

## SCIENTIFIC AMERICAN

ESTABLISHED 1845

MUNN &amp; CO., - - Editors and Proprietors

Published Weekly at

No. 361 Broadway, New York

## TERMS TO SUBSCRIBERS

One copy, one year for the United States, Canada, or Mexico ..... \$3.00  
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Scientific American (Established 1845) ..... \$3.00 a year  
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 MUNN & CO., 361 Broadway, New York.

NEW YORK, SATURDAY, AUGUST 19, 1905.

The Editor is always glad to receive for examination illustrated articles on subjects of timely interest. If the photographs are sharp, the articles short, and the facts authentic, the contributions will receive special attention. Accepted articles will be paid for at regular space rates.

## FAILURE OF THE ISHAM SHELL.

The Isham shell, of which so much has been heard during the past few years, has at last received its quietus in a test which has just been made at the Sandy Hook proving ground. The shell was designed on the theory that, if a projectile charged with high explosive be burst by impact against the outside of armor plate, it will produce the same destructive effects that are secured when a high explosive shell is carried through the armor and burst within the interior of the ship or fortification. It was only a few years ago, as recorded in the columns of the SCIENTIFIC AMERICAN, that tests of two projectiles representing the two theories above mentioned, were made about the same time against armor plate of the same thickness, and backed up by similar structures, each representing the side of a warship. One was the present army high explosive shell filled with maxinite and dunnite, and designed to penetrate the plate and burst in the rear of it; the other was the Gathmann shell, carrying an enormous charge of high explosive and intended to burst on the front face of the plate. Gathmann believed that the mere detonation of the charge against the plate would demolish both the plate and its backing, driving it rearwardly. He claimed that if one of his shells struck the side of a warship, a large area of the ship's side would be blown bodily inward. The experts of the Army Ordnance Board believed that his theory was wrong, and advised strongly against the appropriation of money by Congress for a futile experiment. The tests were carried out and the armor plate was only slightly dished by the earlier shots and cracked through by the last. Very different were the results obtained with the army shells filled with maxinite, and with other shells filled with dunnite, the charges inserted in the shells being very small, compared with those used in the Gathmann projectiles.

The shells were carried entirely through the armor and tore the backing literally into shreds, thereby giving a dramatic illustration of what would happen in case of penetration of the thick armor of a battleship.

In the tests recently made of the Isham shell, an armored target representing a section of a battleship was set up, and the shell was fired with a velocity corresponding to the probable striking velocity at battle ranges. It exploded on contact and merely dished the face of the armor a few inches inward. The officers in charge of the tests claim that, had the plate been built into the elastic structure of a ship, the results would have been even less marked than they were.

## RESCUE OF THE FIALA-ZIEGLER EXPEDITION.

The cablegram announcing the rescue of the Fiala-Ziegler expedition by one of the three rescue parties that have started during the last two years in search of the explorers, tells briefly the fate of one more of the many ill-fated attempts that have been made to solve the final mystery of the far North. The "America," which had been specially fitted and provisioned for the trip, sailed in charge of Mr. Fiala, from Trondheim, Norway, with a complement of thirty-seven people, on June 23, 1903, for Franz Josef Land, where it was the intention to pass the winter, and set out early the next year on expeditions in dog sledges. On June 15, 1904, a relief expedition sailed from the same port, carrying provisions and general supplies; but on account of the ice and fog it was unable to reach the "America" and returned to Norway on the third of the following month. Mr. W. S. Champ, who had charge of the relief expedition, then chartered the arctic steamer, "Terra Nova," and in the following summer, on July 14 last, sailed from Tromsø, Norway, in another attempt to find the "America." By dint of arduous labor the relief ship was pushed through until the rescue party found the members of the Ziegler expedition at Teplitz Bay, Franz Josef Land.

According to Mr. Fiala the rescue was timely, the expedition having been cut off from all communication

with the outside world for two years past. The "America" wintered in Teplitz Bay where, early in the winter of 1903-04, she was crushed by the ice and became a total loss. Fortunately the party found the large supplies of stores which had been left at Franz Josef Land by various relief parties. Three separate attempts were made to reach a high latitude, but they all failed.

As far as the interests of geographical knowledge are concerned, the expedition must be regarded as a distinct failure, the farthest north recorded being 82 deg. 13 min. As early as the year 1827 Parry had reached the same latitude. So did Alarich in 1875; while Markham, Lockwood, and Peary all attained higher latitudes than this. The farthest north was made by Nansen, with a record of 86 deg. 14 min. in 1895, and the Duke of Abruzzi, who reached 86 deg. 33 min. The cable dispatches announce that the scientific work that was planned for the expedition was successfully carried out by Mr. W. J. Peters, of the United States Geological Survey.

It should be stated that yet another relief expedition, headed by Dr. O. L. Fassig, of Johns Hopkins University, left London in May in the arctic steamer "Belgica," taking the Greenland route. A message was received from the expedition on August 7, stating that no member of the Ziegler expedition had been seen.

## BIDS FOR THE MANHATTAN BRIDGE.

Over two years ago the Bridge Commissioner of this city asked the Board of Aldermen for the necessary appropriation for the construction of the greatly-needed Manhattan Bridge, across the East River. The Board flatly refused to make any appropriation, and, as a consequence, New York city has been subjected to two years of needless delay and untold discomfort. The present bridge engineer, who was responsible for the delay, has designed, or caused to be designed, a new structure, bids for which have only recently been called for. The lowest of the five bids that have been received was \$7,255,000 for the superstructure steel work, and this was made by the firm that built the approaches and the suspended roadway of the Williamsburg Bridge. It now becomes possible to compare the cost of the new design with that of the design that was rejected, and the probabilities are that the new structure will prove to be the more costly and that it will take from a year to a year and a half longer to build. If this should prove to be the case (we hope to take up this matter in fuller detail in a later issue) New York city will have had another object lesson in the supreme folly of allowing its municipal engineering works to be made the sport of politics. It begins to look as though, by the time this bridge comes to be opened, which will certainly not be earlier than the year 1910, New York city will have paid the penalty of three or four years' delay and several million dollars expense for which the public at large will receive no compensatory return whatever.

## ELECTRIC LOCOMOTIVES FOR THE NEW YORK CENTRAL.

In recent issues, both of the SCIENTIFIC AMERICAN and SUPPLEMENT, we have given illustrated articles on the subject of the elaborate tests that have been made by the New York Central Railroad of an experimental electric locomotive, designed for handling the express traffic within a radius of 35 miles of the New York terminal station. These tests have been carried out on a six-mile stretch of track on the main line of the company's system, west of Schenectady, and they have now been continued steadily for such a long period of time, that the engine may be said to have experienced practically every conceivable condition of weather, load, and track. The data gathered in this way are so eminently satisfactory, that the company has placed orders for electrical equipment, which are said to aggregate over \$6,000,000 in value. The order includes thirty-five electric locomotives for the through express service, and 175 cars which are to be used in the suburban service. Each of these engines will weigh about 95 tons and will develop normally 2,200 horse-power, although this amount can be exceeded when it is necessary. They will be carried on eight 44-inch driving wheels, all coupled. Although the draw-bar pull considerably exceeds that of the most powerful steam express locomotives of the day, the concentrated load on the drivers will be considerably less than that on steam locomotives. Each engine will be able to haul at schedule speed a train of about twelve cars, equivalent to a load of about 500 tons. The electric locomotives will be coupled to the main line incoming express trains at Croton, where there will be a running shed and shop conveniences for both the steam and electric locomotives. The expresses will be run into and brought out from New York city entirely by electric power. The same conditions will prevail at White Plains, twenty-five miles out from New York city, on the Harlem division, where the steam locomotives will be uncoupled and the electric locomotives will take their place. It is expected that

this equipment will be ready for work within the next twelve months, by which time sufficient progress will have been made with the change of tracks to admit of a partial use of the electrical service.

## RAILROAD AND OTHER ACCIDENTS IN THE UNITED STATES.

Accident Bulletin No. 15, of the Interstate Commerce Commission, opens with the following statement: "The number of persons killed in train accidents during the months of January, February, and March, 1905, as shown in reports made by the railroad companies to the Interstate Commerce Commission, under the Accident Law of March 3, 1901, was 232, and of injured 3,713. Accidents of other kinds, including those sustained by employes while at work, and by passengers in getting on and off the cars, etc., bring the total number of casualties up to 909 killed and 14,397 injured." There is probably nothing in all the current literature of the day that the railroad companies dislike quite so much as the modest little pamphlet, published quarterly, from which the above quotation is taken. They claim that the bald statement of losses and injuries, as presented in these bulletins, gives undue and misleading prominence to what, according to their point of view, is merely a detail of the vast operations of our railroad system. They claim, with perfect propriety, that the total number of accidents should be considered in relation to the total number of passenger miles.

During the past few months the technical journals that are specially devoted to railroads have taken up the question from the railroad company's point of view, and are attempting to mitigate the horror of our casualty list by pointing to the enormous number of passengers that are carried without any mishap. The question, however, is not how many do we carry, and how many do we kill, but rather how does the proportion of killed and wounded to total number carried in the United States compare with the proportion of killed and wounded to total number carried in other countries. As everyone knows, the proportion is notoriously larger in the United States.

One of our contemporaries, however, raises an excellent point when he claims that the undue prominence given to railroad accidents is due to the fact that accidents through other means of travel are not officially recorded by the government. The same journal asks whether it would not be advisable to have other commissions appointed to collect and have power to enforce the submitting of statistics of electric railway and street railway accidents, and accidents through the growing use of the automobile. We are so far in agreement with our contemporary that we think immediate steps ought to be taken by Congress to appoint such a commission and empower it to collect statistics of accidents as complete as those furnished to the Interstate Commerce Commission.

Particularly is it desirable that statistics of automobile accidents should be reported and classified in quarterly bulletins. We are satisfied that were statistics available for the whole of the United States, the total number of killed and injured would prove so large as to cause a thrill of horror to pass through the whole nation. Both the general public and the owners and drivers of the automobiles themselves, require the protection that is undoubtedly afforded by governmental supervision of accident statistics. Considerations of humanity alone should prompt Congress to take up this matter as a question that is assuming national importance.

## BOMBS FOR HAIL IN SWITZERLAND.

In a note which he recently presented to the Académie des Sciences, M. Vidal shows the efficacy of the new hail-destroying bombs which he has invented. On the first of August of last year, a severe storm which was condensed on the highest summits of the Bernese Alps at altitudes above 10,000 feet, came down through the narrow valley of the Rhone. With great speed it passed across the northeast end of Lake Lemman, over the rich plains of the Vaud canton, then ended at the Lake of Neuchatel. All the localities were much damaged by hail, except the small towns of Lonay and Echichens. These were the only places where the bombs were fired into the air, and this seems to be a good proof as to the efficacy of this means of preventing hail. Besides this, M. Vidal brings out a point in meteorology discovered during the storm and hitherto completely unobserved. The clouds seemed to have been banked in, and were only allowed to follow a certain path. It is remarked that all the localities which lay higher than 2,200 feet altitude escaped damage by the storm. We thus have a valuable indication as to the height of the storm-clouds, and it seems certain that they kept at a very short distance from the ground. He considers that even when formed at a high altitude in the upper layers of the air or on the snow-covered tops of mountains, the storms tend to approach the soil, and the more so as they are more highly charged with water or hail. It is due to the low altitude that the rockets and bombs against the hail are so effective. They are easily fired, and explode