

don. The geological structure of the country between Cra-dock and Middleburg is very uniform, showing few traces of upheavals. The rocks are chiefly sandstones of various degrees of fineness, with alternating beds of red or blue marl. Near Hope Town there are immense tracts of sand, and it is here that an active trade in diamonds is carried on. The tract of country between the Orange river and Vaal river, called Albania, is very barren of geological interest, being chiefly a sandy waste with a few low hills, dykes of green stone, trap, etc., and occasionally an outcrop of hard blue schist. The true diamond district was at the Griqua Mission Station. Here was observed the outcrop of a hard conglomerate, sometimes assuming the aspect of a breccia, composed of angular and rounded pebbles and blocks of quartz and jasper of all sizes; overlying this was a highly ferruginous soil containing numerous pebbles of quartz, jasper, and iron ore in which the diamonds had been found. A great deal of unstratified limestone was observed, in which diamonds were said to have been found with limestone adhering to them. Beneath this limestone, when cleaned away, a ferruginous clay makes its appearance, and is searched by the natives for diamonds. The diamonds were everywhere obtained from the ferruginous soil, and the spots which had been searched were always near the river. As many as 500 diamonds were seen in the possession of one person, some weighing as much as fifty carats. There was one fragment of a stone which must have originally been at least as large as the Koh-i-noor. Mr. Smyth considers that the reports of the number of diamonds found have been greatly exaggerated.

Hardening Rails.

Want of room at Demitoff's rail mill, at Salda Nischne, caused, some years ago, a lot of red hot rails to be removed to outside of the building where the ground was covered with snow, when it was found that the iron had been wonderfully hardened by the sudden cooling process it had undergone. A government commission, by careful examination, satisfied itself on this point, and since that time all the Russian mills have adopted the plan of suddenly cooling the rails by means of water. The rails are plunged into cold water immediately on leaving the saws, except at the works of Von Patilow, near St. Petersburg, where rails with heads of mild puddled steel are allowed to cool sufficiently to lose their luminosity before receiving the cold bath. Rails so treated are found to be perfectly reliable in the severe winters of Russia, so that there can be no question of their service in other and less rigorous climates. "The degree of fracture in good hardened rails depends," says a cotemporary, "obviously on the degree of hardness, and this depends not only on the amount of carbon present in steely irons, but on the temperature at which the hardening is effected; and there can scarcely be any tenable ground why rails should not be hardened while many other articles are, in which fracture is equally to be feared. The hardening effected by sudden cooling is indisputably less dangerous than that imparted by phosphorus; and, in case of iron free from impurities, when we compare rails hardened on the one hand by the addition of carbon (approaching steel in composition), and on the other by sudden cooling, the advantage of safety would undoubtedly be in favor of the latter—to say nothing of the expense of manufacture.

EDITORIAL SUMMARY.

THE *Phrenological Journal* gives an account of the case of James T. Anderson, whose body, by a severe injury to the cervical region of the spine, has become entirely useless to him, except for purposes of digestion, while his brain retains its normal force and capability. Unable to move or to act except with his head, and with the increase of activity of the mind that his helpless condition has induced, Mr. Anderson has already become proficient in the art of writing by holding the pen in his mouth, and is even practicing drawing by the same means. The case is a remarkable one, being a proof that injury to the cervix may extend, from its seat, in the direction of the body, without traveling in the other direction, towards the brain. Some of our physiologist readers may be able to explain a fact so much at variance with current belief.

A HUGH ELECTRO-MAGNET.—Wallace & Sons, of Ansonia, Connecticut, have just delivered to the Stevens Institute of Technology a magnet which weighs in all about 1600 pounds. The coils are wound on eight brass spools, each 9½ inches high by 11¼ inches external diameter. About 400 pounds of copper wire, ½ inch thick, are wound on these spools, which are of course split and filled in with vulcanite. The cores are hollow, and six inches in diameter by 3 feet 3 inches in length. The lifting force of this magnet is estimated at between 30 and 50 tons. It will be five times as powerful as the one used by Faraday and Tyndall in their famous researches.

DECORATION OF METALS.—Dr. Puscher recommends a solution composed of a mixture of 3 parts of hyposulphite of soda and 1 of acetate of lead, for the purpose of decorating metallic surfaces. When heated to about 100° C., this solution deposits a layer of sulphide of lead upon any metallic surface in contact with it—the effect of the peculiar color of the metal beneath being to produce a great variety of tint.

THE commencement of a systematic traffic through the Mont Cenis tunnel is announced for September 15th, on which day a formal inauguration of the colossal work will take place.

MR. T. W. WOODWARD, of Winnsborough, South Carolina, writes to us, with a few suggestions as to a method of causing the descent of rain at will. Stimulated by necessity (the district in which he lives suffering from a very severe drought), and having observed that heavy cannonading during war has brought down rain, he suggests that a keg of nitro-glycerin or gunpowder should be exploded, to arrest the moisture which the clouds are carrying away to some more favored region, and to bring it down to the thirsty fields and gardens amidst which he lives. The idea is a good one, and can very easily be tried at a small cost.

GALLEIN, A NEW DYE.—The crystals of gallein are first produced, and these are converted into gallin by means of zinc and dilute sulphuric acid. On subsequently treating the gallin with concentrated sulphuric acid at 200° C., a substance named cörulein is obtained. This dissolved in anilin forms a rich indigo blue, and with alkalis it gives a fine green, while, if mordanted with iron compounds, a fine brown is imparted to the goods. These colors are readily imparted to cloth, and are of considerable permanence, resisting the action of soap.

THE works of the Belcher sugar refinery, of St. Louis, occupy a frontage of upwards of 1,400 feet, covering nearly four squares of the city, the buildings being from six to ten stories in height; and where streets intervene they are connected by tunnels under the street or bridges overhead. To show the rapid and continual growth of the business of this establishment, we may state that the amount of refined sugar sold by Belcher's refining company in 1864 was 7,000,000 pounds, while in 1870 it had increased to 25,500,000 pounds.

It is intended to make a tunnel through the mountains of Nevada, to serve the double purpose of the Pacific Railroad and the Lake Tahoe Water Company. The latter corporation intends conveying the water from Tahoe lake in the mountains, and have agreed with the railroad company for the making of the tunnel, which will be five miles long, through a granite rock. The water company has charge of the execution of the work.

Examples for the Ladies.

Mrs. M. Leary reports her earnings with a Wheeler & Wilson Machine \$700 a year for shop-work, and \$130 more for custom work, besides her family sewing for 6 persons.

NEW BOOKS AND PUBLICATIONS.

THE ROAD MASTER'S ASSISTANT, AND SECTION MASTER'S GUIDE. A Manual of Reference for all having to do with the Permanent Way of American Railroads, and containing the Best Results of Experience, and Minute Directions for Track Laying, Ballasting, and Keeping the Track in Good Repair. By William S. Huntington. Railroad Gazette Series. Chicago: A. N. Kellogg, 110 and 112 Madison Street.

This is a timely and useful little treatise; one which, as a practical guide, leaves little to be desired. It should be carried in the pocket of every Road and Section Master in the country.

PHRENOLOGICAL JOURNAL. Published by Samuel R. Wells, 389 Broadway, New York.

The number of this highly popular magazine for September has a table of unusually interesting contents. Among the most readable is an article entitled "Life in a Head Only;" an autobiographical account of a remarkable case wherein a blow being received upon the back of the neck, all use of the body below the point of injury was lost, yet the mental faculties were retained, the injured person learning to write with a pencil held in the teeth. A fac-simile of this mouth writing is given with the article.

SCRIBNER'S MONTHLY. Published by Scribner & Co., 654 Broadway, New York.

The number for September is remarkable for the beauty of its engravings. Its contents are also rich and varied. "Pictures from Canada," illustrated; "Mercator, the Path Finder of the Seas," with a fine engraving of Mercator; "The Co-Education of the Sexes," are the articles that have most interest for us; but there is variety enough to suit the popular taste, and altogether the number is one of the best that has yet appeared.

ECLECTIC MAGAZINE. Published by E. R. Pelton, 108 Fulton street, New York.

This always entertaining and highly instructive Magazine is out, and presents, as its frontispiece, a splendid portrait of the distinguished scholar, thinker, and author, Max Muller. These portraits are a distinguishing feature of this magazine, and one of great value. We can hardly say too much in praise of its contents. The selections are admirable.

LIPPINCOTT'S MAGAZINE. Published by J. B. Lippincott & Co., 715 and 717 Market street, Philadelphia, Pa.

The September number of this Magazine is more than ordinarily good. The poem by Howard Glynodon is an exquisite piece of word painting, rarely excelled in American literature. "Scrambles among the Alps" is pleasant, and "Shall we Throw Physic to the Dogs," profitable reading. There are many other good things, which we have not space to name.

THE ATLANTIC MONTHLY. Published by J. R. Osgood & Co., Boston.

The number for September will not compare favorably with some of the former recent issues of this periodical. Still, there is enough to repay the reader for its price and the time spent in the perusal of some of its articles. We advise the reader to skip the weak story, "Twin Love," by Bayard Taylor, and the still weaker "Encyclicals of a Traveler," which has little humor and less wit, and scarcely enough of readable description to fill a paragraph of moderate length.

Value of Extended Patents.

Did patentees realize the fact that their inventions are likely to be more productive of profit during the seven years of extension than the first full term for which their patents were granted, we think more would avail themselves of the extension privilege. Patents granted prior to 1861 may be extended for seven years, for the benefit of the inventor, or of his heirs in case of the decease of the former, by due application to the Patent Office, ninety days before the termination of the patent. The extended time inures to the benefit of the inventor, the assignees under the first term having no rights under the extension, except by special agreement. The Government fee for an extension is \$100, and it is necessary that good professional service be obtained to conduct the business before the Patent Office. Full information as to extensions may be had by addressing

MUNN & CO., 37 Park Row.

Whitcomb's Asthma Remedy.—"Nothing so successful."—THEO. METCALF, Apothecary, Boston.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per Line will be charged.

SCIENTIFIC AMERICAN.—Back numbers and volumes for sale at low prices. Theo. Tusch, Scientific Book Agency, 37 Park Row, New York. \$1200 will buy the patent of the best Hames Clip ever invented. For description, address Joseph S. Hays, P. O. Box 2641, Williamsport, Pa.

d'Heureuse's Patent Air Treatment in the quick, cheap, and perfect manufacture of wine, cider, spirits, sugar, oils, etc. Rights for sale. For particulars, apply to R. d'Heureuse, P. O. Box 6,844 New York.

No end to demand for reversible sash illustrated July 22, Mr's Sash, Builders' Hardware, etc., secure your territory now at low rates. Wm. P. Nelson, 618 N. Main street, St. Louis, Mo.

Vinegar—how made—of Cider, Wine, or Sorgo, in 10 hours. F. Sage, Cromwell, Conn.

Copper and Brass Seamless Tubes (from 3-8 to 5 in. outside diameter). Merchant & Co., 507 Market st., Philadelphia.

Die Sinkers, see advertisement on page 156.

Patent English Roofing Felt, ready coat, thick, durable, and cheap. Merchant & Co., 507 Market street, Philadelphia.

See advertisement of Wilkinson's Combination Pocket Tool.

For circular describing the best and cheapest combined Punch, Shears, and Tire-Upsetter, ever invented, just patented, Agents wanted, address R. M. Mansur, Augusta, Maine.

Send to E. & A. Betts, Wilmington, Del., for list of nice Machinists' Tools, on hand, and making.

Wanted—A first class Pattern Maker; also, Boiler Makers. Address Waynesboro' Steam Engine Works, Waynesboro', Franklin Co., Pa.

Capitalists and Manufacturers are requested to examine Goodchild's Clamps. See last week's paper, 1st page. Circulars on application. W. H. Goodchild, 8 Liberty St., N. Y.

To Brass Founders and Steam Fitters. For sale—A valuable Patent Right. Address Isaac W. Brown, Canton, Baltimore, Md.

Cast Steel Castings, made of any size to pattern, may be worked and tempered same as tool steel. Van Zandt Bro's, Agents, 4 Dey street.

Millstone Dressing Diamond Machine—Simple, effective, durable. For description of the above see Scientific American, Nov. 27th, 1869. Also, Glazier's Diamonds. John Dickinson, 64 Nassau st., N. Y.

Power Punching and Shearing Machines.

For car builders, smith shops, rail mills, boiler makers, etc. Greenleaf Machine Works, Indianapolis, Ind.

Peck's Patent Drop Press. Milo Peck & Co., New Haven, Ct

The paper that meets the eye of manufacturers throughout the United States—Boston Bulletin. \$4 00 a year. Advertisements 17c a line.

For best Lubricating Oil, Chard & Howe, 134 Maiden Lane, N.Y.

To Cotton Pressers, Storage Men, and Freighters.—35-horse Engine and Boiler, with two Hydraulic Cotton Presses, each capable of pressing 35 bales an hour. Machinery first class. Price extremely low. Wm. D. Andrews & Bro., 414 Water st. New York.

L. & J. W. Feuchtwaenger, Chemists, 55 Cedar st., New York manufacturers of Silicates of Soda and Potash, and Soluble Glass.

Send your address to Howard & Co., No. 865 Broadway, New York, and by return mail you will receive their Descriptive Price List of Waltham Watches. All prices reduced since February 1st.

Quinn's Patent Ferrule makes good all leaky boiler tubes. Address P. Quinn, South Newmarket, N. H.

Self-testing Steam Gauge.—The accuracy of this gauge can be tested without removing it from its connection with the boiler. Send circular. E. H. Ashcroft, Boston, Mass.

Ashcroft's Low Water Detector. Thousands in use. Price, \$15. Can be applied for less than \$1. Send for Circular. E. H. Ashcroft, Boston, Mass.

Lord's Boiler Powder is only 15 cts. per pound by the bbl., and guaranteed to remove any scale that forms in steam boilers. Our Circular, with terms and references, will satisfy all. Geo. W. Lord, 107 W. Girard ave., Philadelphia, Pa.

Brown's Coalyard Quarry & Contractors' Apparatus for hoisting and conveying material by iron cable. W. D. Andrews & Bro., 414 Water st., N. Y.

Presses, Dies, and Tinnors' Tools. Conor & Mays, late Mays & Bliss, 4 to 8 Water st., opposite Fulton Ferry, Brooklyn, N. Y.

Over 1,000 Tanners, Paper-makers, Contractors, &c., use the Pumps of Heald, Sisco & Co. See advertisement.

For Solid Wrought-iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Mining, Wrecking, Pumping, Drainage, or Irrigating Machinery, for sale or rent. See advertisement, Andrews' Patent, inside page.

Bliss & Williams, successors to Mays & Bliss, 118 to 122 Plymouth st., Brooklyn, manufacture Presses and Dies. Send for Catalogue

Makers of 4 in. light Cast Iron Pipe, address E. Whiteley, 61 Charlestown Street, Boston.

Improved Mode of Graining Wood with Metallic Plates, patent July 5th, 1870, by J. J. Callow, Cleveland, O. Sample plate sent for \$3.

Superior Belting—The best Philadelphia Oak Tanned Leather Belting is manufactured by C. W. Arny, 301 Cherry Street, Philadelphia.

Improved Foot Lathes, Hand Planers, etc. Many a reader of this paper has one of them. Selling in all parts of the country, Canada, Europe, etc. Catalogue free. N. H. Baldwin, Laconia, N. H.

Bailey's Star Hydrant, best and cheapest in the world. All plumbers send for a circular to G. C. Bailey & Co., Pittsburgh, Pa.

Wanted—To invest \$500 to \$5,000 in a good paying Manufacturing or Mercantile Business. Address Box 574, Pittsburgh, Pa.

Wanted—To employ a competent man having a thorough knowledge of all the details connected with building Mowing and Reaping Machines. Address, with reference, Lock Box 35, Wheeling, W. Va.

Fire Arms—We would call attention to the advertisement in another column of our paper under the above heading.

Copper and Brass Seamless Tubes (from 3-8 to 5 in. outside diameter). Merchant & Co., 507 Market st., Philadelphia.

To Ascertain where there will be a demand for new machinery or manufacturers' supplies read Boston Commercial Bulletin's Manufacturing News of the United States. Terms \$4 00 a year.