THE DEATH OF DR. RICHARD J. GATLING.

When Dr. Gatling visited the offices of the SCIENTIFIC AMERICAN on February 26, no member of the staff suspected that it was for the last time. For years he had made it a practice to call upon the Editor whenever he was in town, and to spend half an hour in conversation. His sudden death is for that reason all the more keenly felt.

Dr. Gatling was born in Hertford, N. C., on September 12, 1818. From his father, a well-to-do planter, he seems to have inherited the mechanical genius which found expression in inventions of world-wide repute. He studied medicine at the Ohio Medical College, receiving his degree in 1850. He never practised.

Of his early inventions, those that deserve especial mention are a screw propeller, a rice-sowing machine, the principle of which he later adapted to a wheat drill, and sowing-machines in general. But the invention which brought him more notice than any other, was the famous Gatling gun. Even in its original form of 1862, when it was still more or less crude, the gun had a firing capacity of 250 shots per minute. Now in its improved form, it can fire 3,000 shots per minute. When the gun was finally acquired by the Colt Firearms Company, Dr. Gatling had lavished on it some thirty years of hard work.

His more recent experiments in improving modern ordnance were not so successful. It was his idea that a cast-steel gun could be produced which would have the same ratio of energy to weight of gun, as a built-up gun, and stand the test of continued firing. In the trials which were carried out at Sandy Hook four years ago, the gun burst. In justice to Dr. Gatling it must be said that he always claimed that a mishap occurred at one stage of the manufacture of the gun which resulted in weakening the breech.

Latterly Dr. Gatling had turned his attention to motor-driven agricultural implements, and had invented a motor plow which is being exploited by the Gatling Motor Plow Company, of St. Louis, Mo. The idea was by no means a new one with him, for in 1857 he had invented a steam plow.

Although best known as the inventor of a terrible death-dealing weapon, Dr. Gatling was the gentlest and kindliest of men. The sight of returning wounded soldiers early in the civil war led him to consider how war's horrors might be alleviated. By making war more terrible, it seemed to him nations would be less willing to resort to arms. He devoted himself to the study of ordnance and ballistics, and finally invented what may be considered the first modern machine gun. As the inventor of that gun his name will probably be handed down.

TO DETECT FIRE AT SEA.

In the whole range of possible disasters to which shipping is exposed, there is none that is more insidious, and we may safely say, that strikes greater fear to the heart of the seaman, than that of the spontaneous combustion of a ship's cargo. When the various holds of a vessel have been loaded with such freight as cotton, which is always more or less liable to spontaneous combustion, and the hatches have been battened down, some anxiety must necessarily be felt as to the condition of the cargo. Should fire start in a hold from some cause such as the one above mentioned, it is usually impossible to detect it until it has been for some time under headway; and frequently the danger is not realized until the bulkheads have become so hot as to attract attention. The use of appliances for detecting the very beginning of a fire has not received the attention that the importance of the subject demands. Even if the ship is wired with fusible fire-alarm cables, it is necessary for their action that a fire shall have been under way for a sufficient length of time to raise the temperature to the fusing point. We recently had the opportunity to inspect at the docks of the North German Lloyd Company at Hoboken, N. J., an ingenious device for giving an earlier intimation of the existence of fire in the hold than is possible by any known system in use. The device, which is based upon the theory of the well-known maxim that "where there is smoke there is fire" is carried out in the following manner: At a convenient position on the ship there is placed an indicator station in which is mounted an electric motor which operates a suction fan. The fan acts upon the upper ends of a number of one-inch pipes, which extend down into the various holds and bunkers of the ship. Each pipe terminates with a flaring opening at the ceiling of its respective compartment; and the system is so arranged that when the fan is running, the smoke of any fire that may occur in a compartment will be drawn up and pass into the indicator station. The upper ends of the pipes, where they terminate in the station, are inclosed in glass panels, so that their ends are exposed to view. Mounted in the indicator station box is a clock which is provided with contact disks, so arranged that at a few minutes intervals, the motor fan will be started, an electric bell rung, and an incandescent lamp lighted. The starting of the fan draws some of the air from the ceiling of each compartment, bunker, or hold up into the station. Should a fire have broken out in any compartment, some of the smoke will be drawn therefrom and will issue from the upper end of the tube, where it can readily be seen through the glass panels by the watch in charge of the station, who within a few minutes after the outbreak of fire, can take the proper steps to quench it before it attains any serious headway. He would at once couple on a steam hose to the smokepipe and force steam into the particular compartment, thereby extinguishing the fire.

AMENDMENT TO THE UNITED STATES PATENT STATUTES.

At different times we have referred to the proposed amendment of the United States patent statutes, which will permit foreigners to file their United States patent applications during the year following the filing of the home application. While this is the most important amendment which appears in bill No. 17,085, which has been passed by the United States House of Representatives, and which is now before the United States Senate, several other striking changes in our patent statutes will be made when the bill is passed by the Senate and receives the approval of the President.

The general spirit of the amendment is to give to foreigners all the protection to which they are entitled under the articles of the International Convention. The amendment of Section 4887 of the United States Revised Statutes will not only extend the time in which foreigners may file their patent applications in the United States Patent Office, but an additional paragraph will be added to this section, which will provide that when an application is filed in the United States by any person who has previously filed an application for a patent in a foreign country which by treaty, convention, or law, affords similar privileges to citizens of the United States, the application in the United States shall have the same force and effect as though it were filed in this country on the date on which the application for a patent for the same invention was first filed in such foreign country. The effect of this amendment will be far-reaching, as for instance in interference cases, where the foreign inventor may claim the date of the filing of his first foreign application, for all purposes, as his date of filing in the United States Patent Office, although the actual filing of the application papers in the United States Patent Office was not made until nearly a year after such date. Under the amendment, foreign inventors will be obliged to file their applications for design patents within four months of the filing of their first foreign application.

Section 4902 of the Revised Statutes will be amended so that it will be possible for a foreigner to file a caveat. Under the present law, only citizens of the United States and foreigners who have declared their intention of becoming citizens of this country are able to take advantage of the provision of our laws which provides for the filing of caveats in the United States Patent Office.

Every patent attorney who has received many applications from foreign inventors must at times have had difficulty in filing the applications in the Patent Office, because of the fact that the inventors did not appear before some official holding a commission under the government of the United States, as in many cases an oath made before a notary public of a foreign country was not accepted by the Patent Office officials, and this although the present statute provides for taking oaths before notaries public in foreign countries. In many cases foreign inventors are obliged to travel a considerable distance in order to have the oath made before an official acceptable to the Patent Office. It is also now necessary to go to considerable trouble and expense to have ancillary letters of administration issued in the United States when a foreign inventor dies, for the United States Patent Office will not recognize a foreign executor or administrator as an applicant for a patent. The bill now before the United States Senate overcomes these difficulties by permitting foreign executors and administrators of deceased inventors to file patent applications in the United States. It is also provided that an oath may be made in a foreign country before a notary public, judge or magistrate having an official seal and authorized to administer oaths in the foreign country, whose authority shall be proved by a certificate of a diplomatic or consular officer of the United States.

The importance of this bill has, perhaps, been underestimated. It is considered, perhaps, by those who have not investigated its meaning and do not understand its spirit, that as it provides for expanding the privileges of the patent laws as affecting foreigners, it is of comparatively small importance, but it means far more than that. The failure to pass the bill by Congress would be an act of bad faith toward the other signatories of the International treaty. The United States has entered into a contract or treaty with certain other powers. This treaty is not operative within the United States, although it has been ratified by the Senate and signed by the President, for the reason that the Patent Laws have not been so modified as to conform to the terms of such treaty.

Under the existing conditions the foreign members of the International Convention are extending to citizens of the United States certain rights and privileges which the United States under the present patent laws refuses to grant to foreigners. This is neither fair nor honest, and it is the intent of the present bill to correct these inequalities and to extend to foreigners the same privileges that citizens of the United States enjoy who seek to obtain protection for industrial property in other countries of the Convention. There is every reason to believe that the bill now before Congress will be passed before adjournment.

SCIENCE NOTES.

Curator Wilcomb of the San Francisco Museum has recently received a number of Indian relics from the Moqui reservation, about one hundred specimens in all, many of rare interest. The collection includes an ancient firestick used in aboriginal times for kindling a blaze on a block of wood by rapidly twirling it on its pointed end; old water-bottles of basket-work, ceremonial drums of various designs, sacred paraphernalia rarely parted with, a complete costume of the kind worn by the priests in the famous snake dance, which was witnessed by Prof. Wilcomb; stone household utensils, now disused and hard to find, and many other specimens of great value as showing the habits of living in vogue among these interesting people before they came in touch with civilization. The collection will be unpacked at the earliest opportunity and placed in the ethnological room.

In a recently published book by F. Fischer, "Das Studium der technischen Chemie an den Universitäten und technischen Hochschulen Deutschlands und das Chemiker-Examen," it is said that there are about 4,000 chemists who receive their education in technical institutions, and only about 200 who follow chemistry purely as a science. In other words, about 95 per cent of German chemists are professional technologists. France distributes the 4,000 chemists referred to as follows: Chemical industries, 220; artificial fertilizers, 90; explosives, 50; petroleum, 50; chemical preparations (inorganic), 250; organic preparations and coloring matters, 1,000; beet sugar factories and refineries, 300; starch, dextrine, ferments, 50; fats, dies, 100; metallurgy, 400; other industries, 390; laboratories and agricultural experiment stations, 700; government bureaus, 100; apothecaries, 200; assistants in night schools, 100.

Enormous quantities of red lead are employed in industry, and it is important to ascertain whether it is in a state of sufficient purity. The different processes in use for testing red lead consist in converting it into an oxidized pulp, then reducing this oxide by a suitable reagent, so as to be able to dissolve the oxides of lead completely in nitric acid. The reducing substances employed ordinarily are oxalic acid and sugar. It is proposed to substitute for the employment of these substances that of oxygenated water. The following is the mode of operation: 2.5 grammes of red lead are treated with 20 cubic centimeters of dilute nitric acid (1 part of acid to 1.39 and 4 parts of water) and shaken. The red lead being thus converted into the oxide, the oxygenated water is added gradually while shaking. A few drops are sufficient to cause the oxide to disappear in a short time. If the red lead is free from colcothar, sand, barium sulphate, and other impurities, a solution, limpid or nearly limpid, will be obtained in a few minutes.—La Revue des Produits Chimiques.

Sir Samuel Wilks, writing to Knowledge, states that Fahrenheit's thermometer owed its beginnings to the invention of a thermometer by Newton, which was described in the Philosophical Transactions for 1701. Newton's instrument was a tube filled with linseed oil, and the starting-point of the scale was the temperature of the human body, which Newton called 12. It is worthy of notice that at this period, when numeration was based upon natural requirements, the duodecimal system was proposed for this, as it was in use for all other purposes. Newton accordingly divided the space between his datum and the freezing-point of water into 12 equal parts, and stated that the boiling-point of water would be about 30 of these degrees on the scale. Fahrenheit, when he began to work with Newton's thermometer, did not find the scale minute enough for his purposes. He therefore first doubled the number of degrees, making the scale number 24 instead of 12. Finding he could, by mixing ice and salt, obtain a temperature below freezing, Fahrenheit next adopted this for his starting-point and counted 24 degrees up to body heat, making the freezing-point 8 and calling boiling water 53. Later on he again divided his degrees into four. It will be seen that if the above figures are multiplied by four, the result is the thermometric scale called after him which is still in use.

A NEW DEPARTURE IN SHIP LOGS.

Mariners have long been looking for a ship log or speed-recording instrument which can be sufficiently relied upon to determine accurately a vessel's location in foggy or stormy weather, when observations cannot be obtained. The usual method of towing a heavy float or propelling wheel on a line many feet in length involves many difficulties. Whenever the ship stops the line must be immediately attended to, lest it, with its attachments, be lost; and every time the vessel starts, the log must be cast overboard, and care taken that the line does not foul the wheel. The log is also liable to injury from driftwood, and heavy seas interfere with its accuracy. A radical departure from the towing type of log has been introduced by the Nicholson Ship Log Company, of Cleveland, Ohio. The new log comprises, essentially, two tubes which project through the bottom of the vessel and extend vertically to an indicator mechanism located in the pilot house or any other convenient location. One of these pipes, which is shown on the left in our diagram, is open at the bottom and, therefore, permits water to flow in to a height equal to the draft of the vessel; while in the other pipe, since the bottom is closed and the opening is in the side of the projecting portion, the water will rise above the load-water line to a height proportional to the pressure caused by the speed of the vessel. Each tube is provided with a float. The float in the "speed-tube" is arranged to communicate its variations of level through suitable gearing to a vertical feed shaft. The upper end of this shaft is threaded, and at each end of this threaded portion a disk is mounted. These disks are connected by rods, which pass through a nut or hub threaded on to the shaft. It is evident that any change of water level in the speed-pipe will cause the feed shaft to rotate, thus raising or lowering the hub, which is kept from turning by the rods above mentioned. In order to compensate for changes in level due to variations in the load of the vessel, connection is made between the float in the "level-pipe" and the disks mounted on the feed-shaft, so that a rise or fall of this float will result in a compensating rotation of the disks and the rods which connect them. Thus the hub is rotated and fed up or down the feed-shaft according to the load of the vessel. The adjustment is such that when the vessel is at rest the hub will always remain at its lowest position, no matter what the level of water in the level-pipe. Suitably connected with the hub is a rack, which rises and falls with the same. This rack governs the motions of the pointer in the speed-indicator. It has been found that the water level in the speed-pipe varies approximately as the square of the speed, and therefore, it would obviously be confusing to have the rack operate directly on the pointer. A train of intermediate gearing is therefore used, as shown in our detailed view. This train includes a pair of compensating gear wheels, which are so designed that the upper member of the pair will move through the same arc for every corresponding increase of speed of the vessel. Thus a perfect record of speed is at all times indicated on the dial.

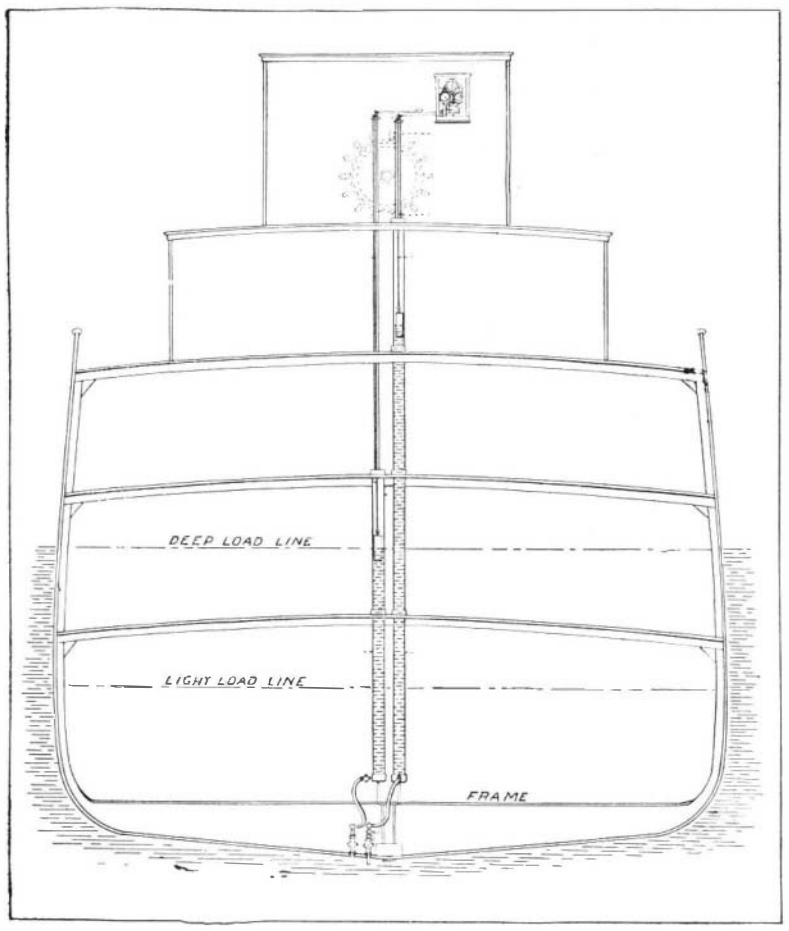
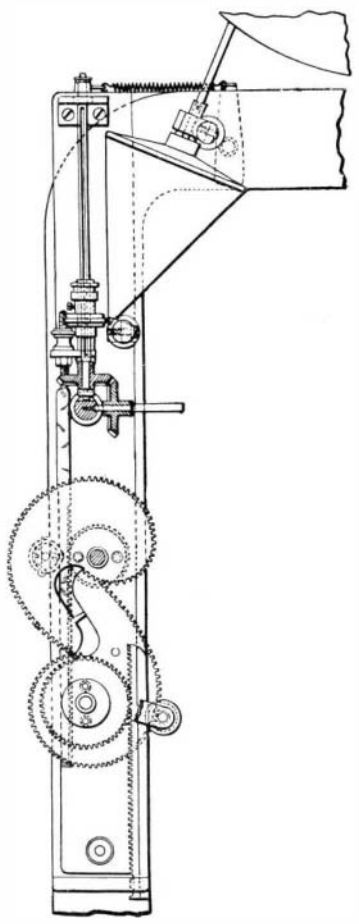


DIAGRAM SHOWING LOG INSTALLED IN A VESSEL.

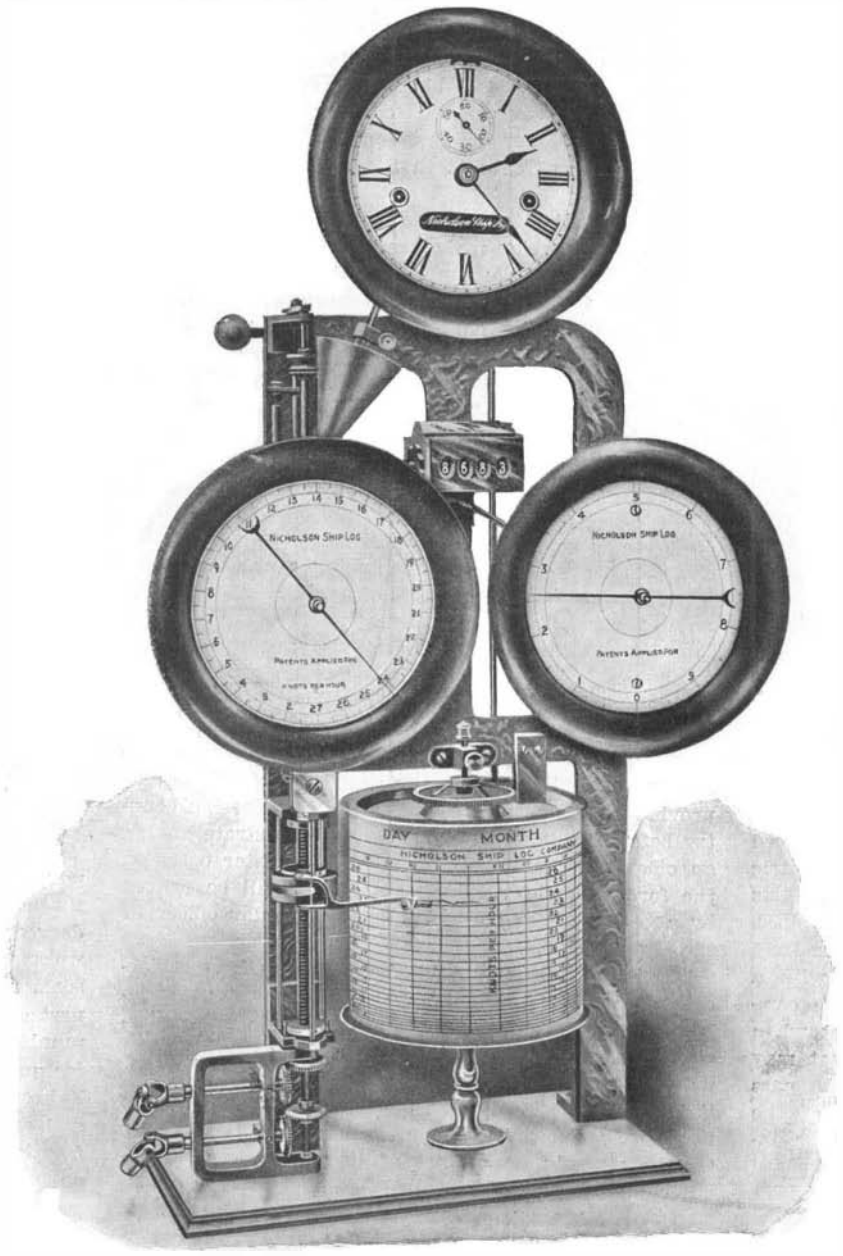
In addition to the speed-indicating mechanism is a speed-recording mechanism, which comprises a chart drum rotated at a uniform speed by clockwork. A pencil or marker is arranged to slide up and down with the speed-indicator hub, and all the variations of speed are recorded on the chart.

The distance-recording mechanism, as shown in our detail view, comprises a friction wheel, which is splined to a vertical shaft and rotated by engagement with the face of an inverted cone driven at a uniform rate by the clockwork at the top of the ship log. This motion serves to operate a small counter through the medium of a pair of miter gears. Since the distance covered by the vessel is equal to the time multiplied by the speed, a rack and gear connection is provided between the speed-indicator shaft and the friction wheel, whereby the latter is moved upward along the face of the cone as the speed increases. This causes the friction wheel to rotate more rapidly, so that the miles are counted off with a proportionately higher speed on the distance recorder. To the right of the counter is a dial which indicates fractions of a mile or knot, as desired.

A trial of the Nicholson ship log was recently made by the United States Navy, the torpedo boat "Porter" being equipped with this apparatus. The results of the trial were very favorable. The desirable features reported are briefly as follows: The actual speed of the vessel is shown on the speed dial at all times. Its accuracy is not affected by the conditions of the sea. It will not foul readily, though, in case of fouling, provision is made for clearing it by withdrawal of the tube. No towing line is required. The only portion of the log outside the hull of the vessel is a one-inch pipe sufficiently long to clear the eddy set up by the skin friction. The only attention required is the daily winding of the clockwork. The undesirable features mentioned are as follows: The height of float-pipe required is objectionable, particularly for vessels of low freeboard, such as the "Porter," on which it was necessary to rig a 3-inch pipe 20 feet or more above the deck. The size of the recording mechanism (31 x 19 x 9 inches) is large compared with that of logs in general use. The speed and recording dials should be graduated in tenths of knots, and the chronograph should be omitted. In regard to the first of these objections, the builders inform us that this has been entirely overcome, and pipes can be stored away between decks on the fastest vessels of low freeboard type without reduction of delicacy in registration. Obviously the second objection is far outweighed by the advantages offered by the log, and the third undesirable feature is merely a matter of detail, which can be easily remedied to suit requirements. In summing up these features, the Navy Bureau of Equipment consider that the inlet pipes are liable to become fouled when navigating in shoal water, where mud and sand may be stirred up. However, no such complaints have been received from users of the log. The Nicholson ship log has been installed on a number of the Lake steamers, and has given perfect satisfaction.



THE SPEED GEARS AND DISTANCE RECORDING MECHANISM.



IMPROVED SHIP LOG COMPRISING A SPEED INDICATOR, A DISTANCE RECORDER, AND A SPEED CHART.

Save Your Eyes.

If your eyesight is good, take care of it. Look away off yonder every time you get to the bottom of a page in reading. If it is defective, let no foolish pride prevent you from wearing the proper glasses.

There is no sense in handicapping yourself in life when a piece of glass before each eye will make your vision as good as it possibly can be. The oculist will not advise you to wear glasses if you do not need them any more than he will prescribe a drug you do not need.

Plenty of people, though, do not know that they have defective sight because they have never really seen at all. They have headaches, inflamed eyes, sties, even much graver troubles, from the strain of trying to see with eyes that were put up wrong. There are cases where homicidal insanity has been completely cured when impaired vision has been corrected.—Harvey Sutherland in Ainslee's Magazine.

Prof. W. Noel Hartley, F.R.S., of Dublin, presented a report to the chemical section of the British Association, the first part of which deals with phloroglucinol and its derivatives. The aqueous solutions of phloroglucinol, prepared in different ways, all gave the same absorption band, and the benzenoid structure is confirmed. The second part, on the "Curves of Molecular Vibration of Quinone, p-Nitrosophenol, and Similarly-derived Substances," investigated by the same author, is interesting chiefly because it does not support the view that the special structure of quinone is common to colored organic substances. Von Baeyer and Villinger have recently studied the so-called halochromism—the formation of highly colored salts from colorless substances; there is no quininoid structure in these cases, so far as the spectroscopic evidence goes.