

SCIENTIFIC MUSEUM.

Longmaid's Improvement in Separating Metals from their Ores.

A very interesting paper was read before the London Society of Arts in their last meeting in April last, on Longmaid's Process for Separating Metals from their Ores.

When common salt and minerals containing silver, copper, iron, and sulphur, are mixed together, and exposed to the combined action of heat and atmospheric air, mutual decomposition ensues, with formation of sulphate of soda, and chloride of silver and copper, soluble in the alkaline solution thereof. Mr. Longmaid has further discovered that every description of ore containing silver and copper might be treated with great advantage by various modifications of these processes, and the silver and copper economically obtained. The waste of sulphur annually destroyed in the copper works of Great Britain, at an enormous cost of labor and coal, was stated to be from 60,000 to 70,000 tons annually. From this, the original idea was to manufacture sulphate and carbonate of soda. Taking the metals as incidental products in the original process, objections had arisen to its application to ores rich in copper. These were now obviated; and the period was confidently looked forward to when it would be applicable to copper ores generally. The chief points adduced by Mr. Longmaid are, the complete separation of silver and copper, and also lead, when these metals exist in the ore; and the great economy of the process, whereby the sulphur is rendered available for the manufacture of alkali. His late patent refers to the application of the process to ores rich in copper and silver; ores containing about 25 per cent of sulphur, and from 5 to 10 per cent of copper, are mixed in such proportion that 32 parts of sulphur by weight are added to 100 parts of common salt. The mixture is ground sufficiently fine to pass through a ten-hole sieve, the material is then calcined in a furnace of four or five beds, commencing at that farthest from the fire, and gradually being advanced by stages to a greater heat; the charge is finished at the bed nearest the fire; the calcined mass, which is called sulphate ash, is conveyed to suitable vats, in which the soluble portions are dissolved, and consist of sulphate of soda, and chlorides of silver and copper. In the rude process of smelting copper ores, as at present practiced, the sulphur of the ore is not only wasted, but a considerable degree of fuel and labor is employed to destroy this valuable product. The great objection which has hitherto retarded the introduction of these processes into the copper-smelting works arose from a variety of causes. It could only be used practically on a large scale; the copper-smelters were wedded to a practice by which they had realized such enormous profits, they regarded with distrust schemes which they did not understand, and they had a foolish prejudice against becoming alkali manufacturers; neither could the ordinary copper-works be readily converted into furnaces and apparatus for the patent processes; but the astounding fact that the smelters are destroying property to the extent of 50 per cent. on the value of the ore in their present operations, must sooner or later force these improvements into general use.

Carbonic Acid Gas and the Atmosphere.

Throughout the whole atmosphere there is distributed a small portion of carbonic acid gas. It is derived from springs, volcanoes, the respiration of animals, plants, and we might also say inorganic matter in a state of change, such as limestone when burning, and from all matter in a state of combustion.—When mixed with water, it possesses great solvent powers. It disintegrates the hardest granite rock; pure cold water has no effect in decomposing rocks, but when mixed with carbonic acid it becomes a powerful solvent. This has been demonstrated in a most beautiful manner by our eminent countrymen, Professors Rogers, they found no description of rock that would not yield to water when impregnated with carbonic acid gas. The fact that bodies will not burn in carbonic acid, nitrogen, or hydrogen gas, but will when combined with oxygen, has given rise to a classification, by which bodies that produce com-

bustion are termed supporters of combustion, and those which waste away are considered as combustible—hence atmospheric air is taken to be a supporter of combustion. These terms are very convenient, and, when properly applied, will lead to no error; but it is now ascertained that there is no difference between supporters of combustion and combustible bodies, which mutually operate on each other, and which act reciprocally as combustible bodies, and supporters of combustion, but strictly speaking, oxygen is well denominated "the great supporter of combustion." When we examine the structure of the earth, however, and view the materials of which its sur-

face is composed—whether of rocks that rise in walls or twining veins, we find that the whole has been produced by the combustion of oxygen, and some other bases with which it has combined.

This explains the part which oxygen performs in changing the surface of the globe, and to which is to be attributed the reddish color of soils and rocks. That this process is still going on, is made more manifest from the consideration that nearly all hot springs point to the fact that water and atmospheric air find their way into the interior of the earth, which is indicated by the numerous apertures on its surface.

IMPROVED SIGNAL LIGHTS.

Figure 1.

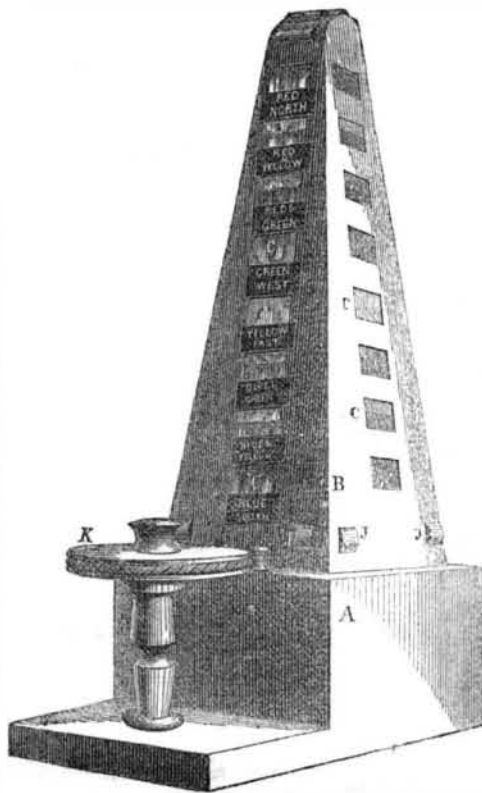


Figure 2.

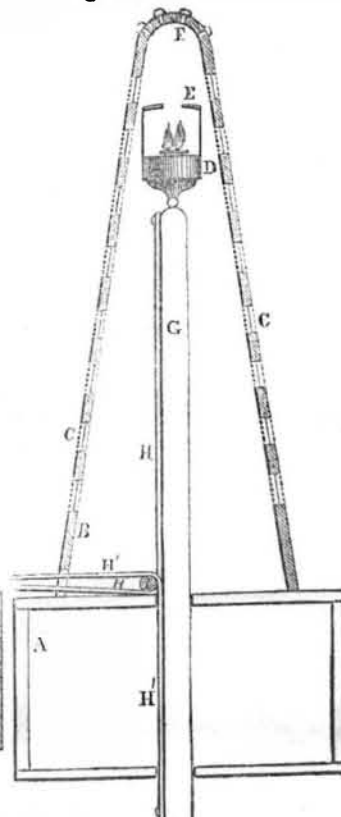


Fig. 1 is a perspective view and fig. 2 a vertical section of an improvement in Signal Lights for vessels at sea, and other purposes, to be used at night and for other purposes. The same letters refer to like parts. The inventor is Thomas H. Dodge, of Nashua, N. H., as noticed by us last week. This is an improvement on his already-patented Marine Signal Light, which was illustrated on page 145, this volume Scientific American.

A is the base of the signal box. The signal box is a hollow pyramid, B, having a number of colored glass windows on every side, extending from the top to the base; C represents the side glass lights; D is a lamp which is made to move up and down on a pedestal in the hollow pyramidal box. The light is exhibited on the whole four sides of the signal box. There is a reflector, E, above the lamp, and one placed on the upper surface of the lamp, so that the light will be thrown full upon the colored glass windows immediately opposite the flame in a horizontal line. Slides above the flame and under it, so as to leave a window open on every side, may be made to move up and down with the lamp on arms, so as to close all the windows except the four opposite the flame. The different colored glass lights are signals to tell which course the vessel is steering. At the top, the signal light is red, which indicates the north course of the vessel. The light below is a mixed one, composed of one half of red plate glass, and the other half plate yellow glass, for a north-west course, and so on for the course of the vessel, whether it is steering north, south, east, or west, the course will always be indicated by the colored light or lights of the signal. The lamp is elevated and lowered by a very simple arrangement. I is a horizontal pulley; on its surface the courses E., W., N., S., &c., may be marked out like a compass. A cord, H H', passes around the groove of this pulley, and one end is secured to the lower part of the sliding pedestal, G, and the other end to the top of this pedestal. When the pulley is moved round in one direction, it will elevate the pedestal and lamp, and when

moved round in the contrary direction, it will lower the lamp. The lamp can thus be elevated and lowered to be brought always opposite the colored glass window which will indicate the course of the vessel. The box has a door to allow the lamp to be taken out and put in as required. J J are lugs to lift off the whole pyramidal box when required. The cord which works the lamp pedestal is guided over a small horizontal barrel, I, and small vertical pillars sustain it in its motion; F is the ventilating top of the signal box.

This signal is very simple, and can be constructed at no great cost. It will not be affected with water nor the motion of the vessel. In cases of distress the signal may be frequently changed, or some other plan upon the same principle adopted. The precise colors indicated above are not to be understood as embracing the whole principle, for colored glass figures may be used in place of plain glass, and other modifications may be adopted.

This apparatus we commend to our railroads for a night signal. It can be erected at a small cost at every station, and by running the lamp up or down in the simple manner illustrated in the engravings; signals of danger or safety can be conveyed to approaching trains. As a night signal for almost every purpose it is the most simple we have seen, and it will at once commend itself. Mr. Dodge has made application for a patent, and more information may be obtained from him by letter.

Gum Arable.

In Morocco, about the middle of November that is, after a rainy season, which begins in July, a gummy juice exudes spontaneously from the trunk and principal branches of the acacia tree. In about fifteen days it thickens in the furrow, down which it runs, either in a vermicular (or worm) shape, or more commonly assuming the form of oval and round tears, about the size of a pigeon's egg, of different colors, as they belong to the white or red gum tree. About the middle of December, the Moors encamp on the borders of the forest, and the harvest lasts six weeks.

The gum is packed in very large sacks of leather, and brought on the backs of bullocks and camels to certain ports, where it is sold to the French and English merchants. Gum is highly nutritious. During the whole time of harvest, of the journey, and of the fair, the Moors of the desert live almost entirely upon it, and experience has proved that six ounces of gum are sufficient for the support of a man during twenty-four hours.

LITERARY NOTICES.

SPORR'S GRAND VIOLIN SCHOOL.—This is a large work, revised from the latest German and English editions, and edited by the distinguished U. C. Hill. This work contains complete instructions, and embraces the best elements of music for the violin. The violin, as a musical instrument, is the most difficult of all instruments to master, if indeed it can be mastered; it is a dwarf in stature but a giant in power, and we like it better than any other instrument when the performance on it is good; on the other hand, it tries the temper to hear mere scrawlers on the cat-gut. It is very necessary that those who wish to learn the violin should commence right; this is the best work extant for that purpose. It is published by Oliver Ditson, Boston, and J. E. Gould & Co., this city.

POETICAL WORKS OF FITZ-GREENE HALLECK: 1 Vol., 12mo.; J. S. Redfield, publisher; Clinton Hall, N. Y.—Mr. Redfield is now furnishing the public with a series of publications of a rare and valuable character, several of which we have already noticed in our columns. The volume before us is made up in faultless style, and adds another testimonial to the well-earned character of the publisher, and we feel assured that the public will seek with interest the poems of Halleck, a name long since celebrated at home and abroad, a distinguished author and cotemporary of Bryant, Cooper, and Irving.

The July number of Graham's Magazine is a perfect gem, and is decidedly creditable to the cultivated genius of its publisher. Aside from its brilliance as an illustrated and well edited serial, we should not omit to mention the letter press, as a superb specimen of the art typographical. The present number commences a new volume. Terms, \$3 per annum. Dewitt & Davenport, agents, N. Y.

MANUAL OF GEOGRAPHICAL NAMES: by A. J. Perkins and G. W. Fitch: published by Geo. Savage, 22 John st., N. Y.—The design of this volume is to furnish teachers and scholars the etymology of the scientific terms used in the study of geography, and to explain their meaning. It is an instructive little book of over 60 pages.

SARTAIN'S MAGAZINE, for July, is a fine number, it embraces a series of pictures illustrating the life of Gen. Jackson, besides others of less merit; it covers 112 pages of well prepared letter press, and is, on the whole, the best number ever issued of this work. Dewitt & Davenport, agents.

The "North American Miscellany and Dollar Magazine," for June, is received from the publishers, Messrs. Angell, Engel & Hewitt, New York. It is a cheap and excellent magazine, and deserves patronage.

BEN BRACE—A Nautical Romance; by Captain Chamier, author of "The Life of a Sailor," etc.: price 50 cts., just issued by Messrs. H. Long & Brother, 43 Annst.

GODEY'S LADY'S BOOK, for July, contains four full page engravings and 112 pages letter press; it is well and ably supplied with contributions from the very best authors, and the publication stands forth unquestioned in point of genuine merit. It is emphatically "The Lady's Book," and is conducted by one who knows their tastes full well. H. Long & Brother, New York, agents.

INVENTORS

Mechanics and Manufacturers

Will find the SCIENTIFIC AMERICAN a journal exactly suited to their wants. It is issued regularly every week in FORM SUITABLE FOR BINDING. Each number contains an Official List of PATENT CLAIMS, notices of New Inventions, Chemical and Mechanical; Reviews, proceedings of Scientific Societies; articles upon Engineering, Mining, Architecture, Internal Improvements, Patents, and Patent Laws; Practical Essays upon all subjects connected with the Arts and Sciences. Each Volume covers 416 pages of clearly printed matter, interspersed with from Four to Six Hundred Engravings, and Specifications of Patents. It is the REPERTORY OF AMERICAN INVENTION, and is widely complimented at home and abroad for the soundness of its views. If success is any criterion of its character, the publishers have the satisfaction of believing it the first among the many Scientific Journals in the world.

Postmasters, being authorized agents for the Scientific American, will very generally attend to forwarding letters covering remittances.

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N. B.—The public are particularly warned against paying money to Travelling Agents, as none are accredited from this office. The only safe way to obtain a paper is to remit to the publishers.