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NEW YORK, SATURDAY, MAY 27, 1899.

IS SMOKELESS POWDER RELIABLE?

It will be a great misfortune if the recent bursting of a 10-inch gun at Sandy Hook disturb the confidence of our artillerists in the reliability of smokeless powder just at the time when we are introducing it extensively into our naval and military service. For the idea of abolishing the new powder is not to be entertained for a moment—all Europe is committed to its use, and we are already so far behind in this matter that a retrograde step at this juncture would be disastrous. We have been informed on the very best authority that immediately upon receipt of the tidings of the Sandy Hook disaster, the department canceled all orders for smokeless powder. If this be the case, the responsible authorities must have been in a state bordering upon panic, and the War Department, surely, is the last quarter in which a panic should be possible.

The accident is being made the subject of an exhaustive inquiry whose resulting verdict would carry more weight if the question of smokeless powder had been taken up in earnest half a dozen years earlier than it was, and our ordnance officers had acquired that familiarity with the subject which can only be gained by long and careful study in the laboratory and at the proving ground. It is an open secret that the War Department has been prejudiced, or, shall we say, ultra-conservative, in its attitude toward this supreme military question; and in its investigation of this, the first actual catastrophe due to the new propellant, it should guard against jumping to hasty conclusions, or being influenced by preconceived ideas. Conservatism is an excellent quality in the abstract, and there are certain spheres of activity in which we cannot well have too much of it. But the field of artillery and explosives is certainly not one of these; and it is a question whether it was not the determination of our experts to take no risks and make no mistakes that placed the country in the serious plight as to powder in which it was found at the opening of the Spanish war.

Official conservatism—the determination not to imperil expert reputation by risky but none the less imperative experimental work—is responsible for many of the fatalities at Santiago and in the Philippines. Surely, in our experimental work we could have afforded to burst an occasional gun or wreck a powder factory, if by such work the 20 or 30 per cent increase in our dead and wounded due to telltale brown powder would have been avoided. And that it could have been avoided the official dispatches only too clearly show.

We feel that it is impossible to attach too much importance to the smokeless powder discussion—seeing that it touches so nearly the very foundation of our system of naval and military defenses—and hence, we have thrown open our columns more freely than is our custom to the ventilation of a special technical question. In the current issue of the SUPPLEMENT will be found an article from Mr. McGahie, who has been intimately associated with the production of the form of smokeless powder adopted by the army and navy, on the question of Wave Action in Guns. Some of the data presented will be in the nature of a surprise to anyone who believes that the era of dangerous pressures was ushered in with the advent of smokeless powders and that the era of safety died with the passing of the "brown prismatic." The firing records obtained under the late Capt. Sidney E. Stuart prove that it was possible for practically the same charges of brown powder to show a variation of over 80 per cent in the pressures developed. Thus while 400 pounds in a 12-inch gun gave a normal chamber pressure of 36,000, 406 pounds showed a pressure of 60,000 pounds; while of two charges of 200 pounds in a 10-inch gun, one showed 37,600 pounds in the chamber and the other 59,000 pounds. Mr. Brown, the inventor of the wire gun of that name, is jubilant over the fact that in the 157th round at the test of his first 5-inch gun, a pressure of 82,600 pounds was recorded in the gages—a result which was as damning to the brown powder as it was creditable to the gun.

Evidently occasional irregularity in pressures is not confined to powders of the smokeless kind, and in view of the general excellence and uniformity of the results obtained with our smokeless powder, we cannot but feel that any determination to stop the introduction of an up-to-date propellant into our service is greatly to be deplored. As is shown in the article referred to, the possible causes of abnormal pressure have been investigated and are in a fair way to become definitely known. Here, by the way, is one of the most promising and alluring fields for further investigation of which we know.

THE FORTY-FOOT ENTRANCE TO NEW YORK HARBOR.

It is a cause of genuine gratification that the contract has now been let for dredging the great forty-foot entrance channel to New York Harbor. The position of New York as the leading port in the New World, and the point of arrival and departure of the great trans-Atlantic steamship companies, renders it imperative that its facilities shall not only be equal to the growing demands of shipping, but that they shall anticipate them. It goes without saying that, for a harbor to be entitled to rank as first-class, it must be capable of receiving the largest vessels at any state of the tide, and New York has always seen to it that the entrance channels to its harbor were deepened from time to time to meet the increasing draught of the largest ocean steamers. In 1881, when the maximum draught was 22 feet, the main channel was maintained at 24 feet; in 1891, when the draught had increased to between 25 and 27 feet, the channel was deepened to 30 feet; and last year, when the maximum draft of vessels actually entering the harbor had risen to 32 feet, and other even larger ships were either building or planned, it was decided by Congress to dredge out an entirely new channel, and increase the depth to 40 feet. At first sight this looks like an extravagant depth, especially as it is to be maintained for a clear width of 2,000 feet; but he is a bold man who, in view of the rapidity with which the dimensions of ocean steamships are increasing, will venture to predict that it will prove to be in excess of the requirements of the near future.

The present main ship channel is crooked and somewhat difficult to navigate, containing one sharp turn of about 95.° The new channel, which is to be about 7 miles in length, will commence on a southerly course and at once curve with a broad, easy sweep to a southeasterly course, on which it will run in a direct line to the 40 foot contour, 5 miles outside of Sandy Hook. The present soundings on the line of the channel vary from 32 feet at the inner end to 16½ feet on the outer shoal, and the estimated quantity of sand to be removed is 40,000,000 cubic yards. The contract has been let to Mr. Andrew Onderdonk of this city at a rate of 9 cents per cubic yard. By the terms of the contract he is given a year in which to prepare his plant, and after that he must remove 400,000 cubic yards in each working month of the first year and 1,200,000 cubic yards in each working month of the succeeding years until the task is completed. The work should be finished in about six years.

The scheme also provides for an inside channel, which will extend from the Narrows to beyond the Erie Basin and follow the shoreline on the Brooklyn side. It will be 1,200 feet wide and 40 feet in depth. The dredging of this channel will involve the removal of between 20,000,000 and 30,000,000 cubic yards of material, and the contract price is $2,485,000, thus making the total cost of the improvements $6,085,000.

The outer channel will probably be excavated by powerful sea-going suction dredges, similar to those in use on the Mersey bar off Liverpool, an illustrated description of which appeared in the SCIENTIFIC AMERICAN of August 27, 1898. These vessels can pump up 2,000 cubic yards of sand from a depth of 50 feet in three-quarters of an hour. Their hopper capacity is 3,000 tons. It is likely that the inner channel will be excavated by dredges of this kind assisted by scoop dredges of the standard type.

A QUESTION OF GOVERNMENTAL ECONOMICS.

In these days of increasing paternalism, with a multitude of State and National Experiment Stations around us, we hear much of Economic Entomology, Economic Botany, etc., and rightly so. But there is a phase of the "economic" portion of this work which appears to be in grave danger of escaping from the public view under the weight of printed material now showered from these centers of research. The case of the introduced "Cabbage butterfly," *Pieris rapæ*, an insect now pretty generally distributed throughout the country, although known to science west of the Mississippi but a few years, is in point. An examination of the bibliography of this species of insect pest divulges the fact that there has been much over a hundred papers or tracts published having reference, solely or in great part, to this species; and a cursory examination of these is all that is necessary to prove that, in most of them, there are no new or pertinent facts recorded, and that they contain but a reprint or rehash of former work, usually that so well done under the auspices of the late United States Entomologist, Prof. C. V. Riley, or his able successor, Dr. L. O. Howard. The case of this butterfly is but one of many like cases; that of the Texas "horn-fly" is almost as marked. It would seem that, if this work is to continue to deserve the title "economic," the directors in charge of the Experiment Stations should devise some means whereby the original work of one station would be electrotyped, or even printed at some common headquarters, and from there distributed to all needing it. That each station best knows its individual needs, and is best able to distribute literature to its immediate constituency, there can be no doubt; but that the recompilation and typographic and illustrative reproduction that is now the rule is not based on true economy is equally beyond doubt. The appropriations at hand, and the time of the able corps of students conducting this work, are far too limited to warrant this form of wastefulness, while so many economic problems of the first magnitude remain practically untouched.

HOW OUR ART MANUFACTURES MAY AFFECT OUR EXPORTS.

Art and art industries receive much more encouragement abroad than in the United States. We do not fully realize in this country the commercial value of art as applied to industries. We have, of course, many firms who produce artistic iron and bronze work, silver, glass, and ceramics which compare favorably with almost anything produced in Europe; but there are many things of every-day use which are made in the United States for home consumption and for export which are far from beautiful, and their ugliness is wholly unnecessary, and in time this will have an influence upon the export of these articles. There are many articles which we make which are far better than those made in Europe, but they must be improved in other ways outside of the essentials of technical excellence and cheapness, if they are to hold their own against similar objects made in Europe.

The Hon. Charles DeKay, late Consul-General at Berlin, has devoted great attention to this subject, and has considered it in all its phases. If the manufacturers in the United States realized what efforts are being made in Europe by the foundation of industrial museums—museums and schools for textiles, wood carving, and cabinet making—they would soon perceive that so soon as the manufacturers of Europe obtain the machines with which we make our goods, they will produce these articles as cheaply, if not more cheaply, than we can do, owing to the lower wages which obtain there, and will add to that cheapness the beauty which the training in art of those who have a natural aptitude for it can give the articles. Mr. DeKay is not an alarmist, but his observations and the testimony of the industrial art periodicals of the world should teach us that we cannot be too quick to forestall the loss of such prestige as American manufactures already possess and prepare for a much closer rivalry in such objects in the near future. Those who visit the great exposition at Paris next year will see for themselves that his note of warning is justified.

THE MECHANICAL ENGINEERS AND THE PATENT OFFICE.

At the recent meeting of the American Society of Mechanical Engineers at Washington, a subject of great importance was brought up and discussed; this was the question of the inadequate facilities of the Patent Office, and it resulted in the adoption of resolutions urging Congress to provide more ample facilities for the conduct of the business of the Patent Office.

Resolved, That the association, as a body and through its individual members, urge upon Congress the necessity of relieving the present overcrowded condition of the Patent Office and providing sufficient room, force, and facilities for the prompt and proper execution of its work.

Resolved, That we further urge that the records of the office, which so largely constitute the legal evidence of title of so many of the large manufacturing industries of this country, should be more safely stored, and that ample appropriations be made for providing incombustible receptacles for the records.

Resolved, That we especially urge that the library of the Patent Office, upon which the efficiency and accuracy of the work of the bureau depend, shall have such ample appropriation for its extension in its special field and for keeping it fully abreast of the progress in the mechanical and manufacturing arts of the day.

Resolved, That this association urge the necessity of giving to the Patent Office the use of the entire building in which it is now located, and that the moneys paid into the Patent Office by inventors be applied so far as necessary to the uses of the office.

We are much gratified to see that this most important matter has been made the subject of resolutions by the distinguished and representative body of men that make up this society. Coming from every section of the country and representing practically every branch of the industrial arts, the members are well qualified to advocate the claims of an institution which has been the most potent influence in fostering and building up the great industrial interests of this country. These resolutions come as a timely indorsement of the efforts of Commissioner Duell and his immediate predecessors to secure, not special favors, but common justice and courtesy at the hands of Congress.

The disabilities under which the Patent Office labors