

THE INFLUENCE OF THE WAR ON INVENTION.

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Very few Americans really believed in the possibility of a European war, until it was a reality, and with the usual American confidence in our ability to extricate ourselves from trouble of our own making, we had failed to guard our supply, and in our manufactures bought materials wherever it appeared most convenient, here or abroad. When the war broke out, we thus found ourselves not only with insufficient shipping facilities to carry our products to the markets of the world, but confronted by a complete stoppage of supply of many necessities of our industrial production. Thus anguish days followed, when lists of <sup>all</sup> imported materials were made up, and of their possible domestic substitutes, and where no domestic substitute was at hand, inventive skill became active to produce the missing material, or develop a substitute, or change the manufacturing process or product, and in this manner, the war is exerting a powerful stimulating effect on invention. The danger has to some extent been relieved, and means devised to get some supplies from the blockaded nations of Europe, but while it was acute, it has been so forcibly impressed upon the industries of America, that a return to the former easy going conditions is improbable.



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and even/after the war the routes of commerce will be open again, we shall never allow ourselves to become so dependent on European supply. This is a development, for which we have to thank the war.

In the reverse, we are threatened with serious losses: the large importation from America to the blockaded nations of Europe: Germany, Austria-Hungary and Russia, have now practically stopped, and if we do not quickly succeed to restore them, we may find at the end of the war, that these materials are not needed any more, and this export trade permanently lost. Germany is one of the foremost industrial nations; it leads the world in agriculture and in chemical industries, and its centralized government makes it specially efficient to direct all inventive ability towards the solution of national problems. A generation ago it imported the sugar it consumed: now it produces more than its demand, and exports. The same may happen with these commodities, in which Germany now depends on importation: textile fibers as cotton, lard, oil, nitrites etc. Agriculture and chemistry, with the ocean and the coal mines as supply, may under the inventive spur of necessity make Germany independent and finally a competitor with us in these commodities, which it now imports from us.



Thus, sometimes to our advantage, sometimes to our disadvantage, the war is exerting a powerful stimulating effect on invention and industrial development.

In other directions however, it is decidedly harmful.

An achievement as the steam turbine, which now drives the transatlantic liner or the super dreadnought, lights our cities and propels their rapid transit and surface railroads by electric power, or as the mazda lamp, which gives from 3 to 6 times as much light for the same cost, as Edison's best carbon filament incandescent lamp, such appears to the layman as an "invention", and he asks who is the inventor? But these are developments, each comprising the combined result of many inventions of numerous inventors, and very commonly the co-operative work of several nations, and herefrom results one of the serious damages, which the present war will do to industrial progress, by raising barriers of hatred between nations, and so interfering with their co-operation. In the development of the steam turbine for instance, America, England and Germany have contributed. The history of the incandescent lamp, culminate<sup>ing</sup> in the present mazda lamp, is the history of inventive co-operation between America and Germany (the latter including Austria-Hungary and Switzerland).

The incandescent lamp was the creation of Edison and his collaborators, and it was a most wonderful invention: it left its inventors hands so perfect, that for 20 years all the inventors of all the nations were unable to make any



radical improvement on it.

The first step beyond it was the Harnst lamp, named after its inventor, the German Professor Harnst, and further developed here in America: for a time it threatened the incandescent lamp, but finally vanished before the still more efficient Mazda lamp. Then came the Osmium lamp - twice as efficient as the former incandescent lamp - the product of the Austrian chemical engineer and nobleman Auer Von Wellsbach - the same man who increased the efficiency of gas lighting manifold by giving the world the gas mantel. Then came the Tantalum lamp - the product of the German Siemens Company, introduced in America and probably still familiar to many.

Then finally, in the Tungsten lamp, and its most perfect form, the "Mazda lamp" America again took its leading place, and simultaneously - at first independently, then in close co-operation - this lamp was developed by the inventors of both nations, until finally American engineers succeeded to produce from the brittle metal tungsten a wire more than twice as strong as the strongest steel, and so fine, that a dozen of them twisted together are less in thickness than a human hair. No single man, no million dollar corporation could have accomplished this development, for many hundred thousands of dollars had to be spent before there were any financial returns. The problems which had to be solved, are difficult to appreciate by the layman, who only sees the finished product: even such an



apparently simple thing, as the support of the glass filament, is a formidable problem, when considering, that the mazda lamp filament is terribly hot: so hot, that compared with it, the highest temperature of the iron smelting blast furnace, is colder than the arctic winter as compared to the temperature of the blast furnace.

Thus only in America and in Germany, the two countries where the electrical industry has been consolidated in few giant electric companies, is electrical progress now possible, and as the result, wherever you look at great electrical undertakings, whether the subways of London or power transmission in Japan or South America, or the railway system of an Australian capital or power distribution in South Africa or in India, you always find them either "made in America" or "made in Germany".

As international co-operation has contributed to a large extent to the rapid industrial progress, and international relations are seriously interrupted by the war, industrial advance and invention will suffer by it, and therefore, to us as neutral, who have no quarrel with either side, it behooves to be specially careful not to increase the damage by any partisan attitude, but to remain truly neutral not only in acts but also in sentiment, and neither to side with our Anglo-maniacs, who try to make us believe that England's interests are ours, nor with those of our citizens, who wish us to join in the cry of "perfidious Albion".