

THE FUTURE OF SOUTH AFRICA.—II.

BY EDGAR MELS, FORMERLY EDITOR OF THE JOHANNESBURG DAILY NEWS.

Having thus, in my previous article, outlined briefly the status of commerce in South Africa, a word about the resources and topography of the country will not be amiss.

The southern end of Africa is of volcanic origin, as is proved by the diamond mines in Griqualand West, which are really extinct craters. From the coast to a hundred or more miles inland the country is fairly fertile and studded with undulating hills admirably adapted for vineyards. Beyond this fertile belt lies the Hinterland veldt—level plains sparsely covered with short grass and dotted here and there by the karoo bush, a stunted tree from a foot to eighteen inches high. Here thousands of sheep and cattle graze, living in comparative luxury on the leaves of the nutritious karoo.

Back of this comes the plateau, some five thousand feet above the sea. It is on this eminence that the gold mines are situated. These, too, are of volcanic origin, tremendous physical upheavals having produced the peculiar conglomerate quartz, called banket, in which the gold is found. Again, further inland, is another plateau, rich in minerals and splendidly adapted for cattle raising.

Minerally, South Africa is the richest country in the world. Every mineral known to science can be found there. Diamonds being the most valuable come first. Leaving aside the Kimberley and the Jaegersfontein (Free State) mines, the precious stones are also to be found in the Vaal River, seventy miles from Kimberley; near Klerksdorp, in the Transvaal; in Zebedili's country, north of Pretoria; in the Zoutpansburg district, and in the Blaauwberg Mountains. Rhodesia is closed territory as far as diamonds are concerned, for Mr. Rhodes, as managing director of the De Beers Diamond Mining Company, made a contract with himself as the managing director of the British South Africa Company, Chartered, giving himself the exclusive right to mine diamonds in Rhodesia for "obligations rendered."

Gold has been found in Southern Africa since time immemorial, and Mashonaland is popularly supposed to be the Land of Ophir mentioned in the Bible. In modern times gold was first found by Arabs as early as 1500. Now it is found at Johannesburg, Klerksdorp, Barberton and Krugersdorp, in Swazieland, at Knysa, at Potchefstroom, in Zululand, Damaraland and Namaqualand, in Rhodesia, and a dozen other spots. The only alluvial gold worth mining is that at Lydenburg.

Coal is found in the Cape Colony in half a dozen places: in Natal, near Dundee; in Zululand, twenty-five miles from St. Lucia Bay; in the Orange Free State, near Kronstadt and Viljoen's Drift; in the Transvaal, at Klerksdorp and Vereeniging and at Boksburg; and in Rhodesia on both banks of the Zambesi. The approximate output of the coal fields in 1898 was nearly two million tons.

Silver is found all over South Africa, but the only mines in operation are those near Pretoria. The official reports of the Transvaal state that the best veins are from two to four feet wide, assaying forty-five ounces of silver and ten per cent of copper to the ton of ore. Under the present system of working, each ton of ore produces \$13.50. The Marico mines, near Zeerust, assay sixty ounces of silver to the ton, but cannot be worked with profit, owing to a lack of coke.

Copper is found in Namaqualand, where it has been mined since the seventeenth century. About thirty thousand tons of ore were shipped to England for smelting last year, the value being about \$70 per ton. Large deposits of copper have also been found in Mashonaland. The principal mines are those of the Cape Copper Company, which made an estimated profit of nearly half a million dollars last year.

Lead is found in connection with other metals in all parts of the country. Zinc exists in the Malmani district, and antimony near Barberton and in the Zoutpansburg. Tin is mined in payable quantities in Swazieland, twenty-one pounds of pure tin being taken from every ton of ore. Iron is everywhere, but is not mined, the profit being too small.

Quicksilver has been discovered in large quantities in the northern part of the Transvaal, and as it brings \$60 a flask of the gold mines, this find has proved a most lucky one.

Asbestos six feet in length has been found on the Orange River banks. It is coarser than the Canadian product, but is more valuable on account of its length. The Griqualand West Copper Company and the Cape Asbestos Company are mining the fiber at a profit. Mica exists in the Zoutpansburg, between the Selati and the Great Letaba Rivers. Salt is also plentiful, and especially so at Uitenhage, Cape Colony, where as much as 100,000 bushels have been mined in one year. It is also mined at Cradock and Bloemfontein. Sulphur in paying deposits is found at Tuli, Rhodesia. In Natal there are shale beds promising petroleum. Clay suitable for pottery, lime and kaolin are to be found in a number of places. Nitrate deposits have been located in the Doornberg Mountains, where they are said to extend for more than fifty miles.

Besides diamonds, other precious stones are amethysts, beryl, carnelian, garnets, olivines, opals, sapphires, topaz, tourmalines and turquoises.

Having delved into the mineral deposits of South Africa, it behooves me to say something of the results of these finds. Leaving out of the question the diamond mines at Kimberley, which are capitalized at \$20,000,000 and which pay dividends of from twenty-five per cent to thirty per cent per annum, the total dividends of the gold-producing mines in 1896 was \$7,450,000. In 1897 it was six millions more, and in 1898 it was \$24,450,000. Among the dividend-paying properties in 1898 were:

Driefontein, 25 per cent; Glencairn, 25 per cent; Knights, 30 per cent; Rose Deep, 40 per cent; Langlagte Estate, 45 per cent; Crown Deep, 50 per cent; Village Main Reef, 60 per cent; Geldenhuys Deep, 75 per cent; Durban Roodeport, 80 per cent; Bonanza, 100 per cent; Heury Nourse, 125 per cent; Geldenhuys Estate, 147½ per cent; Wenimar, 150 per cent; Crown Reef, 240 per cent; Ferreira, 300 per cent; Johannesburg Pioneer, 675 per cent.

The capitalization of these mines is as extraordinary as their dividends. The Simmer and Jack Proprietary is capitalized at \$23,500,000. The Robinson (De Villiers) comes next with \$13,750,000. Then comes the Randfontein with a mere \$10,000,000 and the City and Suburban with a paltry \$8,500,000. The latter paid fifteen per cent dividend last year.

But mining companies are not alone in this respect. There are a number of land, finance and exploration companies which can hold their own when it comes to a question of capital. The British South Africa Company, chartered, has a capital of \$18,500,000, more or less watered, and used in the development of Rhodesia. The Consolidated Gold Fields, of South Africa, has a capital of \$13,000,000. Of the banks, the Robinson South African Banking Company stands first with \$15,000,000.

In some respects, the gold mines have been improved, especially in the cost of running and in the larger percentage of ore extracted. The following tables are from the office of The Transvaal Mining Engineer. The first table is illustrative of the economic progress of the Witwatersrand mines:

(One ton = 2,000 lb.; one dwt. of gold = about 38 6d.)	1889. 39 Companies.	1892. 74 Companies.	1895. 56 Companies.
Number of tons of ore milled..	306,161	1,979,354	3,456,575
Average number of stamps at work.....	713	1,907	2,546
Crushing power of stamp per diem.....		3'21 tons	4'14 tons
Gold obtained by milling (ounces)..	369,557	973,291	1,501,623
Gold obtained by concentration (ounces).....		40,357	111,397
Gold obtained by cyanide process (ounces).....		160,168	638,732
Value of total production.....	£1,389,030	£4,297,610	£7,840,779
Proportion of same distributed in dividends.....		19'4 per cent (£833,212)	28'8 per cent (£2,258,441)
Proportion of same spent on labor, machinery, development, depreciation, etc.....		80'6 per cent	71'2 per cent
Total yield per ton of ore milled (all sources).....	24'14 dwts.	12'65 dwts.	13'18 dwts.
Total inclusive cost of treating one ton of ore (also lowest grade at which ore could be worked without loss under existing conditions).....		10'20 dwts.	9'38 dwts.
Yield of gold per ton of ore from the mill.....	24'14 dwts.	9'77 dwts.	8'69 dwts.
Yield of gold per ton of ore from tailings (cyanide).....			4'63 dwts.
Net profit from one ton of ore as shown by dividends.....		8s. 5d.	13s. 0½d.

The second table shows the output for the same district during the same years:

	1889.	1892.	1895.
January.....	25,506	84,560	177,463
February.....	22,457	86,649	169,295
March.....	27,919	94,245	184,945
April.....	27,029	95,502	186,323
May.....	35,028	99,436	191,540
June.....	30,878	103,252	201,941
July.....	31,091	101,279	199,453
August.....	30,520	102,322	203,573
September.....	34,149	107,852	191,764
October.....	32,214	112,167	192,652
November.....	33,722	106,795	195,218
December.....	39,050	117,748	178,428
Total ounces.....	369,557	1,310,867	2,277,635

But enough of mines—let us return to legitimate business. The principal industry is wagon, harness and saddle manufacture, of which there are about four hundred and fifty plants, employing three thousand hands. The annual importation into the colonies of this class of goods is about \$400,000. The leather and leather goods imported are about \$3,000,000. There are about a dozen small breweries, but their product is so bad that nearly half a million dollars' worth of beer and ale is imported yearly. Among other industries are printing and bookbinding, ship builders, oil and creosote works, furniture manufactories, ice plants, soap and candle makers, brick yards and potteries and one woolen factory.\*

Most of the retail business is in the hands of Malays, and none of the stores are of enough importance to prevent successful competition. In fact, a real Ameri-

\*These manufactories are small affairs and could not withstand active competition. Some of them employ only two or three hands.

can store would be welcomed. The duties for the Cape Colony on principal imports are: Agricultural implements, 10 per cent ad valorem; cement, one shilling per hundred pounds; flour, five shillings per hundred pounds; cotton manufactures and drugs, 12 per cent; crockery and furniture, 12 per cent; haberdashery, hardware and hats, 12 per cent; iron, 10 per cent; jewelry, leather, linen goods and machinery, 12 per cent; canned meats, four cents a pound; spirits, 10s. 6d. per gallon; paper for printing, free; tea, sixteen cents per pound; tobacco (cigars \$1 per pound and 10 per cent ad valorem); furniture, six cents per cubic foot woolen manufactures, 12 per cent.

In Natal agricultural implements are free; cottons are 5 per cent; hardware, 5 per cent; machinery, free woolens, 5 per cent. In the Transvaal machinery pays 1½ per cent ad valorem; tea, 5s. per hundred pounds; all books, printed matter and seeds are free.

The best investments for capital will be drygoods stores, manufactories for clothing and good restaurants. Goods that will be needed are hardware, clothing, agricultural implements, mining machinery, building materials, woolen goods, and about everything needed to dress man and woman.

The future of South Africa is bright with promise, and America's opportunity for obtaining the greater part of the trade is excellent. But it behooves Americans to "hustle," in order to be on the ground the day peace is declared, for the wily German and the pushing Hollander will be there, seeking to expand their respective trades.

So it remains entirely with the American business man to say whether we shall have another mart for our wares, or whether some competitor shall benefit by British aggressiveness and the Boers' sturdy stubbornness.

The accompanying pictures are fairly illustrative of the peculiarities of the peoples and incidentally of the country itself.

Pietermaritzburg, the capital of Natal, is a picturesque town, situated about seventy miles due north of Durban, the second seaport of South Africa. Interest is centered in it at present, because it is the headquarters of the expedition sent to the relief of Ladysmith. The peculiar two-wheeled vehicle, drawn by a Kaffir, is a jinrickshaw, imported from India and seen frequently in Pietermaritzburg.

The pictures of the natives are typical illustrations of the dress worn by the Kaffirs. Civilization has taught some of them to read and write, others to drink and gamble, but few of them can accustom themselves to the close confinement of civilized clothing. Even though extravagantly fond of bright colors and fancy ornaments, the average Kaffir prefers as little clothing as is consistent with a most liberal interpretation of the law. Still, in their case it is *honi soit qui mal y pense*, for they are generally overgrown, innocent-minded children.

The farmhouse is one of a type that can be seen in any part of South Africa, but more especially in the lower part of Cape Colony, where vegetation is more plentiful than it is further north. Cypress and orange trees abound, with few apple or pear trees, and scarcely any oaks.

It is a common sight to witness the "outspanning" of a team, as shown in one of the pictures. Nine out of ten settlements, whether village or town, are away from the railways, and coaches are necessities of intercourse with the outer world. From six to twelve animals, horses or mules, or a mixture of both, constitute a team. Relays are provided at the end of every hour's travel if it be a regular passenger coach carrying mail; if not, then exhaustion alone is the limit of a team's trip.

Automobile News.

Motor vehicles will be a feature of the fifth annual Cycle and Automobile Show, which will open at Madison Square Garden during the week beginning January 20.

At last President Clausen has decided to admit automobiles to Central Park in restricted numbers, in order that horses may become accustomed to seeing them; and since Mr. Clausen has been out several times in an automobile and has run it himself, he has become quite expert in handling it.

The unaccustomed noise of an automobile in Prospect Park on November 21 was the cause of a stampedede among some horses and the upsetting of a surrey in which two ladies were injured. The Park Commissioner of Brooklyn says that hereafter only experienced operators will be allowed in the Park with automobiles, and they will be confined to certain drives.

Trials of Torpedo Boat "Viper."

The Parsons turbine has again proved its ability to drive a torpedo boat at very high speed. On the official trial of the "Viper," a 325-ton destroyer for the British navy, equipped with compound turbines of 10,900 horse power, a speed of slightly over 32 knots, or 37 miles an hour, was realized at ¾ horse power. When she develops her full horse power, the contract speed of 35 knots will probably be realized.

# SCIENTIFIC AMERICAN

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A Jinrickshaw, Durban.



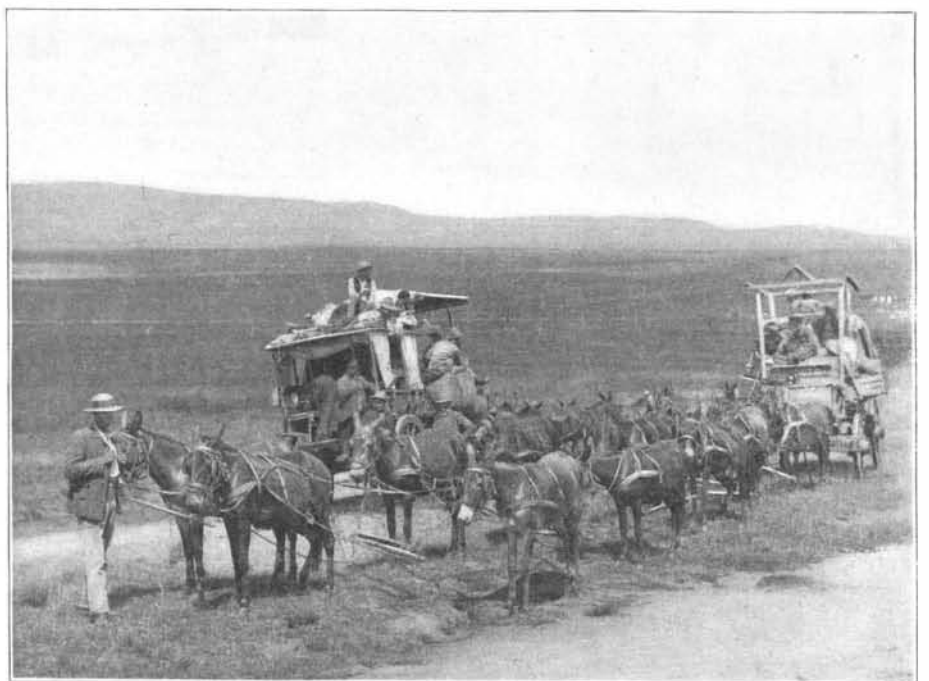
Dutch Farmhouse, Cape Colony.



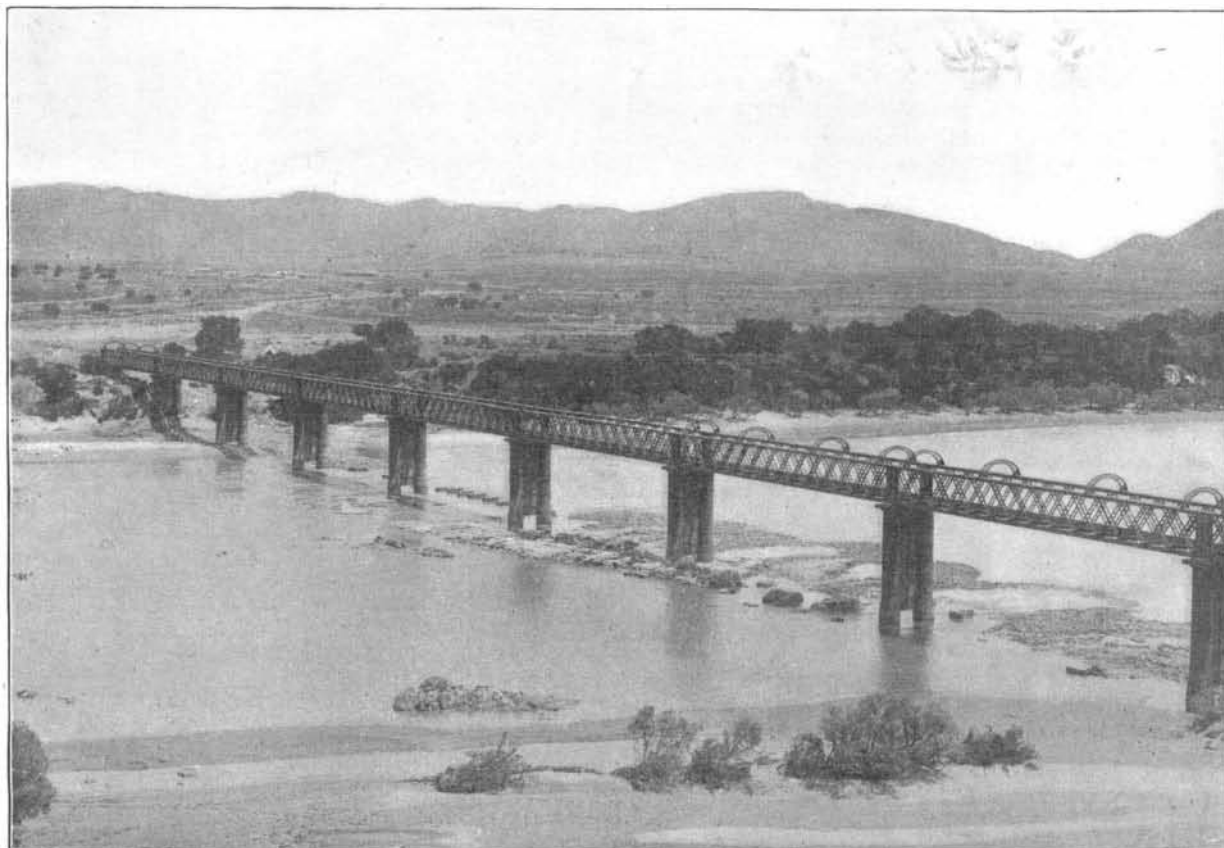
Zulu Girls.



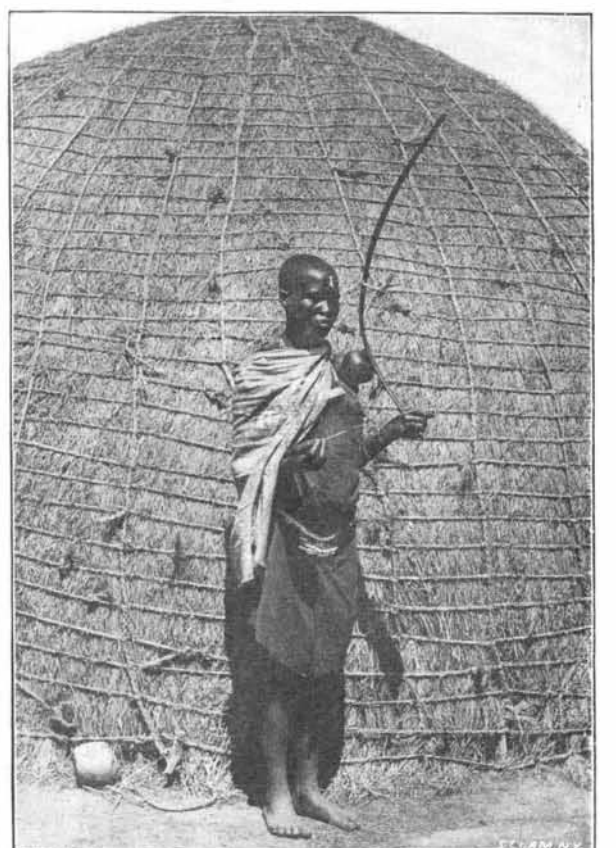
Commercial Road, Pietermaritzburg.



Traveling in South Africa—'Outspanning' a Team.



Orange River Bridge, from North Side.



Zulu Boy Playing on Okopo.

TYPICAL SCENES IN SOUTH AFRICA.—[See page 358.]

## Science Notes.

A most interesting exhibit at the Paris Exposition will be that made by the United States Weather Bureau. It will be prepared under the personal supervision of the Chief of the Bureau, Willis L. Moore.

Prof. J. A. Brashear has developed some of the curved plates on which he photographed the sky one night recently when the meteors were expected to appear. While the night was very bad for photographic purposes, the pictures of the stars which he obtained were excellent. He said that they covered ten times the area that was possible with ordinary plates, and the pictures of the stars were well defined and continued clear to the edges of the plates. The time and labor which were expended in preparing to photograph the meteors was not wasted, because it was shown that curved plates are the proper thing for astronomical photography and have opened up new possibilities in this field.

A pendulum 300 feet long was used in the Masonic Temple, Chicago, November 12, for an experiment. Prof. Bevis, of the Armour Institute, demonstrated with its use the well-known experiment of Foucault. The deviation from the laws of gravity was demonstrated by means of the pendulum. This deviation is caused by the rotation of the earth, and in the few minutes that the pendulum swung it had begun to revolve in a horizontal circle, which would have been completed in thirty-six hours of constant motion had the heavy ball been allowed to swing that long. The weight and motion of the pendulum was neither accelerated nor retarded except by the influence of gravity and the atmosphere. Three hundred feet of wire was used in suspending the weight.

An attractive solution of the purpose of Stonehenge was put forward at the British Association recently. Dr. Alfred Eddowes, addressing the Anthropological Section, advanced the theory that the building was a gigantic sun-dial. The thirty great upright stones with their intervals showed, in his opinion, that the circle was divided into sixty equal parts, the grooved stone having been used for supporting a pole, which formed the pointer of a sun-dial for daily observation, or an indicator of the time of the year by the length of the shadow. Dr. Sebastian Evans, who presided, held that Dr. Eddowes had proved his point, that Stonehenge had been used as an observatory; but Mr. Arthur Evans protested against the attempt to introduce very precise and rigorous ideas into a rude monument; and contended that Stonehenge, which was on the site of an early Bronze Age cemetery, ought not to be regarded alone, but in relation to a large series of other stone monuments. One would like to know what is the date or period to which the oldest authentic sun dial can be attributed.

The Belgian Antarctic expedition has reached Antwerp. It was a private enterprise under the patronage of the Belgian government and was organized by M. A. de Gerlache, who commanded it. It sailed from Antwerp a little over two years ago, and the researches and discoveries made by the scientists who accompanied the expedition are now said to be of more importance than was at first supposed. The expedition explored Graham's Land, Palmer's Land, and Trinity Land. The voyagers remained for fifteen months in the South Polar regions, and during this period a number of magnetic and meteorological observations were recorded. The expedition returns with a fine collection of fauna, and what is said to be of the greatest importance, the material results of the deep sea research which formed part of the programme of the expedition. The deepest known soundings to the south of Cape Horn were obtained at a depth of 400 meters between that cape and the South Shetland Islands. The lowest temperature which was registered on their instruments was 43° below Centigrade, equivalent to 77° of frost Fahrenheit.

D'Arsonval has observed that pieces of rubber tube immersed in CO<sub>2</sub> under a pressure of one to fifty atmospheres swell considerably and absorb large quantities of the gas. The augmentation of volume is sometimes equal to ten or twelve times the original bulk, and the consistence is changed, the rubber becoming more gelatinous and less elastic. On being exposed to the air, the dissolved carbonic acid is gradually given off in small bubbles, which give rise to a distinct sound. CO<sub>2</sub> at atmospheric pressure rapidly passes through a rubber bladder, and escapes still more rapidly from a rubber bicycle tire. Oxygen, under like conditions, was found to behave in a similar manner. The air from a bicycle tire kept at constant pressure by means of an air pump was examined and found to be practically free from oxygen, and to consist solely of nitrogen. It is known that oxygen traverses thin sheets of caoutchouc much more readily than nitrogen, so that by simple filtration of atmospheric air, a gas containing 40 per cent of oxygen may be obtained. The author concludes that CO<sub>2</sub> passes through rubber by entering into solution with it, that oxygen does the same, but more slowly, while nitrogen remains longest under pressure in a rubber chamber.—Comp. Rend.

## Engineering Notes.

A hundred bales of cotton were recently loaded into a box car 34 feet long, having a capacity of 50,000 pounds. The cotton was packed so tightly that there was space to put in five more bales.

According to The Engineering and Mining Journal, the value of the imports of precious stones at the port of New York in the month of October was \$1,233,748; of this amount, \$822,594 were uncut.

The smoke nuisance represents a loss of four or five million pounds sterling per annum in London alone, says The Builder, and no one can estimate the human suffering it entails by shutting out the invigorating sunshine and by poisoning the air.

The Baldwin Locomotive Works has just installed in its erecting shop a crane which has a span of 158 feet. It will lift a 196,000-pound locomotive 40 feet in the air, carry it 336 feet and set it down again in three minutes and thirty-six seconds.

Engine No. 1028 of the Reading Road has established a new speed record with a heavy train on the road running between Camden and Atlantic City. The distance is 55½ miles and was covered in 47 minutes, the average speed being 70.6 miles per hour.

The Delaware, Lackawanna & Western Railway Company has ordered four so-called "club" cars for their suburban traffic. They will be leased out to commuters for a fixed sum per year. This will insure the lessees having the same seats each day, if they so desire.

At Barrow, Messrs. Vickers, Sons & Maxim are making arrangements to house their employes. They will put up a thousand houses in a new village known as Vickerstown. This will be built on Walney Island, which is eleven miles long and one mile wide. A bridge will be built so as to give easy access to the works.

According to The Railway Review, the Tokio Card and Pasteboard Company, of Japan, is now experimenting with pasteboard as a substitute for roofing shingles. It is said that shingles of this material can be produced at a cost about 50 per cent cheaper than that of the wooden article. The pasteboard is made of the desired thickness and tarred to prevent the material from being affected by the weather.

The use of liquefied carbonic acid gas to extinguish underground fires has been dealt with by Mr. George Spencer in a paper read before the Institution of Mining Engineers. A fire occurred in a heading of a colliery with which Mr. Spencer was connected. It was decided to use carbon dioxide to put out the fire, and six cylinders of the liquefied gas were successfully used. In case of fire on shipboard the use of carbon dioxide might prove invaluable. It can be instantly applied and save much damage by water to the cargo.

The following is a suggestion for mounting plans on linen: Get a board or table sufficiently large to take the plan and tack the linen down with small tacks, of course minding that no creases occur in the linen. Get some common flour, to which add the proper proportion of water, and boil until the required thickness is obtained; with a smooth paint brush smear the linen evenly with the paste, taking care to leave no lumps on the surface; lay the plan to be mounted carefully on the linen, and with a handkerchief or soft cloth press the plan, making it tightly adhere. After this put the board aside for two days to dry, when the plan will be ready for trimming off with a sharp pen-knife.

On November 6 occurred an explosion of a calcium carbide furnace in the Dominion Carbide Gas Works near Ottawa. There was a fire in the neighborhood at the time, and the water flowed down into the carbide furnace. As a result the whole furnace blew up, injuring fifteen men. The carbide flew in chunks about the size of a man's fist, but one mass of carbide weighing a thousand pounds was blown through one of the factory doors. Eye witnesses of the catastrophe state that as the explosion occurred the building was filled with flames as well as smoke and the fumes of the carbide, and the people were almost overpowered. The fumes were so strong that the whole vicinity of the factory smelled strongly of the gas. According to The Railway Review, the force of the explosion was felt all over the vicinity.

A tunnel under the Bosphorus has been talked of many times. There is large traffic between the two sides of the Bosphorus and the delay caused by the opening and shutting of the bridge of boats which now forms the only connection is a great drawback. The railroad company is now constructing its lines on both sides, but this will not be of very great avail until the lines can be connected. Tunneling by the ordinary methods is hindered by the fact that the water is extremely deep and there is 20 or 30 feet of mud at the bottom. It has been proposed to suspend or float a tunnel some 35 feet below the surface of the water, thus allowing uninterrupted passage to vessels of even large draft. It is impossible to state whether this plan can be carried out or not. There seems to be great engineering difficulties in the way.

## Electrical Notes.

It is stated that an attempt will shortly be made to connect Havana and Key West by the Marconi system of wireless telegraphy.

The Naval Academy at Annapolis has a new electrical library of 1,400 volumes presented to it by three alumni. It includes a number of rare books.

Articles of incorporation were filed at Trenton, N. J., November 22, of the Marconi Wireless Telegraph Company of America, with an authorized capital of \$10,000,000.

On the trip home, Signor Marconi signaled to the station at the Needles while the vessel was sixty miles out. The terminal wire was fitted to the mast of the steamship for the experiment.

The Chicago, Burlington & Quincy Railroad has just commenced to equip locomotives with electric headlights. It was found that on trains traveling at a very high rate of speed a stronger light was necessary.

It has been suggested that the surplus power obtained by utilizing the gases of the blast furnace to operate gas engines might, in some instances, be advantageously employed in the manufacture of calcium carbide.

The London Tramway and Railway World have arranged for an international tramways and light railways exhibition, the first of its kind held in Europe. It will be held at Agricultural Hall, London, from June 30 to July 11, 1900.

The first use of Niagara power was as long ago as 1725, when the French erected a sawmill near the site of the present factory of the Pittsburg Reduction Company. It was used for the purpose of supplying sawed lumber for Fort Niagara.

Industries and Iron formulates many objections to the Nernst lamp. There is no automatic heating arrangement for the small-power lamps, and they require about eight seconds of artificial heating before they can be brought to incandescence. There are as yet no lamps of small candle power, and as each lamp has three wires, their connection is not always convenient. There have been no practical tests of the light of the lamp outside of the laboratory, and there are as yet no lamps of this design in commercial use. It is thought by some that the Nernst patent cannot be held valid, owing to the same principle being involved in the Jablochhoff candle.

The Electrical World describes an extraordinary phenomenon which has been noticed with regard to chestnut trees in a street in Brussels, since the installation of the electrical tram-cars. The foliage begins to turn brown and drop early in August, to bud and even blossom again in October. The trees on the opposite side of the tramway behave like ordinary trees, for they lose their foliage in the late autumn and do not put forth fresh blossoms until the spring. Botanists are inclined to believe that the cause of this singular state of things is due to the leakage of the electrical current at places underground acting upon the roots of the trees, which are otherwise quite healthy.

Under date of September 22, 1899, Consul Dudley, of Vancouver, informs the Department that the telegraph line from Skagway to Dawson has been completed and is now in operation. The nearest point to Skagway reached by telegraph, adds the consul, is Cumberland or Comax, British Columbia. It is stated that arrangements will be made for steamers to call at Comax to deliver messages brought from Skagway, and on their north-bound trips for messages to be delivered at Skagway. This places Dawson within about two and one-half days by telegraph. Mr. Dudley has also been informed that officers are at work surveying a line from Ashcroft, on the Canadian Pacific Railway, via Quesnelle, British Columbia, to Telegraph Creek, in the valley of the Stickene River. As soon as the survey is completed, it is expected that a telegraph line will be constructed; a branch line to Atlin, British Columbia, from Lake Bennett will also soon be in operation.

Peroxide of lead, when used as a coherer substance, shows the peculiar property of decreasing in conductivity under the influence of electric waves. This property has hitherto been held to disprove Lodge's theory of the coherer, based upon the formation of conducting chains by the welding together of successive particles. T. Sundorph has studied the behavior of this substance, and found that a cell containing PbO<sub>2</sub> powder transmitted a current of 8.5 milliamperes to begin with. After two minutes' exposure to electric waves, the current was reduced to 6.25 milliamperes, and after twenty minutes to 5 milliamperes. At the same time, the amount of PbO<sub>2</sub> was slightly reduced, but the author does not seem to be able to find the reason of this reduction. The only clue he gives is that PbO<sub>2</sub> contains some moisture, and this, of course, might be evaporated by the sparks. But whatever change takes place seems to be confined to the neighborhood of the terminals, and the positive pole becomes hotter than the negative pole.—T. Sundorph, Wied. Ann.