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PUBLISHERS' CARD.

The present volume of the SCIENTIFIC AMERICAN is drawing rapidly to a close. Three numbers (including the present) and the year will be ended. Some eighteen thousand of our subscribers will find, printed on their wrappers covering this week's papers, the announcement that their subscriptions are about to expire, and the request that they will remit for the new volume. To prevent any break in the continuity of their subscriptions, and to enable the publishers to know how large an edition to print at the commencement of the year, subscribers are invited to remit for a renewal as early as possible. Simultaneously with the mailing of this week's paper, an envelope, containing Prospectus for 1876, a beautiful chromo Name List, a Catalogue of our Publications, and an Illustrated Hand Book, useful for inventors and others, will be mailed to all our subscribers; and we hope to receive all the lists back again filled with the names of those who wish in the future to take our paper.

To save our friends all the trouble possible, we also inclose an envelope with our address printed thereon, so that all the subscriber and getter-up of a club has to do, is to place his name or list of subscribers in the envelope, with the postal order, draft, or money, put a 3 cent stamp on the former, and drop it into his post office.

The terms of subscription remain as heretofore—\$3.20 per annum, postage prepaid by us, for single subscribers, with discount for a number. See terms for clubs in special prospectus. All news dealers throughout the country will, as usual, receive subscriptions and have our publications on sale.

THE GREAT INTERNATIONAL EXPOSITION.

The coming Centennial Anniversary of our existence as a nation, celebrated as it will be by the grandest display hitherto seen of the world's natural and industrial products, will have something more than a political interest and significance.

The century just closing has been a century unique and unrivaled for its contributions to the mental and material advancement of humanity: a century in which the Sciences, pure and applied, have passed from the stage of weakness, uncertainty, and general neglect to the very forefront of human progress, creating in their passage an entirely new

type of civilization and adding more to human power and comfort than all the agencies that had previously been brought to bear on them. As never before, man is master of Nature's materials and forces, and mainly through the achievements of the past hundred years.

What the coming century has in store for us, what advances man is destined to make in knowledge and power, it is impossible to forecast; it is nevertheless easy to see that what has been done and gained is little more than the prelude to the more magnificent achievements the future will have to record. It is therefore a peculiarly appropriate time, as we celebrate the first centennial year of our history, to review not merely what we have accomplished during our years of national infancy, but to compare our present standing in material wealth and progress with that of the other leading countries of the world.

To those who can spend the summer at Philadelphia—and nothing less will suffice to enable one to master the wealth of instructive matter to be gathered in the extensive halls of the Exhibition—the opportunity there afforded to become directly familiar with the present state of the world's industrial advancement will be incomparably superior to anything ever offered before on this continent, or likely soon to be presented elsewhere. But of the hundreds of thousands who will throng the Exhibition Buildings, not many will be able to spend more than a few days at most in them—scarcely time for the mastery of a single department. For the multitude to reap the full benefit of its display of the world's resources, the Exhibition must be brought, so to speak, to their own doors.

The more enterprising newspapers will report, and the illustrated papers will picture the daily occurrences of the Exhibition, its current incidents and gossip, its pomp and show, its hourly doings, and its features of temporary interest. But its substantial results—those matters which the engineer, the inventor, the manufacturer, the artisan, the man of practical science, the merchant, and the man of general scientific taste and culture will care most to know about—will lie without the sphere of the popular press. Yet it will be to the large and rapidly increasing portions of the reading public represented by such men that the Exhibition will appeal most directly and powerfully; they will have the largest stake in its collections, and will be able to derive the most immediate advantage from the varied instruction the Exhibition is intended to furnish.

It is the purpose of the publishers of the SCIENTIFIC AMERICAN to provide for the Centennial wants of this large and intelligent class, and to do for the substantial features of the Exhibition what the popular press will do for the incidental and trivial.

While the regular edition of the SCIENTIFIC AMERICAN will convey to our readers, every week, an extensive and most interesting general view of the Exposition, our ordinary space will be inadequate for a large remainder of scientific information, deserving of record. We have concluded to meet the emergency by issuing a SCIENTIFIC AMERICAN SUPPLEMENT, to begin with the first of January next. It will consist of sixteen large quarto pages, issued weekly, richly illustrated and printed in the best style, uniform with the SCIENTIFIC AMERICAN, but in effect a separate and independent publication. The terms of single subscriptions to the SCIENTIFIC AMERICAN SUPPLEMENT will be \$5.00 a year by mail. The two papers, the SCIENTIFIC AMERICAN and the SUPPLEMENT, will be furnished together for \$7.00 a year, postage paid by us.

It must not be inferred from this announcement that the SCIENTIFIC AMERICAN SUPPLEMENT will infringe in any respect upon the field now occupied by the SCIENTIFIC AMERICAN. It will be strictly what its name implies, presenting, so to speak, the overflow of valuable matter which heretofore we have been unable to utilize for lack of space. We shall endeavor not merely to hold the SCIENTIFIC AMERICAN up to the standard of excellence it has achieved thus far, but to improve upon the past; and we may properly observe in this connection that the arrangements entered into for increasing the value of our paper for the coming year are fuller and more liberal than ever before.

Primarily the SCIENTIFIC AMERICAN SUPPLEMENT is designed to illustrate and describe the many interesting subjects and objects presented in the various departments of the Exhibition with great fullness and detail, with such an abundance of engravings and working drawings as will place the natural and industrial riches of the Exhibition clearly and vividly before its readers: not, however, as a dry catalogue of the best things the genius of man has accomplished, but with a liveliness of description that will interest more than those directly and specially connected with industrial affairs.

In addition to the special matter pertaining to the International Exposition, the publication will embrace a very wide range of contents covering the most recent and valuable papers by eminent writers, in all parts of the world, in all the principal departments of scientific investigation and useful knowledge. There will thus be, what has never been attempted hitherto by any single publication, a weekly review, full and comprehensive, of the world's best thought and action.

While it will address the great body of intelligent readers interested in the scientific and industrial progress of the world, the SCIENTIFIC AMERICAN SUPPLEMENT will be specially valuable.

TO MANUFACTURERS, as it will not only describe and illustrate in detail the best machines introduced into each and every branch of mechanical production, but, in the department of Technology, will furnish early information of all new and useful inventions and discoveries relating to the chemical and mechanic arts.

TO METAL WORKERS, as the department of chemistry and metallurgy will embrace accounts of all the chief chemical discoveries and improvements in the process of working the various metals, with engravings of new apparatus, descriptions of new alloys, and much other related information.

TO ENGINEERS, since it will furnish the latest and best papers upon steam engineering, railway engineering, mining and civil engineering, millwork, textile industry, etc., with engravings and working drawings, besides full accounts of the latest improvements in telegraphy and telegraph engineering, in electric batteries and engines, and all new and useful applications of electricity in the Arts.

TO ARCHITECTS, as it will furnish examples of the best new structures, with details and drawings of plans, elevations, etc., with a large amount of information relating to the production and improvement of builder's materials, and collateral matters.

TO STUDENTS and SPECIALISTS, inasmuch as, while it will furnish the latest intelligence of inventions, discoveries, and improvements in each department of scientific thought and enterprise, it will aim not only to keep the specialist promptly advised of all that is best worth knowing in his particular department, but will furnish from week to week such a general review of human progress as to enable him to keep the run of the Sciences with the least outlay of time and money.

The advantages which the SCIENTIFIC AMERICAN SUPPLEMENT will offer to advertisers, either for addressing special classes of men or the intelligent public at large, cannot be surpassed. The classes to which it will be addressed will comprise the most active and well-to-do portion of the community: the higher ranks of producers: men of genius and energy: large buyers and extensive consumers of raw and manufactured material. And as each number of the SUPPLEMENT will have a permanent value, its announcements will remain a permanent source of suggestive reminders. The superior value of such persistent advertisements needs no arguments.

We shall issue the first number of the SCIENTIFIC AMERICAN SUPPLEMENT some days in advance of its actual date, in order to meet the large demand for specimen copies. For additional particulars, see prospectus in another column.

THE WATER GAS DELUSION AGAIN.

This old device has been revived, and is now on exhibition in Brooklyn and a few other places. It consists simply of an inverted bell jar plunged in a vessel containing diluted sulphuric acid and zinc. The water is decomposed into its constituents, oxygen and hydrogen. Free hydrogen gas escapes, while the oxygen of the water combines with the zinc to form oxide of zinc, which, in its turn, combines with the sulphuric acid to form a soluble salt. The operation, therefore, results in liberating hydrogen from water, and changing the zinc and free sulphuric acid in the water into a solution of sulphate of zinc.

The value of this process depends, like that of most other inventions, on the expense attending it. If the cost of production is less than that of common gas, or equal to it, or even slightly above it, the water gas may compete with the coal gas, as the convenience of being independent of the gas works is worth something. But if the cost is more than \$27 per thousand cubic feet, while common gas costs \$3, less than one ninth, it is evident that water gas can never hope to meet with popular favor. The calculation of expense is simple enough to any one acquainted with the fundamental principles of chemistry. The chemical equivalent of zinc is 64, that of water 18, and of the constituents of water, oxygen and hydrogen, 16 and 2, respectively. Therefore if we wish to decompose water, by means of zinc, into its constituent elements, it takes 64 lbs. of zinc to decompose 18 lbs. of water, by combining with its 16 lbs. of oxygen and liberating its 2 lbs. of hydrogen. Therefore for every 2 lbs. of hydrogen liberated, we must consume 64 lbs. of zinc, which will be changed into 80 lbs. of oxide of zinc. But the process cannot go on without an acid to dissolve the oxide of zinc; and for this purpose the cheapest and best is sulphuric acid, of which the atomic weight is 80; therefore 80 lbs. of acid will be required, to combine with 80 lbs. of zinc, and the result will be a solution of 160 lbs. of sulphate of zinc. Let us now estimate the expense of producing these 2 lbs. of hydrogen gas. The 64 lbs. of zinc will cost, at 9 cents per lb., \$5.76; 80 lbs. of absolute sulphuric acid is required, and about 150 lbs. of the hydrated commercial acid will be needed at 23 cents per lb., costing \$3 75. Total, \$9.51. For this amount we have 2 lbs. of hydrogen gas; and in order to calculate its value in cubic feet, we consider that one cubic foot of water weighs 64 lbs., that air is 750 times lighter than water, and hydrogen 15 times lighter than air, or $15 \times 750 = 11,250$ times lighter than water. Therefore 11,250 cubic feet of hydrogen will weigh 64 lbs.; and dividing both these numbers by 32, we find that 350 cubic feet of hydrogen will weigh 2 lbs.; and as 2 lbs. cost \$9.51, that sum is the price of 350 cubic feet of hydrogen, while, according to this, 1,000 feet of hydrogen will cost \$27.17.

But this is not all. The hydrogen burns with a pale, almost invisible flame, and must be passed through a carbonizer, consisting of a vessel containing turpentine, gasolin, benzole, or some other volatile hydrocarbon, in order to make it luminous. But we will assume that the cost of this is covered by the value of the sulphate of zinc solution, which might be sold to a chemist, for evaporation and crystallization into dry sulphate of zinc. It is, however, almost worthless, as the large amount of the salt put into the market by the telegraph offices makes the product of little account.