

GENERAL NOTES

THE EARTHQUAKE IN ORIENTE PROVINCE

Prof. Jover of Santa Clara, the well known meteorologist, notes in the February 27th earthquake some unusual features, the chief of which was the severity of the disturbance along the northern coast. In a recent letter to the press he says:

"The earthquake in the eastern part of Cuba on the 27th ult. was perhaps one of the most notable in character and extent in more than a century. A list of earthquakes in the city of Santiago de Cuba since the sixteenth century has been published, which shows that earthquakes of greater intensity than that of the 27th of last month occurred in less than a century. In order to avoid erroneous interpretation, I would point out that what was notable in character of that of the 27th was not its intensity, even if it had been the greatest in the City of Santiago where earthquakes are common, but because its greatest force was in the northern part of the province. Local earthquakes in the City of Santiago de Cuba occur with great frequency and it would be childish to consider them as unusual. What was notable about the one of the 27th ult. was that its greatest intensity was in the north, being felt in the greater part of the northern section of the island and with a strength registering between the fifth and sixth degrees of the Mercalli scale, according to information from Puerto Padre, one of the north coast towns."

A full description of the disturbance was given in *THE CUBA REVIEW* for March.

Dr. Lopez del Valle of Havana's board of health says that there are 23 cigar factories in Havana in which women are employed to do the stripping of tobacco and there are about 60 factories employing 5,000 women for various purposes, and for whom the owners have made absolutely no provision for their convenience and comfort.

He is determined that the conditions must be bettered and an inspection has begun among the factories.

Three and possibly four Cuban warships will be sent next year to the Panama Pacific Exposition when President Menocal will be a visitor to the fair.

General Loynaz del Castillo is the Cuban commissioner to the exposition.

An association of "Boy Scouts" was recently organized in Santiago. It is new in that historic city.

BISHOP'S DONATION REFUSED

The Reporters' Association of Havana some time ago was donated a parcel of land at Colon Cemetery near the city by the Bishop of Havana for the construction of a mausoleum for its members.

Recently, owing to some anti-clerical expressions in the newspapers, Mgr. Gonzalez Estrada, the Bishop, in a letter to the president of the Reporters' Association reminded the members of the gift, at the same time complaining of the anti-clerical press utterances.

When this letter was received it was decided that terms had been expressed in the message which affected the dignity of the reporters and an answer was at once sent to the Bishop stating that the association would pay for the lands because in no way was it to be understood that the donation represented the purchase of silence on the part of the press.

A resolution to that effect was passed. The land is valued at \$204.00.

REBUILDING THE NATIONAL THEATRE

A contract has been signed for rebuilding and refurnishing the National Theatre of Havana, long known as the "Tacon" and which is now a part of the great new building of the Centro Gallego. An illustration and description of this structure was printed in the February issue of *THE CUBA REVIEW*.

The contract is for \$224,000, and includes the rebuilding of the box tiers, family circle, gallery, stage and lobby. It will be made fireproof. Improvements include a double stage and the placing of the orchestra under the stage. The contract calls for completion by January 15th next.

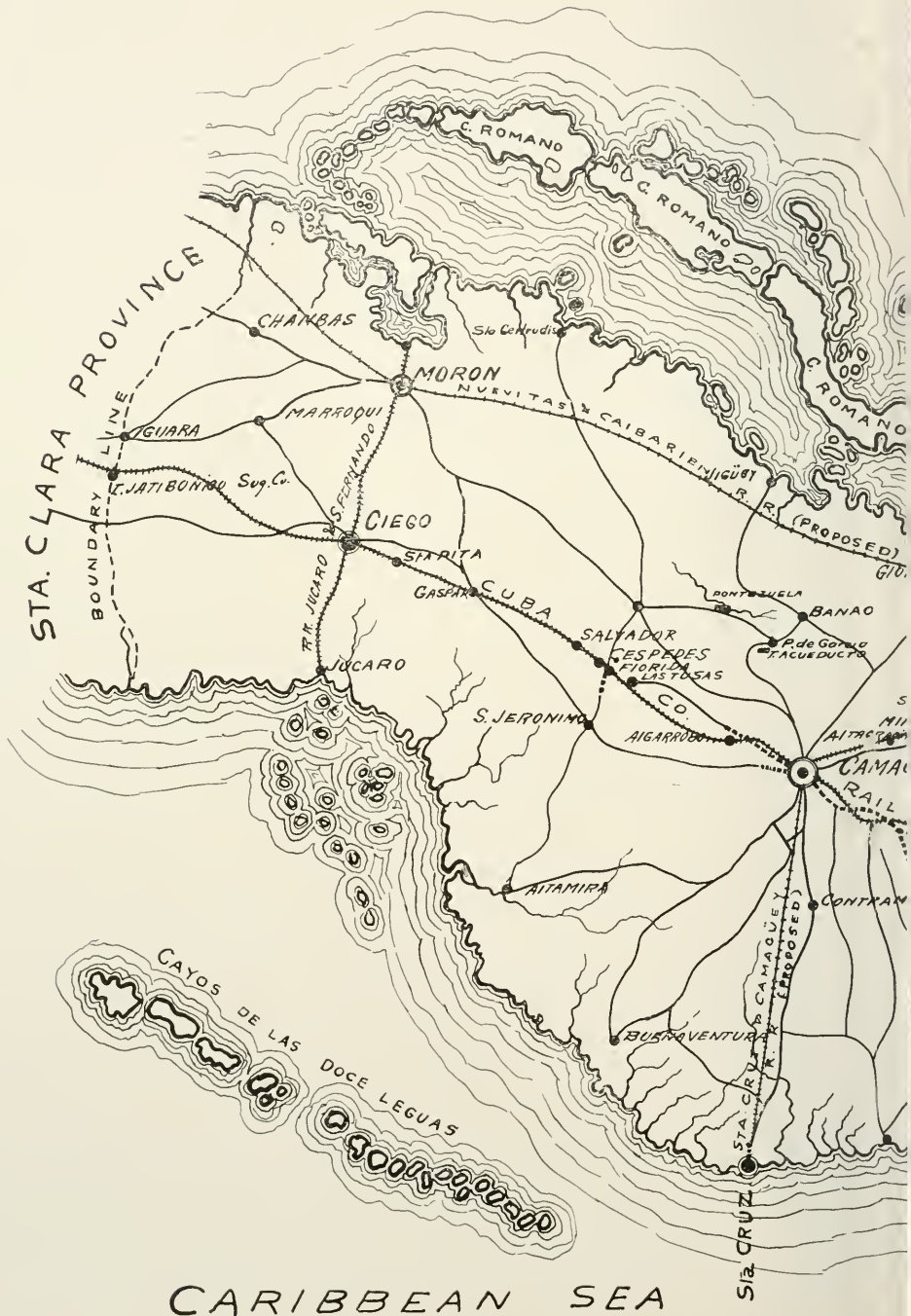
CONFEDERATE VETERANS TO VISIT CUBA

Havana will be visited next month by some veteran Confederates accompanied by their daughters and sons.

General Emilio Nuñez, the Cuban secretary of agriculture and president of the Association of Cuban Veterans, will, says the *Post*, extend the veterans an invitation in the name of the organization of which he is the head. Many Confederate Veterans after the civil war played an important part in the helping of the Cubans in their ten years' war against Spain. One of the most notable was the late General Fitzhugh Lee, who was for many years United States consul general at Havana and later commanded the Seventh Army Corps sent to Cuba during the Spanish-American War.

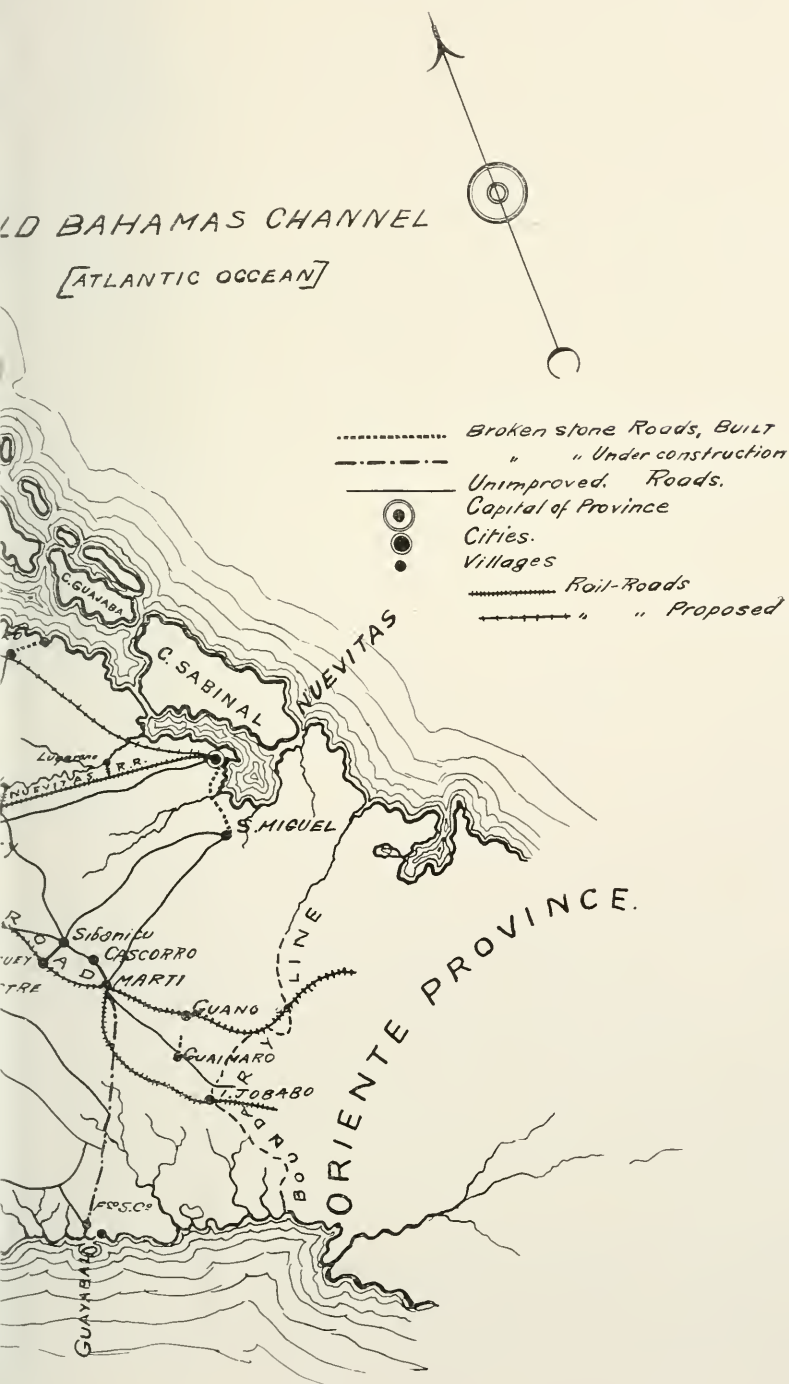
SKETCH ROAD MAP OF C.

Scale 1 : 1,000,000 showing roads built, those under construction and those unimproved. Also cities, villages of Public Works, Camaguey, February, 1914, under the direction of Sr. Pon



existing railroads and projected new lines. Made for THE CUBA REVIEW by the Department
 o Sariol, Ingeniero Jefe de Obras Publicas, Camaguey, Cuba.

existing railroads and projected new lines. Made for THE CUBA REVIEW by the Department
 o Sariol, Ingeniero Jefe de Obras Publicas, Camaguey, Cuba.



MINING THE IRON-ORE BODIES OF CUBA

By C. A. TUPPER

(From the *Mining and Engineering World*)

It is only within recent years that the vast extent of the mineral resources of Cuba has met with appreciation on the part of American mining interests. Now, however, the development of extensive iron ore properties is proceeding rapidly, and it is only a question of a short time before copper, lead and zinc mines are opened up, the known deposits of copper being particularly abundant.

As far back, however, as 1883, while Cuba was still a possession of Spain, the insular government issued a proclamation to the effect that for a period of 20 years mining companies were to be exempt from all taxes on their land, that no export duty should be imposed upon ores, that coal brought in by mining companies for their own use would be duty free, that for a period of 5 years mining companies might import, without tariff charges all machinery or material used in the recovery or transportation of ores, and other provisions of a similar character. The laws relating to navigation, port charges, clearances, etc., were amended in like manner, so far as vessels in the service of mining companies were concerned.

Under the provisions of this and subsequent statutes or decrees of an almost equally favorable character, several American companies, among which the principal are the Spanish American Iron Co., Bethlehem Iron Mines Co., Piloto Mining Co., Juragua Iron Co., Ponupo Manganese Co., Buena Vista Iron Co., Eastern Steel Co., Guantanamo Exploration Co., have acquired concessions. Their investments now amount to many millions of dollars, and the plants and equipment provided are in several instances as modern and complete as any in the world.

Operations being entirely on the surface, stripping and loading is accomplished by machinery, and the ore is handled and conveyed to steamers on the coast in the most economical manner.

Mining operations are confined, at present, to the eastern end of the island, being distributed among the Mayari, Levisa Bay and Moa-Taco districts on the north, the Santiago de Cuba district in the extreme southeast and the Camaguey district, lying west of the others towards the north coast. Iron ores of good grade are also known to exist elsewhere on the island, as near Trinidad and throughout Santa Clara Province, in the Sierra Maestra mountains on the south coast and Pinar del Rio in the west, but exploration work has only just begun.

The ores in the south are mostly magnetite and hard hematite, with some that are manganese or heavily manganiferous; while in the Moa-Taco and Mayari districts they are mainly limonites, and usually soft and fine, so as to require nodulizing. The latter occur in blanket formation, with little or no overburden, and rest on igneous or metamorphic rocks. In some cases the surface deposits are in nodular or spherical form, interspersed with scraps and masses like broken furnace slag, indicating the action of volcanic heat. The Cubans name these deposits *tierra perigones*, or "partridge shot" and "Muco de herrero," blacksmith slag. Besides a high-iron content, this fine ore carries a small percentage of nickel and chromium; and it is usually below the Bessemer limit in sulphur and phosphorus. An average analysis covering 4 months' shipment during the present year, as taken by the Spanish American Iron Co., was as follows: Iron, 55.57 per cent; silica, 4.41 per cent; alumina, 14.21 per cent; chromium, 2.13 per cent; nickel and cobalt, 1.04 per cent, and phosphorus, 0.022 per cent.

Reserves of ore at present staked out are estimated by Chas. F. Rand, president of the Spanish American Iron Co., as 3,221,000,000 tons. Of those only 6,000,000 tons are credited to the hard ores of the south coast, where mining was commenced in 1889, with shipments dating from 1895, while the remaining deposits lie in the north.

The north coast holdings of the Spanish-American Iron Co., whose operations will be first described, were acquired in 1903; in 1909 the first shipments were made, amounting during that and the following year to 310,000 tons. Since then the output has been steadily increased.

The ore of the Mayari district lies along an irregular plateau, about 15 miles long and 5 wide, overlooking Nipe bay in the province of Oriente. This table land was originally covered with pine trees and brush, growing directly over the ore. The elevation at the northern extremity, which is approached by the company's own railroad from the port of Felton on the bay, is about 1,700 ft. above sea level. From this point the plateau rises to an elevation of nearly 2,000 ft.

For taking out the ore steam shovels were first installed, and are still used where the conditions permit; but the contour of the ground at many places is not well adapted to steam shovel operation. Not only is it irregular, but the depth of the ore varies considerably, and pockets are formed by projection to the surface of the underlying rock. Therefore, it proved difficult to find many areas where a steam shovel could be operated for any extended period in a cut of economical depth, without including a great deal of rock in the ore excavated.

Another point of importance was the fact that the top layers of ore differ in composition from the bottom levels, as nickel and chromium are concentrated with depth. Accordingly it was considered desirable to remove the ore, not in horizontal layers, as with a steam shovel, but in inclined slices, so as to insure even mixing of the grade. In looking for some machine which would set on the ground level, and allow its buckets to penetrate into all of the pockets of the bed rock, it occurred to the management to try dragline excavators, and this was accordingly done, with the most successful results. The apparatus selected, and now in operation, comprises three excavators, each of which has a capacity of 900 to 1,200 cu. yds. in 8 to 10 hours, depending upon the character of the ground and the placing of cars for loading. With the difficult nature of the ground for laying trackage, this latter operation is not easy, and tends to prevent working the excavators to their full capacity. The bucket on each machine swings through a radius of 60 ft., and removes all of the ore, down to rock bottom, within 100 ft. Coal for the shovels, excavators, locomotives and other purposes, including a large power plant on the bay, is secured from mines not far distant and owned by the company, illustrating another of the mineral riches of Cuba.

The ore excavated is loaded into standard-gauge, side-dump cars of 50-tons capacity. These cars are then hauled to the head of an inclined plane, about 6,809 ft. long, with a grade varying from 6 to 25 per cent. From the foot of this incline there is a short railroad to the head of a second incline, 1,950 ft. long, 25 per cent grade, which ends in a gravity switching yard 130 ft. above sea level. By means of these inclines and the connecting trackage, the ore is lowered from a vertical height of 1,491 ft., or elevation 1,621 ft., to 130 ft., the total length of track on each side being 2.44 miles. Both inclines are double-tracked, 14-ft. center to center, and the lowering and hoisting of cars on the inclines is in balance. The equipment for the lowering planes was furnished by the Nordberg Mfg. Co.

The main cables, 3-in. steel ropes, pass over heavy 20-ft. diameter drums, of which there are two at the head of each incline. These drums, set in tandem, both carry heavy gears which mesh with a common pinion. Half-turns are made over each drum by the cable. The pinion shaft is also the crank shaft of 30 by 30-in. vertical engines, which control the speed on the incline, with the aid of post-brakes also operated by steam. The principal function of the pair of engines is to give sufficient motion to the cable to carry the cars over certain parts of the incline, where the descending loads are on too low a grade to pull the empties, in balance, up a steeper grade. Two to three cars are sent down at a time. The lower incline is arranged like the upper, but the cable used differs. The upper cable is made of 6 strands of 19 wires each, of plow steel, with a 6-strand, 1 $\frac{1}{4}$ -in. center, also having 19 wires, which is twisted around a hemp core. The lower cable, while having the same diameter to keep the mechanical details uniform, is made of cast-steel wire on a hemp center.

From the gravity yard, where loads are made up into a train by gravity, and empties taken from train by a switch-back arrangement, the ore is hauled over a single-track, narrow-gauge line, 13 $\frac{1}{2}$ miles long, to Felton on Nipe bay. There a nodulizing plant, for drying and sintering the ore to be smelted in northern blast furnaces, is situated.

This plant is equipped with 12 rotary kilns, 10 by 125 ft., of the type commonly used in the manufacture of cement, each driven by a 35 h. p. variable-speed motor. To feed these kilns there are revolving tables kept filled with ore by a grab bucket taking its supply from the adjacent stock yard. Under the edge of the kiln side of each feeder table is a wide hopper, ending in a chute set at a steep angle. The ore is gradually and regularly plowed off the table by a fixed deflector, which makes an acute angle with the direction of motion of the ore, and the latter falls to the kiln.

The sintered ore, in the form of nodules, is delivered from the kiln, at its lower end, to an open-cast, iron chute, which passes under the floor to a wide, deep trough outside the building, extending its full length of 240 ft. A small stream of water trickles down each chute into the trough, facilitating the movement of the nodules and cooling them, as the trough fills to a depth of 8 or 9 ft. An electric carrier over the trough, with a grab bucket, removes the nodules to 50-ton electric transfer cars for delivery to the loading wharf. These cars run on an inclined trestle.

The rocky bottom of the bay, however, prohibited the driving of piles for a break-

water or a loading station off shore; so the type of handling equipment decided upon was a cantilever projecting into the roadstead, with its foundation at the water's edge, and a conveyor discharging to the holds of a vessel anchored under the end of this cantilever.

The ore of the Ponupo Manganese Co., which is of the character indicated by its name, highly magniferous, is won in open cuttings, and brought by a short line of railroad to a bin at the inshore end of the cantilever. It is not, however, taken directly by the conveyor of the latter, but runs into a 5-ton skip, and is hoisted to the summit of a hill, just back of the cantilever. Here it discharges to a hopper which feeds directly to an Allis-Chalmers Gates breaker. This crusher delivers its product, through a chute, to a bin quarried out of the rock, which has a storage capacity of 11,000 tons. The axis of the bin is in line with the cantilever. Under the center of the bin is a tunnel, through which a 30-in. Robins belt conveyor runs, continuing on out over the cantilever, and returning on the under side of the latter to complete the circuit. The cantilever rises in a gentle slope from the mouth of the tunnel, and then falls in a steep grade towards the discharge end. The conveyor belt is 410 ft. long and will handle ore at the rate of 900 tons or more hourly.

Of the other companies above mentioned, all have thus far confined their efforts to exploration work, or at least what would be known by that name on the Michigan-Minnesota iron ranges; but further developments of considerable interest, including the location in Cuba of blast furnace plants and steel mills for export trade, supplied in part with South American ores, may be looked for in the not far distant future.

The shipments of Cuban iron ore by the Spanish-American Iron Co. were 1,028,000 tons during 1913, an increase over 1912 of over 100,000 tons.

Here there is a long stock yard equipped with two motor-operated ore bridges, each having a main span of 175 ft., and a cantilever extension on the water side 90 ft. in length, to the end of which is hinged an additional 60 ft., to carry the grab buckets out



Steam shovel at work in the mines of the Spanish-American Iron Co.

over the hatches of vessels. One of these bridges carries a 15-ton trolley and grab for handling ore, and the second a 6-ton grab to be used mainly for unloading coal, but also available as an auxiliary ore carrier. The nodulized ore in the stock yard is delivered to and taken from a trough with inclined sides, which facilitates the pick-up with the grab buckets. For the mechanical details above given, the writer is largely indebted to data prepared by James E. Little of the Pennsylvania Steel Co., of which the Spanish-American Iron Co. is a subsidiary.

The operations of the Spanish-American Iron Co. at Diaquiri are carried on at a distance of about 5 miles from the coast, shipments being made to Santiago harbor by rail. These consist of mining the ore in benches, with the aid of Bucyrus steam shovels, and crushing it in Allis-Chalmers gyratory breakers of the Gates type. The system of mining, and the crushing and loading plants, are so clearly shown by the accompanying illustrations that none of the details will be entered into here.

The mines of the Juragua Iron Co., a subsidiary of the Bethlehem Steel Co., are located at Firmeza, about 17 miles east of Santiago, to which port the ore is also conveyed by rail for shipment, like all of the other ores mentioned, to the United States. The particulars of this operation will be given in a later article.

Of greater immediate interest, because of the loading problem that was solved, is the property of the Ponupo Manganese Co. at Nima Nima, about 9 miles west of Santiago. At the time this mine was opened only 250,000 tons were in sight, and the cost of building a railroad to connect with the nearest harbor, Santiago, was deemed prohibitive; but about 3 miles distant from the mine was the open roadstead of Nima Nima, where vessels could lie close to the rocky shore.

Output of the Mines

The following tabulation of the output of the iron mines now operating in Cuba, since the opening of the first mine in 1884, might be of interest:

CUBAN IRON-ORE PRODUCTION

Year	Spanish American Iron Co.			Juragua Iron Co.	Ponupo Manganese Co.	Total
	Daiquiri	Mayari	Total			
1884 to 1894 incl..	.....	.....	.....	2,237,041	.....	2,237,041
1895 to 1905 incl..	4,489,305	.....	4,489,305	2,701,023	.....	7,190,328
1909	514,066	7,875	521,941	353,485	59,628	935,054
1910	523,132	167,179	690,311	318,814	162,548	1,171,673
1911	513,730	365,860	879,590	353,132	165,073	1,402,795
1912	537,224	503,333	1,040,557	402,560	127,327	1,570,444
1913	489,691	442,119	931,810	408,116	125,370	1,465,296
Total	7,067,148	1,486,366	8,553,514	6,776,171	642,946	15,972,631

1911, record year for El Cuero Mines.

1912, record year for Daiquiri and Mayari Mines and for Cuba.

1913, record year for Juragua Mines.

It is evident from the above figures that Cuban iron mining was not only in a healthy condition during 1913, but that it was the best year in its history with the one exception of 1912, which is likely to hold the record for some time to come.—Letter of D. B. Whitaker, Santiago de Cuba, January 31, 1914, to the *Engineering and Mining Journal*, New York.

Cuba's Pine Imports

Cuban shipment from all Gulf ports for the period from January 1st to April 4th, a little less than three months, aggregated but 22,594,093 feet. This is the smallest quantity reported for the first quarter of any year since 1909, and is not much over one-half of the export in similar months of last year, when record figures were established. Havana shipment has been particularly light, the total to that port being 7,707,678 feet, considerably under its usual

proportion of the Cuban total. In twelve months of 1913 over fifty-seven million feet of lumber was shipped from Gulf ports to Havana.

The outlook for Cuban business does not improve, orders being more scarce than three months ago.

Cuban shipment of the week totalled about one and one-half million feet.

Cuban movement is somewhat below the usual average for spring months.

GENERAL NOTES

GO AFTER FOREIGN BUSINESS

In his address to the Los Angeles (Cal.) Chamber of Commerce recently W. C. Redfield, secretary of commerce, urged American manufacturers to immediately cultivate the foreign business field. His advice, which applies to conditions in Cuba as elsewhere, is as follows:

"The foreign field is not a dumping ground. Do not offer the foreign buyer what you want to get rid of, but what he wants to buy.

"Agents on the ground should study the foreigners' needs.

"Faith, courage and patience are needed to get foreign business.

"It is useless to go into the export trade as a 'flier.' It must be a permanent part of the business.

"It is not so necessary to give low prices as it is to establish a market based on quality."

NATIONAL BANK ELECTION

At the annual election of officers of the National Bank of Cuba, held in February, William A. Merchant was unanimously elected president for the ensuing year and Messrs. Pedro Gomez Mena Jose Lopez Rodriguez and H. Olavarria vice-presidents.

The board of directors consists of the following well known business men: W. A. Merchant, Pedro Gomez Mena, Jose Lopez Rodriguez, H. Olavarria, Edmund G. Vaughan, Ignacio Nazabal, J. M. Berriz, A. W. Preston, Ernest Gaye, Oscar Fonts, Elias Miro, W. M. Talbott, Angel Barros.

NEW RAILROAD PROJECTED

A project for a railroad from Casilda to Placetas del Sur in Santa Clara Province has been favorably reported by the committee on public works and will probably be approved by the Senate. Casilda is the port of Trinidad on the south coast and Placetas del Sur is on the main line of the Cuba Railroad. The names of those seeking the concession is not given.

HAVANA ELECTRIC RAILWAY, LIGHT & POWER COMPANY DIVIDEND

A semi-annual dividend of \$3.00 per share on the Preferred Stock and a dividend of \$2.50 per share on the Common Stock to be paid on May 16, 1914, was declared by this company to stockholders of record at the close of business on April 18.

EARNINGS OF THE SANTIAGO ELECTRIC LIGHT & TRACTION COMPANY

	1914	1913
February gross	\$36,184	\$37,051
February net	18,604	17,563
First two months' gross.	73,685	76,419
First two months' net...	36,416	34,818

CUBAN CENTRAL RAILWAY EARNINGS

For the week ending March 21st the earnings of the Cuba Central Railways compare as follows:

1914	1913
£22,103	£17,201

Havana Schools in Bad Shape

The public schools of Havana are established in private houses, says *La Lucha*, and the rooms were originally used as dining rooms, bedrooms, kitchens and most everything else except school rooms. Ventilation is lacking and generally there are no conveniences required in a school. We cite one case of a kitchen converted into a class room. The blackboard was placed over the cooking stove and the children, in order to use the board, had to climb the great water jars, tinajones, which collect the rain water. To-day schools require to be more than a mere circle of scholars and teachers. The modern school demands scrupulous medical examinations, and a better understanding between the medical inspectors and the parents of the children, to the end that the spread of contagious diseases may be prevented. Medical examinations are al-

ready insisted upon in the schools, although not in all. But we have no playgrounds or gymnasiums, no individual slates and books and, more than all, no proper buildings and furniture. To construct suitable houses is not an easy task nor can it be done in a day. But now as the hot season is near much can be done to provide the schools with clean furniture and school accessories and conveniences. Also to establish the school rooms in houses which will admit a free circulation of air. These improvements will not entail any new expense but would add largely to the physical welfare of the children.

A proposition is before Congress to establish a school in Havana for deaf and dumb and blind children. There are no statistics available as to the number of children thus afflicted.