DR. P. H. VANDER WEYDE.

P. H. Vander Weyde, the well known scientist, and a former frequent contributor to the pages of the SCIENTIFIC AMERICAN, died at his residence in this city on the morning of March 18, after an illness of a few days.

Dr. Vander Weyde was born in Nymegen, Holland, in 1813, a country to which his family, originally German, emigrated at the time of the Reformation. He studied at Durpldorf and was graduated from the Royal Academy at Delft. He was early known as a scientific teacher, writer and lecturer, his first appearance in the latter capacity having been made at Bois-le-Duc in 1833, when he delivered a lecture on acoustics before the philosophical society of that place. Subsequently he was appointed to the chair of mathematics and natural philosophy at the Government School of Design. In 1842 he established a journal devoted to mathematics and physics, and three years later was awarded a gold medal by the Society for the Promotion of Scientific Knowledge for a text book on natural philosophy. At the same period, he was editor of a political journal which vigorously waged war against government abuses.

In 1849 he came to New York, bringing with him a valuable historical collection of philosophical apparatus which he had been forming for some time. He then turned his attention to medicine, and after studying at the College of Physicians and Surgeons and the New York University Medical College, was graduated from the latter institution in 1857. Directly after his graduation, he was appointed professor of chemistry in the New York Medical College; was also appointed physician to the Northwestern Dispensary, and practiced medicine in several parts of the city until 1859, when he relinquished his profession to occupy the chair of physics, chemistry, and the higher mathematics at the Cooper Institute.

In 1864, the chair of industrial chemistry was expressly created for him at Girard College. Resigning this professorship two years later, he returned to this city, and devoted himself to scientific writing and experimentation. In or about 1869, he constructed, after wood cuts published in a German periodical, a telephone transmitter that had been invented by the German schoolmaster Philip Reis. This apparatus, the first seen in this country, is illustrated and described in the SCIENTIFIC AMERICAN for May 29, 1886. The original instrument of Reis had no adjusting screws, so that its operation was uncertain. Having provided these and made certain other improvements, the instrument worked very satisfactorily. Not so with the receiver, with which he first had considerable trouble, but of which he succeeded in remedying the defects by abandoning the principle of Reis and substituting the intermittent magnetization of an iron bar for the intermittent elongation of iron needles. This resulted in the production of a receiver which worked perfectly.

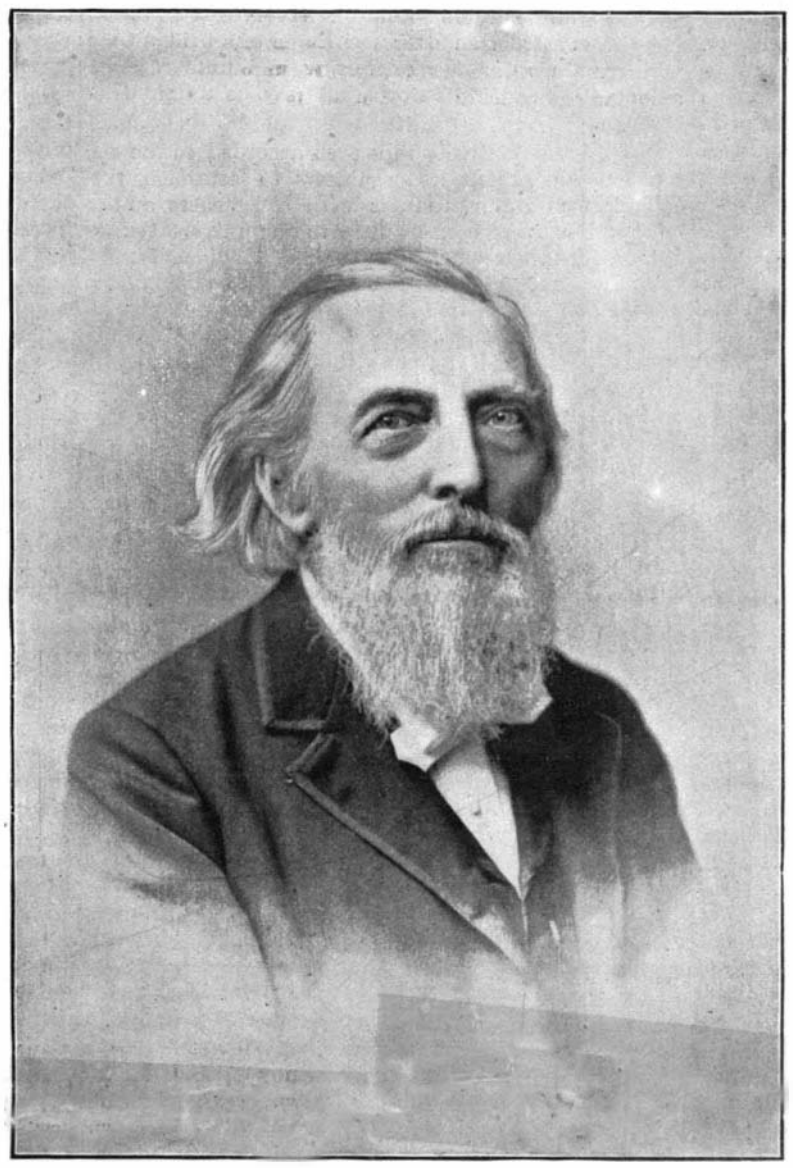
Dr. Vander Weyde was not content to rest with the instruments of these types only, but a year or so later, in 1870, made a form in which there was a horseshoe magnet mounted back of and facing the plate armature. It was simply a powerful electro-magnet receiver, something like, but immeasurably superior to, the instruments shown in the Bell patent of six years later.

In 1869, Dr. Vander Weyde accepted the editorship of the Manufacturer and Builder, a scientific journal of this city. During his long connection therewith his pen was very active, and his contributions to the scientific press and especially to this journal were numerous. He was one of the editors of Appleton's New American Cyclopedia and contributed many scientific articles to that work. As an inventor he had a wide reputation, the number of patents taken by him on inventions of his own, mostly pertaining to electricity, being more than two hundred.

Dr. Vander Weyde, who claimed descent from Walther von der Vogelweide, the celebrated minnesinger of the thirteenth century, was also an accomplished musician and well known as a composer, the number of his compositions amounting to more than three hundred.

He was corresponding member of numerous scientific societies in Europe and America.

Notwithstanding his advanced age, he enjoyed vigorous bodily and mental health up to the time of his death, within a week of which event he wrote and completed an article upon modern electricity for a scientific journal of this city.



DR. P. H. VANDER WEYDE.

Waves.

At the Royal Institution recently Lord Rayleigh, F.R.S., delivered the first of a course of six lectures on "Waves and Vibrations." After giving a brief account of the nature of the wave forms, he said that he proposed that day to deal more especially with waves of water. In such waves the velocity was not independent of the wave length (or distance between crest and crest), as it was in the case of sound waves, which in air moved with the same speed whether they were long or short. With waves of water the long ones traveled more quickly than the short. Waves at sea were mostly generated by wind, though other causes, such as earthquakes, occasionally operated. By blowing the surface of a long trough of water with a powerful fan the lecturer showed that the waves produced close to the source of the wind were shorter than those set up further away. The effect of oil upon waves was also illustrated and explained. Oil had no effect upon big rollers, but the broken water upon which it acted was just what was dangerous to boats in a tempest. A storm in mid-ocean generated waves of all lengths, but at a distance a kind of regularity was found, since the long waves arrived first, the shorter ones following afterward. In the island of Madeira the lecturer said he had observed waves with the long periodic time of ten seconds. The height of waves in the sea had often been exaggerated, owing to the difficulty of measuring them, but the highest authentic observation was about forty feet. The lecturer next discussed stationary waves as opposed to the progressive waves of which he had been speaking. They were described as the result of the meeting of two perfectly equal sets of progressive waves, and the production of two systems of them was shown in a round tank. Lord Rayleigh then spoke of the effects of waves on ships. He showed a small model boat so weighted as to have the same rolling period as the waves in the tank in which it floated. The result was that its rolling was exceedingly violent, but became comparatively slight when the weights were altered so as to change the rolling period. War ships, in which stability was very essential, were designed to have a longer period of roll than any waves they were likely to encounter. The lecture was concluded with some remarks on standing waves, which it was explained would be formed in a river flowing four miles an hour by a wave traveling up it at the same speed. The waves produced would be standing as regards an observer on the bank, but progressing as regarded the water.

THE FRENCH EXPOSITION OF 1900.

The preparatory period of the Universal Exposition of 1900 has been devoted by Mr. Alfred Picard, its distinguished commissioner-general, to a public exposition of the projects, which, as Mr. Guadet has well expressed it, in a report relating to the operations of the jury, which terminated its labors on December 28, 1894, has been especially a "competition of ideas." The result of it has been entirely satisfactory. The French architects have been able to respond to the appeal that was made to them with their habitual qualities of activity, fertile improvisation and artistic training.

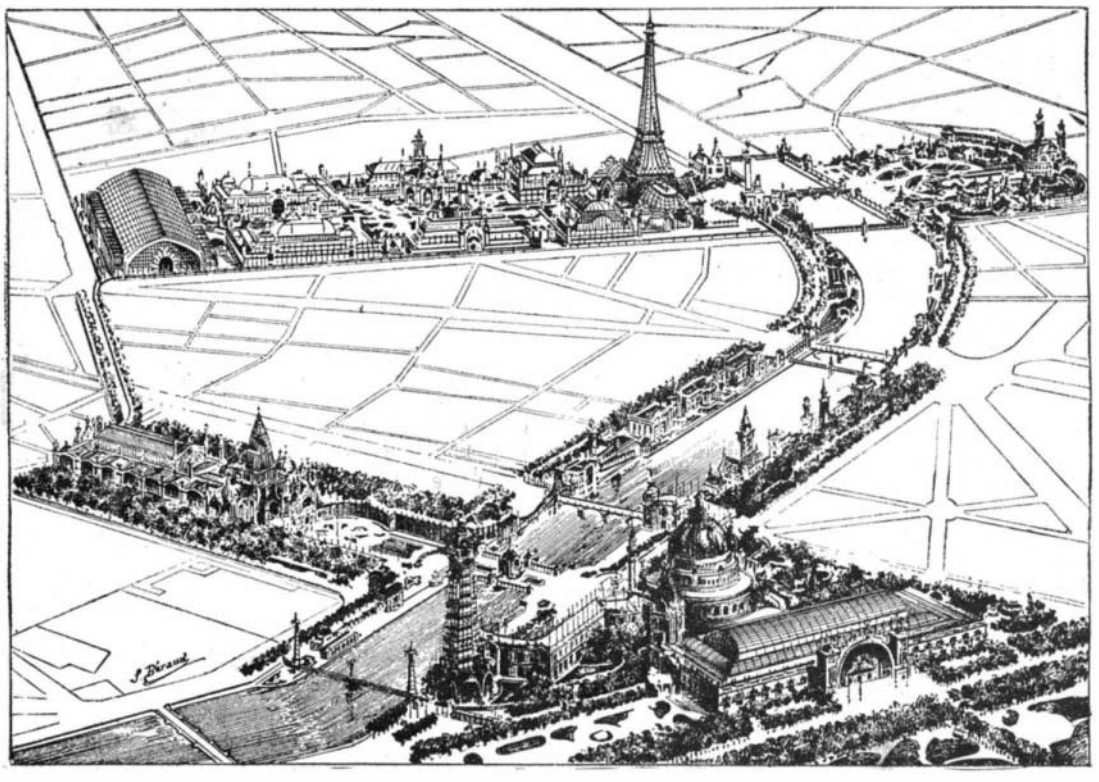
Finally, eighteen laureates have been rewarded, taking three first prizes, four second prizes, five third prizes and six mentions. According to the terms of the programme, their projects remain the property of the administration, which can use them as material from which to borrow the general elements of the final project that it has to establish. This labor is entrusted to Mr. Bouvard, an architect of merit whom a participation in the work of our preceding universal expositions makes especially competent.

This competition is itself alone a first indication of utility and interest. After examining what it has furnished, it cannot be doubted that the Exposition of 1900, although it has to surpass the fine one of 1889, will be attended with a success that will be as great as it will be brilliant. For the artistic and industrial honor of France, it will worthily mark the debut of the twentieth century.

Let us recall here that the laureates of the competition of projects for the Exposition of 1900 were the following:

First prizemen: Messrs. Girault, Henard and Paulin. Second prizemen: Messrs. Cassien Bernard, Gautier, Larche & Nachon and Raulin. Third prizemen: Messrs. Blavette, Esquie, Rey & Tronchet, Sortais & Toudoire and Pradelle. Fourth prizemen: Messrs. Bonnier, Hermant, Louvet & Varcollier, Masson-Detourbet, Mewes, Thomas and De Tavernier.

All these projects proceeded from the following great principles: To establish a con-



MR. GIRAULT'S PROJECT FOR THE PARIS EXPOSITION OF 1900.

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nection between the banks of the Seine; to modify or rearrange the buildings remaining from the preceding expositions; to preserve, as far as possible, the beautiful planted grounds of the city of Paris upon the site set apart for the Exposition of 1900; and to assure, also, as far as possible, an exact, methodical and rational classification.

To our regret, we cannot enter here into a detailed description of the prize projects, and still less, publish a host of original details, new conceptions and ingenious and grand ideas found in a large number of those that came afterward and do their authors honor.

We shall be content, following in this the magistral selection of the jury of awards, briefly to describe the three projects that were awarded the first prize and that appear to have responded to the main idea of the great enterprise that is preparing. Their "artistic mean," if it be permissible to express ourselves thus, well gives the image of the future exposition, and our readers, in looking at our engravings, will be able to obtain a preliminary idea of it. These projects are, as we have said, those of Messrs. Girault, Henard and Paulin. We shall take them in alphabetical order.

Mr. Girault's Project.—Mr. Girault, using the power accorded him by the general programme of the exposition, has suppressed all the structures remaining upon the Champ de Mars, with the exception of the Machinery Hall, of 1889, and the Eiffel Tower. These two grand structures will well symbolize, in 1900, the art with which the engineer and architect were able to appropriate metal in the age of iron and steel that will have just passed. Nothing will be easier, moreover, if it be desired, than to rearrange the interior of the vast nave of the Machinery Hall and to "embellish" the Eiffel Tower in order to give it an architectural aspect. The 300 meter tower, which it would have been costly to demolish, is the joy and the admiration of visitors who come from every quarter of the globe. From its summit, it will be possible not only to contemplate the completed Exposition of 1900, but also to see it constructing and rising like an immense fairy scene. Were it to regard it only from this view point, it would be just and rational to preserve it. In the center of the Eiffel Tower, Mr. Girault has arranged a large and beautiful cupola and two great monumental greenhouses for horticulture on each side. This is the "embellishment" of the tower, and it is certainly well conceived.

Mr. Girault preserves also the Palace of Industry, of which he modifies the approaches and gives it a monumental porch. This latter will serve as a secondary entrance to the exposition, the main entrance of which will be situated on Place de la Concorde.

In his project, this able architect has, with special care, anticipated a general classification of the members of a same group in the special palaces in whose center would be found the retrospective centennial exposition. He would thus furnish its visitors with elements of instruction such as have not as yet been seen grouped in any exposition, and this certainly is a very happy idea.

Mr. Eugene Henard's Project.—In his project Mr. Henard has preserved the Machinery Hall of the Exposition of 1889 and the Palaces of Fine and Liberal Arts erected upon the Champ de Mars. What characterizes his very beautiful and very imposing project is that the Machinery Hall would become the Hall of Fetes of the Exposition. The "hit," to use the common expression, would be a colossal dome 100 meters in diameter and 200 in height. The Champs Elysees would be connected with the Esplanade des Invalides by a three-arched bridge 100 meters in width.

Mr. Paulin's Project.—In Mr. Paulin's project, which is very sensible and very moderate in its conceptions, it is the Seine that serves as the principal motif. Its banks, converted into gardens, would offer the visitors varied recreations, specimens of structures of all countries, and suspended gardens. As the river would serve not only as an axis, but also, in a manner, as an entrance to the exposition, a monumental bridge would be constructed at the height of the Palace of Industry and its approaches would be provided with great triumphal arches.

Mr. Paulin proposes the preservation of the Eiffel Tower, the Machinery Hall, and the Palace of Industry, but he would annex to the latter a gallery parallel with the Seine, and a vast central rotunda having an access near Place de la Concorde, with a grand vestibule and monumental stairways.

Such are the broad lines of the three projects that obtained the highest awards from the jury. What will the exposition of 1900 be? Every one is already asking this question with curiosity.

It would be necessary in truth to be more advanced than Mr. Bouvard himself and than Mr. Picard in order to answer this question, for it is certain that the general and definite plan, in course of elaboration, will borrow from the various prize projects all that they possess of the seductive, and that these different elements will be fused together in order to form a majestic and homogeneous whole.

As to the general impression, we will doubtless find a certain resemblance between the new exposition and that of 1889, since the preservation of the Eiffel Tower and the Machinery Hall materializes the souvenirs of 1889 in a grand and indelible manner.

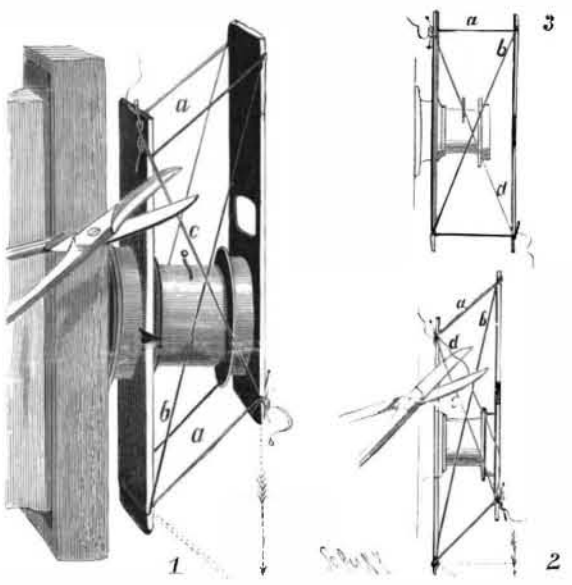
But the extension of the exposition upon the two banks of the Seine will give it a character of evident innovation. The wide perspective opened, too, within the limits of the exposition, from the Palace of Industry to the Esplanade des Invalides, will present to the visitors an unexpected spectacle. It serves as a motive for the construction over the Seine of a bridge that will remain after the exposition and take a place among the beautiful things that may be admired at Paris.

Finally, the relatively wide area accorded to the exposition will permit its organizers to establish the classification of the products with a clearness and a method that have been wanting in our universal expositions since the remarkable one of 1867, which, thanks to the work of the learned Le Play, was a model of its kind. The visitor will therefore be able not only to be more easily amused and entertained, but also instructed, and this is a quality that ought to be essentially possessed by such a great enterprise, the mission of which, in a manner, is to summarize the industrial, artistic and scientific progress of an entire century.—La Nature.

A SIMPLE CAMERA SHUTTER.

BY GEORGE M. HOPKINS.

During last summer's vacation, the writer, while in the mountains enjoying the scenery and trying to survive an acute attack of photographia, received a superb lens ordered some time previously, but the shutter was not yet completed. The lens was used with great satisfaction with the cap as a shutter, the only difficulty being that of overexposure and the occasional loss of a subject requiring an instantaneous exposure. When, however, a desirable snap shot subject presented itself, an instantaneous shutter became a necessity, and hence the invention of an exceedingly simple shutter for the emergency.



A SIMPLE CAMERA SHUTTER.

This shutter, which is here illustrated, has been used since its first application to the camera, notwithstanding the adaptation of the fine shutter belonging to the lens.

Two oblong pieces of pasteboard box, four hair pins, four common pins, a long thin rubber band, a piece of black velvet, and a piece of thread constitute the materials, and the time required for making the apparatus was twenty minutes.

In the center of one of the pieces of pasteboard was formed an aperture to fit over the threaded end of the lens tube, and in the center of the other oblong piece of pasteboard was formed a wide transverse slit, and a piece of black velvet was attached to one side of the pasteboard and carried over the edges around the slit. In the absence of other forms of wire four hair pins, a, were straightened, the ends of each one bent at right angles in the same direction and inserted in opposite edges of the pasteboard above and below the lens tube. Two of the common pins were inserted in the front of the lower part of the movable portion of the shutter, from opposite directions, forming a cleat for the reception of the piece of thread, and in a similar way two pins were inserted in the stationary pasteboard. A slender rubber band, b, was stretched around diagonally opposite ends of the pieces of pasteboard within the wire arms, a, and was prevented from slipping by the ends of the arms which entered the pasteboard.

This shutter was set by raising the front part so as to bring the lower imperforate portion against the front of the lens tube, thereby shutting off the light, then bringing the thread, c, already attached to the cleat on the stationary part, around the cleat on the movable part. The exposure was made by cutting the thread by means of a pair of scissors as shown in Fig. 1. The focusing was done while the shutter was held open by another thread, d, having a loop in it, which was slipped on the front cleat as shown in Fig. 3.

To make a slightly prolonged exposure the thread, c, which held the shutter closed, was cut first as shown in Fig. 2. The looped thread, d, which held the shutter open was cut immediately after it, the time elapsing between cutting the first and second threads being the time of exposure. The rapidity of the shutter is increased by adding another rubber band.

Filter Beds.

Considerable attention has been directed of late to the purification of water in large quantities by means of artificial filter beds. A number of these filters are being tested in various parts of the United States and their use promises to become general. The use of unfiltered water, it is generally recognized, tends to spread dangerous germs, and the importance of some convenient and economical means of supplying pure water can hardly be overestimated.

The filter beds situated at Ilion, New York, will serve to illustrate the general form of the artificial filters now in use. The water to be filtered in this case is supplied by a small stream which is dammed up and conducted to a storage reservoir. Before filtering, this water passes through a fountain which serves to aerate it. It is thought that this oxygenates the water, so that it will permit of sufficient nitrification in the filter beds without necessitating from time to time the aeration of the pores of the filter. The filter is arranged with an underdraining consisting of two courses of bricks laid dry. The lower course is placed end to end and forms lines which run at right angles to the main collecting drains. The space between these lines is equal to the width of one brick. These spaces are covered with the second course of bricks, and over this is spread six inches of pea gravel, and over this in turn a layer of sand thirty inches thick, of a uniform grade throughout. The water passes through this filter into the collecting channels formed by the first course of bricks, and is then collected in a clean water basin for distribution.

A filter of a slightly different form was opened in 1893 in Lawrence, Mass. In this case the filter measures two and one-half acres, and filters 5,000,000 gallons of water a day. It is arranged in a number of beds, each of which has a depression in the center which makes it possible for the water to rise gradually over the sand. The depth of the sand in these beds is five feet, and in the depressions a fine grade of sand is used to equalize the filtration for all parts of the bed. Artificial filter beds of the same general form have also been introduced at Poughkeepsie, Hudson, and Mount Vernon, N. Y.; at Nantucket, Mass., and elsewhere.

Some very satisfactory results are also obtained, it is claimed, by rapid or mechanical filtration with the use of coagulants. In this method, a rapid stream of water is furnished for several hours, and the filtering sand is washed by the disturbance created by reversing the current until the water which comes from the sand is perfectly clear. Several processes of carrying on mechanical filtration have been patented, and companies have been formed to fill contracts for constructing such filters. The filtration of drinking water is a necessity in many parts of the country, and it is to be hoped that filters of some form may in time come into very general use.

Primitive Fire Engines.

The oldest known fire engine for pumping water is probably the one mentioned in the Spiritalia of Hero, about 150 B. C. This engine, it is said, was contrived with two single-acting pumps with a single beam pivoted between the two for working the plungers. The streams of water united in a single discharge pipe and passed up a trough having an air chamber, and out of a nozzle which might be turned in any direction as desired. Fire engines appear also to have been used extensively by the early Romans, who furthermore organized regular fire brigades.

In the early part of the sixteenth century a fire engine known as a "water syringe" was introduced, which, in a measure, resembled the modern forms of fire engines. This was mounted on wheels and the water was pumped by levers. This form of engine was very generally used in Germany. In England about the same time large brass syringes were used. These held several quarts of water and were operated by three men, two of them holding the syringe at each side with one hand and directing the nozzle with the other, while the third operated the plunger. It was necessary, after having discharged the water from the syringe, to refill it from a well or cistern near the fire or from buckets. The syringes were later fitted to portable tanks of water. The first successful fire engine was probably the Newsham engine, and this was the pioneer of manually operated fire engines. The pumps in these engines were built on many different designs, but in most cases they were operated by levers. Fire engines similar in form to the Newsham engine were in use up to the year 1850.

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