

=.114 D. 2. When  $D=2B$ , then  $r=.23 D$ . 3. When  $D=B$ , then  $r=.35 D$ . 4. When  $D=\frac{1}{2}B$ , then  $r=.54 D$ . 5. When  $D=\frac{1}{3}B$ , then  $r=.63 D$ . 6. When  $D=\frac{1}{4}B$ , then  $r=.70 D$ .

Taking the fourth of these propositions where the depth is one-half of the breadth, and constructing a section with the ascertained radius, the area divided by the boundary gives a result expressed by .531 D. When we make the section a simple semicircle, the area divided by the boundary gives only .5 D, showing that in the proportion of surface to area, there is a gain of about six per cent in the section above described over a semi-circular section. The gain is still greater over sections formed by ogee curves of great concavity, such as are sometimes employed on vessels. That cross section which gives the greatest ratio of its area to its boundary is entitled to be called "the section of least resistance." It follows from this also that of two steamers, equal in displacement and capacity, with engines of the same power, and equally well modeled as to water-lines, the one will excel in speed whose sections are constructed with the radius of bilge as found according to the method set forth in the paper of Mr. Napier. These results of pure mathematical science are not chimeras, for they have been applied with unprecedented success in the construction of several steamers in Glasgow, and they must ere long come into general application. They furnish another illustration of the value of pure science in promoting the progress of the useful arts. Mechanical ingenuity, however great it may be, cannot dispense with the deductions of science, but must employ them in attaining the highest results.

#### LITERARY NOTICES.

THE AMERICAN ANNUAL CYCLOPEDIA. D. Appleton & Co., 443 Broadway, New York.

The value of a volume which includes all the prominent events of the day, and which sums up in a compendious form the principle occurrences of the year, is almost incalculable. Such a work is the "American Annual Cyclopædia," and the utility of the publication for ready reference for all classes in the community, whether lay or professional, cannot be over estimated. Under their appropriate headings, political, civil, military, and social affairs receive attention; and the amount of information conveyed in the biographies and obituaries, notices of distinguished men, in commercial and scientific statistics, is such as to render the "Cyclopædia" an absolute necessity to every one who desires to keep pace with the spirit of the age. The individual who could carry even a brief synopsis of the events described in the book would unquestionably be considered a well-read man. The article entitled "Army Operations" contains full and copious notes on the physical aspect of the war, the attitudes of the two sections of the country, and the causes which led to the disagreement still, unhappily, existing. This portion of the "Cyclopædia" occupies no less than one hundred and forty-eight of its pages, and its importance justifies the space bestowed upon it. Many a lavishly-praised history of the war is ushered into existence without possessing a tithe of the merit of this excellent digest. Mr. Samuel Colt's invention, the revolving pistol, which made his name so famous, is also noticed; and the narration of the early struggles of the inventor and his subsequent success forms one of the most interesting pages in the work. Under the caption "Confederate States" we notice a thorough investigation into and register of the important events which transpired in that section of the country during 1862, and the financial and executive departments of the pseudo-government, so far as known from published accounts, are detailed at length. The British Industrial Exhibition has also a large space allotted to it, and the wonders of the mechanical, artistic, and scientific world claim the reader's attention and interest. We consider the "Cyclopædia" one of the most valuable books issued from the press this year, and shall have frequent occasion to refer to its columns. It is pleasant to notice the fidelity with which the minute incidents and every-day occurrences connected with the particular subject in the "Cyclopædia" are reproduced and retained. They serve to add a zest and flavor of energy and spirit to the volume, without which it

would be as flat and unprofitable as soda-water without carbonic acid gas. The "American Annual Cyclopædia" is a book that cannot be dispensed with; and we welcome it as a valuable addition to our library.

THE ATLANTIC MONTHLY. Ticknor & Fields, Boston, Mass.

Almost with the regularity which attends the issue of a daily newspaper, this standard magazine appears monthly upon our table, and the volume for July is replete with interest. The leading article, "The Doings of the Sunbeam," is a careful review of the photographic establishment of Messrs. E. H. and T. Anthony, the widely-known artists of this city, and gives the reader a very clear insight into the details of the several processes there carried on. "The Wraith of Odin," a poem; "Gala Days," by Gail Hamilton; "Paul Blecker," (concluded); "The Growth of Continents," a continuation of Professor Agassiz's interesting series on subjects of a kindred nature; "English Naval Power and English Colonies; and many other articles in prose and verse which we are unable to specify for want of space. The story of "Paul Blecker" is written with such strength and intensity of purpose and feeling, that the reader is impressed with the idea that it must be a life-history; and the interest in the narrative—so we may call it not inaptly—ceases only with the closing line. Out of all the fire and trial that hedges about the principal characters of the tale—out of the heat of passion there springs a lesson of purity which is an earnest and vital aid to those who lean to virtue's side but are tempted from it by circumstances, that is as refreshing as it is sound and healthy. One reads Miss Dodge's "Gala Days" with a feeling very much akin to that curtly expressed by Sir Charles Grandison in reference to bores:—"I never know what they are going to say next." "Gala Days" is a dashing, rattling, voluble narrative of events, and the charm of recounting them seems never to weary or pall upon the writer. Several glaring inconsistencies were noticed by us, as in that line where the authoress apologizes for using the barbarism "lets up" and then confesses to "kicking" her husband, and defiantly defends the phrase and the act as though she were conscious of its inelegance but would have her own wilful way. "Our General" is a record of General Butler's career in New Orleans, and is an interesting review of events occurring during that period. No one who wishes to keep pace with the current literature of the day should fail to read the "Atlantic."

THE SCALPEL. Edward H. Dixon, editor. Published by Everardus Warner, No. 1 Astor House, New York.

Although this publication is professedly a periodical devoted to the elucidation of knotty theoretical points in medical science and practice, yet there are many pages on which popular subjects are treated in a terse, vigorous and to-the-point style that claims the attention of the reader and invites his criticism. The present issue (No. 3 of Vol. XII) contains, among other articles, one upon the evils of "diploma-shops" or "doctor-factories" as they are sometimes called. This article has too much truth in it to be slighted by the general reader, and we think that, in connection with the theme, a little attention might be profitably bestowed on some unworthy representatives of the surgical art who follow the army and saw off the legs and arms of soldiers. The operations in many cases ought not to be performed, and when done is oftentimes mere brutal butchery. Charles Reade, the celebrated English author, in his new novel, is engaged in a scathing raid upon pretenders to medical science in London, and will doubtless succeed in opening the eyes of the doctor-ridden public to the enormity of their sufferings. The "Scapel" is the pioneer in this much-needed reform at home.

THE PRACTICAL SHEPHERD. Published by J. B. Lippincott & Co., Philadelphia, and D. D. T. Moore, Rochester, N. Y.

A new work on sheep-husbandry entitled "The Practical Shepherd," is about to be issued; it is edited by the Hon. Henry S. Randall, LL.D., author of "Sheep-Husbandry in the South," &c. Mr. Randall is well known to be the most reliable writer on sheep-husbandry in the country; and the new work is intended to be standard authority upon all ques-

tions relating to sheep, such as descriptions of the various breeds, their management, breeding, diseases and remedies, &c. The information obtained by its author has been derived from thirty-five years' personal experience with large flocks, together with a knowledge of different systems, received from a very extensive correspondence with leading flock-masters in every part of the world. The book will be a manual to which every farmer can refer when he wishes to ascertain any fact connected with the management of sheep.

#### Composition and Properties of Coal Gas.

Gas made from cannel coal consists of olefiant gas, associated rich hydro-carbons, and light carbureted hydrogen. These give to gas its illuminating properties, especially the two first; the latter giving but little light. It also contains hydrogen, carbonic oxide and nitrogen. The first two burn with a strong white light, and constitute the light-giving constituents of gas. Although this is the case, this is but a small proportion of the complex mixture of coal gas. The light carbureted hydrogen forms from thirty to forty per cent. of coal gas; it burns with a yellowish flame and gives but little light. The hydrogen and carbonic oxide compose the remaining gas. They give no light on combustion but a faint blue flame. The light carbureted hydrogen and carbonic oxide may be regarded as mere diluents of the two first. Dry gas made from cannel coal and freed from carbonic acid contains the following proportions:—

	Per Cent.
Olefiant gas and associated hydro-carbons.....	9.21
Oxygen .....	0.16
Nitrogen .....	5.37
Light carbureted hydrogen .....	38.08
Hydrogen .....	42.33
Carbonic oxide .....	4.84
	100.00

#### Gas from Anthracite Coal.

At a recent meeting of the Board of Councilmen of this city, the following resolution was offered by the president:—

*Resolved*, That there be and is hereby granted to the Anthracite Gas-Lighting and Heating Company, of New York, permission to lay pipes and mains for conducting gas, for illuminating and heating, and for other purposes, through the streets, avenues, lanes, and other public places in the city of New York, for a period of fifty years, as provided by the general manufacturing laws of the State of New York; the same conductors to be laid under the supervision of the Street Commissioner, the said company being required to restore the streets opened by them for laying such pipes to the same condition as before the said pipes or mains were laid.

Which was referred to the Committee on Finance.

This is a singular resolution relating to a preposterous project, judging from the name of the company. Illuminating gas cannot be produced from anthracite coal.

A GREAT SALT DEPOSIT.—It appears from scientific investigation that the salt deposit at New Iberia, Louisiana, is of the most extensive and wonderful description. For vastness and purity it is unequalled on the globe. One account says:—"Imagine, if you can, the granite quarry of Massachusetts or the marble quarry of Vermont to be solid deposits of pure rock salt, clean and transparent as so much clear white ice, in one solid, inexhaustible mass, underlying the earth, and you then acquire an imperfect idea of the vastness of this salt formation."

IRON CLAD LADIES.—The last new thing in the way of dress ornamentation is leather. The Princess Metternich made her appearance lately in a dress of Havana-colored silk, ornamented with leather trimmings, studded with steel-headed nails. The bonnet was of the same material, ornamented in a like manner, and, strange to say, so was the parasol. Similar ornaments are the rage among ladies in this city. They make the fair wearers look as if they were iron-clad.

ARRIVAL OF COTTON AT NEW ORLEANS.—During the week ending May 22, there were received at New Orleans 2,492 bales of cotton, principally from the country which has just been opened by General Banks. In the four days following—that is to say to May 26—1,340 more bales came to hand. This made altogether a stock on hand and on ship-board of 7,150 bales, with a prospect of much more to come at once.

## Income Tax Law.—Important Decisions.

The Commissioner of Internal Revenue has made the following decisions in relation to the Income Tax :—

The Income Tax must be assessed and paid in the district in which the assessed person resides. The place where a person votes, or is entitled to vote, is deemed his residence. When not a voter, the place where tax on personal property is paid is held to be the place of residence.

In cases of limited partnerships, formed with the condition that no dividend or division of profits shall be made until the expiration of the partnership, each member of such firm will be required to return his share of the profits arising from such business, for the year 1862, as, had they so desired, a division of the profits could have been made.

Gains or profits realized from the sale of property during the year 1862, which property was purchased before the Excise Law went into effect, should be returned as income for the year 1862.

The executors or administrators of the estates of persons who died in the year 1862, should make return of the income thereof for the year 1862.

A merchant's return of income should cover the business of the year 1862, excluding previous years. Uncollected accounts must be estimated.

Physicians and lawyers should include actual receipts for services rendered in 1862, together with an estimate of unrealized or contingent income due to that year.

Dividends and interests payable in 1862 should be returned as income for that year, no matter when declared.

Dividends derived from gas stock are taxable as income.

Income derived from coal mines must be returned, although a tax has been previously paid on the coal produced. No deduction can be made because of the diminished value, actual or supposed, of the coal vein or bed, by the process of mining. Rent derived from coal mines is income.

Premiums paid for life insurance shall not be allowed as a deduction in statement of income.

Pensions received from the United States Government must be returned with other income subject to taxation.

Old debts formerly considered hopelessly lost, but paid within the time covered by the return of income, should be included in this statement.

Debts considered hopelessly lost, but paid on the 31st of December, 1862, and due to the business of the year 1862, may be deducted from the business; if subsequently paid, they must be included in the return for the year in which paid.

In order to give full effect to the proviso to the 91st section of the Act of July 1, 1862, respecting the tax on that portion of income derived from United States Securities, it is directed that when income is derived partly from these and partly from other sources, the \$600 allowance made by law shall be deducted, as far as possible, from that portion of income derived from other sources, and subject to three per cent tax.

No deduction can be allowed from the taxable income of a merchant for compensation paid for the services of a minor son.

A farmer, when making return of the total amount of his "farm produce," shall be allowed to deduct therefrom the subsistence of horses, mules, oxen, and cattle used exclusively in the carrying-on of said farm. The term "farm produce" is construed to include all productions of a farm, of what nature or kind soever.

The account of stocks sold by a farmer since Dec. 31, 1862, should not be included in the present assessment, but the profit realized thereby must be accounted for in his next year's return. Where he has included in his return produce raised by him, and fed in whole or part to stock subsequently sold, he must account for the gain realized by feeding and selling of said stock. Where he has not included the produce so fed, he must return, as profits, the difference between the value of said stock on the 21st of December, 1861, and the amount realized for them.

Fertilizers purchased by farmers, to maintain their land in present productive condition, will be considered as "repairs" in estimating income.

Interest should be considered as income only when paid, unless it is collectable and remains unpaid by the consent or agreement of the creditor.

Losses incurred in the prosecution of business are a fair offset to gains derived from business, but not from those portions of income derived from fixed investments, such as bonds, mortgages, rents, and the like.

Property used in business, and furnishing profits, when destroyed by fire may be restored at the expense of those profits, to the condition when destroyed; if insured, the difference between insurance received and amount expended in restoration will be allowed.

The increased value given a new building by permanent improvements will be charged to capital—not income.

The contingent fund of manufacturing corporations, made up during the year 1862, and not distributed, should not be returned as part of the income of the stockholders.

The undistributed earnings of a corporation, made previous to Sept. 1, 1862, whether the corporation is required to pay tax on dividends or not, should not be considered as the income of the stockholders, nor should the corporation be required to make return of said reserved earnings as trustees, under section 93 of the Excise Law.

The income of literary, scientific, or other charitable institutions, in the hands of trustees or others, is not subject to income tax.

## Curious Assertions for Historical Societies and Financiers to prove or disprove.

There are in the United States more men and estates that can be assessed for one million dollars each than there were at the close of the Revolution that could be assessed for ten thousand dollars each.

The cash value of the property of the United States (excluding the States in rebellion), is one hundred times what it was in all the States at the close of the Revolution.

The gold and silver in the United States is one hundred to one at the close of the Revolution.

Joint stock companies—bank, insurance, railroad, steamboat, manufacturing, &c.—are as one thousand to one at the close of the Revolution.

The annual product of gold and silver that enters into and braces our currency and credit is as five hundred to one at the close of the Revolution.

Our commerce, inland and foreign, is as five hundred to one at the close of the Revolution.

A Spanish quarter-dollar was of more importance in the eyes of the people then than a double eagle is now.

The country, as the basis for borrowing and paying, is more than one hundred times greater than at the close of the Revolution. Where, then, is the point in likening our Government currency and securities to Continental money?

Old and first-class nations are able to sustain immense debts—see England and France—while new and minor nations are classed as of doubtful future, and shunned by money lenders.

We are now a first-class nation. At the close of the Revolution we were the youngest and smallest of all nations.

The power to sustain a debt is as the cube of the base on which the debt rests. This holds good with national, corporate, and individual payers.

A trader with a thousand dollars capital is hardly considered trustworthy for any balance on account. A merchant with a million capital is trusted with any number of other millions.

A bank of small capital is hardly considered safe to send a moderate collection to; whereas a two-million bank is considered a safe depository for twelve or fifteen millions, all payable on demand.

With nations the same parallel holds good. This country can better sustain a debt of two thousand millions now, than it could one of a hundred thousand at the time of Continental money.—*Thompson's Bank Note Reporter.*

PROFESSOR WHITNEY, the State Geologist of California, found among the Sierra Nevada, about 200 feet above the level of the ocean, an almost perfect jaw of a rhinoceros. Huge petrified oyster-shells were also found among the mountains of the interior and at a great elevation.

## A New Solvent for Silk.

The London *Photographic News* states that M. J. Persoz, the distinguished Parisian chemist, has discovered a new solvent for silk, and it is believed that a solution of silk will prove to be useful in photography as a substitute for collodion. This agent is also valuable to distinguish the nature of tissues, such as fabrics mixed with silk, cotton and wool. While it dissolves silk it does not act thus upon woolen and vegetable fiber. To different learned bodies samples of wool and silk tissues have been exhibited, a portion of which has been dipped in chloride of zinc. The silk was all dissolved out whilst the wool was left intact. The solvent employed by M. Persoz is chloride of zinc concentrated to about 60° of the areometer. This is to be boiled with excess of oxide of zinc until it becomes sensibly neutral to litmus paper. It is in this state a basic chloride; when distilled water is added to it, it does indeed become slightly turbid, but the solution has the advantage of causing no alteration in vegetable tissues which may have to be isolated in the course of the experiment. If excess of free hydrochloric acid be present it might dissolve cellulose, as this acid has been found to exercise a strong solvent power on vegetable fiber. On contact with the chloride of zinc, prepared as above described, the silk is converted into a gummy mass, preserving at first the form of the threads of the tissue, but changing gradually to transparent clots, and finally becoming completely dissolved. In fact the process of solution is very similar to that of dissolving gun-cotton in alcoholized ether. Chloride of zinc of the above strength gradually dissolves a considerable quantity of silk at the ordinary temperature; but under the influence of heat the solution is effected in a few instants, becoming viscous and capable of being drawn into threads like a thick sirup. It then resembles a strong solution of gum arabic. Ammonia produces in this solution, after dilution with water, a white precipitate which dissolves completely in an excess of reagent. Many chemical means have been tried to separate the silk from the chloride zinc used as a solvent; but after once being obtained in solution it resisted all attempts to separate it until the beautiful dialytic method of Professor Graham was tried. The silk solution was first diluted by pouring it into water acidulated with hydro-chloric acid. In a former experiment the solution, having been twice filtered without getting rid of its slightly opalescent appearance, was placed on the dialyser. A large quantity of chloride of zinc passed directly, and after a few hours the liquid became much more viscid. It then increased in volume and became an opaline, jelly-like starch. This jelly contained yet a little chloride of zinc which could not be separated. In succeeding experiments by diluting the solution with more water before submitting it to the action of the dialyser, and especially by heating it for a few minutes, all the chloride of zinc was separated and a limpid, colorless and tasteless liquid obtained, being a pure, aqueous solution of silk. This by evaporation gives a gold-colored friable varnish.

## Death of a Distinguished Citizen.

The Hon. Ezra Lincoln died at Boston, on the 15th of June, of an apoplectic fit. Mr. Lincoln had enjoyed the confidence of his fellow-citizens for many years, having filled several high offices within the gift of the people. He was at one time postmaster of Boston, and at the time of his death was assistant United States Treasurer. He was also widely known as a successful patent solicitor and attorney. He was also intimately connected with the late Hon. Benjamin Lincoln, also of Boston, and descended from a family widely known for their talent. Mr. Lincoln's death was very sudden, and is deplored by a large number of his fellow-citizens.

THE IDLER.—Everything within us and about us shows that it never was intended that man should be idle. Our own health and comfort and the welfare and happiness of those around us, all require that man should labor. Mind, body, soul, all alike suffer and rust out by idleness; the idler is a source of mental and moral offense to everybody around. He is a nuisance in the world and needs abatement for the public good, like any other source of pestilence.