Correspondence.

The Patent Bill now before the Senate.

To the Editor of the Scientific American:

It is said that a portion, at least, of the Senate Committee on Patents will report adversely on the H. R. bill No. 6,018 —which aims to deprive patentees of remedy against "the user of any patented article or device that has been purchased for a valuable consideration in the open market"—but that the measure will, nevertheless, probably pass the Senate under the same pressure which got it through the House. Different opinions seem to be entertained of the working of this measure, should it become a law. To the "Granger" and kindred organizations that have been instrumental in its origination and passage, and whose political influence it is intended to propitiate, it is supposed to seem the embodiment of legislative wisdom. These worthy citizens who are accustomed to exact the last penny for the usufructs of *their* special skill or industry may, possibly, not find the provision as plain sailing as they anticipate. For example, even admitting that the clause codicils all previous legislation which it contravenes, can the law be made to operate retrospectively? Can Congress abridge franchises already granted? See 4,884 Revised Statutes. Will then the contemplated statute—in effect—create two classes of patents, viz., those granted before and those granted after its passage? Will it or not be held conformable to the constitutional clause which says, "Congress shall have power . . . to promote the progress of science and useful arts, by securing for limited times to authors and inventors the EXCLUSIVE RIGHT to their respective writings and discoveries."

For advocates of "the progress of science and useful arts," whether inventors or not, the occasion seems opportune to memorialize Congress, and, if need arise, the Executive, against precipitate action. Fairness and public expediency alike demand that the creators of conveniencies and their representatives be given a hearing in committee.

GEORGE H. KNIGHT.

Cincinnati, O., June 6, 1882.

Clearing the Channel of the Mississippi.

To the Editor of the Scientific American:

I have read in your issue of the 3d, an article signed "Rufus Porter," in relation to clearing the channel of the Mississippi River by means of one thousand miles of endless chains, run by as many windmills in mile sections, which he states would not cost over one million five hundred thousand dollars. Would it not be a far cheaper plan for the government to subsidize the Mississippi River steamers, etc., to drag disk chains after them when going down stream, and in that way keeping the sedimentary deposits constantly agitated, or in a state of semi-solution which following vessels would work over a wider range, and serving the desired purpose in a much better way, and moreover costing nothing for the maintenance of machinery, manual labor, etc.?

It strikes the writer, in his humble opinion, to be the most feasible way, costing little for experiment, with the probability of good results.

S. P. C.

Richmond, Va., June 4, 1882.

Standard Time for the World.

At one of the sessions of the American Society of Civil Engineers in Washington, May 17, a report on standard time was presented by Mr. Sanford Fleming, chairman of a committee appointed to investigate the subject at a meeting of the society in Montreal last year.

In response to the request of the society, at its meeting in January, the committee has submitted to a large number of persons directly interested in the matter, the following scheme for the establishment of a prime meridian, and a uniform standard of time, with a series of questions to which replies were requested. To these questions some hundreds of replies were returned, 97 per cent of the writers approving of the scheme, and 92 per cent favoring a numbering of the hours from 1 to 24 consecutively.

The scheme under discussion proposes:

First—To establish one universal standard time, common to all peoples throughout the world, for the use of railways, telegraphs, and steamboats, for the purposes of trade and commerce, for general scientific observations, and for every ordinary local purpose.

Second—It is proposed that standard time everywhere shall be based on the one unit measure of time denoted by the diurnal revolution of the earth as determined by the mean solar passage at one particular meridian to be selected as a time zero.

Third—The time zero to coincide with the initial or prime meridian to be common to all nations for computing terrestrial longitude.

Fourth—The time zero and prime meridian of the world to be established with the concurrence of civilized nations generally.

Fifth—For the purpose of regulating time everywhere it is proposed that the unit measure, determined as above, shall be divided into 24 equal parts, and that these parts shall be defined by standard time meridians established around the globe, 15° of longitude, or one hour distant from each other.

Sixth—It is proposed that standard time shall be determined and disseminated under governmental authority; that time signal stations be established at important centers for the purpose of disseminating correct time with precision, and that all the railway and local public clocks be controlled electrically from the public time station, or otherwise kept in perfect agreement.

Seventh—The adoption of the system in the United States and Canada would, exclusive of Newfoundland and Alaska, have the effect of reducing the standards of time to four. These four standards, precisely one hour apart, would govern the time of the whole country, each would have the simplest possible relation to the other, and all would have equally simple relations to the other standards of the world.

Finally—It is proposed to have only one series of hours in the day, extending from midnight to midnight, and numbering from 1 to 24 without interruption, to number the hours between midnight and noon (1 to 12) precisely as at present, and to denote the hours between noon and midnight by letters of the alphabet.

The society adopted resolutions requesting Congress to take the initiative step toward establishing a time system on the basis of this scheme, by endeavoring to establish a prime meridian which shall be common to all nations.

The Iron Mountain at Durango, Mexico.

The Iron Mountain at Durango, Mexico, is described by Mr. John Birkbine, of Philadelphia, engineer of the company formed to develop its riches, as a hill one mile long, a third of a mile wide, and from four to six hundred feet in height above the plateau. The surface of the mountain exposing ore so as to be classified as good mining land aggregates over 10,000,000 square feet. There are indications that the deposit extends beneath the level of the plateau. Mr. Birkbine says that he spent considerable time in examining the mountain; and though most of the surface shows ore he does not agree with those who pronounce the mountain a solid mass of ore. He is rather inclined to think that the mountain is formed of one or more immense veins of specular iron ore, standing nearly vertical, the fragments of which have, by the action of the elements for ages, been thrown down to form the slopes of the mountain as a talus; but the extent of this detrital ore is too great to permit of locating any foot or hanging walls.

An analysis of an average of twenty-seven samples of ore from various parts of the mountain showed:

Magnetic oxide of iron	2·071
Ferric oxide	77·571
Manganic oxide	0·113
Titanic acid	0·710
Lime	5·050
Magnesia	0·364
Sulphuric acid	0·212
Phosphoric acid	3·041
Loss on ignition—water, etc	1·984
Silica	7·760
Alumina, etc., undetermined	1·124
	100·000
Metallic iron	55·800
Manganese	0·079
Sulphur	0·085
Phosphorus	1·328
Phosphorus in 100 parts iron	2·379

Selected samples, representing about seven-tenths of the area of the mountain, yielded nearly 63 per cent of iron.

Coal-Breaking with Lime.

Two or three years ago, a Scotch inventor devised a system of compressed-air blasting for use in coal-mines, where the out-flow of gas made the use of powder-blasts hazardous. At a recent meeting of the Iron and Steel Institute a much simpler mode of obviating the use of powder was described by a Mr. Mosley. In this system, the steam generated by the contact of water with caustic lime is the explosive agent. After the cartridge of caustic lime is placed in the shot-hole and tamped, water is forced in by a small force-pump, and the coal is broken by the slow pressure of the steam. The system is said to be rapid in its operation, and entirely safe.

Crystals.

Most of the metals assume, under certain conditions, a crystalline form, and those particularly which are found native occur frequently as crystals. The Latrobe nugget, at present in the Natural History Museum, is a magnificent instance of crystals of gold. It consists of natural golden cubes, welded, as it were, together in one mass. Among the metals, bismuth is remarkable for its tendency to crystallize, and by following the directions given, a crystalline mass of bismuth is readily obtained. Take about a quarter of a pound of the commercial metal and melt it either in a small clean iron ladle or over a Bunsen lamp in a porcelain crucible; when quite melted, set the ladle or crucible on a cold metal surface. Let it remain perfectly still, and watch the bismuth carefully, until it is seen to solidify round the edges, then quickly pour out the metal still remaining liquid, and you have the whole of the interior lined with more or less perfect cubical crystals of bismuth. There is one striking peculiarity about these crystals, however. They are but skeleton crystals; the lines forming the edges of the cubes are there, but there is a depression in each face of the crystal evidently not as yet filled up. The growth of the crystal was arrested by pouring out the still liquid metal, and there we have not only shown us the shape of bismuth crystals, but also the manner in which the crystal grows.

For purposes of comparison, try now to make sulphur crystals. To do this, melt down roll sulphur in the ladle or crucible, using, however, a very gentle heat, and not prolonging it beyond the point at which the whole of the sulphur is melted; allow to cool in the same manner as with bismuth, wait until a crust has formed over the surface, and then immediately bore t
wire, the one for the liquiɑ
to admit air. Pour out the
and cut carefully round the
remove it, and the whole of the
delicate needle-shaped, amber-li
Here, then, are two substances, of w
ance and properties, both possessing in com
of crystallizing, but with each there is a de
Further experiment and observation teach us that the
of a crystal is as characteristic of a body as any other
perty it possesses. In the next paper the writer proposes to give further directions for the preparation of crystals, and hopes to add sketches of crystals as viewed by the microscope.—*W. Jago, in Knowledge.*

General J. G. Barnard.

Brevet Major-General John Gross Barnard, Corps of Engineers, U. S. A., died at Detroit, Mich., May 14. He was born at Sheffield, Mass., May 19, 1815. He was graduated at the Military Academy in 1833. He served as captain in the Mexican war. He was a member of the Tehuantepec Survey Commission, in 1850, assisting in the preparation of the first full report to the government concerning the Isthmus. In 1854 he was in charge of the construction of the fortifications at San Francisco, and in 1855–56 he was superintendent of the Military Academy. From 1856 to 1861 he was in charge of the fortifications of New York Harbor. He was present at the first battle of Bull Run as chief engineer on General McDowell's staff. In the same year, 1861, he was made a brigadier-general of volunteers. General Barnard directed the siege operations of the Army of the Potomac during the Peninsular campaign, and was afterward placed in charge of the defenses of Washington. In 1864–65 he served with General Grant as chief engineer of the armies in the field, and was present at the surrender of General Lee. He was made a brevet colonel in the regular army in 1862, lieutenant-colonel of engineers in 1863, brevet major-general of volunteers in 1864, and brevet major-general in the regular army and colonel of engineers in 1865.

After the war General Barnard served as senior member of the Board of Engineers and as a member of the Lighthouse Board. He was placed on the retired list in January, 1881. General Barnard was a member and original corporator of the National Academy of Sciences, and was an active member of several other scientific societies. He received the degree of A.M. from the University of Alabama in 1838, and the degree of LL.D. from Yale College in 1864. General Barnard was a contributor to many standard publications, and one of the associate editors of "Johnson's Cyclopædia." Among his principal publications are the following: "The Phenomena of the Gyroscope Analytically Examined" (1858), "Notes on Sea Coast Defense" (1861), "Reports of the Engineer and Artillery Operations of the Army of the Potomac" (1863), in conjunction with General W. F. Barry, Chief of Artillery; "Report on the Defenses of Washington" (1871), "Report on the Fabrication of Iron for Defensive Purposes" (1871), made in conjunction with General H. G. Wright and Colonel P. S. Michie; "The North Sea Canal of Holland and Improvement of Navigation from Rotterdam to the Sea," "Problems of Rotary Motion Presented by the Gyroscope, the Precession of the Equinoxes and the Pendulum" (1872).

Atkinson's Process for Zinc Sheathing of Iron Vessels.

The process consists in fitting thin zinc sheets, of about the size of ordinary shell plates, over the bare shell, the attachment being by solder applied first to spots prepared by an electro-dynamo machine on the shell of the vessel, and then over the same spots when the sheathing has been fitted. Holes are perforated in the sheathing a little less than the diameter of, but made to correspond with, the prepared spots on the shell, which are spaced every way about eight or nine inches apart—and the application of solder after the sheathing has been fitted results in the fusion of the outer and inner layers of solder, and, consequently, the zinc sheathing between. The landing edges and laps of the several strakes of zinc plates are soldered throughout, the whole presenting a surface smoother than the most carefully sheathed wooden ship, and not much behind iron vessels with their finishing coat of anti-fouling paint. The strong galvanic action incident to the conjunction of iron and zinc is matter of common knowledge, and although the utilization of this knowledge for the purpose of ship coating is not wholly new, the manner in which it is done by Mr. Atkinson's process removes almost entirely the objections to its adoption from an economic as well as a practical shipbuilder's point of view. The waste of the zinc, while not inconveniently rapid, is constant and effective as throwing off all species of fouling. One of the vessels already fitted with zinc has been docked at intervals, and the state of the sheathed portion of the bottom has been found invariably to be clean and in every respect satisfactory; while it has been observed that a streak of the bare shell above the sheathing, which had been submerged, is always thickly incrustated with barnacles and other species of fouling. The result of the application of the process in the present instance will be regarded with interest.

THE REMOVAL OF SNOW IN ST. PETERSBURG.—The snow is thrown into pits, which are located at convenient points of the city. It is melted in these by steam, and runs off into the river by suitable channels.