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THE ARMOR PLATE FIASCO.

Once again, after many days of wearisome and profitless debate, the curtain has been rung down in Congress upon that perennial farce known as the armor-plate controversy. Were the issues involved less vital to the highest interests of the nation, this annual discussion would be, to the impartial and unprejudiced onlooker, simply a diverting spectacle—so curiously compounded is it of politics and prejudice, persistent misstatement, and unpardonable ignorance of fundamental and easily ascertained facts.

Unfortunately, the question of the supply of armor for our battleships, with which Congress has trifled so long, is of the most vital importance to a nation which is rapidly enlarging the field of its imperial interests, and assuming responsibilities which call for a vast increase in its naval and military strength. Every American that appreciates the momentous changes in our international policy which both involved and grew out of our war with Spain, realizes that the possession of a powerful and growing navy is now more than ever an absolute necessity. To such people the spectacle of the whole work of building up the navy being held up by the vociferous oratory of a small handful of congressmen is painful and alarming to the last degree—particularly when it is borne in mind that these very gentlemen who refuse to provide the weapons of war will probably be the most eager for blood-letting in any international quarrel that may arise.

Now that the Senate has given way, and the construction of our warships is to proceed, it is well to point out just how much delay has been occasioned by a controversy that has been altogether barren of results. In the first place, until a week ago, when the deadlock was broken, the construction of no less than nine first-class battleships and three armored cruisers was prohibited, and if the obstructionists had gained their point, the embargo would have lasted for yet another year. The first vessels to be affected were the "Alabama," "Illinois," and "Wisconsin," which were authorized in 1896, and, but for interference, would have been completed during the summer of 1899. As it was, an impossible limit of $300 per ton was put upon the price of the armor, the ultimate result of which was that the war Congress of 1898 was confronted with the spectacle of these three ships, ready for launching, but absolutely devoid of armor. Permission was now instantly given for the closing of contracts for armor, no price whatever being stipulated. Armor-plate, however, takes much time to fabricate, and Congress was presented with the first fruits of its folly in the shape of three costly but unfinished ships that could not by any possibility be available, even if the war were protracted beyond all reasonable possibility.

And thereby hangs a tale, the moral of which is so obvious as to warrant a recital, in the vain hope that some recalcitrant obstructionist may profit thereby. When the certainty of a war was upon us, instructions were given to a shipbuilding firm that had one of the unfinished battleships in hand to draw up plans for placing *wooden armor* upon the sides, barbettes and turrets, with a view to filling in the yawning gaps, for which, thanks to Congress, there was no plating available. The guns were to be placed aboard, and our gunners, snugly ensconced behind this painted sham, were to be sent out under the protection, at least, let us hope, of a merciful Providence. If it were not so painful, this incident would be positively funny; and the least we can hope is that the contemplation of that humiliating episode will effectually prevent its recurrence in a future emergency.

The total delay on the three ships under discussion has been eighteen months; on the three vessels of the "Maine" class, twelve months; while the closing of the contracts for the six vessels of the "Georgia" and "California" classes has been delayed for at least a year.

TWO REMARKABLE ACHIEVEMENTS IN CHEMICAL PHYSICS.

Before the London Royal Society two papers were recently read, the one by Sir William Crookes, the other by Sir W. Roberts-Austen, which, apart from the fact that they dealt with achievements of the utmost importance to scientists, illustrate how painstaking is the work of the modern scientific investigator and how delicate are the methods which he employs.

Sir William Crookes described his experiments in the analysis of the compounds of uranium, an exceedingly rare metal, which, Becquerel found, emitted rays that affected a photographic plate, even though an opaque object intervened. This remarkable property is even more pronounced in other metals, notably in radium and polonium, for which reason it was suggested that uranium rays were due to the presence of minute quantities of these more active metals in uranium. It was the object of the experiments made by Sir William Crookes to ascertain whether uranium was in itself capable of emitting light-rays, or whether its strange property was to be attributed to some other body present in the form of an impurity. His investigations proved that uranium is inactive when pure, that polonium, at least, is not the energetic substance, and that the rays are sent forth by an unknown element, not identical with radium, but so closely resembling it, that its detection is a matter of extreme difficulty.

In his analysis, Sir William Crookes used pitchblende (uranium oxide); for he found that it was more highly radiant than any other uranium compound; and should, consequently, contain the body sought in the largest quantity. He endeavored first to ascertain whether the property was most noticeable in any particular salt of uranium. But his experiments showed that all salts were active; that as the salt increased in purity the phenomenon was not so marked, and that extremely pure uranium did not affect a photographic plate. The natural inference was that uranium had not the property, and that the rays were emitted by some impurity in pitchblende. Polonium, Crookes determined, could not be the metal which he was seeking. Radium is more nearly coincident with the energetic substance; but the fine differences which he detected led him to conclude that the radiant property of pitchblende and other uranium compounds is to be attributed to the very slight admixture of an element still undiscovered, which can not yet be critically examined, because it cannot be obtained in quantities large enough for experiment.

The nicety of the method of investigation employed by Crookes, and the importance of the conclusions which he drew from his investigations, can be fully appreciated only by chemists. The significance of the work of Sir W. Roberts-Austen, on the other hand, will be more readily understood. Four years ago, Sir Roberts-Austen stated that if a column of lead be placed upon a column of gold, and the two metals heated below the fusing-point of lead, the gold evaporates, so that even after a period so short as twenty-four hours, traces of gold can be detected in the lower portion of the leaden column. In order to prove that at common temperatures also, the nobler metal gives off vapors which penetrate the baser body, he subjected the superposed metals to the ordinary heat of 65° F. for a period of four years. At the end of that time he found that the gold had diffused itself in the lead, and that the amount of gold thus diffused diminished as the distance between the two columns increased. He has not proven that gold evaporates without the presence of another metal; but he has certainly demonstrated that two metals may mingle without the application of extraordinary heat.

OUR PHENOMENAL EXPORTS.

An exportation of $40,000,000 worth of manufactures in thirty days is a record unparalleled for American manufacturers. That is the record for the month of April, 1900. The details of the April exportations, just completed by the Treasury Bureau of Statistics, show that the exportation of manufactures during that month was by far the greatest of any month in our history, and within a fraction of $40,000,000. This gives assurance that the exports of the fiscal year, which ends with June, will considerably exceed $400,000,000, and be nearly three times as much as a decade ago. This phenomenal increase in exportation of manufactures is especially striking when compared with the progress made by European nations, our rivals in the attempt to supply the world's market with manufactured goods. Great Britain's exports of manufactures show but slight increase since 1890, and an examination of the export record of the principal European countries fails to disclose an instance in which the increase has been as much as 25 per cent, while that of the United States, meanwhile, has been more than 150 per cent.

An examination of the details of our own exportation of manufactures shows that it is in the production, manufacture and exportation of metals that we seem to excel. The history of nations and peoples shows that great groups of people frequently excel in certain industries, and the growth of our exportation, as well as our domestic production of manufactures, seems to point to metals as our most successful line of work, especially at the present time. In 1889, manufactures of metals formed less than 20 per cent of our total exportation of manufactures, and in 1900 will be about 45 per cent of our exports of manufactures. The increase in exportation of metals and manufactures thereof in the decade 1889–1898 was 339 per cent, while the increase in the exportation of all manufactures in that time was but 110 per cent, and the increase in manufactures other than those of metal during that time was but 55 per cent. In this statement of the exportation of manufactures of metals, only those articles composed exclusively of metals are included; those made up in part of metals, such as railway cars, agricultural machinery, etc., being included in the other manufactures. The rapid increase in the exportation of manufactures of metals is shown by the fact that the exports of brass and manufactures thereof in 1889 were but $321,137, and in 1900 will reach $1,700,000; instruments for scientific purposes increased from $1,033,338 to $2,270,803, and in the year about to end will reach nearly $6,000,000; copper and its manufactures, which amounted in 1889 to $2,348,954, will be more than $50,000,000 in 1900; iron and steel increased from $21,156,077 in 1889 to $70,406,885 in 1898, while in the fiscal year 1900 they will exceed $100,000,000.

Another interesting fact developed by the examination of the figures is that the European countries, in which manufactures have been long established, furnish as satisfactory a market for our manufactured goods as do the countries where manufacturing has not yet been largely developed. In reapers and mowers, clocks and watches, sewing machines, bicycles, and the various manufactures of iron and steel, and many other articles of the higher grades of manufacture, the European countries, in which manufacturing plants and machinery and skilled workmen abound, furnish a market for a large share of our exports, thus failing to justify the expressed fear that a development of manufactures in countries where we are now seeking a foothold for our commerce would destroy their value as a permanent market.

In this attempt to show the growth of the exportation of each article in every direction, it has only been practicable to measure the growth by values, as the varying value of the units of quantity designated by a common name would prove confusing and misleading. A statement of the number of watches, clocks, sewing machines, typewriters, electrical instruments, mowers and reapers, carriages, articles of glass and china ware, builders' hardware, and miscellaneous articles of cotton and woolen goods, for instance, in which the value of units ranges from a few dollars to hundreds in a single class, would convey no information for comparative purposes and does not supply any facility for measuring the real growth of the industry or the commerce in it, as does the simple statement of total values by classes. On the other hand, the well-known fact that prices of nearly all classes of manufactured goods have greatly increased by reason of cheapened and improved methods of production renders a mere statement of values somewhat misleading in an attempt to determine the actual increase in the exportation of numbers or quantity of nearly all articles.

As already indicated, the largest growth in our export of manufactures is in that of metals. The largest class of manufactures of metals exported is that of iron and steel. In 1880 the export of manufactures of iron and steel was $14,716,524, and in 1900 will exceed $100,000,000, or more than seven times that of 1880.

In no feature of our export trade has there been a more remarkable growth during the decade than in rails for railways, especially those of steel. The total exportation of iron rails in 1889 was but 7 tons, and in 1898, 2,769 tons, the value rising from $240 in 1889 to $37,150 in 1898. In steel rails, however, the growth was even more remarkable, the number of tons exported in 1889 being 7,398, and in 1898, 229,782, while the value increased from $235,387 in 1889 to $4,613,376 in 1898 and in the fiscal year 1900 is likely to reach $8,000,000. This increase has been especially marked during the past three years, the exports of steel rails in the fiscal year 1896 being $540,797; those of 1897, $2,482,208; those of 1898, $4,613,376; and those 1899, $5,298,125; while the first ten months of the present fiscal year show a gain of about $2,000,000 over the corresponding months of last year. While this rapid increase is due to a generally increased demand, the countries showing the most marked growth in their purchases of steel rails from the United States are Russia, Canada, and Japan.

THE RAILROAD SYSTEMS OF ASIA.

The total length of the railroads in Asia is 30,000 miles, of which two-thirds are represented by British India. The Trans-Siberian alone has 5,800 kilometers. In China the different European and American syndicates have obtained concessions for about 3,000 miles of railroad, and these are for the most part in construction. The Chinese government possesses also about 300 miles of lines whose operation is now being carried out under good conditions, especially for the lines uniting Pekin to the port of Tientsin. Japan has no less than 3,100 miles of railroad, and the French colonies, which now possess but 250 miles, have more than 2,500 miles in construction in Cochin-China, Annam and Tonkin. The Dutch East Indies have a well developed system, Java alone having 1,000 miles. These figures are far surpassed by those for British India, whose system has a total