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Price 10 cents. For sale by all newsdealers.

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SCIENTIFIC AMERICAN, BUILDING EDITION.

(Illustrated articles are marked with an asterisk.)

Table listing contents of the Building Edition, including Boston elevated stations, Government tests of timber, etc., with page numbers.

Subscription, \$2.50 a year. Single copies, 25 cents.

AMERICAN SUPREMACY IN THE IRON TRADE.

It is a significant fact that while it is a recognized feature of our foreign policy that as a nation we should abstain from all interference in European affairs, the course of events is demonstrating that the time is coming, and coming rapidly, when, by virtue of our expanding trade and growing commercial influence, we shall be forced to take a hand in the commercial strife which is, happily, taking the place of the sword in the world's international rivalries.

The Eastern complication is a trade dispute, pure and simple, and whether her motives be disinterested or not, there is much truth in the contention of one leading party to the dispute, that the rapidly expanding trade of the United States should render her deeply interested in the threatening partition of China.

Time was when the vast area and undoubted resources of the unoccupied territory of the United States seemed to justify the statement that we were commercially a self-contained people; that the work of developing the country would give ample employment for all the industrial works which were rapidly springing up throughout the Eastern States. He would have been reckoned a bold prophet who, a generation ago, might have dared to predict that, in the iron trade, for instance, we would, within twenty-five years, not only be capable of supplying our own enormous demand, but would be making successful inroads upon the European trade in its home markets.

During the past decade there has been a gradual increase in the exports of iron and steel from the United States; but the increase for the past year is very remarkable. From 1886 to 1896, the exports of pig iron rose from 7,659 tons to 29,862 tons. During the same period our exports of iron and steel railroad bars rose from 3,969 tons to 27,645 tons. During the year ending June 30, 1897, however, the export of pig iron was 168,890 tons and the export of iron and steel railroad bars was 112,172 tons. The aggregate value of all our exports of iron and steel to Europe during nine months of the year 1897 was \$45,693,000, as against \$34,549,000 during the corresponding period of 1896—an increase of 33 per cent. During the same months there was a decrease in the imports from \$16,361,000 to \$10,032,000.

In estimating the significance of these figures, it is not sufficient to attribute our increasing competition to the depression through which the country has recently passed. While this may have stimulated us to seek a foreign market, we must look to other causes for our successful competition, and these are to be found in improved methods of mining and manufacture and in the unrivaled richness and accessibility of our iron mines, more particularly those of the Lake Superior iron ore region. Nowhere in the world are there such extensive supplies of rich and easily worked ore as are found in this district, and unless similar ore beds are discovered in other countries, we shall possess an advantage which bids fair to fully offset the cost of transportation in competing with European manufacturers.

The Lake Superior ores possess a fourfold advantage: (1) They are extremely rich in iron; (2) they carry a remarkably low percentage of phosphorus; (3) the ore beds are so situated that the cost of mining is low, being reduced in some cases to a theoretical minimum; and (4) the deposits are of vast extent. In regard to the richness of the ore, it is sufficient to say that out of nine grades of ore mined in the Vermilion Range, two show over 67 per cent, three show between 64 and 65 per cent and none less than 60 per cent of iron; in the celebrated Mesabi Range the percentage runs from 59 to 65.5 per cent; in the Marquette Range most of the ore samples over 60 per cent of iron and some of it as high as 67.62 per cent.

Coupled with its richness is the invariably low percentage of phosphorus, which renders it so amenable to the Bessemer process. The proportion rarely runs over 0.1 per cent, and in some cases falls below 0.01 per cent, the average percentage being about 0.06. To these great advantages must be added the fact that the disposition of the ore beds is such that the cost of mining is reduced to a minimum. The ore is taken out by three systems, the first being the regular underground mining. The second is the "milling" system, in which shafts are sunk, drifts are completed, raises are put up to the top of the ore and chutes are put in at the level. The ore body is then drilled and blasted into the chutes. In the third system the mines are worked as open quarries, the ore being dug up by powerful steam shovels and loaded directly onto the cars. In the earlier stages of the open quarry system, the loaded cars are run out of the mine by gravity. The shovels are of great size, weighing in some cases as much as 80 or 90 tons. On the Mesabi Range a 90-ton shovel is at work which is capable of loading 500 tons of ore per hour on the cars at a cost of 15 cents per ton. Even greater records are claimed where the conditions are favorable,

and the cost is said to have been brought down in such cases as low as 10 cents per ton.

As to the extent of the Lake Superior deposits, it is sufficient to give the figures of production. The first mines of this district were opened some forty years ago, and the total output of the most celebrated ranges, with the dates of their opening, are as follows: Marquette opened 1856, output to January 1, 1897, 46,538,187 tons; Menominee, 1880, 22,994,428 tons; Gogebic, 1884, 20,788,787 tons; and the Mesabi, although opened only in 1892, has produced in five years no less than 8,074,583 tons of ore. This mine alone gives indication of containing some 400,000,000 tons of ore, half of which, at least, contains 60 per cent of iron and only 0.06 per cent of phosphorus.

If we were content to rest satisfied with the extraordinary richness and suitability of this princely storehouse, we should be formidable competitors in the world's trade; but when to this is added a ceaseless and successful endeavor to cheapen the cost of mining, transportation and manufacture, it can be seen that our world-wide supremacy is merely a matter of time.

NEW BILLS FOR THE REGULATION OF PRINT AND LABEL REGISTRATION.

Two bills for regulating the registration of prints and labels have been introduced into the House, H. R. 8620, fathered by Mr. John Murray Mitchell, and H. R. 8582, by Mr. Bennett. For a number of years it has been practically impossible to procure any protection for advertising matter, such as labels or prints. Registration was refused under the copyright laws, owing to the fact that advertising matter was not considered as a proper subject for copyright and as not coming within the provisions of the act. There were two reasons why the law failed to afford any protection. The statute of June 18, 1874, provides for recording in the Patent Office "the title of any print or label not a trade-mark." This the Patent Office construed as a bar to the registration of all labels and prints that contain any device used as a trade-mark, or any device capable of sequestration as a trade-mark, until the trade-mark shall have been registered. Coupled with this was the ruling of the Patent Office following the decision of the United States Supreme Court in Higgins v. Kueffel (1891), in which the court held that a label must have value as a literary or artistic composition to a degree that would sustain any other copyrightable matter. The practice of the Patent Office in this regard became so severe that for years it has been practically impossible to prepare a label that would fulfill the exact requirements of the Patent Office. The provision for the registration of labels had become practically a dead letter. In February, 1898, however, the Commissioner decided (ex parte Mahn) that a label may be registered although it contain matter that is or might be construed as proper subject matter for a trade-mark, and he further held that registration should not be refused unless the whole subject matter of the label was in itself a trade-mark and registrable as such. This decision greatly relieved the situation and made it possible at last to obtain protection for labels.

A print, unlike a label, is not applied directly to the goods, but is used generally to describe the goods, as in the case of a pictorial card or advertising device. Until the recent decision of the Commissioner ex parte United States Playing Card Company, the presence of any device of a nature that might be construed to constitute a trade-mark was not registrable, in spite of the fact that it was evident that a print is not affixed to the goods, and until affixed could not be considered a trade-mark. These rulings resulted in hardship to the manufacturer or merchant, as well as to the artist or lithographer, and the refusal to register such subjects because they might contain subject matter that could be considered as a proper subject for a trade-mark was a great injustice.

These pending bills seek to bring order out of chaos by providing that the presence of a trade-mark in a print or label shall not be a bar to registration, and thus give added force to the late decision of the Commissioner by insuring a uniform practice touching the registration of prints and labels in the Patent Office. Modern advertising has come to be regarded as a science, and the talent of our best artists is often invoked to produce results which will arrest the attention of the public and at the same time appeal to the eye and feeling of the beholder. It seems unfair that it has not been possible in the past to protect fully such productions. There is every reason why one or the other of these bills should become a law, and it is to be hoped that the favorable consideration of Congress will be obtained.

Bill No. 8582 contains a provision which is not included in bill No. 8620, and which we think is very important. Under the present practice it is impossible to procure protection for a pack of playing cards without registering with the Librarian each card separately as an engraving, the expense of which is generally so considerable as to prevent applicants from seeking this form of protection. Furthermore, the Librarian often refuses registration on the ground

that some of the cards do not present registrable matter.

Under section 5 of the bill above mentioned, the registration of this class of objects is provided for as follows:

"Section 5. That every pack of playing cards printed and manufactured in the United States shall be entered under the copyright law in the office of the Librarian of Congress, under the same conditions and provisions of law as those relating to books; one of the cards in each pack of playing cards so copyrighted to bear the notice prescribed by section 4962 of the Revised Statutes as amended."

There is every reason why this measure should become a law, for it will clear the air in regard to this class of registration, and will afford protection, not only for new designs for the faces of ordinary playing cards, but will cover such classes of cards as are designed to be used for the purpose of educating children in the use of words, or in history, geography, the languages or familiar quotations.

PTOMAIN POISONING.

Within the last few days a number of persons in New York City have died from ptomaine poisoning, so that public attention is now directed toward the mysterious nature of these poisons, which are not generally well understood. "Ptomaine" is a generic name for alkaloid bodies formed from animal and vegetable tissues during putrefaction and the similar bodies produced by pathogenic bacteria; it comes from Greek words meaning a "corpse that has fallen." Very often, perhaps generally, the degeneration in the food product is not far enough advanced to offend either the taste or the sense of smell; consequently, suspicion is not excited, and a person eats or drinks something which contains enough of the poison to make a great deal of trouble, if the result is not fatal. We often hear, in the summer, for instance, that persons who attended a picnic were stricken with a violent illness, and that the physicians in the neighborhood were kept busy for hours. The fact is developed that only those who ate ice cream were made sick. Sometimes it is reported that some one had poisoned the food maliciously, but it is known that the cause of most, if not all, of these distressing experiences was the presence of ptomaines in the milk out of which the ice cream was made.

It is not an easy task to trace the history of milk back far enough to reveal the precise conditions under which the ptomaines were developed, but it is believed that failure to properly cool the milk immediately after it was taken from the cows is a partial explanation of the evil. Warm weather favors this condition. The ptomaines of ice cream (tyrotoxin) are particularly to be dreaded, as well as the other poisons, such as mytilotoxin, found in mussels.

It is not pleasant to contemplate that the air we breathe, and the water we drink, and a large proportion of our food abounds in bacteria of different kinds. Most of them are, fortunately, harmless, or should be if proper precautions are taken. Milk is far from being the only medium for the transference of this poison to human beings. A great variety of solid foods of animal origin are also likely to develop ptomaines. One frequently hears of poisoning by canned goods, such as potted meats or canned salmon, for instance. In some cases a metallic agent, perhaps the solder, is the cause of the trouble, but in the majority of cases the sickness, especially if it is of an intestinal and painful character, is due to ptomaines. To all appearances, the food may be entirely fit for consumption, and perhaps none of those employed in the canning house may be responsible, but the chances are that unperceived putrefaction has set in and that ptomaines have been produced.

Fresh fish and oysters are not exempt from the tendency to develop ptomaines. Indeed, fish was one of the first sources from which these poisons were obtained by chemists. The earliest feat of this kind was performed with gelatine in 1882. Since this time Brieger and others have found a variety of ptomaines, such as cadaverine, putrescin, peptotoxin, muscarin and mydalaïne.

Several cases which have occurred in New York City have resulted from eating shad roe, and though it is probable that the tragic death of the great musical conductor Anton Seidl was not caused by this poison, as was at first thought, still this delectable delicacy has been tabooed by many people, owing to the fear which they have of being poisoned by it. The symptoms of ptomaine are vomiting, nausea, diarrhoea and retarded respiration, and in advanced stages coma.

There is no known antidote for this poison, though of course emetics and purgatives should be used where the poison is suspected. There are numerous ptomaines in the body, but they are absorbed by the oxygen or expelled by the bowels, liver and lungs. If not, they strike the nerve centers and sickness results. The real cause of many mysterious deaths is ptomaine poisoning, but there are, of course, many cases of it which do not result seriously.

THE NAVIES OF THE WORLD.

The World Almanac for 1898 contains some most usable tables, showing the comparative strength of the various navies of the world, and we are indebted to this publication for the annexed tables. They were prepared by Lieut. W. R. Hamilton, Fifth Artillery, United States Army, and have been corrected from the latest official reports on file at the War Department, December, 1897.

NAVIES OF EUROPE AND THE UNITED STATES.

Table with columns for Class of Vessels and various countries (Great Britain, France, Germany, Italy, Austria-Hungary, Russia, Spain, Denmark, Netherlands, Turkey, Portugal, Sweden and Norway, United States). Rows include Battleships, Guns of Same, Sea-Going Coast Defence, Non-Sea-Going Coast Defence, Armored Cruisers, Unprotected Cruisers, Gunboats, Torpedo Boats, Hulks and Stationary Vessels, etc.

* This column is inserted for purposes of comparison. † Includes marine corps. H. G. Heavy guns or primary batter. S. B. Secondary batteries or light guns.

In the table given above, the enumeration of vessels of the United States Navy includes those built and building.

NAVIES OF MEXICO, SOUTH AMERICA AND ASIA.

Table with columns for Class of Vessel and various countries (Japan, China, Siam, Korea, Argentine Republic, Brazil, Chile, Ecuador, Peru, Uruguay, Paraguay, Mexico). Rows include Battleships, Coast defence vessels, Armored cruisers, Unarmored cruisers, Gunboats, Torpedo boats, Subsidized vessels, etc.

H. G. Heavy guns, S. B. Secondary battery.

JUBILEE ANNIVERSARY OF THE AMERICAN SCIENCE ASSOCIATION.

BY HORACE C. HOVEY.

Fifty years ago the American Association for the Advancement of Science was organized for the purpose of promoting intercourse between scientific men throughout the continent, encouraging systematic scientific research and increasing the facilities for more thorough investigation and enlarging the usefulness of scientific labors. These ends have been sought by periodical and migratory meetings, by publications, by wide correspondence, and perhaps, most happily of all means, by encouraging genial and familiar intercourse between scientists.

The completion of the first half century of this noble work will be celebrated in an appropriate manner in the city of Boston, August 22-27, 1898, and the preliminary announcements for the jubilee are already made. The meeting will be held in response to the invitation of the Governor of Massachusetts, the Mayor of Boston, and the numerous scientific and educational institutions that cluster about that center of intellectual life and activity. This cordial invitation was accepted at the Detroit meeting of the Association. The Boston Local Committee, now organized, includes a most distinguished list of names, among which we note those of his Excellency Governor Wolcott, as the Honorary President; twenty-five presidents of universities, colleges and other institutions, together with others of distinction, as Honorary Vice-Presidents; one hundred and twenty-nine Members at Large; Dr. Thomas Dwight, Prof. Alpheus Hyatt and Prof. E. C. Pickering, as Honorary Secretaries, and Col. H. L. Higginson as Honorary Treasurer. The latter gentleman is also the Chairman of a strong Committee on Finance. The Chairman of the Reception Committee is Dr. J. R. Chadwick, that of the Committee on Invitations is Dr. Henry P. Bowditch, that of the Committee on Excursions is Gen. F. H. Appleton and that of the Executive Committee is Prof. W. T. Sedgewick. The Local Secretary, to whom all correspondence should be addressed, is Prof. H. W. Tyler, of the Massachusetts Institute of Technology, Boston, Mass.

Geology, Chemistry, Botany, Forestry, Entomology, Mathematics, Engineering, etc. All general and sectional meetings will be held in the halls and rooms of the Institute of Technology and of the Boston Society of Natural History. One day will be spent as the guests of Harvard University, one day in the historic city of Salem, and excursions are planned for the White Mountains, Cape Cod, and other regions of interest.

Members who have allowed their membership to lapse are requested to renew their connection with the Association. A thousand new members are called for, and every scientific man in America is appealed to in order to make this Fiftieth Anniversary of a great Association a marked event in the intellectual history of our continent. Anniversary cards will be sent, previous to the meeting, to all entitled to them, and a list of members in good standing will be printed for the opening day. Each of the nine Sections will prepare a programme in advance, and notice of papers offered should be sent at an early date to the proper secretary. A special invitation is given to all surviving Founders of the Association, that is, of those who shared in the meeting of 1848. The names and addresses of such should be sent at once to Prof. F. W. Putnam, Harvard University, Cambridge, Mass., so that they may enjoy the recognition to which they are entitled.

FLOORS FOR MAGAZINES.—Cement floors in powder magazines are dangerous, because cracks and cavities may form in them, constituting receptacles for inflammable matter, besides which cement nearly always contains silicious particles which may cause ignition by shock or merely by rubbing. Such floors have been forbidden in France since 1881 and in Belgium since 1894, the mine regulations requiring that powder magazines be floored with asphalt or planks. A circular from the Belgian minister of industry calls the attention of mine inspectors to the necessity, when authorizing a powder magazine, of requiring that the regulations be strictly observed in this respect, and also that timber floors be made of oak planks well jointed, perfectly smooth and free from cracks.