

Advertisements.

Inside Page, each insertion --- 25 cents a line.
Back Page, each insertion --- \$1.00 a line.
(About eight words to a line.)

Engravings may head advertisements at the same rate per line, by measurement, as the letter press. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

NOTABLE and SIGNIFICANT ITEMS

FROM THE
FORTY-FIRST ANNUAL REPORT
OF THE
New York Life Insurance Company.

A total income of over sixteen million one hundred thousand dollars, and payments to policy-holders of nearly eight million dollars.

Interest income, over three million dollars, being about 54 per cent. on average net assets, and nearly four hundred thousand dollars in excess of losses by death.

Market value of securities, over three million three hundred thousand dollars in excess of their cost.

Liabilities, both actual and contingent, provided for, and a Divisible Surplus by the Company's standard of over seven million dollars; Surplus by the State standard, over thirteen million dollars.

An increase of nearly two million dollars in income, over three millions in surplus, over seven millions in assets, and of over thirty millions of insurance in force, during 1885.

SUMMARY OF REPORT. BUSINESS OF 1885.

Received in Premiums..... \$12,722,103.03
Received in Interest, Rents, etc..... 3,399,069.71

Total Income..... \$16,121,172.74

Paid Death-claims..... \$2,939,109.64

Endowments..... 741,764.47

Annuities, Dividends, and for Policies purchased..... 3,940,999.64

Total Paid Policy-holders..... \$7,681,873.75

New Policies Issued..... 13,506

New Insurance Written..... \$68,521,452.00

CONDITION JAN. 1, 1886.

Cash Assets..... \$66,864,321.32

*Divisible Surplus, Co.'s Standard..... \$7,064,473.13

†Tontine..... 3,123,742.77

Total Surplus, "..... \$10,188,215.90

Surplus by State Standard, \$13,225,053.94

Policies in Force..... 86,418

Insurance in force..... \$259,674,500.00

PROGRESS IN 1885.

Excess of Interest over Death-losses..... \$399,960.07

Increase in Income..... 1,880,697.35

Increase in Surplus, State Standard, 2,313,707.99

Increase in Assets..... 7,580,597.75

Increase in Insurance Written..... 7,036,902.00

Increase in Insurance in Force..... 30,291,914.00

* Exclusive of the amount specially reserved as a contingent liability to Tontine Dividend Fund.

† Over and above a 4 per cent. reserve on existing policies of that class.

THE SEVEN ADVANTAGES

OF THE
New York Life Insurance Company's
NON-FORFEITING-TONTINE LIMITED
ENDOWMENT POLICY.

FIRST ADVANTAGE.—Insurance for a definite amount, or for an amount increasing with each premium paid, as desired.

SECOND ADVANTAGE.—A Definite Cash Endowment, and a Tontine Dividend, to Policies in force at the end of Endowment and Tontine periods, which periods correspond, and may be either Ten, Fifteen, or Twenty Years.

THIRD ADVANTAGE.—Insurance for the full amount of the Policy, extended for as long a time as the value of the Policy will carry it, within the Endowment period, in case of discontinuance of payment of premiums after three years.

FOURTH ADVANTAGE.—A Grace of one month in the payment of premiums, during which time the policy holder's security is unimpaired.

FIFTH ADVANTAGE.—Three valuable options, including cash value, to policy-holders who survive their Tontine and Endowment periods and keep their policies in force.

SIXTH ADVANTAGE.—Practical freedom of action with respect to occupation, residence, and travel.

SEVENTH ADVANTAGE.—The payment of death claims immediately upon the approval of the required proofs of death.

Do not insure until you have seen full particulars of this Policy. Do not fail to write the nearest Agent or the Home Office for such particulars—at once. The NEW YORK LIFE INSURANCE COMPANY, 346 & 348 Broadway, New York City.

WILLIAM H. BEERS, President.

HENRY TUCK, Vice-President.

ARCHIBALD H. WELCH, 2d Vice-Prest.

RUFUS W. WEEKS, Actuary.

THEODORE M. BANTA, Cashier.

D. O'DELL, Supt. of Agencies.

A. HUNTINGTON, M.D., Medical Director.

FOR SALE.

Six Inch Equatorial Telescope on tripod, and two ft. globe; 4 earth and moon in miniature. JOHN HAMMES, Keokuk, Iowa.

Important Architectural and Scientific Publications.

JUST PUBLISHED.

Roper's Young Engineer's Own Book. With 106 illustrations, 363 pages, price, \$3.00.

Roper's Practical Handy-Books, for Engineers and Firemen.

Engineers' Handy-Book, \$3.50. Hand-Book of Land and Marine Engines, \$3.50. Use and Abuse of the Steam-Boiler, \$2.00. Catechism of High-Pressure Steam-Engines, \$2.00. Questions and Answers for Engineers, \$3.00. Hand-Book of Modern Steam Fire-Engines, \$3.50. Hand-Book of the Locomotive, \$2.50. Instructions and Suggestions for Engineers and Firemen, \$2.00. Care and Management of the Steam-Boiler, \$2.00. Mechanics for the Millwright, Engineer, Machinist, Civil Engineer, and Architect. By Frederick Overman, \$1.50. A Treatise on the Use of Belting. By John H. Cooper, \$2.50.

RIDDELL'S WORKS.

Carpenter and Joiner Modernized, \$2.50. New Elements of Hand-Railing, \$7.00. Lessons on Hand-Railing for Learners, \$5.00. EDWARD MEEKS, Publisher.

S. E. Cor. Walnut and Tenth Sts Philadelphia, Pa.

PATENTS.

MESSRS. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN, continue to examine improvements, and to act as Solicitors of Patents for Inventors.

In this line of business they have had forty one years' experience, and now have unequalled facilities for the preparation of Patent Drawings, Specifications, and the prosecution of Applications for Patents in the United States, Canada, and Foreign Countries. Messrs Munn & Co. also attend to the preparation of Caveats, Copyrights for Books, Labels, Reissues, Assignments, and Reports on Infringements of Patents. All business intrusted to them is done with special care and promptness, on very reasonable terms.

A pamphlet sent free of charge, on application, containing full information about Patents and how to procure them; directions concerning Labels, Copyrights, Designs, Patents, Appeals, Reissues, Infringements, Assignments, Rejected Cases, Hints on the Sale of Patents, etc.

We also send, free of charge, a Synopsis of Foreign Patent Laws, showing the cost and method of securing patents in all the principal countries of the world.

MUNN & CO., Solicitors of Patents,

361 Broadway, New York.

BRANCH OFFICES.—No. 622 and 624 F Street, Pacific Building, near 7th Street, Washington, D. C.



JENKINS BROS.' VALVES.

Gate, Globe, Angle, Check, and Safety.

MANUFACTURED OF BEST STEAM METAL.

The Jenkins Disks used in these Valves are manufactured under our 1880 Patent, and will stand any degree of steam pressure, hot and cold oils, or acid.

To avoid imposition, see that valves are stamped "Jenkins Bros."

JENKINS BROS.,

71 John St., New York. 13 So. Fourth St., Phila. 79 Kilby St., Boston.

H.W. JOHNS' ASBESTOS

Roofing, Building Felt, Steam Packings, Boiler Coverings, Fire Proof Paints, Cements, Etc. Samples and Descriptive Price Lists Free.

H. W. JOHNS MFG CO., 87 MAIDEN LANE, N. Y.

175 Randolph St., Chicago; 170 N. 4th St., Philadelphia.

SAWS

Wanted 50,000 Sawyers and SAW S

full address for a copy of Emerson's Book of SAWS. We are first to introduce NATURAL GAS for heating and tempering SAWS

with wonderful effect upon improving their quality and toughness, enabling us to reduce prices. Address

EMERSON, SMITH & CO. (Ltd.), Beaver Falls, Pa.

WIRE ROPE

Address JOHN A. ROEBLING'S SONS, Manufacturers, Trenton, N. J., or 117 Liberty Street, New York.

Wheels and Rope for conveying power long distances. Send for circular.

PHOTOGRAPHERS

can improve winter evenings making prints from negatives by lamp-light on Eastman's Permanent Bromide Paper. Results produced rival India ink drawings in effect. No toning required. Simple, Certain, Quick. Circulars and sample prints free on receipt of two cent stamp.

EASTMAN DRY PLATE AND FILM CO., 1347 State Street, Rochester, N. Y.

EPPS'S

GRATEFUL-COMFORTING.

COCOA

NEW YORK BELTING AND PACKING CO.

Oldest and Largest Manufacturers in the United States of

Vulcanized Rubber Fabrics

ADAPTED TO MECHANICAL PURPOSES.

RUBBER BELTING, PACKING, AND HOSE,

CORRUGATED

Mats and Matting, and Stair Treads, &c.

BICYCLE TIRES, CAR SPRINGS.

JOHN H. CHEEVER, Treas. New York Belting and Packing Co., JOHN D. CHEEVER, Dep't Treas. Warehouse, 15 Park Row, opp. Astor House, N. Y.

Branches: 308 Chestnut Street, Phila., 167 and 169 Lake Street, Chicago, and 52 and 54 Summer Street, Boston.

ENGINES AND BOILERS

of all sizes.

Write for Circular and tell us what you want.

B. W. PAYNE & SON, Drawer 104, Elmira, N. Y.

Or address our New York Office.

Eastern Agents, HILL, CLARKE & CO., Boston, Mass.

Our patented Vertical Boiler will not prime. No danger of burning flues.

BOXWOOD AND ITS SUBSTITUTES.

—A paper by J. R. Jackson, enumerating and describing the various woods that have been proposed as a substitute for box. Contained in SCIENTIFIC AMERICAN SUPPLEMENT No. 497. Price 10 cents. To be had at this office and from all newsdealers.

BARREL, KEG, Hogshead, AND STAVE MACHINERY.

Over 50 varieties manufactured by

E. & B. Holmes, BUFFALO, N. Y.

Truss Hoop Driving.

Transmission of Power. Suspension Bridges, Tramways, and other applications of

WIRE ROPE

Trenton Iron Co.

WORKS AND OFFICE, TRENTON, N. J.

New York Office—COOPER, HEWITT & Co., 17 Burling Slip. Philadelphia Office—21 North Fourth Street. Chicago Office—146 Lake Street.

GAS ENGINES.

Best in principle, workmanship, and materials. An unequalled small Motor adapted to all uses. When the motor is not at work, the expense of running it ceases. Simple, Safe, Economical, Durable. No extra insurance. Four sizes: 1 H. P., 1/2 H. P., 1/4 H. P., 1/8 H. P. man power, and a Sewing Machine Motor. Our Gas Engines, will work satisfactorily when attached to Gasoline Machines. Send for Illustrated Catalogue.

ECONOMIC MOTOR CO., Office and Salesrooms, 9 CORTLANDT ST., NEW YORK.

ICE-HOUSE AND REFRIGERATOR.

Directions and Dimensions for construction, with one illustration of cold house for preserving fruit from season to season. The air is kept dry and pure throughout the year at a temperature of from 34° to 36°. Contained in SCIENTIFIC AMERICAN SUPPLEMENT No. 116. Price 10 cents. To be had at this office and of all newsdealers.

DRAWING INSTRUMENTS.

Illustrated catalogue sent on application to Wm. T. COMSTOCK, 6 Astor Place, New York.

Barnes' Pat. Foot Hand Power

MACHINERY, \$15. Contractors and Builders, Cabinet Makers and Jobbers in Wood or Metal, who have no steam power, can, by using outfit of these machines, bid lower and save more money than by any other means for doing their work. Sold on trial. Illustrated Catalogue FREE.

W. F. & JOHN BARNES CO., Address: 1999 Ruby St., Rockford, Ill.

Telegraph and Electrical SUPPLIES

Medical Batteries, Inventors' Models, Experimental Work, and fine brass castings. Send for catalogue C. E. JONES & BROS. Cincinnati, O. It is important to us that you mention this paper.

ICE-HOUSE AND COLD ROOM.—BY R. G. Hatfield.

With directions for construction. Four engravings. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, 59. Price 10 cents. To be had at this office and of all newsdealers.

MALLEABLE AND FINE GRAY IRON ALSO STEEL

THOMAS DEVLIN & CO. FINE TAPPING JAPANING AND FINISHING. LEHIGH AVE. & AMERICAN ST. PHILA.

WM. A. HARRIS,

Providence, R. I. (Park St.) Six minutes' walk from station. Original and Only Builder of the HARRIS-CORLISS ENGINE.

With Harris' Pat. Improvements, from 10 to 1,000 H. P. Send for copy Engineer's and Steam User's Manual. By J. W. Hill, M.E. Price \$1.25. MENTION THIS PAPER.

COPPER TUBES

Sheet Brass Wire. Mention this paper.

BOOKWALTER ENGINE.

Compact. Substantial. Economical, and easily managed; guaranteed to work well and give full power claimed. Engine and boiler complete, including Governor, Pump, etc., at the low price of

HORSE POWER..... \$240 00
4 1/2 " " " " " 280 00
6 " " " " " 350 00
8 " " " " " 440 00

Put on cars at Springfield, O. JAMES LEFFEL & CO., Springfield, Ohio, or 110 Liberty St., New York.

THE CURTIS RETURN

STEAM TRAP. For returning steam condensed under pressure automatically into the boiler, whether taken from above or below the boiler lever, without loss or waste. Manufactured by

THE CURTIS REGULATOR CO., BOSTON, MASS. Send for Circular No. 19.

PRINTING INKS.

THE "Scientific American" is printed with CHAS. ENEU JOHNSON & CO.'S INK. Tenth and Lombard Sts. Phila. and 47 Rose St., opp. Duane St., N. Y.



\$350.00 PER MONTH SALARY and Commission to competent business manager in every city for exclusive agency of our National Automatic Gas-Saving Governors. Average 33 per cent. saving in gas bills. Increased illumination and safety from fire. Over 7,000 in service. Indorsed by highest mercantile and corporate authorities. \$500 cash required for \$1,000 sample outfit. No bonds. Address THE UNION NATIONAL GAS-SAVING CO., 21 East Fourteenth St., New York.

THE AMERICAN BELL TELEPHONE CO.

95 MILK ST., BOSTON, MASS.

This Company owns the Letters Patent granted to Alexander Graham Bell, March 7th, 1876, No. 174,465, and January 30th, 1877, No. 186,787.

The transmission of Speech by all known forms of Electric Speaking Telephones infringes the right secured to this Company by the above patents, and renders each individual user of telephones not furnished by it or its licensees responsible for such unlawful use, and all the consequences thereof, and liable to suit therefor.

PROSPECTUS

OF THE
Scientific American
FOR 1886.

The Most Popular Scientific Paper in the World.
Only \$3.20 a Year, including Postage. Weekly 52 Numbers a Year.

This widely circulated and splendidly illustrated paper is published weekly. Every number contains sixteen pages of useful information and a large number of original engravings of new inventions and discoveries, representing Engineering Works, Steam Machinery, New Inventions, Novelties in Mechanics, Manufactures, Chemistry, Electricity, Telegraphy, Photography, Architecture, Agriculture, Horticulture, Natural History, etc. All Classes of Readers find in the SCIENTIFIC AMERICAN a popular resume of the best scientific information of the day; and it is the aim of the publishers to present it in an attractive form, avoiding as much as possible abstruse terms. To every intelligent mind, this journal affords a constant supply of instructive reading. It is promotive of knowledge and progress in every community where it circulates.

Terms of Subscription.—One copy of the SCIENTIFIC AMERICAN will be sent for one year—52 numbers—postage prepaid, to any subscriber in the United States or Canada, on receipt of three dollars and twenty cents by the publishers; six months, \$1.50; three months, \$1.00.

Clubs.—One extra copy of the SCIENTIFIC AMERICAN will be supplied gratis for every club of five subscribers at \$3.20 each; additional copies at same proportionate rate.

The safest way to remit is by Postal Order, Draft, or Express Money Order. Money carefully placed inside of envelopes, securely sealed, and correctly addressed, seldom goes astray, but is at the sender's risk. Address all letters and make all orders, drafts, etc., payable to

MUNN & CO.,
361 Broadway New York.

THE Scientific American Supplement.

This is a separate and distinct publication from THE SCIENTIFIC AMERICAN, but is uniform therewith in size, every number containing sixteen large pages. THE SCIENTIFIC AMERICAN SUPPLEMENT is published weekly, and includes a very wide range of contents. It presents the most recent papers by eminent writers in all the principal departments of Science and the Useful Arts, embracing Biology, Geology, Mineralogy, Natural History, Geography, Archaeology, Astronomy, Chemistry, Electricity, Light, Heat, Mechanical Engineering, Steam and Railway Engineering, Mining, Ship Building, Marine Engineering, Photography, Technology, Manufacturing Industries, Sanitary Engineering, Agriculture, Horticulture, Domestic Economy, Biography, Medicine, etc. A vast amount of fresh and valuable information pertaining to these and allied subjects is given, the whole profusely illustrated with engravings.

The most important Engineering Works, Mechanisms, and Manufactures at home and abroad are represented and described in the SUPPLEMENT.

Price for the SUPPLEMENT for the United States and Canada, \$5.00 a year, or one copy of the SCIENTIFIC AMERICAN and one copy of the SUPPLEMENT, both mailed for one year for \$7.00. Address and remit by postal order, express money order, or check.

MUNN & Co., 361 Broadway, N. Y., Publishers SCIENTIFIC AMERICAN.

To Foreign Subscribers.—Under the facilities of the Postal Union, the SCIENTIFIC AMERICAN is now sent by post direct from New York, with regularity, to subscribers in Great Britain, India, Australia, and all other British colonies; to France, Austria, Belgium, Germany, Russia, and all other European States; Japan, Brazil, Mexico, and all States of Central and South America. Terms, when sent to foreign countries, Canada excepted, \$4. gold, for SCIENTIFIC AMERICAN, one year; \$9. gold, for both SCIENTIFIC AMERICAN and SUPPLEMENT for one year. This includes postage, which we pay. Remit by postal or express money order, or draft to order of

MUNN & CO., 361 Broadway, New York.

PRINTING INKS.

THE "Scientific American" is printed with CHAS. ENEU JOHNSON & CO.'S INK. Tenth and Lombard Sts. Phila. and 47 Rose St., opp. Duane St., N. Y.