Professor Sainte-Claire Deville.

The London *Chemical News* gives the following concise sketch of "one who, for the past thirty years, has had few equals and no superior in the fields of mineral chemistry and inorganic analysis." Etienne Henri Sainte-Claire Deville was born March 18, 1818, in the island of St. Thomas, in the West Indies. At an early age he manifested an ardent passion for the study of chemistry, which at that time found in France so many of its most distinguished professors. His abilities were manifested so early that at the age of twenty-six he was commissioned to organize the Faculty of Science, newly created in Franche Comté, and to preside over it as its dean. Here he undertook the analysis of the waters of the Doubs, and of the springs around the town of Besançon, and greatly improved the methods then known for water analysis. Shortly after, he succeeded in preparing nitric anhydride, which previously had been attempted in vain. Toluol was another of his discoveries. In his thirty-third year he succeeded Balard in the chemical chair at the Ecole Normale Supéricure, at Paris. Here his emoluments only reached the modest sum of 3,000 francs; chemistry in France, as well as in England, being supposed to be its own reward. His next researches related to the properties and the industrial preparation of aluminum—discoveries which attracted public attention throughout the world. He then turned his attention with signal success to the metallurgy of platinum, and its separation from its associated metals. His investigations on boron and silicon are also well worthy of notice, and his production of sodium at a cheap price has placed a powerful reagent in the hands of chemists, and has led the way to valuable results, both in the laboratory and in industrial establishments. His highest achievement, from a strictly scientific point of view, was the establishment of the laws of dissociation. Previously, decomposition was regarded as a simple phenomenon, effected and completed, in the case of every substance, at a fixed temperature. Deville showed that in some cases it is effected within certain limits of temperature, being arrested at a given heat by the equilibrium established between the decomposing body and the products of decomposition. A most admirable characteristic of the deceased *savant* was his strict accuracy—an attribute all the more deserving of honor in a man of his ardent and impetuous temperament. Among his pupils may be counted not a few of the most meritorious among the younger French chemists, such as Debray, Troost, Hautefeuille, Grandeau, Gernez, and others. M. Deville died on July 1st, at Boulogne-sur-Seine, and was buried on the 5th. His old friend, M. Pasteur, pronounced an eloquent and impressive *éloge* at the funeral. All honor to his memory, and may his experimental accuracy, which M. Pasteur calls the "probity of the chemist," find abundant imitators.

W. Milnor Roberts.

We are in receipt of the sad intelligence of the death by typhus fever, at Rio Janeiro, on the 14th of July, of Col. W. Milnor Roberts, past President of the American Society of Civil Engineers, and late Chief Engineer of Public Works of Brazil. We are indebted to *Engineering News* for the following:

Colonel Roberts was born in Philadelphia, February 12, 1810. His aptitude for mathematics early introduced him to the then new profession of civil engineering, and in the spring of 1825 he received his first appointment as a chainman of the Union Canal, of which Canvass White was chief engineer, and Sylvester Welch, locating engineer. At 18 years of age he was appointed engineer in charge of the most difficult division of the Lehigh Canal, from Mauch Chunk down, sixteen miles, and from that time forward he was always intimately connected with great canal and railway enterprises, principally in Pennsylvania and New York States, with intervals in Brazil and in the Western States. He held important offices under the United States Government, was Chief Engineer of the Northern Pacific Railway, Associate Chief Engineer of the St. Louis Bridge, and an active and important member of the Mississippi Jetty Commission. In 1879, shortly previous to his departure for Brazil, Colonel Roberts was elected President of the American Society of Civil Engineers, a society of which he was a very active and always interested member, and which will very keenly feel his loss. Though so far advanced in years, Colonel Roberts was an unusually active and energetic man, and some idea of the extent and difficulty of his labors in Brazil may be gathered from letters which have been published in this journal during the past two years. Colonel Roberts was possessed of a most genial and kindly disposition, and the news of his death will be received with feelings of great sorrow by the entire profession of which he was a member, as well as by a very large list of friends in this and other countries where he was known.

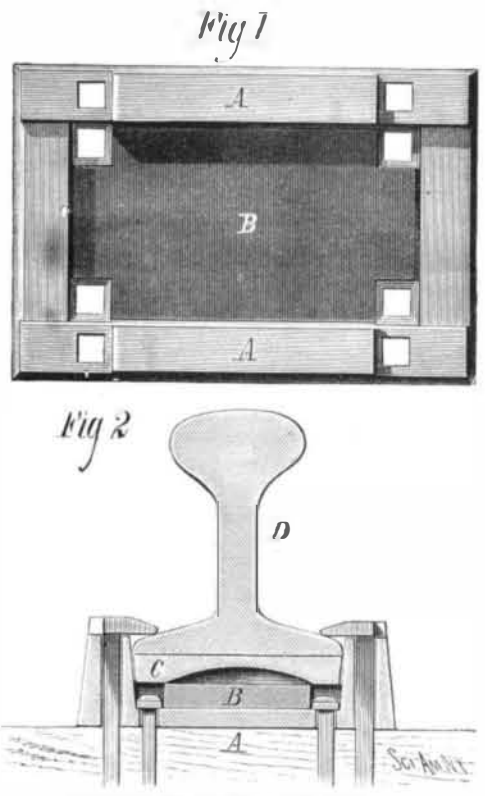
Improvement in the Paper Trade.

From statistics presented to the meeting of the American Papermakers' Association, which met at Saratoga on the 27th of July, 1881, it appears that 307 manufacturers had offered 897 tons for export without limit as to price. The increase, according to the report of the committee on export business, in the export of paper in 1880 over 1879 had been 16,500 tons. Statements were also made by prominent members to the effect that the out-put of the paper mills had been fully 25 per cent over that of the previous year, and paper is now sold as low in New York as in London

The total capacity of all the mills in the country is now 2,500 tons per day of all kinds of paper.

NEW RAIL FASTENING.

The engraving shows a new fastening for securing rails and chairs to the railway ties and sleepers recently patented by Mr. Isaac K. Bennett, of Moosup, Conn. Fig. 1 is a plan view of the chair and cushion, and Fig. 2 is a vertical transverse section of the chair, showing the rail in position. The chair, B, is secured to the tie or sleeper by square-headed spikes passing through holes in the bottom into the timbers. A rubber pad, B, is placed in the cavity of the



BENNETT'S RAIL FASTENING.

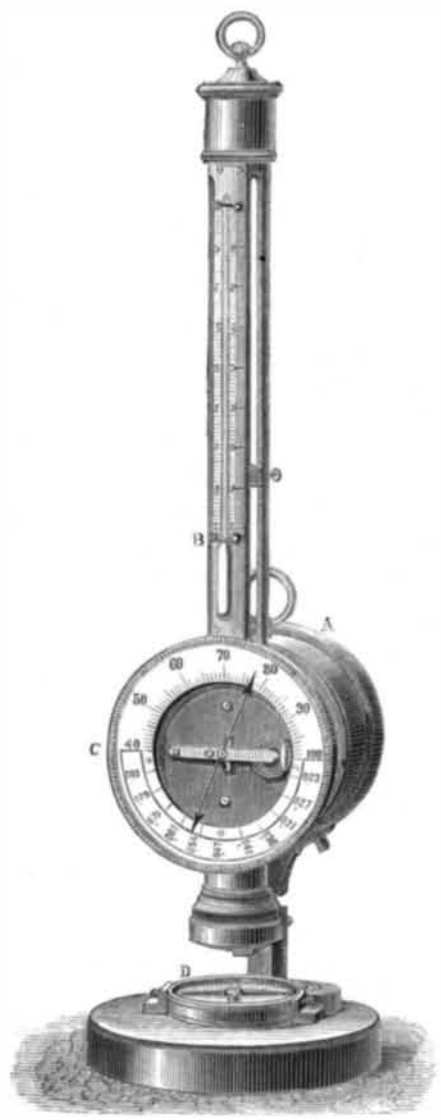
chair and covered with a metal plate, C, which fits the cavity in the chair, and is concaved on its under surface, forming an air cushion. The rail, D, rests on the plate, C, and is secured by hook-headed spikes passing through square holes in the chair into the timbers.

This method of fastening gives great elasticity to the joint and prevents hammering the rails end and bruising the ties.

This device may, with advantage, be applied to the middle or other portions of the rail.

PORTABLE METEOROLOGICAL STATION.

Under this name is designated an instrument especially adapted for the use of travelers in mountain excursions in



PORTABLE METEOROLOGICAL STATION.

order that they may be able to observe and accurately register the different atmospheric phenomena they experience, and so fill the gap that generally exists in the history of Alpine and other ascensions.

This instrument is so arranged that it can, in any place, conveniently and exactly determine the most important meteorological phenomena, the pressure and temperature of the air, and its degree of humidity. It is a combination of a barometer, thermometer, hygrometer, and compass, arranged in a small case that can easily be carried, as it weighs only one kilogramme.

The different parts are so perfectly balanced that the instrument can be used in any position and can stand without injury the rough usage of mountain traveling.

The barometer, A, is the aneroid, a well known instrument, and is especially adapted to show the pressure of the atmosphere and the elevation of the place of observation above the sea level.

The temperature is shown by a mercurial thermometer, B, fixed on a copper tube, that forms a general support for the whole apparatus. The thermometer registers the centigrade system from 25° below zero to 40° above.

The degree of humidity in the atmosphere is determined by a Saussure hair hygrometer, which is slightly modified in this apparatus. A well constructed hair hygrometer gives results sufficiently accurate for general meteorological observations, as the hairs work regularly, and their small bulk causes them to be easily affected by the surrounding air, which is a great advantage when there are only a few moments to make an observation.

This hygrometer is the only one available for those altitudes where the temperature is below zero, and where, consequently, neither the psychrometer nor the condensing hygrometer could be used.

Another advantage is that it shows immediately the degree of humidity, for a table, inscribed on the semi-circumference, C, of the circle, gives in a moment the equivalent of the degrees of the hygrometer in the fractions of saturation of the air.

By this method we can make most interesting comparisons of the humidity of the fogs and mists that are encountered on the mountains and in the vicinity of elevated lakes.

It is easy to see the utility of the compass, D, which shows the position of the country, and is especially useful to the traveler, when exploring an unknown place or surrounded by a heavy fog. The direction of the wind can also be easily ascertained by tying a piece of ribbon to the ring at the top of the instrument, and so making it still more useful.—*La Nature.*

STEAM-BOILER NOTES.

It will be remembered by those who gave attention to the subject of steam-boiler construction, how the steel plates used by Messrs. Elder & Co., of Glasgow, in the construction of the boilers of the Livadia, the Russian war yacht, behaved in the most capricious manner, after having passed the tests that are approved by Lloyds, the Admiralty, and the Board of Trade, and how since that event the attention of civil, metallurgical, and mechanical engineers throughout the civilized world has been drawn to the subject of so-called mild steel as a structural material for engineering works.

According to a recent report on the behavior of the steel plates above mentioned, by W. Parker, Esq., chief engineer surveyor of Lloyds' Register, which was read at a meeting of the Institute of Naval Architects of England, it appears that, up to the date of the Russian event, Mr. Parker and his colleagues of the Lloyds' Register had never observed a single instance of brittle steel plates during their manipulation of 17,000 tons that entered into the composition of no less than 1,100 steel boilers now in use in steamships.

The report shows that, during the construction of these Russian boilers (which were 14 feet 3 inches diameter, with triple-riveted lapped longitudinal seams, plates ¾ inch thick) a plate fell from the slings on to a piece of metal, the shock of which cracked it between the rivet holes at a distance from the place that received the blow; thereupon all the plates were annealed in a furnace specially adapted for the purpose.

The first boiler that was tested after completion gave way in three places before the required pressure, 140 pounds, was reached, and the second gave way in anticipation of the test; in other words, it was found to be cracked by those who were about to test it in a similar manner behind the rivet holes.

In the general chemical analysis which followed their failure nothing seems to have been found to warrant such conduct on the part of these plates. But the appearance of the fracture indicated that the metal was not of uniform structure throughout the thickness of the plate, and a series of special analyses performed on successive layers, each $\frac{1}{16}$ thick, planed off, showed that there was a notable difference in the chemical composition of the middle as compared with the surface layers of the plate. There was more carbon, more phosphorus, and more sulphur in the intermediate layers; of carbon and sulphur they contained nearly double, at the middle, the average quantity of all the layers. Mr. Parker concludes from his investigation that there is nothing but the want of uniformity of structure to account for the singular freaks of these plates. He says: "The tensile strength was not reduced by the punching, but the plates, where punched, were *extremely brittle.*"

In 1848, the ex-Commissioner of Patents, in his report, which was published in the SCIENTIFIC AMERICAN of May 19,