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(Illustrated articles are marked with an asterisk.)

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TESTING OF OUR GREAT GUNS.

There have lately been some interesting trials of heavy ordnance of the latest build at the government proving grounds at Sandy Hook, the most recent being that of a 12 inch breech-loading cast iron mortar. It was made by the Builders' Iron Foundry, of Providence, is steel-hooped and steel-lined, measures 10 feet 9 inches from muzzle to breech, and weighs twelve and a quarter tons. The shell was of steel, said to be tempered to resist 140,000 pounds to the square inch, and weighed 628 1/2 pounds. It was conical, 3 feet long, and in service is expected to carry a bursting charge of 22 pounds of powder, the shell being designed to pierce the armor of a ship's deck at which it is fired and then explode. The target was a solid steel armor plate, 10 feet by 5, and 4 inches thick, made at the Bethlehem Steel Works, and was held in position by heavy timbers sunk in the sand, cart loads of sand being piled behind the target. The charge used consisted of 51 pounds of Dupont's spherohexagonal powder in a canvas bag. After it had been rammed in behind the projectile a primer was placed in the breech-plug and the latter screwed to place.

It had been intended to fire four shots, but after the first one there was not enough left of the target to continue the trial. The projectile, instead of simply piercing the plate, as had been intended, took a big piece out of it, leaving the remainder of its surface in a badly cracked condition. The shell was found about half a mile away, with a piece broken out of its base. One of the purposes of the test was to determine the quality of steel to be used in the shells, which must be the subject of still further experiment, but there is no room for question as to the penetrating power and destructive effect of a projectile fired from such a gun on the deck of the most modern armored vessel. With a powder charge of 80 pounds, the shell is expected to pierce the deck of such a vessel at a distance of three and a half miles.

The week previous to this trial a 12 inch built-up steel rifle was tested the second time on the same grounds, the special object being to try a slow-burning brown powder of the Dupont mill. The gun is designed to be fired with a full charge of 440 pounds, the projectile to have an initial velocity of 1,975 feet per second. The projectile weighed 1,000 pounds and the gun was fired four times, with increasing charges, no target being fired at, as the object of the experiment was to determine the velocity of the projectile and the pressure developed in the gun. For the first shot, 150 pounds of powder were used, developing a pressure of 19,000 pounds to the square inch, and giving a velocity of 1,473 feet per second; on the second shot, 200 pounds of powder gave a pressure of 24,660 pounds and a velocity of 1,618 feet; at the third firing, 400 pounds of powder caused a pressure of 30,000, and gave a velocity of 1,750 feet; and with the full charge of 440 pounds, on the fourth trial, the projectile attained a velocity of 1,865 feet per second, but it was impossible to obtain the pressure, on account of a slight damage to the breech plug.

The powder thus far made for these guns is not just what is called for by the government, the object being to obtain the required velocity of projectile with the minimum pressure within the gun, and to this end the powder is designed to exert its explosive force against the projectile during all the time of its passage from the breech to the muzzle, and not suddenly strike it, as it were, with a blow, which is the difficulty most to be guarded against with the smokeless powders for smaller calibers. It is not a difficult matter to obtain what is wanted, but the extreme care and thoroughness with which the government officials are proceeding in these tests, and the competent understanding shown by them of the progress being made by foreign governments in the same lines, give good promise that the armaments, both naval and military, now being provided for the nation will not be any discredit to American genius and skill.

AN OFFICIAL GEOLOGICAL ORGANIZATION.

While important ends are gained by organizations already existing, such as the geological section of A. A. S., the Geological Society of America, and the International Congress, there is need of a closer union of the State and national surveys. A preliminary meeting was held, August 29th, at the rooms of the Cosmos Club, in Washington, D. C., at which were present Major J. W. Powell, director of United States Geological Survey, and these State geologists, namely, James Hall of New York, J. M. Safford of Tennessee, J. W. Spencer of Georgia, E. A. Smith of Alabama, J. A. Holmes of North Carolina, Arthur Winslow of Missouri, E. T. Dumble of Texas, J. Lindahl of Illinois, N. H. Winchell of Minnesota, and J. C. Brauner of Arkansas. A committee of six, of which Major Powell is chairman, was appointed to draught a constitution and by-laws, to report hereafter.

The special objects of the proposed association are the determination of the proper objects of public geologic work, the improvement and unification of methods, the establishment of the proper relative spheres and functions of national and State surveys, co-operation

in works of common interest and the prevention of the duplication of work, the raising of the standard of public geologic work and the appreciation of its value, and the inauguration of surveys by States not having such at present.

THE AMERICAN CHEMICAL SOCIETY.

At the second Cleveland meeting of the American Association for the Advancement of Science, held in 1888, the desirability of a national organization of chemists was considered by the various representatives of that science in the chemical section. A committee was appointed to report on the feasibility of such an organization, and at each of the gatherings of the American Association since then the matter has been discussed in the chemical section.

Last summer a so-called general meeting was held at Newport, R. I., when chemists from all over the country met and discussed papers of scientific interest. This gathering, originally suggested by Professor Charles E. Munroe, the chemist of the United States Torpedo Station, proved so successful that a second general meeting of American chemists was held in Philadelphia, at the close of the year. Both of these meetings were fully reported in the SCIENTIFIC AMERICAN.

A call for a third general meeting of chemists was issued on August 5 by the American Chemical Society and arrangements were made by the chemists of Washington to secure rooms at the Columbian University, where later the American Association convened. The meeting included sessions held on August 17 and August 18.

The first session began with an address by the President of the American Chemical Society, Professor George F. Barker, who said that, in science as well as socially, man was a gregarious animal. The best results in any direction were obtained by community of action. The world fondly looked forward to the day when all the people of the earth would form one great community. The annihilation of time was the goal of all efforts. The great misfortune of the human race was, he said, the fact that existence is but a time function. Perhaps in a future state we would be freed from all these irksome restraints. Professor Barker then referred to the movement for the inclusion of the various local chemical societies scattered all over the country in the American Chemical Society as a central body, and expressed the hope that the plan would be carried out. United under one central or general body, the members would be benefited by the larger circle of association and the society's strength would be augmented.

The following papers were then read: "A New Form of Soltameter," by George C. Caldwell; "A Theory of the Mica and Chorite Groups," by Frank W. Clarke; "The Occurrence of Tin in Canned Goods," by Henry A. Weber; and "Composition of American and European Chestnuts," by William Frear.

On August 18, the second session was held, and on that occasion papers were read as follows: "Identification of Arsenic and Antimony," by James T. Anderson; "On Acid Sulphate of Lime" and "Gluten," by Hermann Endemann; "On the Nature and Origin of the Asphalt from the Island of Trinidad," by Clifford Richardson; "Some Characteristics of Picrite," by Harvey W. Wiley; and "On Metatitanic Acid," by Francis P. Dunnington.

Subsequent to the reading of the papers, representatives of the American Chemical Society, the Washington Chemical Society, the Association of Official Agricultural Chemists, the Cincinnati Chemical Society, the Brooklyn Institute, the chemical section of the Franklin Institute, the Association of Manufacturing Chemists, and the Louisiana Association of Sugar Chemists, met and agreed to organize a general society to be called the American Chemical Society, of which the organizations they represented were to become local sections. This action was largely the result of the willingness of the New York society, which has borne the title of American Chemical Society since 1876, to resolve itself into a local section, and to yield its general name to a national organization.

Appropriate resolutions covering the points of agreement were passed by the delegates assembled, who now report back to their respective societies, and on the ratification of their action a final meeting will be held, at which the American Chemical Society, with local sections in New York, Brooklyn, Philadelphia, San Francisco, New Orleans, and elsewhere, will come into existence. A membership of at least 500 chemists is expected, and then the chemists will have a society that in strength will compare favorably with the other similar organizations in Germany, France, and England.

This result, which has so earnestly been sought for by the chemists of the United States during the past three years, gave great satisfaction to the many assembled representatives of chemical science, and since the Northumberland meeting of scientists to celebrate the discovery of oxygen, in 1874, no such gathering of American chemists has been seen as this in Washington.