alexander Winton, the United States. M. Charron used a Panhard-Levassor racing machine. M. Girardot arrived second, his time being 10 hours, 30 minutes, 23 seconds. The other competitors did not finish.

A NEW process for the extraction of rubber from the rubber tree consists in cutting up the bark and roots and soaking in dilute sulphuric acid. This decomposes the woody portions without affecting the India rubber. In this way the rubber and the bark and roots are separated.

Paris Exposition Notes.

The Horticultural Palace, situated on the bank of the Seine, opposite the National Pavilion, has for some time been open to the public. It consists of two large greenhouses, placed end to end, but separated by a considerable space; at the back of this space is a building devoted to collection of seeds and the various accessories used in horticulture. The two main greenhouses have a number of hemispherical bays along each side to break the monotony of the structure and to add to the space inclosed. At the outer end of each building is a circular greenhouse, and one of these is occupied by the United States. A horticultural exhibition has been held recently, in which were seen a number of fine collections of flowers, especially the azaleas sent by a number of German houses, and in the French section the various exhibits of roses were remarkable. One of the Paris seed houses has a fine display of vegetables, and several fruit displays were seen, including oranges and lemons from the Mediterranean region; these, however, did not compare for extent or interest with the fruit display of the United States, which occupied the whole of the pavilion; the collections of apples, peaches, pears, and grapes were especially commented on, and many of these were marked "first prize." Of these, all but the apples are preserved in alcohol. The third horticultural exhibition has been recently opened; an official visit to the exhibition was made by President Loubet, accompanied by a number of distinguished visitors. A number of fine collections are shown; the display of rhododendrons and roses placed in the center of the Salle des Fêtes was especially remarked; they were placed there on account of the lack of space in the main greenhouses on the Seine. The latter were filled with a number of interesting flower and fruit exhibits; the fruit collection of the United States continues to attract attention; fruits are shown from the south of France and from other countries. With the President were Doctor Withmak, professor of horticulture at the Berlin University, and most of the members of the Horticultural Society of France. In the Austrian section the attention of visitors is attracted to a strange plant of thick appearance, placed under a glass shade; this is the Asclepindex capensis. This plant, which is supposed to be the only specimen of its kind in Europe, was brought from the Cape of Good Hope nearly a hundred years ago; it has been impossible to obtain seed or new growths of this singular plant. According to observations made upon the growth of the plant, it is supposed to be several centuries old.

The work in the Electrical Palace and the large dynamo and boiler rooms adjoining it is now being rapidly carried on. In the foreign dynamo room the four large machines of German make are now completed, and will soon furnish current; the engines average about 2,000 horse power. The three Belgian dynamos, which average 1,000 horse power, are also nearly completed; the three machines of the Swiss section are also practically finished, and are commencing to run. The English dynamos will soon be finished; there are three of these machines; the largest, of Siemens & Halske make, is rated at 2,000 horse power. The Austrian section has two dynamos, one of 900 and another of 1,600 horse power, and that of Holland gives 500; Italy has two engines of 600 and 1,200 horse power; the latter machines are also nearing completion. The total capacity in the foreign section is about 22,000 horse power, representing 19 engines. In the French dynamo room the large engines and dynamos are nearly finished, and some of them are aleady running. The largest engines are those of the Fives-Lille Company, of 1,200 horse power; the Decauville machine, of 1,200; and the Crescent, of 1,500 horse power; there are 19 dynamos in all, giving a total of 20,000 horse power. The Thomson-Houston Company have a large dynamo built in France, connected to an engine of 1,200 horse power. As the building contains also the mechanical exhibits, a number of these are to be seen on the lower floor, along with the various collections of small dynamos, motors and various apparatus. The United States is represented principally by a number of exhibits of machine tools. The Roebling Company show a full-sized section of underground conduit for electric roads, and the General and Western Electric Companies will be represented. The Ingersoll-Sergeant Drill Company, the E. P. Bliss Company, Warner & Swazey, and many others, have exhibits on the lower floor. On the second floor are the lighter exhibits, and here have been erected a number of fine pavilions. That of the United States is the most prominent and covers the greatest space. The historical collection is now being put in place here, and a number of cases are already finished. Next to it is a structure of a different style, erected by the Allgemeine Company, of Germany, to contain a varied collection of apparatus, including the Nernst lamp. The Swiss pavilion is near it, and a number of large and small structures are being erected for the exhibits, which are being rapidly installed; it is expected that before long the interior will be sufficiently advanced to permit it to be thrown open to the public.

Science Notes.

The penny-in-the-slot machines for holding directories are becoming very popular, both in New York and Chicago, and in the latter city directories are not to be sold, but will be leased to subscribers.

According to Sig. G. Pollacci, the presence of formic aldehyde can be determined by the ordinary tests, in the first portion of the distillate, when leaves which have been long exposed to light are macerated and distilled with water.—Boll. Chim. Farm.

An extensive building has recently been opened in Leeds (England) to be devoted to the development of clothworkers' research, dyeing, etc. It is the intention of the Clothworkers' Company of London that this college should become the leading and most complete example of a textile and dyeing school in the world.

The new mines of lignite which have been discovered in Germany are of considerable importance; they are located at Quadrat, in the neighborhood of Cologne. A series of soundings has shown the presence of a compact mass of lignite from 40 to 50 feet below the soil; the bed extends over several hundred acres. The extraction has commenced, and at the present time about 600 tons of briquettes are made perday, these being used to replace coal.

According to Sig. G. Spampani, olive oil is actually formed in the cells of the epicarp, and especially in those of the mesocarp, of the fruit of the olive, where it is ultimately found. The presence of a small quantity of an oily substance in active protoplasm is a universal phenomenon, and the oil of the olive presents only a strongly marked illustration of this law. The oil is not a result of the degeneration of the protoplasm, but is formed when that substance is in its most active condition.—Bull. Soc. Bot. Ital.

According to the annual report of the British Comptroller-General of Patents, a number of new acts have been passed in Japan to amend the Law of Patents, Designs and Trade Marks. Under these acts the duration of a patent is fixed at fifteen years, and of the copyright of a design ten years, subject to the payment of annual fees. The term of protection obtained by registration of a trade mark is fixed at twenty years, except in the case of trade marks previously registered abroad, where the term is the same as that for which the original registration is valid.

A mercury thermometer for high temperatures has been designed in Germany. It consists of a small cylindrical receiver of steel closed at one end. At this end a capillary tube of steel ¼ mm. internal diameter is connected. This tube can be made of any length up to 50 yards, so that the indications of the instrument can be seen at a considerable distance from the place of which the temperature is required to be known. The capillary tube is connected to another small flattened tube which is wound in the form of a spiral. The whole of these tubes and the cavity are completely filled with mercury. The heating of the small cylindrical receiver then causes the spiral to dilate and to untwist. One end of the spiral being held and the other being fixed to a suitable gearing, the indication of the temperature can be given on a dial which can be seen for a considerable distance.

Owing to the ephemeral nature and to the exceedingly small size of bacteria, it would seem well-nigh impossible to study the minute forms which assuredly must have existed ages ago. Two French investigators, B. Renault and C. E. Bertrand, have, however, microscopically examined several varieties of anthracite coal and partially carbonized wood, and believe to have discovered petrified bacilli. Renault has even designated several of his species by name (Micrococcus carbo, Bacillus carbo, Bacillus colletus). He advances the theory that these bacteria have effected the transformation of wood cellulose into coal—a theory which is decidedly opposed to our conception of the carbonization of wood. Bacteria, according to Renault, would therefore be most powerful factors in the geological development of the world.

During the night of February 22-23, 1900, M. Charlois, astronomer at the Nice Observatory, discovered to the right of the star ε of the constellation Leo a new asteroid, which had for co-ordinates on the 22d of February at 9 h. 30 m. (mean time of Nice)

$$AR = 9 \text{ h. } 30 \text{ m. } 44 \text{ sec.}$$
$$P = 67° 28'$$

Its proper motion in right ascension and in polar distance were — 17′ and — 1′. Its brilliancy compares with stars of the 12th magnitude. Another asteroid has been discovered by M. Palisa, astronomer at the observatory at Vienna, in the constellation Virgo; it is of the 12th magnitude, and its co-ordinates on the 1st of March (14 h. 30 m. 0 sec. mean time of Vienna) were

$$AR = 12 \text{ h. } 25 \text{ m. } 30 \text{ sec.}$$
$$P = 97° 1' 44''$$

Its proper motion in right ascension and in polar distance were — 10′ and + 1′.

Messrs. Palisa, Charlois and Wolff (Heidelberg) are the astronomers who have discovered the greatest number of asteroids.

Engineering Notes.

It is estimated that the armor for the new battleships for the German navy will cost $65,000,000.

A railway is to be built between Cape Nome and Port Clarence, Alaska, and rails and narrow gage locomotives and freight cars have already arrived at Seattle.

A trial of the Raddatz submarine boat was made at Milwaukee, June 4. It made a trip of a mile under water and returned. Storage batteries are used as a source of power.

Mr. Andrew Carnegie is building an addition to his Scotch home, Skibo Castle. Steel construction is used to the astonishment of the inhabitants of the surrounding country.

A serious accident occurred in a Pittsburg foundry, where the supporting beams under a 28-ton traveling crane gave way under a 16-ton load. The crane was transferring a steel shear-housing, and while it was being carried six men were riding upon it. As a result of the accident one man was killed and seven were injured.

An English electrical journal has suggested that the proprietors of an English factory shall bring over a large number of American workmen in order to demonstrate the use of automatic machinery of American manufacture. Ordinary floor laborers may be utilized to do the work of skilled mechanics by the use of this machinery.

A landscape photographer has been engaged for the Delaware, Lackawanna & Western Railroad Company to take a six weeks' trip over the road for the purpose of photographing scenes upon it. Special engines will be provided and a platform will be built in front of the locomotive, enabling the photographer to take pictures while the train is in motion.

The first section of the great Russian pipe line has been completed. The pipe runs parallel to the Trans-Caucasian Russian State Railway. The section just completed is 145 miles long. The pipe is of wrought iron, lap-welded, and the internal diameter is 8 inches. It was made in Russia from native materials. There are three pumping stations with two pumps in each, only one being used regularly, the other being kept as a reserve. It is expected that 416,275,200 gallons of oil will be pumped per annum.

It is an interesting fact that at the Paris Exposition the "mill engine" is not in evidence and appears to be ceasing to exist on the Continent. There is not a main driving belt nor a driving rope at work in the Exposition. All the large engines without exception are employed in driving dynamos, for the most part of the flywheel types, says The Engineer, and these supply power where it is wanted through cables led in various directions. This is an evidence of the favor with which electrical transmission is regarded on the Continent.

A curious accident occurred at Boulder, Col. The brake on a tank car loaded with sulphuric acid refused to work, and the car went down a grade. Whistles were blown, and the switchman saw the train in time to shunt it onto a side track. The tank car struck a box car loaded with household goods; the tank car, which contained about 4,500 gallons of the acid, slid off the platform car and was telescoped into the box car. The acid began to escape and ruined the furniture and made a great pool in the yard, temporarily preventing the passing of teams to obtain freight. The loss amounted to several thousand dollars, says The Railway Review.

A funicular railway is proposed at Trieste, says The Engineer. The object is to connect the town, which is in a hollow at the foot of the Karst, with Opcina. At present, in order to reach Opcina, which is 2,150 meters from the center of the town as the crow flies, it is necessary to travel by the railway line to Vienna, which, however, has to make a long detour, stopping at the junction of Nabresina, and the journey from Trieste to Opcina takes from an hour to an hour and a half. The line will be of narrow gage, five kilometers long. The steepest portion of the line, the gradient of which, is 1 in 4, will be laid down on the rack-and-pinion system. Six stations are to be provided for the present. The line will be worked by electric power, and the Abt system now in vogue in Switzerland will be used.

The recent consolidation of the two great palace and sleeping-car companies necessitates a vast amount of work The word Wagner had to be painted out on the 720 cars of that company. Of the cars operated by the Wagner Company, 502 bore the same names as 502 of those belonging to the Pullman Company. A list of these duplicated cars was made out, and the day after, the transfer painters went to work changing them. The first Wagner sleeper had its name changed from "Java" to "Paltava." The Pullman standard lock is being placed in former Wagner cars, says The Railway Review, thus necessitating a change of 40,000 locks. The bed-linen, blankets, towels, doormats, and the glass in those windows containing monograms will have to be changed, and it may take many months before the alterations are completed.

Automobile News.

On June 2, the Automobile Club of America had a run from New York to Philadelphia, returning on June 4. The start was made at 7:30 in the morning from the Waldorf-Astoria. There were eight steam carriages, nine gasoline vehicles and three electric carriages. One of the electro-automobiles was the Riker machine which won a prize in the recent 50-mile race on Long Island.

The Paris courts are occupied with the cases of automobile drivers who have exceeded the legal rate of speed. The police have been very severe in their construction of the ordinance, and the result is that hardly a day passes without some prominent person being haled to the police court. Each offender is sentenced to one day's imprisonment, with the right to appeal. It is sometimes possible to escape on appeal with a heavy fine.

There will be an Automobile Exposition at Nuremberg from June 1 to July 1, 1900. It will, undoubtedly, be very interesting, showing, as it will, what German automobile manufacturers have been producing recently. Private carriages, freight trucks, vehicles for transporting prisoners, for sanitary and military purposes, etc., as well as automobile fire engines, will be exhibited. Races to Würzburg, Kissingen and Bamberg will take place. Austria has some automobiles on exhibition.

The first long-distance races held by the Rhenish Automobile Club have recently taken place over the route from Mannheim to Pforzheim and back. According to the Berliner Tageblatt, the control stations were placed at Bruchsel and Hockenheim. A large assemblage of persons witnessed the start, and the races were of an interesting character throughout. The victor was Herr Vasserot, a prominent automobilist of Frankfort-on-the-Main; he rode an Adler motocycle.

A series of automobile races was held at Antwerp on the 6th of May, including various classes of machines. The time made by the winners was as follows: Motocycles—Baron Tserclaes, with a machine of 6 horse power, 1 m. 6⅘ sec. Light vehicles, under 250 kilogrammes—Lucien Haŭvast, 1 m. 57⅘ sec. Class of light vehicles of 400 kilogrammes—Dratz, 1 m. 29⅘ sec. Automobiles, under 400 kilogrammes—M. de Terwagne (8 horse power), 1 m. 25⅕ sec. Automobiles, over 400 kilogrammes—M. Pierre de Crawhez (12 horse power), 1 m. 15⅗ sec.

In the German army, the automobile using alcohol as a combustible is to be tried for the transportation of provisions and ammunition. Emperor Wilhelm gave an order some time ago for the construction of four automobiles with gasoline motors, in order to test the value of this type for army use. The alcohol automobile has recently been used in Germany by some of the large firms for delivery wagons, with considerable success, and the Emperor has decided to have two of these made for the army; they will be constructed by the Daimler Company.

An association of automobile companies has been formed in Berlin; a large structure has been erected in the center of the city which will contain a permanent exposition of automobiles of different makes, including private and racing vehicles, delivery wagons, motocycles and all the accessories of automobile construction. In this way the public will have an opportunity to inspect the different makes, and it is expected that this will considerably increase the trade. Besides the vehicles will be shown an extensive collection of plans, designs, models, etc. The project has been undertaken on the initiative of the Count of Talleyrand-Périgord, and the persons interested represent the leading financiers and industrial firms as well as prominent sportsmen.

The automobile trouble still continues in Paris; a number of prominent conductors have been arrested for high speed, and have been sentenced to fine or imprisonment. It is claimed that many of these arrests are unjust, and that the police agents are showing an excessive zeal in this direction. According to the decree of the 10th of March, 1899, the speed has been fixed at 12 milesper hour in the streets and 16 on the road. It was at first thought that a rule would be made limiting the speed in the city to 5 miles, but it appears that the Minister of Commerce denies the intention to cut down the speed to this figure, and says that it will remain at 12 miles, as before. The committee in charge of the matter is to make the necessary rules and also consider the question of adopting a large number or name for each vehicle. The Automobile Club has not taken the action which was expected of it, and many of the members have protested against the lack of energy shown in protecting their interests. On the other hand, the Chambre Syndicale du Cycle et Automobile have drawn up a series of resolutions protesting against the recent action of the authorities, and resolved that a delegation should be appointed to visit the Minister of Public Works and show the situation in its true light, and suggest the proper regulations to be made.