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THE VIENNA EXHIBITION AND ITS RESULTS.

The Vienna Exhibition closed November 1 last, and that wonderful display of industrial products, which had been gathered with so much toil, and at such expense of time and money, from every quarter of the globe, has been broken up, and its exhibits are now scattered as widely as before their collection. The greatest of international exhibitions has become a thing of the past. Its influence, however, remains and will long be felt in every part of the world. Even on our side of the Atlantic, thousands of miles from the strange, busy scene in which we, of all civilized nations, took least part, we feel that, in some respects, we have been benefitted by the most important and most creditable of all Austrian enterprises.

We felt it our duty to warn the public of the risks which were to be met by those who proposed to take into Austria valuable inventions. We considered the defective patent code of that country no safeguard to inventors, and showed that, despite the promises—still unfulfilled—of liberal changes, any really valuable improvement would be likely to be pirated, unless, as could seldom be the case, the exactions of the law were fully complied with. These facts were so well exhibited that but few of our great inventions were seen at Vienna, and the United States section became conspicuous for its small extent; and our own people, visiting the *Ausstellung*, were struck with the barrenness of the American department. We were, however, well represented in quality, if not in quantity; and if we may judge from the official record of awards, the jury was very favorably impressed. The proportion borne by the number of awards of Medals of Progress to the number of Medals of Merit granted, as well as the large proportion of awards made to our small number of exhibitors, are both high, in Group XIII (machinery). The medals are nominally of equal value, but the second class mentioned are given for abstract merit, while the first named were given only where merit was accompanied by evidence of a substantial and meritorious advance, effected since the date of the Paris Exposition, in devices deemed specially meritorious at that time. The United States brought away one third more medals of the first than of the second kind, and is, we believe, the only nation in which the comparison does not give a reverse proportion.

The real results of this enterprise are properly gauged, however, by a broader view than this. The distribution of medals is but an incident of the grand work. Comparatively few of the exhibits taken to Vienna by our people will be brought back to the United States. They have found purchasers from all parts of the world, and go among strangers, civilized and uncivilized, to spread abroad the fame of American mechanics and Yankee inventions. Our sewing machines are distributed from St. Petersburg to Calcutta, and our agricultural implements are found in every grain raising district from Great Britain to China, and our wood and metal working tools are almost as familiar to the Hungarian and the Bohemian as to our own mechanics. In the Chinese and Japanese sections, even, it was noticed very early in the season that nearly every article was marked *verkauft* (sold) and the unique productions of the Orientals thus also become distributed throughout the world. From the farthest east, from north and south and west, the most intelligent and the most enterprising of every nation have met to see what others have accomplished, and to learn whatever may most aid their own advancement.

It is this universal dissemination of the acquired knowledge of every department of industry that constitutes the most important work of an international exhibition. Bringing together, as it does, the products of the labor of every nation, and displaying the natural resources of every country to all who can purchase the one or who can develop or

utilize the other, bringing the nations of every part of the globe into close communion, and presenting to all the best fruits of the labors of each, the most advanced and most thoroughly civilized are stimulated by competition to greater exertions, and to the accomplishment of still nobler results; while those countries which are farthest behind in the great march of human progress are taught what has been done by others, and are awakened and urged to make an earnest effort to overtake those who are now so far in advance of them. All are taught that nations, like individuals, may choose between poverty and competence, if not affluence, and that intelligence, honesty, industry, and frugality invariably bring their reward.

Now that the Austrian Exhibition of 1873 has become one of the great by-gones, we look forward with renewed zeal to the successful inauguration of our own coming Centennial International Exhibition of 1876. The time for preparation is none too ample, and we anticipate with anxious as well as hopeful interest the opening of its

“ * * * * * long laborious smiles

Of palaces; lo! the giant aisles
Rich in model and design,
Harvest tools and husbandry,
Loom and wheel and enginery,
Secrets of the sullen mine,
Steel and gold, and corn and wine,
Fabric rough or fairy fine,
Sunny tokens of the line,
Polar marvels, and a feast
Of wonder out of West and East,
And shapes and hues of part divine
All of beauty, all of use,
That one fair planet can produce,
Brought from under every star,
Blown from over every main,
And mixed, as life is mixed with pain,
The works of peace with works of war.

PATENT OFFICE PRINTING.

A correspondent of the *New York World*, writing to that paper from Washington, gives some items of public printing done by the Congressional Printer, among which is the sum of \$142,793 charged for Patent Office printing. On this the writer complains in the following style:

“I selected the Patent Office from the Interior Department for this reason: the work done for that institution is not paid for by taxes, but by the people that take out patents. It is the people's money, not the Administration's, and in justice the work should be let out to the lowest bidder after advertisement. In this item 25 per cent, if not more, could be saved. In this connection the Government is running a monthly periodical for \$1 a year, called the *Official Gazette*, a most flagrant abuse of public confidence and rather a small business for a government spending its \$300,000,000 a year to engage in.”

We fail to perceive where the “flagrant abuse of public confidence” would come in, even if it were true that the *Official Gazette* were a monthly periodical run at \$1 a year. Unfortunately it is not true. The price is \$6 a year, and it is published weekly. The publication is, however, carried on at a heavy expense to the government; but as it has been expressly ordered by Congress, the Commissioner of Patents only discharges his simple duty in attending to its publication, and the manner in which the work is produced is highly creditable to him. The *Official Gazette* takes the place of the former annual volumes, known as the Patent Office Reports, on which Congress was accustomed to spend far more than the weekly *Gazette* costs.

The Patent Reports were printed for free distribution by members of Congress, and the same practice is substantially maintained in respect to the *Gazette*. The public demand for it is far from sufficient to pay its support.

Ten thousand copies of the *Gazette* are printed every week, of which three thousand copies go to subscribers, who pay \$6 a year, and seven thousand copies are given away to members of Congress, other departments of the government, courts, libraries, etc. The total cost of the publication is not far from sixty-four thousand dollars a year. The annual loss to the government by the publication, is a little under fifty thousand dollars a year.

Prior to the establishment of the *Official Gazette*, the patent claims were published in the *SCIENTIFIC AMERICAN*, and our publication of them was a matter of great convenience and advantage to the Patent Office. On the basis of the amount now paid out by the government for similar work, our publication of the claims must have saved the Patent Office from twenty to forty thousand dollars a year, during a period of nearly twenty years. But we never received a single centaro from the Patent Office for the service; indeed we could never prevail upon the department to be so liberal as to furnish us with a free copy of the claims for our printers to set up the types. On the contrary, we were compelled to pay the Patent Office from five hundred to a thousand dollars a year to furnish us with the copy. After the issue of our paper, the Patent Office was then accustomed to expend a few cents weekly in purchasing extra copies of the *SCIENTIFIC AMERICAN*, out of which it scissored the printed claims for use in the various examiners' rooms, and in connection with the drawings, and the preparation of the annual reports.

The weekly publication of the claims is desirable as a matter of convenience, to the Patent Office, and to a limited number of persons, consisting mostly of patent agents and attorneys. But the public in general have little use therefor. We believe it would be a much better plan to enlarge the *Gazette* so as to give the specifications and drawings in full of all patents issued. This would form an invaluable work of great importance to the public, and, if issued at, say, \$25 a year, would doubtless be self-supporting, provided the free list were wholly suspended, and the best economy practiced in the printing.

SCIENCE RECORD FOR 1874.

The new volume of this work is now upon the press, and will be ready for delivery about the 20th of January. The forthcoming book is one of unusual interest and value. It embraces a condensed account of the leading discoveries and improvements in the various branches of science, including Chemistry, Metallurgy, Mechanics, Engineering, Electricity, Light, Heat, Sound, Technology, Pisciculture, Botany, Horticulture, Agriculture, Rural and Household Economy, Materia Medica, Therapeutics, Hygiene, Natural History, Zoology, Meteorology, Terrestrial Physics, Geography, Geology, Mineralogy, Astronomy, Biography, etc.

The various departments are illustrated with suitable engravings. In Metallurgy, for example, we have illustrations of Siemens' furnace and a description of his new and successful method of making iron and steel direct from the ore. This is accomplished at a cost of from 20 to 50 per cent less than by the present blast furnaces. The subject is of importance to iron workers. In Mechanics and Engineering, we have accounts of new railway improvements, novel machines, and a great variety of new devices. Technology is full of new information, and there is hardly a worker in any branch of the applied arts, but will here find some new hint, recipe, or suggestion, of more worth to him than many times the cost of the book. In Agriculture, we have accounts of new methods for preparing manures with economy, improvements in treating soils, new and useful plants and vegetables. Among the latter is illustrated a new and early variety of the potato, from which six hundred pounds are raised for every pound of seed planted, a most valuable acquisition for a farmer who maintains gardens. Natural History, Zoology, Pisciculture, all are full of interest. Portraits of prominent scientific men and discoverers are given, among which we notice those of Liebig, Draper, Proctor, Lockyer, Baker. The miscellaneous department will be found especially attractive and useful. Here we have a series of engravings illustrating the various devices employed to assist learners in drawing. Among these is a new reflecting drawing board, which, by means of a simple pane of glass, throws down upon the paper the outline of the picture that is to be copied. Then we have the pentagraph, the perspective rulers, sketching frames, reducing and copying glasses. All are so described as to enable any person of intelligence, to make and use the several instruments. This series of engravings, with the practical instructions given for drawing, will greatly facilitate and encourage all persons, old or young, who wish to acquire the art of drawing. Not only are the various instruments shown, but their manner of use in actual practice is illustrated. *Science Record* for 1874 forms a handsome octavo volume of 600 pages, nicely bound, uniform with previous issues. Price \$2.50. Published by Munn & Co., 37 Park Row, N. Y., and by them sent everywhere on receipt of price. May be ordered through any book or news store.

THE VALUE OF A KERNEL OF CORN.

In considering the curious and interesting chemical nature of corn, we shall use the word as applied to wheat, as well as to maize. The two grains are chemically constituted very much alike, and what may be said of one applies with almost equal truth to the other. Both are made up of starch, dextrin, gum, sugar, gluten, albumen, and phosphates of lime, magnesia, and potassa, with silica and iron. Wheat contains about double the amount of lime and iron, and considerable more phosphoric acid, but less magnesia and soda. The maize seeds are rich in a peculiar oil, which is nourishing and highly conducive to the formation of adipose or fatty matter; hence, the high utility of corn in fattening animals. What a remarkable combination of chemical substances is stored up in a kernel of corn? It may almost be said to be an apothecary's shop in miniature; and the order and arrangement of the mineral elements and vegetable compounds, needed to render the comparison more apt, are not wanting. For some reason, Nature places the most valuable substances in a kernel nearest the air and sunlight, while the little cells of the interior are full of the material used to keep erect and tidy our collars and neck bands—starch. With a moistened cloth, we can rub off from the kernel about three and a half per cent of woody or strawy material, of not much nutritive value; and then we come to a coating which holds nearly all the iron, potash, soda, lime, phosphoric acid and the rich nitrogenous ingredients. This wrapper is the storehouse upon whose shelves are deposited the mineral and vegetable wealth of the berry. Whence come these chemical agents? By what superlative cunning are they grouped within the embrace of this covering? They come of course from the soil; and by the mysterious and silent power of vital force, they have been raised, atom by atom, from their low estate, and fitted to perform the high offices of nutrition in the animal organisms. And should we not appropriate them to our use as the most carefully adjusted of all materials designed for human aliment? Certainly we should; but do we? Unfortunately we cannot render an affirmative answer. The sharp teeth of our burr mills drive ruthlessly through the rich wrappers of the kernel, and then torn fragments pass to the bolt, and from that to the barn or stable; the animals obtain the nutritious gluten, and the starch, in the form of fine flour, is set aside for family use. But it is not designed to enlarge upon this point. Let us look at the chemical offices the substances found in the kernel of corn subserve in the animal economy.

Starch is the wood or coal which, under the influence of oxygen, is to be consumed or burned to maintain animal warmth. It passes in as pure fuel, it is oxidized, and the ashes rejected through the respiratory organs. The warmth imparted by this combustion is necessary to the proper ful-