APPLIED SCIENCE.

REVOLVING FURNACE BARS.—Foreign technological journals find a very considerable improvement in furnace grates in an invention of M. Eloy Schmitz, who replaces the straight fire-bars ordinarily used singly or in pairs, by hollow cylindrical bars, pierced with holes and so arranged as to revolve readily. The new fire-bars rest on supports which are themselves cylindrical and hollow; they are supported lengthwise by a plate fixed beneath the door of the fire-box, and fitting into a neck made at the near end of the bar. With this construction, it is affirmed, the duties of the stoker are rendered much less important and troublesome, and a very material economy of fuel is effected. The following advantageous features are claimed for it: The layer of coal resting on the grate may be doubled in thickness, thus obviating the necessity of frequent charging and the entry of cold air into the fire-box. The interior of these hollow bars being always visible to the stoker, he is able to observe any choking of the air passages as soon as it takes place. It is only necessary for him then to give the bars a fractional turn with the winch, and a clear surface, free from slag and scale, is presented to the fuel. This is accomplished without opening the doors and admitting an excess of cold air. The rotation of the bars has the additional beneficial effect of clearing the obstructed part and throwing down into the ash-pit the ash and other non-combustible impurities, the retention of which retards combustion. The economy of fuel which is claimed for the new construction is of even more importance than the economy of labor.

EXPERIMENTS ON STEEL.—MM. Trève and Durassier have communicated to the French Academy the following results of their investigations into the relation existing between the chemical and physical properties of steel. They prepared fifteen bars of steel, divided into five series of three bars, each series being of a different degree of carburation, and each tempered in a different manner. These bars were then magnetized to saturation, and their magnetic force determined by the method of deflection. The bar containing 0.95 per cent of carbon, and tempered with cold water, caused the maximum of deflection represented by 47. The bar containing the same amount of carbon, but tempered with oil at 10° C. (50° Fahr.) gave 43. That the magnetic capacity of steel is influenced by the nature of the liquid used for tempering, seems therefore to be manifest. The bar containing 0.25 per cent of carbon gave a deflection represented by 13, showing how decided is the influence which it exerts. In preparing diagrams of variations for the different series of bars, the influence of the percentage of carbon and of the tempering liquid became manifest. It was remarked, however, that at the top of the scale in carbon, the nature of the tempering liquid no longer exerted a very marked influence. The study of these diagrams brought to light, likewise, the noteworthy fact that a remarkable similarity existed between the magnetic curves and the curves of elasticity of the bars. The investigators assert from their experimental trials that carbon gives elasticity to the steel, and at the same time enhances its capacity for magnetism.

PURIFICATION OF THE MORE FUSIBLE METALS BY FILTRATION.—Prof. Lampadius of Freiberg concluded, that at a certain low temperature of fusion, the metallic impurities present in the more easily fusible metals would separate, partially as such, and partially as definite, crystalline compounds, and float in the fused mass, from which they could be removed by filtration. Experiments by him in this direction were so far successful that the expected definite compounds were found upon the filter, but the metallic filtrate was still very impure. The filter was made of quartz-sand, slag, &c., which was not wet by the molten metal. Carter, however, according to a communication by him, in trying to adapt this principle to the purification of Bohemian tin, on a commercial scale, sought for material for a filter, which would be wet by the metal to be purified, without being dissolved in it. Iron, with its comparatively high temperature of fusion, and its adhesion for tin, as manifested in the tinning of iron, was employed for the filter. Five hundred strips of tinned iron, as thin as paper, about 0.6 of an inch long, and one-fourth as broad, were packed tightly in a square iron frame, by the aid of wedges, and the frame was then lifted into a suitable opening in the bottom of a graphite crucible. The tin, melted in a second crucible, was allowed to cool until the separation of fine crystals on the surface was noticed, and the thickening metallic mass was then poured into the filtering crucible, when the still fluid, pure metal, passed through, and a pasty magma was left, in which iron, arsenic and copper, concentrated to a great degree, were found combined with tin, while the filtered tin proved to be almost chemically pure. Fifty hundred weight were purified in the crucible described. Other forms, and other materials for filters, are suggested, and other possible applications of the method, as in the separation of silver from lead containing the former metal.

TEMPERATURE DESTRUCTIVE TO VITALITY.—The important biological question as to whether life ever originates except from previous life, seems, in the present state of investigation, to turn upon the far simpler one as to what temperature is destructive of vitality, and since trustworthy observations establish the fact that organisms may develop in sealed flasks, in boiled water, the question again resolves itself into whether there are forms of living matter, germs, seeds, or something, that can withstand a temperature of 200°, and if so, what temperature will, with certainty, destroy the vitality of these. More than a hundred years ago Spallanzani, in opposing a theory of spontaneous generation, recognizing, as in accordance with his own observations, the fact that the lower infusoria may appear in sealed flasks, previously exposed to a temperature of 212°, also noticed that the organisms perished at about 100°, and inferred that the unknown germs of the infusoria might be able to withstand a much higher temperature than the organisms themselves. A long series of careful experiments, bearing upon this hypothesis, showed that eggs, in all cases, can withstand a higher temperature than the animals which produce them; that a similar difference exists between plants and their seeds, and that plants and seeds can withstand a higher temperature than animals and eggs; but that nothing—egg, seed, animal, or plant—can retain its vitality when subjected to a moist heat of 212°. Since the dryness of the seeds seems to be the cause of their greater indifference to heat, and since some eggs resemble seeds in so far that they prove capable of development, even after they have been dried, on being suitably moistened, Spallanzani rested his opposition to spontaneous generation upon the hypothesis that the germs of the lowest types of animals might become dry in a similar manner, and in this condition surpass even seeds in their power to resist heat to the same degree that the latter surpass eggs. This hypothesis, which could not be tested experimentally at that time, has, to say the very least, not been sustained by recent investigations. Thus Prof. Sanderson has shown that the germs of Bacteria, far from withstanding drying, lose their vitality when exposed for three days to the low atmospheric temperature of 104°, while the microscopic organisms are entirely deprived of the power of further development by complete drying; and it has been further shown by Dr. Bastian that all direct experiments in regard to the capability of Bacteria and their germs to resist heat have led to the conclusion that both perish if exposed to a moist heat of 140° for a short time.

LITERARY NOTES.

A new novel by Amanda M. Douglass is promised by Lee & Shepard.

M. Littré is revising the proofs of a new edition of his French Dictionary.

Goeche's new edition of Lessing's works is at last completed, in eight volumes.

A "Glossary of Liturgical Terms," by Dr. F. G. Lee, is to be published in England.

Miss M. Betham Edwards is at work upon a new novel of English domestic life, entitled "A Story of Seven."

Messrs. Macmillan have issued the thirty-first thousand of Green's "Short History of the English People," with corrections and alterations.

The Austrian Government, it is said, has offered Mr. Max Müller a professorship in the University of Vienna, allowing him a free choice of subjects for his lectures.

Mr. Emerson's poem, read before the Ladies' Centennial Tea Party in Boston last Winter, and not hitherto printed, will appear in its revised form in *The Atlantic Monthly* for February.

Prof. Moses Coit Tyler is at work upon his handbook of American Literature, but it will not be ready for publication till the Fall. It will be especially full in its treatment of early American literature.

There will be added to the "Vest Pocket Series," Mr. Longfellow's "Miles Standish," Mr. Tennyson's "Enoch Arden," Mr. Fields's paper on "Nathaniel Hawthorne," Mr. Howells's "A Day's Pleasure," and Mr. Lowell's "Sir Launfall."

A work on "The Battles of the Revolution," by Gen. Carrington, senior colonel of the regular army, will be published soon by A. S. Barnes & Co. It will be of popular and military interest, and will contain plans of all the battles from surveys made by the author.

An International Literary Convention has been established between the German Empire and Belgium. The treaty is reported to be well adapted to insure the reciprocal interests of authors and publishers, and includes a scheme for the public registration of literary works.

Gen. Custer will contribute to *The Galaxy*, beginning in March, some papers on his experience in the war. The first paper will contain a remarkable letter by a high Confederate authority in regard to the closing campaign of the war, and the credit due to Gen. Sherman and Gen. Grant relatively.

The longest and weightiest article in the February *Atlantic* will be that on "The Currency Conflict," by the Hon. James A. Garfield of Ohio, who, it is promised, will argue the "hard money" side with a good deal of wit as well as wisdom. A singular and striking tale, entitled "Mammah'lisa," by Mr. C. A. De Kay of New-York, is promised for the same number. It treats of an invisible but tangible being.

Prof. Mahaffy, says *The Academy*, is still occupied with "Ancient and Modern Greece." His primer on "Life in Old Greece" in Mr. Green's series is in the press, and he has announced a series of lectures next term on his travels in Greece, which will afterward be published with illustrations by Messrs. Macmillan. A larger and more important work on "The Literature of Ancient Greece"—a great want—is announced as in preparation by Messrs. Longman.

The appreciation of Mr. Stedman's "Victorian Poets" by the English press, referred to recently in THE TRIBUNE'S London correspondence, has been almost without exception. Most of the critics speak, however, in ignorance of Mr. Stedman's own poems, the English *furore* over American poets centering in the "new school." *The Saturday Review* suggests that the highest type of criticism "is seldom found apart from considerable powers of original production," and therefore doubts the existence in Mr. Stedman's work of certain qualities for which American critics have found it noteworthy. But, it says, "he is faithful, studious, and discerning; of a sane and reasonable temper, and in the main a judicial one; his judgment is disciplined and exercised, and his decisions, even when one cannot agree with them, are based on intelligible grounds;" and he deserves the thanks of English scholars. *The Graphic* pronounces the book "a valuable one for students of contemporaneous literature," and kindly adds that "its style is singularly good, being, as a rule, agreeably free from Americanisms." A Liverpool authority speaks of it as "a very precious addition to the critical literature of the generation," and adds: "Few English readers are acquainted with even the name of Mr. Stedman, but among these few he is pretty generally recognized as one of the truest and most artistic of the younger poets of America, and the publication of this work will give him a high place among the literary critics of a singularly critical period." The volume has provoked discussion as to the value of cotemporary criticism, and *The Examiner* is "at a loss to understand for what particular class of readers this bulky and handsome volume was designed." It hazards the very "wide solution" that it is "not for the American public, else a Boston and not a London house would bring it out!"—the London book being of American sheets. On the whole, the book has added much to the respect for current American literature.

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FROM SAN FRANCISCO TO AUSTRALIA AND NEW-ZEALAND via HONOLULU, S. I.:
S. S. ——, Monday, Jan. 31.
and every four weeks thereafter.
FROM SAN FRANCISCO TO VICTORIA, PORT TOWNSEND, TACOMA, PORTLAND, &c., &c.,
On the 10th, 20th, and 30th of every month.
For freight or passage, apply at foot of Canal-st., N. R.
R. J. BULLAY, Superintendent.

Dry Goods.

Lord & Taylor

OUR SILK DEPARTMENT

CONTAINS ALL THE CELEBRATED MAKES OF THE BEST LYONS MANUFACTURERS.

We offer 250 pieces CACHIMIRE CYCLOPE, costing imported $2 47, gold, to land, at $2, currency, per yard.

A Giraud & Cie. CASHIMIRE ALEXANDRA and BIG ELEPHANT Autne. Guinet & Cie. Gros Grain Superieur CACHIMIRE LE RHONE, all offering at a reduction of 50c. to $1 a yard FROM FORMER PRICES.

Bonnet & Co. superior quality POULT DE SOIE, reduced from $3 50 to $3; from $3 75 to $3 25; from $4 50 to $3 75.

In PLAIN COLORED SILKS we are offering TAFFETAS at 75c., worth $1, and CASHIMERE RISTORI at $1 50, worth $2. PLAIN GROS GRAINS in seal brown, myrtle green, navy blue, Corbeau, prune, fumee de Londres, tea rose, Eglantine, Gris perle, and all the fashionable shades for street, dinner and evening wear, at $1 25, $1 75, $2, and $2 50, reduced from $1 50, $2, $2 50, and $3.

STRIPED, CHECKED, AND PLAID SILKS, IN ALL COLORS, FROM 50c. TO $1 PER YARD.

Elegant Lyons Brocades, in pink, sky, pearl, ecru, cream and white, 27 inches wide, reduced from $5 to $3 50, and from $4 to $2 75.

LARGE STOCK RADZIMIRES, CLOAKING SILKS AND SATINS, GAZE DE CHAMBERY, AND SILK GRENADINES AT HALF PRICE.

BROADWAY AND TWENTIETH ST.

GREAT SALE
OF
LINENS.

We beg to inform the public that we have purchased the entire stock of linens of the celebrated manufacturer of Messrs. John S. Brown & Sons, of Belfast, who have closed their house in this city.

The stock consists of the finest Damasks, Table Cloths, Napkins, and 4-4 Linens ever imported, which we shall offer at retail on Tuesday, Jan. 11, at lower prices than have been known in this country for many years.

We take great pleasure in having the opportunity to give our customers and the public such advantages, and respectfully invite their attention.

Arnold, Constable & Co.,
BROADWAY AND 19TH-ST.

Lord & Taylor

BROADWAY, COR. TWENTIETH-ST.

We will offer for the BALANCE of the MONTH, commencing

MONDAY, JAN. 10.

Preparatory to our SEMI-ANNUAL STOCK-TAKING, our complete stock of

DOMESTICS
AT GREATLY REDUCED PRICES.

SPRAGUE PRINTS, 12 yards for 75c., and Cochecos 9½c.
LANCASTER CAMBRICS, at 11c., and yard-wide Prints at 12½c.
Yard-wide FRENCH and ENGLISH PRINTS, at 18c., 20c., 22c., and 25c.
Full lines PERCALES and CHEVIOT SHIRTINGS, and English, Scotch, and Domestic Ginghams at POPULAR PRICES.
WAMSUTTA, UTICA, and NEW-YORK MILLS yard-wide Sheetings at 12½ cents, and all the STANDARD BRANDS, at case prices.
8-4, 9-4, and 10-4 SHEETINGS, bleached and unbleached, in all the desirable makes.
PILLOW CASINGS, in all widths and qualities.
WE CALL PARTICULAR ATTENTION TO OUR 8-4 SHEETINGS at 22c. PER YARD.
ENGLISH and AMERICAN CANTON FLANNEL, and American Tickings and Checks.
WE SHALL OFFER FIVE CASES CROCHET QUILTS at $1 50 each.
ALSO,
In complete assortment, Eiderdown Quilts, Marseilles Quilts, Blankets, Comfortables, Bedding of every kind, including Hair, Hair, and Excelsior Mattresses, Pillows, Bolsters, Spring Beds, &c., &c., making the most complete HOUSE-FURNISHING DEPARTMENT IN THE STATES.

R. H. MACY & Co.

EVERY ARTICLE GUARANTEED as REPRESENTED. EXCHANGES MADE WITHIN ONE WEEK after purchasing, or MONEY REFUNDED. GOODS ALL FIRST CLASS. FOREIGN GOODS our own importation. Novelties from Europe every week.
FOURTEENTH-ST. and SIXTH-AVE., NEW-YORK.

Ocean Steamers.

RED STAR LINE.—Appointed to carry the Belgian and United States Mails.
The following steamers are appointed to sail.
FOR ANTWERP.
From Philadelphia. | From New-York.
VADERLAND.....Jan. 15 | STATE OF NEVADA, Jan. 4
NEDERLAND.....Jan. 22 | SWITZERLAND.....Jan. 28
FROM ANTWERP.
For Philadelphia. | For New-York.
NEDERLAND.....Jan. 16 | SWITZERLAND.....Jan. 4
VADERLAND.....Feb. 9 | STATE OF NEVADA Jan. 28
PRICES OF PASSAGE IN CURRENCY.
First cabin.....$80 | Second cabin.....$60
Steerage tickets to and from all points at the lowest rates.
Passenger accommodations for all classes unsurpassed.
For passage, rates of freight and other information, apply to
PETER WRIGHT & SONS, General Agts.,
307 Walnut-st., Phila.
GEO. W. COLTON, 42 Broad-st., N. Y.

STAR BALL LINE.
UNITED STATES AND BRAZIL MAIL STEAMSHIPS, Sailing regularly EVERY MONTH from WATSON'S WHARF, BROOKLYN, N. Y., for PARA, FERNAMBUCO, BAHIA, and RIO JANEIRO, calling at ST. JOHN'S, PORTO RICO.
NELLIE MARTIN, 2,000 tons, Jan. 25, at 1 p. m.
JOHN BRAMALL, 2,500 tons, Feb. —.
J. B. WALKER, 2,700 tons, March —. When 25th falls on Sunday, steamers sail the day previous.
These steamers are perfectly new, with all the latest improvements, having first-class passenger accommodations.
For freight and passage, at reduced rates, apply to
J. S. TUCKER & Co., Agents, 54 Pine-st.

WHITE STAR LINE.
FOR QUEENSTOWN AND LIVERPOOL.
CARRYING THE
UNITED STATES MAIL.
The Steamers of this Line take the Lane Route recommended by Lieut. Maury, U. S. N., going south of the Banks on the passage to Queenstown, all the year round.
ARABIC, SATURDAY, Jan. 15, at 8 a. m.
BALTIC, SATURDAY, Jan. 22, at 2 p. m.
REPUBLIC, SATURDAY, Jan. 29, at 7 a. m.
GERMANIC, SATURDAY, Feb. 5, at 1 p. m.
CELTIC, SATURDAY, Feb. 12, at 7 a. m.
FROM THE WHITE STAR DOCK, PIER 52, NORTH RIVER.
These steamers are uniform in size and unsurpassed in appointments. The Saloon, Staterooms, Smoking and Bath Rooms are placed amidships, where the noise and motion are least, affording a degree of comfort hitherto unattainable at sea.
RATES.—Saloon, $60, $80 and $100, gold. Return Tickets on favorable terms. Steerage, $28.
For information of sailing and other information, apply at the Company's Offices, No. 37 Broadway, New-York.
R. J. CORTIS, Agent.

ALLEN DODWORTH'S
DANCING SCHOOL,
No. 212 FIFTH-AVE.
Brooklyn branch at 198 Washington-st.
Classes or Private Lessons for Ladies, Gentlemen, and Children. For particulars send for a circular.

Dry Goods.

E. Ridley & Sons,
309, 311, 311½ Grand-st., N. Y.

TO-DAY.

HAMBURGH EDGINGS
AND
INSERTINGS,
3c., 4c., 5c., 6c., 7c., 8c., 10c., 12c., 15c., 18c., 20c., up to 50c. per yard.
THESE LINES
WILL BE FOUND FULLY
ONE-THIRD
LESS IN PRICES
THAN SOLD ELSEWHERE. WE INVITE ATTENTION.

CASHMERE LACES,
ALL WIDTHS,
DESIRABLE AND SCARCE.
ECRU "DE" FLANDERS LACE.
COTTON AND SILK CASHMERE LACES.

50 NEW STYLES
IN
LACE, CASHMERE,
ECRU, SILK AND EMBROIDERED
TIES AND BOWS.
☞ PLEASE INSPECT.

EXTRAORDINARY BARGAINS IN OUR WH