for their own benefit. Other senators, who pretended to know something about the Union Pacific Company, had said that the company was liable to become insolvent any day, and if that should come to pass, the result would be that the first mortgage bonds would be foreclosed, and the Government lien would be cut off, and this Congress would be held respon sible for it.

The importance of Senator Stewart's foreshadowing is made apparent by the fact that the Government has already issued $56,852,320 in bonds to the Pacific Railroad, upon which the company assumes to pay the interest; but if the first mortgage is suffered to be foreclosed, of course the people must be taxed to pay the interest on the whole of the above issue of bonds.

SPRINGS, THEIR POWER AND USES.

The peculiar property possessed by various materials, which has received the general name of elasticity, exhibits itself in many ways. Some substances manifest it, when compressed, in a high degree, while bars of the same material may be bent without developing elastic power to any great extent. Others on the contrary, exhibit great elastic power when bent, and comparatively little upon compression. Others, again, may be stretched without manifesting much elasticity, while upon bending they show it in a high degree.

Springs may be classed as follows: Flat, straight, or bar springs, coiled springs, spiral springs, and block springs, intended to resist compression, usually made of rubber, and in common use on railroad cars, etc., convex disks, concave disks, or a union of the two latter in a corrugated spring.

In metallic springs it is found that the elastic power resides in great measure near the surface. A well-tempered bar spring will lose much of its elastic strength by filing off a very thin scale from its surface. This fact has never yet been explained satisfactorily.

Power may be applied to springs in four ways. They may be stretched, compressed, bent, or twisted. The elasticities developed in the same material by these different methods of application, are not demonstrated to possess any ratio to each other. In fact, the mathematical data relating to springs are extremely meager, and it is greatly to be desired that some accurate experimenter would give to the world some tabulated results that could be relied upon with certainty as a guide in construction. At the present time there is nothing of this kind, so far as we know, that can be referred to.

It is evident from the fact above stated—namely, that the elastic power of springs lies, in a great part, near or upon their surfaces—that the form of the metal which presents the greatest surface will give the maximum power, within certain undetermined limits. The doubling of the thickness, the width remaining constant, will not give double power, while doubling the width will nearly double the elastic power if the thickness be the same.

But while the elastic force is found to be in some way dependent upon the surface, it is also evident that there must be some ratio which the thickness should possess in regard to the other proportions, in order that the maximum effects should be maintained. It is easy to see that were the leaves of an ordinary elliptical carriage spring much reduced in thickness their strength would be impaired.

At present the determination of the strength of springs is left almost wholly to experiment. It is plain also, that whatever data may be determined for springs having proportional dimensions, and considered as being formed of homogeneous material, and of the same temper, nothing but experiment could determine their strength with accuracy, for, although dimensions may be accurately determined, the quality of the metal and exactness of temper can never be relied upon as constant. Approximate results, however, might be obtained of great use in the construction of this important element of machinery.

The uses of springs seem constantly multiplying. A large number of most important machines, such as printing presses, and the like, employ them in almost all their forms. In many clocks, and all watches, they are the prime movers, while their employment for all sorts of vehicles need not be more than alluded to.

A class of rather visionary inventors have vainly (as yet) endeavored to use them as the propelling power for vehicles, and we receive many communications requesting our views upon the feasibility of so doing. While there is theoretically no impossibility, in the idea of such propulsion, we think we can see so many practical difficulties in the way of its accomplishment as to render its success extremely doubtful. These practical difficulties are so well known that they need not here be specified. Mechanical skill may possibly eventually overcome them, but let not the mistake be made that a spring possesses any more power than is delegated to it. It is only a magazine of power, and can give only what it has previously received. We should have considered this last remark unnecessary had it not been that the tone of some communications lately received indicates that their authors have not fully purged themselves of the old illusion of the perpetual motion.

PROTOPLASM.

Protoplasm is the scientific name for a substance which modern science has demonstrated to be common to all living things from the lowest plant to the highest animal organization. Prof. Huxley demonstrates that it may in itself exhibit all the phenomena of life. It contains oxygen, hydrogen, nitrogen, and carbon. Before these elements can form living protoplasm, they must unite to form the binary compounds known as water, carbonic acid, and ammonia. In the presence of pre-existing living protoplasm these compounds form a complex living substance, new protoplasm, which, Prof. Huxley so aptly terms the "physical basis of life." He says: "To this complex combination, the nature of which has never been determined with exactness, the name of *protein* has been applied. And if we use this term with such caution as may properly arise out of our comparative ignorance of the things for which it stands, it may be truly said that all protoplasm is proteinaceous, or, as the white or albumen of an egg is one of the commonest examples of a nearly pure proteine matter, we may say that all living matter is more or less albuminoid."

The living protoplasm of animals, a good example of which is seen in the white corpuscles of the blood, has not the power to influence the combination of the above-named compounds into new protoplasm. This power belongs only, so far as is at present known, to vegetable protoplasm, which, however, is not on that account to be considered as distinct from animal protoplasm. The latter has the power of converting dead animal or vegetable protoplasm into living animal protoplasm.

In this view protoplasm is the primary "matter of life," the first step from the inorganic into the organic world.

SKINNING AND STUFFING BIRDS.

The preservation of the skins of animals and stuffing them so as to preserve their natural appearance, is an art requiring considerable skill and taste. It is also of great utility in the study of natural history, as well as a very pleasing pursuit for amateur collectors.

We are requested by several correspondents to give some information upon the skinning and stuffing of birds. While no amount of verbal instruction can give practical skill and artistic taste in the preparation and mounting of specimens, what we may say will perhaps be useful as a guide to those who have just begun to exercise this instructive and amusing art.

It is more difficult to properly prepare and mount bird skins than those of other animals, as the preservation of the plumage in an unruffled and unsoiled state, is the point to be aimed at, and feathers, if broken, are very hard to re-adjust properly.

In killing birds with shot the feathers are very apt to be more or less damaged and soiled with blood, which, if it be permitted to dry on the plumage, will be difficult to remove without some permanent disorder in its arrangement. These evils may be in a great measure avoided if the sportsman will attend to the following directions: He should take the field provided with a small box of cotton wool, a bottle of water, and a small shallow dish of some kind to hold a small portion of water at need. He should also be equipped with some small sable brushes, such as are used in water color painting, and a short piece of stiff wire with the end rounded. As soon as he has shot a bird he should aim to get it in hand as soon as possible, and plug the shot holes with cotton to prevent further bleeding. In doing this he will find the wire above alluded to a very useful instrument. When the bleeding is stopped, he should next cleanse the feathers from the blood which has already flown, by using the water which he carries for the purpose and the brushes. If the blood is thus removed before it dries, it can be so completely washed off as to leave no stain even on the whitest feathers, and at the same time their texture may be preserved from damage. Should any of the feathers become so much bent as to be difficult to straighten, they may be restored measurably by soaking in hot water.

Before skinning, the principal dimensions of the bird should be taken and noted down for reference in mounting. The first incision should be made longitudinally backward from the lower point of the breastbone. From the beginning of the operation to the conclusion, all fluids should be constantly absorbed by cotton wool, the greatest care being taken that they do not flow out and soil the feathers. As fast as the skin is separated from the body a thin layer of cotton should be inserted to prevent its adhering to the flesh and for purposes of absorption. Through the incision made as directed the entire process of skinning must in general be performed. When the skin is stripped down from the muscular portions of the legs, they must be cut off on the inside of the skin with scissors or a knife so as to leave the feet attached to the skin. The tail is likewise cut off on the inside at its attachment to the back. The body can then be suspended from a hook and the skinning proceed toward the head by turning the skin inside out. When the wings are reached the skin should, if possible, be removed as far as the joint constituting the elbow, but if it is found difficult to do this without tearing the skin, the bone may be severed as low down as practicable, by use of cutting pliers or strong scissors. Great care will be needed to avoid breaking the delicate membrane which constitutes the external ear upon the heads of birds which are nearly or quite bald. Care is also required in manipulating the eyes, the external membrane of which ought, if possible, to remain unbroken. The brain is removed from the skull through incisions made well back through the roof of the mouth. All loose flesh and fat about the neck, tail, and legs, should be removed from the skin. For this purpose the skin on the wings may be cut through on the inside, when it covers those parts from which the bone and flesh could not be removed. The parts liable to decompose may then be rubbed over on the inside with arsenic, or arsenical soap, which will effectually prevent decay.

The skin is now ready to be stuffed, which although it seems simple in description, requires considerable skill. If glass is not used for the eyes their orbits should first be stuffed through the mouth with cotton. Next the upper parts of the throat should be filled with the same material. A roll of cotton should now be inserted through the first incision, and pushed up through the neck to the base of the skull. Then the body should be filled, during which process the wires for supporting the bird when mounted should be inserted into the legs, neck, and wings. This completes the process so far as it can be described in words, with the exception of sewing up the opening through which the stuffing has been performed. This requires no special skill to be performed neatly.

Some slight variations in the method are requisite, according to the character of the bird. For instance, a very large bird may require to have the neck cut off when the skull is reached, and the skinning of the head to be performed by an incision from the outside down the back of the skull.

In mounting birds there is room for considerable display of taste in the adjuncts. A branch of the tree which the bird most affects, with artificial leaves, may be used with good effect as a support for the feet. The natural beauty of the plumage may be enhanced by suitable contrasts of color in the lining of the case where they are kept. An aquatic bird may be shown holding a fish in its mouth, such as it commonly obtains for its food, and many other fancies will suggest themselves to those who wish to excel in the art.

The directions we have given will, if observed, enable any ingenious person after a little practice to skin, stuff, and mount a bird creditably.

WHY DON'T BOYS LEARN TRADES?—MECHANICAL LABOR.

Our recent agitation of this question and subject has brought us a number of communications. We do not propose to iterate and reiterate our statements or suggestions. We have already stated the facts, and pointed out the possible and practicable remedy. It is perfectly simple, and entirely feasible. But we give the gist of a few of the communications we have already received, in order to show the general feeling on the subject, and in the hope that those in whose hands the remedy lies may be induced to apply it. A young man, signing himself "Eugene Dunbar, of Holliston, Mass.," says: "There are many boys, myself included, who would be very glad to learn some good trade. For several years I have been very desirous to learn the trade of a locomotive machinist, but, although not too proud to take an apprentice's position, I have not met with success in my endeavors to obtain a chance to learn the business."

Another writing from Georgetown, D. C., referring to our article published on page 169, current volume, under the heading, "Why is Mechanical Labor Objectionable?" says: "Education is everything. But just so long as we train our young people in literature and the classics, we must necessarily breed a race of men and women lazy in the qualities demanded by mechanical labor. Our school system needs a thorough remodeling. Our farmers' sons, after passing through a course of literary training lose all taste for the noble art of cultivating the soil. We should have a more healthy state of society, if, at school or college, our children were thoroughly instructed in a practical knowledge of mechanics and agriculture. The cultivation of the soil demands for its intelligent management a knowledge of chemistry, botany, geology, of fruits, trees, rearing of cattle, of the properties and uses of manures, etc., all of which afford pleasure, and give healthy mental and physical occupation. He who is once initiated into this science of sciences, and its application, will not quit the cultivation of the soil for any meaner profession. Literary training, instead of being the principal object of school education, should be considered a recreation, and the practical should take precedence."

E. W. Dean, of Norwich Town, Conn., also writes that he has passed through the ordeal, having been a clerk three years, where his hands were kept soft and white, and then became a machinist's apprentice. This was hard on his hands, and insured his receiving the cold shoulder from his acquaintances, who before welcomed him. He, however (very wisely, in our opinion), prefers his position of independence as the master of a useful art than as a mere caterer to the tastes of purchasers of finery.

The following from the Philadelphia *Morning Post* is allied to the general subject, and we therefore copy it: "The late report of the directors of Girard College shows not only the great changes that have in late years taken place in our social and business systems, but a very unpleasant result in regard to the college. There are now forty boys in the institution who are ready to go out, but who are obliged to remain because there is no one willing to receive them under indentures, as provided by the will of Girard. The system of indentured apprenticeship having fallen into discredit and disuse, these boys are unable to find masters, and must, therefore, remain in the college, occupying the places of many who are ready to enter, thus interfering very much with the usefulness of the institution. There is, it appears, no legal way of disposing of these pupils, who have gone through the prescribed course, and have drawn from the college all the benefits to which they are entitled.

"According to the will by which the institution was founded and governed, these boys must be bound out to learn a suitable trade. That patiently waiting for persons willing to take them under these conditions will be of any avail we doubt. Every month, every year will find fewer and fewer business men adhering to the old system of apprenticeship. Every year the number of boys who have graduated but cannot leave the college, will increase, until in time the whole establishment will be filled with its alumni, to the total exclusion of new scholars, and this body of graduates must, we suppose, stay there until they are old men, and every time an octogenarian drops off, a boy may be admitted.

the legislature is empowered to pass such a law as may enable the Board of Directors to place the boys at suitable trades and callings without the necessary accompaniment of an indenture, it should immediately be done."

VELOCIPEDE NOTES.

One of the most brilliant exhibitions of skill in velocipedestrianism that has ever taken place in this city or elsewhere, took place at Apollo Hall, corner of Twenty-eighth street and Broadway, a few evenings since, under the direction of the Pearsall Brothers. Dodworth's band was present, and the evolutions of the skillful riders present on the occasion were rendered more pleasing by the accompaniment of splendid music, for which this celebrated band is distinguished. The tournament opened by the entrance upon the floor of twenty-five of the most expert riders in the country, whose advent called forth immense applause, renewed as the graceful evolutions of the performers excited and delighted the admiring assembly. The affair was very select, and was attended by a large and fashionable concourse of ladies and gentleman.

Nearly all the bicycles in popular favor were represented, but the most attractive feature of the evening was the performance of a sister of Messrs. Pearsall, on a beautiful little ladies' velocipede, which has been appropriately called the "Peerless." This machine has low wheels, and is propelled by treadles connected with the cranks, so that a special dress is not required by the fair rider. It is altogether a most attractive design, and will, we think, speedily become a favorite with the fair sex.

A two hundreddollar Pickering velocipede is offered by the Pearsalls, to be competed for the fastest time in a half mile at the Gymnacyclidium, on Thursday, the 15th inst. The machine is mounted with silver plate and ivory fittings, and is a gem.

A challenge has been put forth by Mr. Frederick Hanlon, who offers to race any velocipedist of the United States for a thousand dollars a side and the championship. The race to take place in this city or Brooklyn, half mile heats, best two out of three. The time between the heats to be ten minutes. The party accepting the challenge to choose his own velocipede, the fore wheel of which shall not exceed 37 in., except it be a Demarest, in which case the fore-wheel shall not exceed 41 inches.

The *Herald* says: "It is probable that a Brooklyn expert will accept Mr. Hanlon's $1,000 challenge, and that the race will be arranged to come off at the Empire City Rink."

Mr. Stephen W. Smith has commenced a suit against Mr. Calvin Witty for alleged infringement upon patents originally granted to Philip W. McKenzie, of Jersey City, and subsequently assigned to Mr. Smith. The McKenzie invention was illustrated in these columns a few weeks ago.

Much diversity in opinion, as to the proper dimensions of the velocipede wheels and cranks, has existed, but the favorite size seems to be from 30 to 36 inches for diameter of driving wheel, and 6 inches for length of cranks. We have seen larger ones, but we doubt that they will be much used so long as the bicycular form of velocipede is considered the best.

Since writing the paragraph in regard to rubber tires for velocipedes, we have had submitted to us a number of plans for fastening them. To fasten them firmly has been the difficulty heretofore. Some of the plans proposed seem well adapted to meet the requirements of the case, but actual trial can alone demonstrate their value.

We saw recently a bicycle propelled up the heavy grade from the Wall Street Ferry to the top of the Brooklyn Hights. We were too far away to ascertain the maker of the machine, or the name of the rider. When we add that this grade is certainly not less than one foot in ten, our readers will appreciate the significance of this statement, with reference to the possibility of overcoming steep grades. The rider ascended the entire grade, certainly not much less than three hundred yards in length, using the flagged sidewalk as a way.

The *Brooklyn Union* says, the fastest time yet made on a velocipede in this couutry, was that made by Messrs. Burroughs and Demarest, on the night of the third inst., on Demarest machines, with 45-inch and 41-inch driving wheels. The trials took place on the mammoth rink in Third avenue, and the machines which were ridden were the Demarest, Wood, Pickering, Mercer, and Monod, and the Union Hardware Company. Previous to the race the Tilton Brothers and the two Tildens did some bicycle gymnastics, and the display was much admired. We heard a suggestion made that the exhibition would be preferable if the two parties went in couples rather than in a quartette. After the fancy riding came the races. The course was half a mile, three times the circuit of the hall, the center of the hall being marked off by rows of seats for exercise riding. Mr. Burroughs led off on a 45-inch Demarest, and he went round at a startling pace, making his first circuit in eighteen seconds, great time for the sixth of a mile. He, however, started too fast to keep up his pace, and he occupied 72½ seconds in doing the entire distance. Darling was the next, and he made the half mile in 71½ seconds on a 41-inch Demarest. Young Hamburgh now tried in on a a 33-inch Union Company machine, and he made excellent time, coming-in in 85½ seconds. Mr. C. D. Demarest now got on a 41-inch Demarest machine, and he flew round the hall at a rapid pace, coming-in in 68¾ seconds!—the fastest half-mile time on record. A Mr. Weed then tried a 38-inch Pickering, but it took him 90 seconds to go the half mile. G. Tilden then tried his skill on a 45-inch Wood machine, and he did his half mile in 76½ seconds, his brother doing it in 83½. A rider named Capeless was the last, and he went round on a 35-inch Monod in 84 seconds, and thus ended the trials.

Editorial Summary.

The State Engineer of New York has transmitted to the Legislature his report for the year ending September 30, 1868. This document furnishes the aggregate statistics of 157 companies, as follows: Total cost and equipment of steam roads, $208,185,783; horse roads, $21,133,522. Passengers carried by steam roads, 18,434,300; tuns of freight carried, 11,961,632. Number of passengers carried in city cars, 146,326,486. Cost of maintaining steam roadway, $13,074,595. Cost of operating roads, $15,250,716. Earnings, steam roads, $49,377,790; horse roads, $8,262,291. Persons killed on steam roads, 302; injured, 358. On horse roads, killed, 13; injured, 90. During the year ending September 30, 1868, under both the general railroads law and special acts, thirty-six companies, with a total capital stock of $23,125,000 and a total length of 750 miles, have organized and filed their articles of association in the Secretary of the State's office. During the same year, 169 miles of railroad, under twelve companies, have been opened.

BUSINESS OF THE WORLD'S RAILWAYS.—*Van Nostrand's Engineering Magazine,* says that according to the calculations made by the Government Statistical Office at Berlin, the number of passengers conveyed daily by the railways of the world amounts to three millions, and the quantity of goods to twenty-seven millions of ceutners, or a million and a half of tuns. Also 58,000 telegrams are forwarded, and four millions of letters delivered every day. The daily gross receipts of the railways are 8,000,000 florins; they possess 40,000 locomotives, 1,200,000 carriages and vans, and give regular employment to a million persons. The aggregate length of the telegraph wires would, if united, reach to the moon and back again.

THE great Polish salt mine, recently noticed as in danger of being destroyed by the inundation of water, is pronounced safe by the committee of seven of the principal engineers sent to institute an inquiry on the subject. These functionaries have now sent in a report to the effect that the irruption of water is not of a nature to destroy the mines or prevent their working; and that the forcing pumps for emptying the pit are now nearly all set up.

COAL OIL BURNERS.—We are receiving inquiries in regard to the report of the committee appointed by the American Institute to test coal oil burners, sent to them for that purpose, in pursuance of a notice published sometime since in the SCIENTIFIC AMERICAN. The report will undoubtedly be made in due season, when we will give our readers the benefit of the results obtained.

NEVER HEARD OF IT.—A rustic gentlemen called at a wholesale store the other day, and after purchasing a bill of goods, was asked by the junior proprietor if he had "ever seen a velocipede," "Is that the machine that adds up three columns of figures at once?" said rustic. The reply was in the negative, and he was piloted round to a velocipede school and introduced to the mysteries.

A COTEMPORARY says that two gentlemen in Meriden, Conn., have completed the invention of a needle manufacturing machine. This machine takes in the wire and turns out a completely finished needle—except pointing, hardening, and tempering!

SOLUBILITY OF INDIGO.—M. Camille Kœchlin has discovered the curious fact of the solubility of indigo in alkaloid, salts, and particularly in the acetates and chlorides of aniline, morphine, etc.

VELOCIPEDE PATENTS.

In the United States Circuit Court, April 5th, the suit of W. Smith agt. Calvin Witty was heard. The plaintiff charged that the defendant had infringed on his patents for improvements in velocipedes, and prayed that an injunction be granted. He averred that Philip W. McKenzie, of Jersey City, had obtained at various times three patents for improvements in velocipedes, and had sold the same to him; that he (Smith) had, at great trouble and expense, been manufacturing, for sale, velocipedes made under said patents, and that he will realize large gains therefrom if infringements are prevented; that various parties in different parts of the United States have acknowledged the validity of his (Smith's) claim to said patents, and have taken license thereunder, but that Witty has continually, in violation of his (Smith's) rights, made and sold velocipedes containing the improvements patented as above stated, and that he is still doing so. Smith further says that despite due notice on his part, Witty has refused to desist from infringing these patents. He therefore prays that Witty may be enjoined from continuing these alleged infringements; that he may be compelled to pay him (Smith) the profits he has acquired and the damages he (Smith) has sustained by such alleged infringements, and that Witty be compelled to make a discovery of how many velocipedes, infringing, as alleged, his (Smith's) patents he has made, and how many he has sold. A motion for Witty to show cause why the relief asked should not be obtained is to be argued.

The McKenzie patent, under which Smith claims, is illustrated on page 181, and the patent of Lallement, owned by Witty, on page 102, present volume, SCIENTIFIC AMERICAN.

NEW PUBLICATIONS.

GEOLOGY OF NEW JERSEY, 899 pages large octavo, illustrated by 108 Photolithographic Engravings and Woodcuts, and six Mine Maps; and accompanied by a portfolio containing Maps in sheets of

1. Azoic and Paleozoic Formations, including the Iron ore and Limestone districts; colored. Scale, 2 miles to an inch. 2. Triassic Formation, including the Red Sandstone and Trap-rocks of Central New Jersey; colored. 3. Cretaceous Formation, including the Greensand Marl Beds; colored. Scale, 2 miles to an inch. 4. Tertiary and Recent Formations of Southern New Jersey; colored. Scale, 2 miles to an inch. 5. Map of a Group of Iron Mines in Morris County; printed in two colors. Scale, 3 inches to 1 mile. 6. Map of the Ringwood Iron Mines; printed in two colors. Scale, 8 inches to 1 mile. 7. Map of the Oxford Furnace Iron-ore veins; colored. Scale, 8 inches to 1 mile. 8. Map of the Zinc Mines, Sussex County; colored. Scale, 8 inches to 1 mile. Price of the book and portfolio of maps, $5·00. Same, without portfolio of maps, but containing a folded and colored map of the State, on a scale of 5 miles to 1 inch, $4·00. Single copies of either of the above maps, colored and in sheets, 50 cents. The prices are fixed to merely cover the cost of paper, printing, and binding; the expenses of the survey and preparing book and engravings being paid by the State. These publications can be had from Prof. George H. Cook, State Geologist, New Brunswick, N. J., on remitting the price, or through the booksellers. A valuable book, from which we can promise our readers some interesting extracts, as soon as space will permit their appearance.

FORCE AND NATURE, ATTRACTION AND REPULSION; THE RADICAL PRINCIPLES OF ENERGY, DISCUSSED IN THEIR RELATIONS TO PHYSICAL AND MORPHOLOGICAL DEVELOPMENTS. By Charles Frederick Winslow, M. D. Philadelphia: J. B. Lippincott & Co.

We have endeavored, before expressing our views in regard to this book to read it in a perfectly candid spirit of inquiry. We confess that we found it hard to maintain that spirit to the end. Its style is at times forcible, and its author has evidently caught more than a mere glimpse of certain fundamental truths; but while saying this much, we are compelled to add that it is one of the most illogical books we ever attempted to peruse. It is full of fantastic speculations, and contains not a few errors in its statements of facts. It is wearisome, from its interminable repetitions, and its diffuse method of discussion will hardly fail to draw upon it the severe criticism of thinking readers. In short, it is to philosophy what punch is to the palate, full of incongruities; and, although too much diluted by redundant forms of expression, still quite palatable, but not very nutritious. Claiming at the outset to assume nothing, it ends by assuming everything. Written to enunciate what is evidently a pet theory of the author, namely, that repulsion is equal in quantity to attraction, and that the two are coexistent, and the foundation of all material existence, it will convince few, while its speculations will, if we mistake not, draw upon its author a storm of adverse criticism.

THE AMERICAN YEAR BOOK AND NATIONAL REGISTER FOR 1869. Edited by David N. Camp. Hartford: Published by O. D. Case & Co.

This work is, as its preface informs us, the initial volume of a proposed annual publication, prepared to meet an increasing demand for information respecting the affairs of the General and State Governments, public institutions, finances, resources, and trade of this country; the political, financial, and social conditions of other countries; and various other subjects relating to social and political economy. The work is a thick 8vo, printed and bound in excellent style; and, so far as we can judge from a hasty review of the large mass of statistical information it contains, seems a valuable work of reference.

WE have received from the publishers in Berlin, Messrs. A. Effert and Lindtner, a copy of the "Verhandhungen des Vereins zur Beförderung des Gewerbfleisses in Preussen (Transactions of the Society for the Advancement of Useful Arts in Prussia), for 1867; being the sixty-fourth year of the existence of the society. The members of this society include not only the King of Prussia, and other royal personages, but also the most scientific men of the kingdom. It also comprises a large number of scientific and industrial associations. These facts a are sufficient warrant for the value and interest of its contents. The present number for January, February March, and April, 1868, contains the business transactions of the society, list of members, minutes of meetings, list of premiums offered for valuable inventions, followed by articles illustrated with profuse and finely-executed engravings, upon the following subjects: "On the Production of a Green Coating on Bronze;" "On Stamping Presses;" "On Kapselräder," in which category are included rotary pumps, wheels, etc., "On the Resisting Power and Elasticity of Wrought Iron Double T-Beams;" "On Boiler Explosions in Prussia during the Year 1867." It also gives a list of new patents granted in Prussia during 1867; and a table of prices of wool in all the m arket towns of the kingdom during the year.

"THE LITTLE PEAT CUTTERS; or the Song of Love," is the attractive title of a new volume of the Sunday schools series of choice religious works published by Henry Hoyt, Boston. "Kate and Her Brother," also published by the same firm, will prove an interesting story for the little ones. For sale in New York by N. Tiballs & Co., 37 Park Row.

WE have received parts 13 and 14 of "Locomotive Engineering," edited by Zerah Colburn, and for sale by John Wiley, 535 Broadway, New York. They fully maintain the character of the previous numbers received, and are unsurpassed in beauty of illustration, and typographical execution.

PART VI. of "Packard's Guide to the Study of Insects" is also at hand, profusely illustrated, and full of entertaining and instructive matter.

"Van Nostrand's Eclectic Engineering Magazine" makes its appearance for April, with a well-selected array of engineering and mechanical essays, and items.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; beside, as sometimes happens, we may prefer to address correspondents by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1·00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

G. J., of Me., says, "a combined steel and iron rail of excellent quality is manufactured in Portland, Me." This in commenting on an article in the SCIENTIFIC AMERICAN published on page 213 current volume copied from the London *Engineer*. We do not hold ourselves responsible for statements made by other journals and copied into our columns.

C. M. B., of Conn.—We propose in our series of articles on "Shafting Pulleys and Belts," now in course of publication, to give some directions in relation to pulleys and belts, relative diameters, etc., which will better meet your case than any reply we can make in this column.

P. J. P., of Mass.—To turn a true taper on the lathe, the cutting point of the tool should be exactly at the center of the piece which is to be turned. In ordinary turning it is better to keep the point above the center.

J. H. W., of Pa.—The reason why your cold chisels break is to be found in your hammering them when nearly cold, to "smooth finish' them, as you say. It is certain that this extra finish produced by hammering refines the steel—compacts its fibers—and thus changes its texture, and consequently its before ascertained quality. It will not stand so high a temper. All the hammering required is that necessary to bring the chisel into shape while hot, changing the texture of the metal as little as may be.

H. O. B. of Mich.—You are mistaken in supposing that a very great distance is necessary between shafts connected by a quarter turned belt. We have seen them run at only three diameters apart; that is, two six-inch pulleys only six inches between their perimeters, the centers of the shafts only twelve inches apart. Width of belt is an obstacle in the way of extending the principles of runn ing turned or twist belts. In our answer to "W. H. of Pa.", on page 251, the "15 feet" should have been 30 feet. This matter of belts will receive further attention in a subsequent article, one of a series on "Shafting, Pulleys, and Belts" now being published in these columns.

H. McD. of N. Y., will see his critical note embodied in an article on the same subject to appear soon. His suggestions are worthy the subject and will receive due attention.

J. I. G., of Pa.—You can brown your gun barrel by coating it with oil (sweet oil) and heating it over a fire. We prefer, however, the use of acid as giving a darker and more even color. If the surface is properly cleaned before applying the acid there will be no difficulty in getting an even shade.

B. R., of Iowa says, in relation to prevention of limy incrustations in boilers, mentioned on page 219 current volume, SCIENTIFIC AMERICAN, that the use of oak saplings therein mentioned is really advantageous, as he has used it successfully for twelve years and never knewit to fail. Or put half a bushel of common (Irish) potatoes in the boiler and no more trouble will be experienced. As to patent powders he has never tried them.

E. H., of Mass.—In Shaffner's Telegraph Manual, page 605 and those succeeding, you will see sections of just such cables as you describe, containing more than one insulated conducting wire.