

justment screw. Fig. 1 shows by dotted lines the position of the saw-blade when the teeth are to be sharpened. It will be noted that these teeth project slightly above the clamping jaws in convenient position to be filed. In Fig. 2 we show the position of the blade when the teeth are to be set. It will be noted that the blade is clamped with the teeth resting against the face of the anvil. A rod extends across the frame below the anvil, and mounted on this is a punch which may be swung up against the saw teeth. In operation the punch is struck with a hammer so as to force the alternate teeth of the saw against the anvil, this being permitted owing to the fact that the punch has free lateral movement along the rod on which it is mounted. After the alternate teeth have all been set, the blade is removed and replaced in the vise with its opposite face against the anvil. Thereupon the intermediate teeth are set by means of the punch. By means of the set-screws the jaws may be adjusted to any desired angle with respect to the anvil face, in order to give the saw-teeth the desired set.

STREET CLEANER'S TRUCK.

A very useful improvement in street cleaners' trucks has recently been invented by Messrs. John Rehm and Theodor von Gerichten, of 570 East 149th Street, New York city, N. Y. The principal advantage of the apparatus is that it provides means for conveniently raising and dumping the refuse of the street into the can or receptacle. Furthermore, the receptacle can be readily removed or replaced on the truck, when desired. The apparatus comprises a frame supported on two large wheels and a trailer wheel. At the upper end of the frame are a pair of oppositely-disposed brackets, one of which is indicated at A in the engraving. These brackets are formed with sockets adapted to receive the trunnions of the can. Pivoted at C on these brackets is a yoke lever, whose lower arms support a dumping pan. The upper arms of this lever form an acute angle with the lower arms, and serve as a handle for the truck. The engraving shows the can resting on the ground in position to receive the street sweepings. The street cleaner can dispense with the usual scoop, and sweep the refuse directly into the pan. This done, the handle is swung over the can to the position indicated by dotted lines. The pan will thereby be raised and its contents dumped into the receptacle. Indicated at B is one of a pair of grapples mounted at opposite sides on the frame, and which are adapted to engage and hold the handle so that they can be used for moving the truck to any desired position. The grapples are hinged to the frame so that they can be moved out of the way of the handle when desired. Below the grapples B are a pair of hooks D, which are adapted to hold the handle in a more depressed position. When engaged by these hooks the handle may be lifted up, carrying the frame with it, swinging the brackets A over the axle of the wheel and down the other side, and thus depositing the can on the ground. The can may be readily replaced on the truck by reversing this operation.

A NOVEL CIGAR LIGHTER.

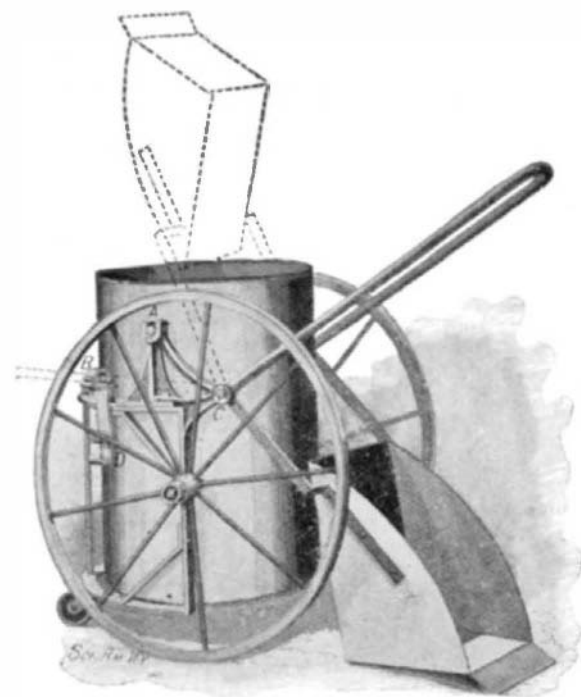
The common alcohol-burning cigar lighter in which detachable torches are provided is a very convenient device, particularly in a busy store. However, it has the disadvantage that a flame for igniting the torches must be kept constantly burning, thus occasioning a waste of fuel when the device is not in use. Electrical cigar lighters on the other hand use no current except when it is automatically turned on to light a cigar. But they usually possess the disadvantage of being rather cumbersome to handle, as the entire device must be lifted to the cigar, and furthermore the wire connections limit the area over which they can be moved. We illustrate herewith an improved cigar lighter, which aims to combine the advantages of both the torch and the electric lighter. The device comprises a stand with a pair of branching arms in which the torches are placed. At the top is a receptacle for tooth picks or the like. Within the device is a well for oil or other inflammable fluid, and connected with this well are a pair of wicks, which conduct the fluid to the torch receptacles. The torches are provided at their lower ends with absorbent material adapted to soak up a portion of the oil furnished by the wicks. In place of an oil flame for igniting the torches an electrical sparking device is used, consisting of a small spark coil within the stand and a battery for actuating the same, the terminals of this coil being connected to a series of sparking fingers which project through the wall of the stand into a slideway. In use a torch is taken from its receptacle and drawn down the slideway, whereupon a series of sparks will result, due to the contacting of the fingers, and the inflammable material in the torches will be ignited. The cigar may then be lighted, and the torch returned to the receptacle. It will be noted that there is no waste of current, as there is no flow except when the torch is drawn down the slideway. At the same time the cigar lighter possesses all the advantages of the usual alcohol-burning type. A patent on this device has been

granted to Mr. George S. Andrews, of 147 North Main Street, Butler, Pa.

Profitable Mechanical Invention.—I.

BY THALEON BLAKE, C.E.

Travelers assure us that even in those remote parts of the world where the name America is but a report, and consequently where a classification of national characteristics is based on no more secure foundation than mere hearsay, each of us is reputed to possess fabulous wealth and marvelous mechanical skill.



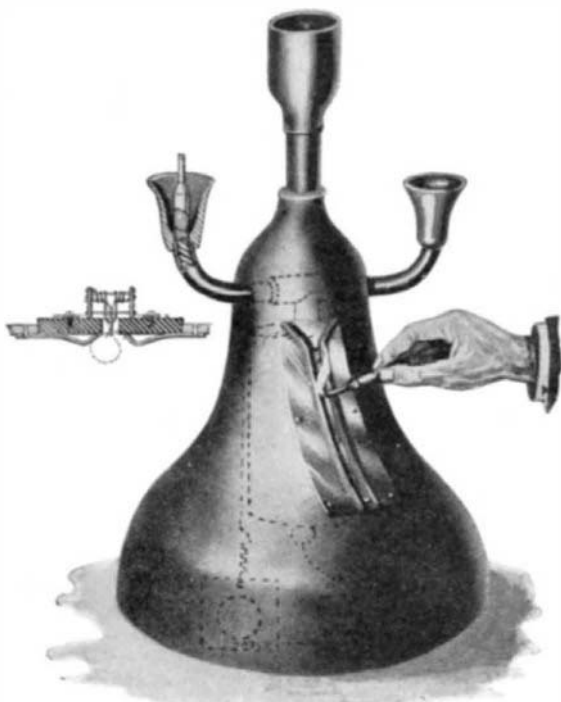
STREET CLEANER'S TRUCK.

The false note of exaggeration in this prevalent assumption is manifest; yet there is a pronounced sound of truth in it.

Each of us is at least rich in that inheritance bequeathed by our mechanicians. Besides, the American inventors have made wealth possible to untold thousands of their countrymen, by creating labor- and time-saving machines. Liberal patent laws have stimulated Yankee ingenuity; many have become inventors solely for the remuneration of wealth or fame, and have surpassed expectation.

And the field of invention is not yet worked out. Prizes still await the patient and, above all, the observing men. Yet there has been a great change in the personnel of inventors within the last quarter of a century.

This change has largely been brought about by the mechanical engineers, who follow inventing as a profession. For these men go about their life's work with well-defined plans and aims. Like careful explorers, they select some particular region to explore, and then proceed to explore it systematically. If



A NOVEL CIGAR LIGHTER.

some of them fail of the highest achievement, it is not because of insufficient preparation and of indefinite ideals. They know what they want before they set forth upon their expeditions. They do not end their march in the neighborhood of some North Pole of mechanics, arriving there accidentally, after a meandering march to and fro in some Torrid Zone, aimlessly seeking countries to explore. They have their North Pole in their mind's eye, and strike directly for it.

The result is that inventions are no longer so exclusively accidental, nor the result of inconstant thinking, and of chance experiment. Much of the haphazard progress of mechanics has been eliminated; much of the romance dispelled.

Still, any man may conceive an idea, and a valuable one. The professionals have no corner in ideas. That is impossible.

It is this element of chance which makes the inventing game so alluring to the novice. The fascination of possibly drawing a prize, of stumbling upon a fortune, conquers him. Should at any time an increasing proportion of unprofessional inventors be doomed to little or no returns from their experiments, it is to be ascribed to their having attempted to invent devices already perfected, or even long since antiquated. The fault will be theirs because of an unwise selection of a subject for their meditation and practical improvements. It is of these important truths, and for the benefit of bright young men who evince a love of mechanics, that this is written.

Before considering the prospects of being a successful temporary inventor, let us examine the aspects of professional inventing, and especially the manufacturer's point of view, as well as his relation to the professional inventor. In many of the large factories in which such machines as gas engines, typewriters, arms, bicycles, automobiles, standard farm implements and farm machinery, or electrical supplies are made, mechanical engineers work ceaselessly for improvement of their products.

"If I could get the public to buy new machinery as fast as I can get experts to design it and get it out, I should be very rich in a very short time," said a thriving manufacturer recently. That is true; for in quite a number of large industries, the expert mechanical engineers are far ahead of the actual demands of the trade. No sooner does the public fairly take up with a machine, than along comes a manufacturer with a superior one which his experts may have had perfected months before, and which he may have kept back, waiting for a fit time to introduce it.

Sometimes manufacturers have better models of machines than the ones they offer for sale; they may not be in any hurry to push out these improved machines, as they, perhaps, may have a great deal of money recently invested in the plants in which the older models are made. They may not desire a too hasty change to the better models, as it would necessitate a discarding of old methods of manufacture, sending of expensive tools to the scrap-pile, or dismantling of entire plants.

"But does it not pay to be progressive?" is a question apt to arise in the minds of students and experimenters.

To which query it may be said that all manufacturers of standard types of machinery are very conservative. However, new types will be placed on the markets of the world. Thus it occurs that frequently machines are abandoned before being worn out, because they are rendered obsolete by the incessant improvements of the professional inventors, who are thorough masters in their lines of endeavor and of the conditions and wants of their several markets.

The professional inventors as a body bear an intimate relation to the great industries, some of which would not have been created but for the brilliant work of these gentlemen. There is a growing respect and union between the manufacturers and the professional inventors, which results in profit to both sides, although it goes without saying that the former still gather the lion's share in the matter of dollars and cents.

Why is this so, that manufacturers entertain an unwonted respect for this new class of inventors? Because of the training of this class in mechanics, or in mathematics, or in chemistry, or in advanced shop practice and shop economics. Because, also, of their practical aims and successful solution of practical problems entrusted to them for scientific investigation or improvement.

A professional inventor to be successful in many inventions must have, first, an accurate knowledge of what machines are being built similar in design, or for a similar purpose, to his; and second, above all things, a prescient ingenuity, inasmuch as he must have a correct intuitive perception of how the trade, or the public, needs, and is likely to welcome, his contemplated inventions. Indeed such a man is in the possession of a high order of ability.

It has often been remarked that it is not nearly so difficult to invent, as to find out what to invent. It is, indeed, a veritable stroke of genius to catch a glimpse of an idea which is at once absolutely new and very valuable. But the highly-trained mechanical engineer goes one step farther. He realizes that it is more important to know what not to invent than what to invent, as many machines that are inventable are not also profitable. This is what the professional inventor, from his occupation and association, is especially competent to know.

Thus it will be seen that the amateur inventor has

two formidable competitors. Besides the professionals, there are the specialized workmen in the various industries. For instance, in a large automobile factory it is safe to assume that a respectable number of competent workmen are constantly evolving improvements. These men have a peculiar advantage, being on the spot where the latest types are made, and having most excellent opportunities of getting acquainted with the models of their company's rivals, as well as with the minutest details of the models which they make.

What chance, other than a gambler's chance, have unskilled inventors to compete with these two bodies of competitors? Very little chance, indeed, in a few lines of manufacture; but elsewhere, all the wide world in which to roam or to explore. But more of this later.

The first and chief handicap which offers an obstacle to the untrained inventor's success, lies not so much in his lack of brains or opportunity, as in his application of brains to abstract or even visionary projects. For example, if the brains which have been wasted on perpetual motion and on other delusions of like ilk, had been given to homely and every-day necessities, the mechanical achievements of the race would probably be noticeably in excess of what they are. And strange as it may sound in the ears of many people of education, the perpetual motion chim-

era is very much alive this very day. Men who are afflicted with that disorder of the judgment, usually maintain a rare secrecy about their experiments. This reticence is due partly to shame; for although they firmly believe the possibility of a machine being constructed which, once started, shall run until worn out, they very sensibly perceive the hostility of the public to that form of experiment; but this silence is also, and very likely, more instigated by the thought of the abnormal wealth which they conceive will inevitably be the reward of the inventor of a perpetual motion engine.

Nor are these men universally the cranks which a superficial reader may be induced to call them, as they are commonly very useful citizens, and in other respects practical and hard-headed to a degree. Yet by this delusion are they held in an iron obsession. Education is the foe which will drive delusion to cover, and here education may be hopefully sought, as much of mechanics may be self-taught. Many of these sorry day-dreamers, who are poor to-day, would have an excellent chance of being independent tomorrow, if they would but become awake to the real.

A patent attorney of large practice recently wrote, in a letter to a friend, that the bicycle, the rifle, the sewing machine, have been about abandoned by the amateur, who is at present more favorably impressed with the wealth-creating possibilities of the automo-

bile and aeroplane. This is a humorous way of stating that amateurs would rather follow than lead, rather try to invent things about which they know little, than to try their talents where they really might succeed.

Mere industry backed by crude knowledge accomplishes barren results in mechanics, whereas original research in lines well understood is prolific of inventions of merit.

Another hindrance to achievement which impedes the man who does not engage in invention as a regular and gainful occupation—who, for instance, becomes a mechanic only for the purpose of developing an invention or two—is that he is frequently led astray from the inventing of simple articles to try for the solution of the most difficult and complicated mechanisms, which require, for proper solving, like intricate mathematical problems, a thorough training, much experience, and considerable time. Such a man soon feels discouraged as the tasks prove to be unconquerable without skill, money, and extensive shop facilities. To essay certain kinds of invention, a man must be peculiarly talented, or very rich, or probably both talented and rich; for machines, other than simple, often necessitate a model-making plant quite as extensive as an ordinary, fair-sized machine and foundry shop.

(To be continued.)

RECENTLY PATENTED INVENTIONS.
Pertaining to Apparel.

GARMENT-FITTING DEVICE.—ROXANNA A. HAMPTON, New York, N. Y. The device is more especially designed for enabling a dressmaker or other person to accurately and quickly determine the length of a skirt from the waistband down to the bottom edge and the distance the latter is from the floor, with a view to insure a proper hang of the skirt and to have the bottom edge thereof all around an even distance from the floor.

SIZE-REDUCING DEVICE FOR HATS.—R. H. CURTIS, Long Branch, and H. D. CURTIS, Red Bank, N. J. One purpose of the invention is to provide a device whereby the size of the hat, cap, or other article of headwear may be reduced at will from the normal size to any fraction of a size provided for by the construction of the device—a half-size for example. The interior of the hat at the brim may be reduced in size all around or only at the front, back, and sides, or at any desirable single or multiple points. The device is applicable to the crown of any hat.

CLASP.—DORA O. MCHUGH, Lorain, Ohio. The invention relates to clasps, and particularly those applicable to the securing of shoeties. Its principal objects are to provide a neat, convenient, and secure clasp for such purposes. It is symmetrical and inconspicuous and, if desired, may be made of more or less ornamental appearance and of precious metals.

Electrical Devices.

ELECTRIC SIGNAL FOR WEIGHING-SCALES.—S. J. DERBES, New Orleans, La. The invention refers more especially to electric alarm-signals for association with some part of a weighing scale or machine to be operated by the scale-beam for indicating to a salesman or attendant of a store or other establishment that goods being weighed on the scale are approaching the weight at which a balance will be established therebetween and the poise or the poises on the scale beam.

Of Interest to Farmers.

SEEDER AND PLANTER.—G. G. GILBERTSON, St. Ansgar, Iowa. The device is mounted upon wheels and is provided with handles projecting to the rear by which the machine is pushed along in front of the operator, its special purpose being to plant such small seeds as onion-seed, peas, and the like. It may in many of the features be applied to team-drawn seeders and be adapted for planting any kind of seed.

THRESHING-MACHINE.—D. STILL, Milton, Ore. Mr. Still's invention relates to threshing-machines; and the object is to provide an improved apparatus of this class which shall be efficient in separating the heads of grain from the straw and chaff. The invention concerns itself especially with the shoe and the manner of handling the threshed grain and subjecting the same to air-currents.

Of General Interest.

TICKET-BOX FOR THEATERS.—P. H. BREHMER, Rutland, Vt. One purpose here is to provide an arrangement of a box especially adapted for use in theaters and other amusement places, which box can be located in an opening in the wall adjacent to the ticket-window and which is constructed to contain all tickets to be offered for sale on a given date placed under designations of the various parts of the house to which the tickets afford access, the arrangement being visible to the purchaser but protected from him.

DRUM.—A. D. CONVERSE, Winchendon, Mass. The purpose of the improvement is to construct the drum entirely of sheet metal, so that the heads can be securely attached to the

shell without any intermediate props or supports being employed, the sole supports for the heads being at the edges of the chimes of the shell and from uniform contact the inner face of the shell. It relates particularly to metal toy drums.

LOADING APPARATUS.—J. J. ROBINSON, Bloomsburg, Pa. The invention relates to the loading and unloading of trucks used for transporting goods. It is especially applicable in shops and mills for the purpose of facilitating the moving of loads of material in bulk. The object is to produce a construction of truck and platform for the load which will facilitate the moving of the load from the truck to the platform, or vice versa, and to transfer without breaking the bulk.

ATTACHMENT FOR HAND-OPERATED BRUSHES.—J. GRAP, Paterson, N. J. This invention relates more particularly to an attachment for hand-operated brushes of the kind used for spreading paint and varnish, the attachment being flexibly connected with the brush in such manner that the operator while using the brush may move the shield relatively to the same within certain limits.

ORE-SEPARATOR.—P. A. HARDWICK, Colorado City, Col. In this patentee's invention the improvement relates to apparatus for separating and securing the values of the ore, and the inventor has for his principal purpose the provision of an effective apparatus of this character. In use the lightness of the apparatus greatly facilitates its conveyance to the deposit to be operated upon.

FASTENER FOR EYEGLASSES.—D. W. KOLLE, Portland, Ore. In the present patent the improvement has reference to fasteners for eyeglasses or spectacles, and it is intended to be especially useful in connection with the construction of eyeglasses for making a simple connection between the lens, the bow or spring, and the nose-guard.

Heating and Lighting.

ACETYLENE-GAS GENERATOR.—T. S. HOLT, Federalsburg, Md. The invention relates to a generator of that class in which a quantity of calcium carbide is discharged into a mass of water, generating the gas, which is subsequently conducted to the gas-holder, the gas-holder being connected with devices by which the carbide supply is automatically regulated according to the amount of water in the holder.

Household Utilities.

DEVICE FOR ROASTING MEATS AND THE LIKE.—D. G. WALKER, Lindsay, Neb. The improvement relates to culinary vessels, and has reference more especially to devices for roasting meats and the like, being substantially of the type of device for similar purposes described in Mr. Walker's former patent. It is effective and reliable, simple in construction and practically self-controlling. The structure may be readily taken apart for cleaning or repair or other purpose and again put together.

IRONING BOARD.—A. N. MARSDEN, Trenton, Mo. The improvement is particularly adapted for use in laundries, and the object is to rotatably mount on a center support or standard a plurality of boards of different sizes for convenience in ironing various articles, the boards being so mounted that the ones not in use may be swung downward out of the way.

Machines and Mechanical Devices.

WINDMILL.—F. M. ESPINOSA, New York, N. Y. The object of the inventor is to produce a mechanism of this kind which, having folding arms, may be extended at will and, further, to provide improved means for controlling the position of the vanes and governing the power developed by the mill.

MACHINE FOR FORMING PLASTIC MATERIAL INTO LUMPS.—C. BRISTOW, Christchurch, Canterbury, New Zealand. The machine forms butter and other plastic materials into lumps ready for table use, the machine being more especially designed for use in restaurants, hotels, and like establishments and arranged to permit an operator to quickly and conveniently form lumps of any desired shape in a very convenient and sanitary manner without much exertion.

HACKSAW-FRAME.—A. ADAMKIEWITZ, Chicago, Ill. The improvement is in hacksaw frames and handles, and has for its aim to produce a saw for use by machinists and others in which the blade can be readily and quickly removed for sharpening and one in which the blade when not in use can be relieved of all the strain.

POWER-TRANSMITTING MECHANISM.—W. H. SAUNDERS, Philadelphia, Pa. The principal objects of the invention are to provide a belt-driven anti-friction variable-speed counter-shaft drive which will have many advantages over those heretofore invented. The device may be constructed without great cost, to greatly reduce friction and to provide means for tightening the belt without stopping the machinery.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. In every case it is necessary to give the number of the inquiry.

MUNN & CO.

- Marine Iron Works. Chicago. Catalogue free.
- Inquiry No. 8434.**—Wanted, the name of the manufacturer or dealer in machinery and appliances for cleaning cloth fabrics by what is known as the "French Dry Process."
- "U. S." Metal Polish. Indianapolis. Samples free.
- Inquiry No. 8435.**—Wanted, machinery and materials for making market and grape baskets.
- See our Ad. on back page. Star Expansion Bolt Co.
- Inquiry No. 8436.**—Wanted, manufacturers of novelties for mail order trade.
- Handle & Spoke Mch Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.
- Inquiry No. 8437.**—Wanted, to communicate with a party making a composition such as buttons are made of.
- Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.
- Inquiry No. 8438.**—Wanted, an oil well boring outfit.
- I sell patents. To buy, or having one to sell, write Chas. A. Scott, 719 Mutual Life Building, Buffalo, N. Y.
- Inquiry No. 8439.**—Wanted, a small smelter for ores and fuel oil.
- The celebrated "Hornsby-Akroyd" safety oil engine. Koerting gas engine and producer. Ice machines. Built by De La Vergne Mch. Co., Ft. E. 138th St., N. Y. C.
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- Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machine work and special size washers. Quadriga Manufacturing Company, 18 South Canal St., Chicago.
- Inquiry No. 8441.**—Wanted, parties to make metal specialties.
- Headquarters for new and slightly used machinery. Liberty Machinery Mart, 138 Liberty Street, New York.
- Inquiry No. 8442.**—Wanted, names of dealers in grains and seeds, such as Kafir corn, bemb seed, sunflower seed, barley, Canada peas, millet seed, rape seed, flax seed, sorghum seed, cotton seed, broom corn and rye.
- Inquiry No. 8443.**—Wanted, manufacturers of meat meal and meat scraps for poultry.
- Inquiry No. 8444.**—Wanted, makers of mechanical bands and musical machines.
- Inquiry No. 8445.**—Wanted, makers of pulp board, such as used for milk bottle caps.
- Inquiry No. 8446.**—Wanted, a furnace for burning the solder and tin from old tin cans.
- Inquiry No. 8447.**—Wanted, to communicate with parties placing household articles or novelties on the market, suitable for canvass by children.



HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and though we endeavor to reply to all either by letter or in this department, each must take his turn. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. Special Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(10188) D. E. W. says: Will you please tell me if it is a fact that there is a total eclipse of the sun every 18 years and 10 days? A. Eclipses, solar and lunar alike, occur in a period of 18 years and 11 1-3 days, very nearly. It will be 10 1-3 days if there happen to have been five leap years in the period. No one knows when this fact was discovered, but it is certain that the Chaldeans knew it and predicted eclipses by its aid. About 70 eclipses occur in this period, varying somewhat because new eclipses come in at the eastern limit and old ones disappear at the western limit. The name of this period is the Saros. Of the 70 eclipses in a Saros, there are usually 29 lunar and 41 solar eclipses; and of the 41 solar eclipses, 10 are usually total.

(10189) F. B. asks: Why do not the equal days and nights occur when the sun crosses the celestial equator? For example, in one almanac calculated for latitude 40 deg. N., on March 21 last the sun entered Aries and spring began, but the nearest equal day occurred on March 18, three days before, while in September the nearest equal day occurs on September 27, four days after. A. Equal days and nights do occur every time the sun crosses the equator. The day is just twelve hours and the night twelve hours long. But because of the equation of time the clock time of sunrise and sunset varies from six. The true sun is east of the mean or clock sun by about seven minutes in March and a little more than seven minutes to the west in September. See any good textbook of astronomy for a full explanation of this. Todd's, price \$1.75, or Young's "General Astronomy," price \$3, are recommended and can be supplied by us. 2. What causes the synodic revolution of the nodes of the moon, and why does the line of apsides change? A. The synodic revolutions of the moon's line of apsides and the regression of the nodes of the moon's orbit are caused by the disturbing action of the sun upon the moon. The discussion of these effects constitutes the problem of the three bodies. A good elementary presentation of the problem may be found in Young's "General Astronomy."

(10190) P. Y. asks: Suppose recording maximum and minimum pressure gage is lowered below the disturbing influence of the waves, in the open sea, during a calm, what effect will the ebb and flow of the waves have on the gages during a storm, we will say at the time when the difference is 10 feet from the normal, or 20 feet from the crest to trough? A. A pressure gage under water will show the change of pressure due to change of depth of water. It can make no difference whether the depth changes because of a wave or because of a change of depth of the gage.