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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.

HONOR TO WHOM HONOR IS DUE.

Within the last two weeks announcement has been made of one of the most romantic and interesting achievements connected with the history of exploration since the day of Columbus. The announcement of the discovery of the North Pole was one which fired the imagination of the most torpid and stimulated the enthusiasm not only of scientific men, but the whole civilized world.

The knowledge that this elusive goal, which has baffled the energies of man for so many generations, had at last been reached, naturally led to universal rejoicings and much national pride.

Within a few days the announcement of this discovery was followed by news that another American explorer had reached the same goal.

This natural feeling of exultation was, however, quickly dimmed by the criticisms and accusations which followed the first cable dispatches, which made it patent to all that the claim of one of the explorers was to be disputed by his rival, and that the public was to be treated to a long-drawn-out and tiresome controversy.

It is unfortunate that the daily press, in its eagerness for news items and for "copy," controversial and sensational in character, should have seized upon these exceptional circumstances, with a view of fomenting a bad feeling which was regretted by all, and that, in many cases, it should have taken sides, not with the view so much of reaching the truth as to become partisans in a controversy, with a view of stimulating circulation and private gain. This deplorable attitude is not confined to this country, as the same journalistic policy is noticeable in the foreign press. This is a mere condition of the times.

The truth in regard to both these explorations must and will be known. Honor must be given where it belongs.

It is a somewhat unusual precedent to doubt the statements of discoverers, especially when they had been connected with any particular line of exploration for a period of many years. It is most fortunate, however, that the two parties to the controversy should both be Americans, and that there is no danger of the dispute assuming an international aspect.

Those who are in a position to judge of these matters—the scientific men who have interviewed the explorers—are many of them of the opinion, at the time we are going to press, that the description of the exploration of Commander Peary tends to confirm the conditions as described by Dr. Cook.

Of all fields of human endeavor, there is none to which the world has been ready to accord greater respect than that of geographical research; and, because of the multiplied dangers and hardships of Arctic travel, the men who have pushed out farthest in the quest of the North Pole have been especially favored with national attention and municipal honors.

With a unanimity out of all proportion to the results to be obtained, it has come to be recognized that the most valued prize of the few that remained to be won by the explorer was reserved for him who should first set his foot upon that point which forms the northern extremity of the earth's axis. With the slow passage of the centuries, each bearing away its roll of men who have sacrificed their lives in the effort to solve the secrets that lie within the Arctic Circle, the quest for the North Pole had come to take on, moreover, a certain color of romance, which detracted nothing from its dignity as a serious scientific prob-

lem; and the record of unwearied patience, heroic courage, and sublime self-sacrifice which has marked these centuries of polar exploration, has served to place both the men and their mission upon a very high plane of human regard.

Therefore, we look upon it as most regrettable that the almost simultaneous announcement by two American explorers that they had reached the North Pole should have set on foot an undignified controversy of world-wide notoriety. For here we have no mere difference of opinion between two private individuals. One of the disputants, at least, by virtue of the fact of his bearing a high commission in his country's service, and each of them as having but recently planted the flag of his country at the very peak of the world, must necessarily speak and act as a distinguished representative, for the time being, of his native land. Whatever of disappointment, or of fancied or actual wrong, may have been felt by the sender of that accusing dispatch from Labrador, consideration of the dignity of the navy and the nation should have sealed his lips.

REPORT OF THE CHIEF OF ORDNANCE.

For the average civilian, the most interesting section of the last report of the Chief of Ordnance of the United States army will be that which deals with the new 14-inch gun, which for the future will constitute the principal weapon in our scheme of coast defense. Of the five guns of this type provided for by Congress, four are to be built of concentric cylinders assembled by shrinkage in accordance with the system heretofore in use, and the fifth is to be of the wire-wound type. The manufacture of two built-up and one wire-wound gun is well under way, and the construction of the other two built-up guns will be undertaken as soon as the forgings can be procured.

The motive for the design of the 14-inch gun was the desire to produce a weapon that would not be subject to the destructive erosion of the bore that characterizes the present 12-inch guns of high velocity, which is so severe that the 12-inch piece, with a muzzle velocity of about 2,500 feet per second, is so badly worn away in the rifling after firing less than 100 rounds that the projectile fails to bite on the rifling and leaves the muzzle of the gun with an inefficient speed of rotation. As a consequence the axis of the projectile fails to remain true to the line of flight, or trajectory, and the projectile itself begins to turn end over end and fails to strike the target head on. The rapid wear of the interior of the bore is supposed to be due to the extremely high temperature which accompanies the high powder pressures that are necessary to give high velocity. Since the striking energy of a projectile is equal to the product of its weight and the square of its velocity, it is possible, by increasing the weight of the projectile, to decrease the velocity without a loss of striking energy. This is what has been done in the case of the 14-inch gun, which, as compared with the 12-inch gun, firing a 1,000-pound shell at 2,500 feet per second, will fire a 1,600-pound shell at about 2,100 feet per second and with a much lower powder pressure and temperature. The decrease in the erosion is expected to give the 14-inch gun more than double the accuracy life of the 12-inch gun.

The report tells us that in the design of the 14-inch gun the question has arisen as to which of the two methods of construction gives the longer life to the gun, the use of a relatively large or of a relatively small powder chamber and propelling charge. Under the former set of conditions the maximum pressure corresponding to the prescribed muzzle velocity will be appreciably less than under the latter conditions, but the powder charge will be correspondingly greater; and experience has indicated that erosion is affected not only by the maximum pressure of the powder gases but also by the weight of the propelling charge in guns of the same caliber. To determine which method to follow, tests have been made of two 2.5-inch guns, whose ballistic data are exactly similar to those proposed for the 14-inch guns, in accordance with the two systems above described. These firings will be continued until it has been definitely ascertained under which of the two sets of conditions the accuracy life of the gun is the longer.

A new 6-inch, wire-wrapped rifle, with ballistics identical with the 6-inch rifle of the model of 1897, is to be built, in which the use of a superior quality of steel in the tube and the substitution of a wire envelope for the steel jacket will not only greatly increase the elastic strength of the gun but will reduce the weight about 25 per cent and will somewhat reduce the cost. A new design for a 12-inch wire-wrapped mortar, of the same power but weighing 30 per cent less than the 12-inch mortars now in our fortifications, has recently been completed. The question of erosion is the most serious one confronting the Board of Ordnance. Extensive tests with the 0.30-caliber rifle have shown very clearly that the erosion is three or four times as rapid with a propelling charge of nitroglycerin powder as with one of nitrocellulose powder; and that the temperature has a great deal to do with

the erosion is suggested by the fact that, while the temperature of combustion of nitroglycerin powder is about 3,200 deg. C., that of nitrocellulose powder is only about 2,500 deg. C. It is the opinion of the Board that, if it were practicable to so modify the composition of our smokeless powders as to reduce the temperature of combustion, erosion would become a much less serious factor. Here is a problem for the chemist, the solution of which would win for him one of the richest prizes in all the history of military and naval inventions.

Experiments have been carried on with the object of extending the accuracy life of cannon by the use of a rotating band on the projectiles, considerably wider than that now employed. We gather from the report that the ordnance experts expect that the wider band will merely insure better rotation of the projectile when the rifling is worn, but that they do not anticipate that it will prevent erosion.

The SCIENTIFIC AMERICAN has for many years been of the opinion that erosion is largely due to the abrading effect of the rush of gases at high velocity past the projectile, and that if this were prevented by a more perfect obturation, or closing up of all interstices between the shell and the gun, the erosion would be greatly, if not altogether, eliminated. Although the report makes no mention of the fact, we understand that experiments with a new form of rifling band acting in conjunction with a packing material at the base of the shell, have shown most encouraging results, regarding which we hope to give further information at a later date.

THE COMPOSITION OF THE UPPER ATMOSPHERE.

The composition of the air at great altitudes has long attracted the interest of meteorologists. In the earliest ascensions of unmanned registering balloons, twelve or fourteen years ago, attempts were made to secure specimens of air from the upper strata of the atmosphere. In one case half a gallon of air was thus collected. Its analysis showed a composition identical with that of air near the earth's surface. The system of monthly ascensions which was subsequently instituted revealed the remarkable phenomenon of the "permanent inversion layer." The diminution of temperature with increase of elevation, which was observed at all lower levels, was found to cease at a height of about 10,000 meters (33,000 feet), above which level the temperature was found to rise, slightly but regularly, with increase of elevation. This upper warm stratum has been found everywhere, in the tropical and temperate zones, near the Arctic circle, and over the Atlantic Ocean.

The discovery of this singular reversal of the temperature gradient suggested a possible difference in the composition of the atmosphere at high and low levels. The French meteorologist Teisserenc de Bort, although he did not share this opinion, undertook an experimental investigation of the subject. He suspended from a sounding balloon a glass tube closed at both ends and with one end drawn out to a fine point, which was sealed in a flame after the tube had been completely emptied of air. At a certain height an electrically driven hammer broke off the fine end of the tube and admitted air. The tube was then sealed again by the heating of a platinum wire by current from a small storage battery. The electrical contacts required to effect these operations were made either by the barometer at a prescribed elevation or by the clockwork of the meteorograph. The glass tube was suspended at a distance below the balloon which prevented the entrance of a trace of escaping hydrogen.

In this way specimens of air were collected at various heights in July, 1907. Another series of experiments was made on the Atlantic Ocean, from the "Otaria," but the salt contained in the sea air made the electrical contacts unreliable.

The specimens collected were too small for ordinary chemical analysis, but they were tested, by special methods, for argon, neon, and helium. Argon and neon were found at all heights, from 26,000 to 46,000 feet. The characteristic yellow line of helium appeared in the spectrum of most of the specimens, but no trace of helium was found at the highest level (46,000 feet).

For the year 1911 there is being organized in Italy, under the patronage of King Victor Emmanuel, a celebration in honor of Amadeo Avogadro, this being the centenary of the publication of his celebrated memoir concerning the molecular state of gases and the well-known law which bears his name as to the change of volume of gases with temperature. His researches laid the foundation for chemical as well as physical theory. A committee has been formed under the direction of the Royal Academy of Sciences of Turin and it is taking measures to publish a memorial volume containing his most important researches. Besides, there is to be erected a monument to Avogadro at Turin, in which city he was born and was professor of sciences. An appeal for funds is made to all who are interested in the movement, the committee being headed by Senator S. Cannizzaro.