

## ENGINEERING.

The number of persons killed in train accidents during the months of October, November, and December, 1908, as reported to the Inter-State Commerce Commission, was 184, and the number injured 2,924. Accidents of other kinds, including those sustained by employees while at work, and by passengers in getting on or off cars, etc., bring the total number of casualties up to 17,644 (798 killed and 16,846 injured).

It is announced by Secretary of the Navy Meyer, that the voyage of the sixteen battleships around the world involved an outlay of only \$1,500,000 more than would have been necessary had the fleet spent the time occupied on the voyage in home waters, either at anchor, or cruising, or engaged in the customary maneuvers. We quite agree with the Secretary that the investment of this sum by the government was one of the most fortunate and successful that could have been made.

The record for canal excavation at Panama for a single month was again exceeded during March last, when 3,880,337 cubic yards were removed. This amount exceeded that of March, 1908, by 393,050 cubic yards. Of the grand total, 2,352,903 cubic yards were removed by steam shovels, and 1,527,434 cubic yards by dredges. The average daily excavation was 143,716 cubic yards, which was nearly 7,000 yards more than the highest previous record, made in February last.

The arrival of the 17,000-ton ocean liner "Lapland" marks the completion of the first trip of a new Red Star liner, and the addition of one more to the already large fleet of ships of great size plying between New York and Europe. The vessel is 620 feet long, 70 feet broad and 50 feet in depth. In addition to a double bottom and eleven water-tight compartments, she is provided with a center line bulkhead for additional safety. She will accommodate 450 first-class, 350 second-class, and 1,500 third-class passengers, and carries also a crew of 450 men.

A refinement in yacht construction, introduced last year by Fife in the construction of "Shamrock," consists in the substitution of a thin slip of wood, known as a "slip feather," for putty, in stopping the seams after they have been calked. The "feather" is covered with a very tenacious glue, driven hard home into the seams, and left to dry. After the sides are planed off, a remarkably smooth surface is obtained, the skin of the vessel being to all intents and purposes in one piece. This method has the further advantage that there is no calking to work out when the vessel is being heavily strained.

The maiden voyage of the new White Star liner "Lorentic" from Liverpool to Montreal was watched with the greatest interest by the maritime world, because of the fact that she is the first ocean steamship of great size to contain in her engine room a combination of reciprocating and turbine engines. The equipment consists of two reciprocating engines, driving the wing propellers, and a turbine driving the central propeller. The ship is 565 feet in length. A sister vessel, the "Megantic," will make her first voyage early in June. The "Megantic," however, is driven by twin-screw, reciprocating engines. On the comparative results obtained by these two vessels will largely depend the character of the motive power employed in the two new White Star steamers now building, the "Olympic" and "Titanic."

Since July of last year, there has been in service on Long Island Sound a motor boat driven by a 25-horsepower marine gas producer. The plant is very compact, the special design of scrubber being only one-quarter the size of the generator, whereas, according to International Marine Engineering, from which the following facts are taken, the scrubber is usually about twice as large as the generator. The boat has given good satisfaction in all kinds of weather. The consumption is from one to one and a quarter pounds of coal per horse-power. In a ten-hour run, the cost of fuel at \$6 per ton is 94 cents. The same size motor, operating on gasoline, would consume for the same work \$3.50 worth of fuel. The gas producer occupies a space of four feet by six feet; its height over all is five feet; and the total weight is twelve hundred pounds.

The action of the Public Service Commission in ordering the construction and operation of subway cars provided with two doors at each end of the car has stirred up the officials of the Interborough Company to construct and put in operation a train of cars of their own design having single end doors and a wide center door. The Public Service officials claim that better results are obtained with the double-end-door type, while the company believes that the center door gives speedier service. It seems to us that in both types sufficient effort is not being made to secure a circulation of passengers by reserving one set of doors for entrance and the other for exit. At present, the public are allowed to use all doors for entrance and exit, as they please.

## ELECTRICITY.

A novel device has been invented for use in hotels, to enable the patrons to determine the exact time at any hour of the day. A small telephone receiver is connected to the head of the bed in each room, and may be placed under the pillow, if desired. The device is connected to a master clock. When the sleeper wishes to know what time it is, he places the 'phone to his ear and presses a button. A set of gongs will then strike the hour, the quarter, and the number of minutes past the quarter.

In the textile industry it is customary to remove the small fibers of a thread by passing it through a gas flame. The main objection to this method is that most of the heat is wasted, and the products of combustion are injurious to the workmen. To overcome these disadvantages, an electrical singeing apparatus has recently been devised. It consists of a tube of platinum, which is slotted at one side to permit of introducing the thread. The tube is heated by heavy current of low voltage. The products of the combustion are drawn off by an aspirator.

It is somewhat difficult to control the temperature of an electrically-heated flatiron, owing to the fact that when in use it is chilled by contact with damp goods, while at other times it is apt to be overheated. This difficulty is overcome by a recent invention, which provides a thermo-electric control. When the flatiron is in use, a large amount of current is permitted to pass through the heating coils, but whenever the heat rises unduly, a switch automatically introduces the resistance necessary to cut down the current.

The North-Eastern Railway of England has just introduced an electric baggage car, designed to carry both parcels and fish. There are four compartments in the car, one at each end for the motorman, while the body of the car is divided at the center to form the separate luggage and fish compartments. A novel feature of the car is the arrangement of the couplers, there being three at each end. The center one is used for coupling to electrically-driven trains, while the two couplers at each side are required for coupling to a steam-driven train. The car is provided with four 125-horse-power motors.

According to a recent consular report, the telegraph offices in Japan numbered at the beginning of this year 3,308, and the lines were 5,387 miles long, with a total length of wire 92,227 miles. Nearly 8,000,000 telegrams were handled during the year. All the naval vessels are equipped with wireless telegraphy, and some successful experiments have been made with the wireless telephone. The system of wireless telegraphy used is known as the Teishinsho, which is said to differ from the Marconi and De Forest systems. Most of the Japanese steamships on foreign lines are equipped with wireless telegraph apparatus.

The congestion of traffic around the new Union Station in Washington has made it necessary to provide special signaling systems for the trolley cars running to this point. The problem, which was quite a serious one, has now been solved by the use of switch and signal towers at the important switching points. These towers are ornate structures, consisting of small cabins mounted on posts and raised about 8 feet above the sidewalk so that the switchman has a clear view of the car lines. The signals consist of colored lights placed under grated openings in the car tracks. An interlocking switch and signal system is employed to prevent mistakes on the part of the switch operator. The signal will not show clear until the switch has been properly thrown, and thereafter the switch lever cannot be operated until the car crosses over the signal.

A recent number of the Electrical World contains an interesting suggestion, by which the distance and direction of a wireless sending station may be determined. It will be remembered that at the time of the collision between the "Florida" and the "Republic," the "Baltic," although but 65 miles away when first it received the signals of distress, was unable to find the "Republic" for twelve hours, during which time it had steamed over a course of 200 miles. Had there been some method of determining the position of the "Republic," the distance could have been covered in four hours. The method suggested by the writer in the Electrical World is based on Duddell's rule that the distance between the transmitter and receiver multiplied by the strength of the incoming current is a constant. If the "Baltic" had noted the increase or decrease of current while proceeding in one direction as compared with the variation when proceeding on another course, she could theoretically have figured out the exact location of the sinking vessel. While in practice it would be much more difficult to locate the exact position of the sending station by this means, owing to the variations due to other conditions, an approximate position might be calculated, which would undoubtedly be better than none at all.

## SCIENCE.

It is reported that a syndicate prospecting 150 miles south of Suez, on the Red Sea coast, has struck oil, the gusher giving increasing quantities daily, and indicating large reserves. The possibility of a cheap supply of fuel is a discovery of the greatest importance to Egypt.

An attempt is to be made to acclimate the Korean wild fig in California. The fig, growing on a hardy vine, on trees, trellises, and hedgerows to a height of 30 feet, bears a delicious fruit. Some of the seed has been sent to the Department of Agriculture, California State University. The fig grows wild in Korea, and has proven of great value there.

Walter Wellman announces that he will renew his efforts to reach the North Pole by means of his dirigible airship this summer. Capital has been supplied by Americans. The general plan of the expedition remains as it was. In other words, the airship will be assembled and inflated at the headquarters station, Danes Island, Spitzbergen, and will proceed northward some time in August.

Dr. H. O. Beeson states that a very common and entirely avoidable cause of indigestion is the use of common salt in excess. Salt, if used in the proportion of 4 parts or less to 1,000, is beneficial to digestion, but beyond 6 parts to 1,000 it is positively harmful. Our daily average consumption is approximately 22.5 parts to 1,000, whereas sea water contains only about 27 to 1,000. Our daily army ration contains 307 grains of salt of which only 15 are assimilated.

On May 1st the Delaware, Lackawanna & Western Railroad installed on its through trains a system of supplying water to passengers which must commend itself to those who have the public health at heart. In every car a slot machine is installed, which supplies paraffine drinking cups for 1 cent apiece. The passenger uses this paraffine vessel, and throws it away after use. The principle of the scheme is so good, and its advantages so obvious, that they need not be dilated upon.

In order to test whether or not his apparatus for the prevention of mountain sickness is a success, Prof. David P. Todd will conduct experiments in ballooning. It is Prof. Todd's idea to establish on some lofty peak an astronomical observatory, in the clear atmosphere of which it will be possible to make better astronomical observations than are now obtained. To carry out that idea, he intends first to ascertain whether or not mountain sickness can be prevented at elevations exceeding 6,000 feet. He has devised a special apparatus for supplying compressed air which he hopes may attain the object.

Misuse or excessive use of the X-ray is made the subject of a scathing criticism by Dr. Gordon G. Burdick of Chicago. The average X-ray operator in his opinion is thoughtless and careless to a degree, and one who will bear the marks of his blind enthusiasm to the grave. To see many of the electricians who have lived in the atmosphere of the X-ray laboratory is to see a living death personified. The tissues become corroded, and life is bearable only under the influence of opiates. It is sad to think that these men cannot plead ignorance, and that they have sadly and wantonly abused the supreme diagnostic agent of modern medicine.

The effect of earth shine upon the moon is a familiar one to many people, though probably few of them know the cause of the effect. When the moon is in its first quarter the dark portion of it is often faintly visible. The bright quarter is, of course, illuminated by direct sunlight, but the remainder is only seen by virtue of the faint light reflected from the earth. This faintly illuminated portion has been successfully photographed by M. Quénisset at the Kuvisy Observatory, and it appears likely that the results will present many points of interest to astronomers. The light received from the earth naturally falls at a different angle from that at which light is received from the sun, therefore it is reasonable to expect a slightly different effect of light and shade on the irregularities of the moon's surface.

Prof. H. H. Turner, F. R. S., of Oxford, England, in a recent paper refers to the number of earthquake observatories which have been constructed and equipped with delicate instruments that can detect and record the tremors of the earth's crust very exactly in regard to time and extent. From these records it appears that there are every thirty years some thirty thousand minor shakes of the earth in different localities. Of all these only sixty are world shaking and observable at a great distance. The Italian earthquake some months ago was one of this class. In speaking on the distribution of earthquakes, their periodicity and of their prediction, Prof. Turner states that "a shifting of the earth's axis, even to the slightest degree, would impose a great strain on some parts of the earth's crust, and this might explain earthquakes and in turn lead to appreciable results in foretelling them."