## REGENTLY PATENTED inventions. Engineering.

Drawbridee.-William L. Sampson cean Grove, N. J. A bridge of comparatively light weight. and which is strong and durahle, and may be
quickly opened and closed, has been devised by this inquickly opened and closed, has been devised by this in-
ventor. The draw spans each consist of a framework ventor. The draw spans each consist of a framework
traveling on wheels on tracks laid in the ted of the waterway, the spans being moved to open or closed position by a rope or chain passing over a pulley in the bed of the waterway and around a drum on shore, the latter being
operated by any convenient source of power. When the draw is open the convenient source of power. To the draw span present upward incline designed to prevent accidente by the tempted passage of teams or passengers.

## Electrical.

Incandescent Lamp.-Forest W. Dunlap and John R. Quain, London, England. This invention provides an improved light refracting and magnify-
ing envelope to concentrate the light rays downward or ing envelope to concentrate the light rays downward or direction. With this view the bulb is inclosed by a closely wound spiral of glass rod of circular or other closely wound spiral of glass rod of circular or other
section, having throughout its length the property of a biconvex lens or prism, producing a concentrating and
magnif $\begin{aligned} & \text { ing effect. When not required to apply the cn- }\end{aligned}$ magnif $y$ ing effect. When not required to apply the envelope to the entire lamp, the upper or thelower half
may be employed as desired.

Bicycles, Etc.
Bictcle Propelling Mechanism.Erling Slippern, Anaconda, Montana. Besides the usual foot-propelling mechanism, the handle bar, according to his invention, 18 made with each side separate and with motion of the two sides of the handle bar may be communicated through a link to a sprocket wheel mounted on the forward part of the frame, this wheel being con-
nected by a sprocket chain with the main crank shaft. nected by a sprocket chain with the main crank shaft.
The arrangement is such that the motion of the handle hars will be opposite that of the pedals, the right handle
har rising while the right pedal is descending.
Elastic Tire.-William F. Williams, London. England. This tire is made of a bancl of rubber or rubber and canvas in which are embedded justaposed
transerse spiral springe, the band having lateral extensions stiffened by non-coiled prolongations of the springe, im, on wher ins rim, on which it is relained by eugage:nent of the latera
extensions. The device is designed io combine the advantages of a pne
solid rnbber tire.

## Mechanleal

Warping Roller. - John Cocker, Philadelphia, Pa. This invention provides an improved
sectional drum for beam warping machinee, arranged to sectional drum for beam warping machines, arranged to drum with new parts instead of procuring an entire new drum when renovating a machine. The drum shaft carries one, two or more rimmed webs, a drum rim formed with internal bosses or flanges registering with the web rims, and set screws in the web rims for adjusting and supporting the drum rim concentric to the shaft. Drum rims of different diameters may be used, and placed in position by the set screws on the webs, for the same
warping machine, according to the work under treat-

Roller Cotton Gin.-Frederick L. Montgomery, New York City. This invention covers an improvement on a formerly patented invention of the
same inventor, providing an improved gin arranged to properly strip the seed from the lint of upland or other cutton without danger of tearing or pulling the fibere anart and without crushing or otherwise injuring the
se.al. A fixed stripper plate has its inner face concave and in close proximity to the peripheral face of the ginning roller, the upper end of the plate being formed into a knife edge and a movaule stripper operating over the
plate, while under the plate is a drawng device with rollers, one in front of the other, and held in peripheral con tact with the ginning roller

## Agricultural.

Cattle Guard. - James Hensey, War en, Ark. To prevent cattle or other animals from passtion provides a simple and inexpensive guard or gate mounted to swing transversely of the track, across which is extended a rock shaft carrying a lever, there
being a link connection hatween the lever and gate, arme a link connection hetweel the lever and gate'
arom the shaft, and a platform bearing on the arms. The platforms may extend any desired distance at both sides of the gate or guard, and the ar-
rangement is such that, by an animal stepping upon rangement is such that, by an animal stepping upon
one of the platforms, the gates are drawn to closed

Bee Catcher. - Edward Arrington, in the hive without danger of the operator being stang this invention provides a suitable elide frame with grooves in which may be reciprocated a bliding door, controlling
the entrance of a receptacle. the whole being pivotally mounted on a bracket on an exterrsibie pole. Flesible pieces are provided to enable the operator to slide the
door to open or close the receptacle while the latter is held in elevated position or near a tree limb, the ausitation of the latter causing the bees to fall minto the
rece:;tacle. The receptacle may be held in any desired position with respect to its support, and raised close to the swarm of bees.

## Miscellaneous.

Filetering Apparatus. - Charles Prevet, Paris, France. This invention provides a simple and inespensive filter, designed to be made in small
pocket form for the usc of soldiers, sportsme?, etc., or pocket form for the usc of soldiers, sportsme 3 , etc., or
in larger sizes. The filter proper is composed of two shells of unsized filtering paper, between which is interposed a lens-shaped piece of perforated metal or of being' such that the water will be first passed through
the paper and then through the carbon, a free space be
ing left for the filtered water to collect in. The filtering ing left for the fills and internal receptacle are joined together by flat position
Penholder. - Wellington Blend, Yonkers, N. Y. To give increased elasticity at the holding pen less rigid than usual, enabling one to execute fine penmanship with greater freedom and beauty of shading
than can be ordinarily attsined with a steel pen, this in than can be ordinarily atrained with a steel pen, this in-
vention provides for an elastic coiled wire ferrule on the vention provides for an elastic coiled wire ferrule on the
penholding end of the penholder, an elastic holder penholding end of the penholder, an elastic holder
plate being also attached to the penstock and projected dinto the ferrule
Fountain Pen.-Carl J. Renz. New York City. To provide for the control of the ink from
the barrel to the pen by a slight movement of a controlthe barrel to the pen by a slight movement of a control-
ling valve or stem, the valve opening and closing the barrel close to the feder, and the feeder being formed invinuous with the valve, are the main objects of thise
invention. The feeder is placed loosely in the barre nozzle, allowing a more than usual free circulation of air, but allowing for a gentle vibration of the feeder, whose stem extends the length of the barrel, so that
when the pen is in use a greater flow of ink is obtained in rapid writing and a lessened fow in slow writing. ane construction is such that the pen may be readily
and conveniently placed in position on the feeder or de tached therefrom.
Gas Burner. - George 1. Woolaver Quincy, Mass. A burner designed to utilize the expangas has been devised by this inventor, the burner being intended to stop or nearly stop the flow of gas when the
flame is put out. Standing on the casing or body portion of the burner is an expansion tube, to the upper end of which and extending through it is attached a gas.con
ducting tube, thelatter having a bypass, while held by the lower end of the gas-conducting tube is seated on the casing or body portion. The burner has the usual cock, but on the extinguishment of the gas,
without turning this cock, the flow of gas is so far diminished as to prevent asphysiation or an appreciable

Kite.-Claison S. Wardwell, Staınford Conn. This is a kite of simple and inexpensive con-
struction, arranged to be conveniently folded. It is of substantially diamond shape, with a longitudinal stick and a bow or cross stick, the bow of the cross stick
being maimtained by a tightly drawn cross wire connected by bounding cords or wires which carry the cover. The two sticks are
blocks and a binding cord.
Hitching Post. - Elmer J. Sellers, Kutztown, Pa. A post adapted, when not required for
use, to be dropped into a chamber or recess below the level of the ground is provided by this invention. Th post is hollow, and is slidable in an embedded tube, in
which are guides, there being means for locking the post in both its raised and lowered positions, and the ar partial elevation of the post is automatically accomplished by depressing or otherwise operating a trigger or catch, making it unnecessary to stoop to the ground

Neck Yoke Coupling. - Lord 0. Snell, Athens, Pa. A coupling which permits the easy adjustment of the yoke bar on the pole after or before
attachment to the harness is provided by thle invention, the coupling not being liable to become accidentally detached in case of a broken whiffetree or harness. The coupling consists of a head with shank for attachment to
the pole, the head extending above the shank and having a segmental guideway in which is free to move and tur clip to the yoke har.
Broom S Awing.-Frederick A. Buck and Joseph D. Valentine, Urbana, O. To hold a broom edgewise or parallel to a saw blade while the handle is
being acted on by a band saw, jig saw or other suitable saw, to cut a curve or slit lengthwise through any por-
tion of it, these inventors have devised a tion of it, these inventors have devised a novel form of
support by which the body is movable freely on the support by which the body is movable freely on the
table to permit the kerf to be waved and to reduce friction.
Clothing Boiler. - William P. Ry lander, Temple, Texas. This boiler has in its upper central opening. and aloove this cover is supported a perforated upper cover, there being in the lower portion
of the boiler a folse conical perforated base from whic a pipe leads upward to a soap box in the lower cover,
from which also a surrounding perforated pipe leads from which also a surrounding perforated pipe leads
downward. The soap is thus adied to the water as the boiling proceeds, and there is no danger of the water or
Household Furniture.- Charlie E. Kuhn, Johnstown, Pa. A combination article of house-
hold furniture provided by this inventor comprises a for other purposes, a step ladder, a child's crib and support for an ironing board or sinilar article, the inven tion covering a novel construction and combination of
parts, mcluding end frames with pivoted locking diago nal braces, removable sides and a removable slatted

Lock.-Henry 1). Smith and Josiah W. Batcheller, st. Lotis, Mo. A lock especially designed for use on freight cars has been devised by these invent-
ors, whereby the doors may be securely closed by a lock located within the car, with only its operating wit a dial or disk containing a combination, which. togetber with the hanuie or knob, may be quickly and
conveniently removed from or placed in engagement with the locking spindle to bolt or unbolt the lock. Note.-Copies of any of the above patents will be send name of the patentee, title of invention, and date of this paper.
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HINTS TO CORRESPONDENTS.
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Burer wisher to purchase any article not adverised
in our columns will be furnished with addresses of

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price.
mals sent for examination should be distinctly
marked or labeled.
(7332) C. H. asks : 1 . How can I coat copper with quicksilver! A. Clean the copper by dip-
ping it into dilute sulphuric acid, and then put it into ping it into dilute sulphuric acid, and then put it into
the mercury, or else pour the mercury upon it and rub i around. 2. Give me the address of some electric supply house in Chicago where I can get the material to
make the battery deacribed in SUPPLEmENT, No. 792. A. Any dealcr in Chicago will supply you. See our adve tising columns. 3. How many volts will one Bunsen cel (7333) W. C. P
(7333) W. C. P. writes referring to query No. 7321: The article I have seen sold for making a
transfer of a picture to a wLite paper resemhles paraffine transfer of a picture to a wLite paper resemhles paraffine,
colored to disguise it. I have used an ordinary paraffine candle for the purpose with entire success. The transfer annot be made very well after the picture is reversed in transferring. The right hand becomes the left. People with articles in their hands look
left-handed in the transfer. (7334) S.
(7334) S. C. McKay asks: 1. Is there manufactured a mechanism by which current (either the
alternating or an intermittent commuted current) from regular telephone magneto dynamo is utilized to make and break a local battery circuit? A. We do not know any such appliance on the market, but there is no durcuit in the same manner as it rings a bell by a vibrating seeming of an electro magnet. 2. Mhibited in the com mon noncentrally pivoted magneto ringer. One may find the clapper persistent in hanging over to one side,
but. in a few days or weeks, equally as determined to but. in a few days or weeks, equally as determined to
"stick " to the other side. Lightning sometimes makes this change, but $I$ find that it often occurs in winter whe polarized magnet is gencrally used. The armature i apt to stick on one side or the other. The shifting may be due to some slight change of adjustment brough
about by atmosp) eric clanges. 3. I have repeatedly, bs about by atmosp? eric clanges. 3. I have repeatedly, by
putting my car to the transmitter of a telephone, heard talking that was going on over the line, my hook being
down at the time. This happens with carbon phones down at the time. This happens with carbon phone those with the extension arm. Is this not caused by the waves of sound being imparted to the body of the phone When the receiver is harging on its hook, the circuit of receiver and transmitter is open, and the circuit of the magneto and the bell is closed. The talking may he
caused by mduction from the bell coils as sou singest.
(7335) B. P. B. asks: 1. Can a common
 power) lamp? Or is the current gotten out of nne kind, too weak? I refer to common battery lamps. A If your magneto generator gives sufficient current, it
would light a lamp. No special kind of winding or commutator is required. 2. If one of the generators will
light a lamp, does a special kind of lamp have to be
osed $\boldsymbol{q}$ If so, please tell me what kind? A. No. 3. Will
you please deseribe, in this issue of your paper, how an you please deseribe, in this issue of your paper, how an
electric needle, used to kill the roots of hairs, is made and electric needle, used to kill the roots of hars, is, and and o. 20 , query (7336) G. L. asks how to apply. Rum tific American Supplement, No. 569 , also the numbe like to know the difference, If any, between an induction
like and spark coil. A. The condenser for your coil should consist of 20 sheets of tinfoil, each $4 \times 5$ inches. Allow the sheets to project on the ends 1 inch, and the effective surf ace of foil will be 4 inches square. Join one side of
the condenser to the plus wire from the battery and the other to the negative pire A rarts coil istery and th coil with a condenser. Both the spark and the induction coils are explained in Sloane's "Electrical Toy Making,"
price $\$ 1$ by mail. Or we can send you for $\$ 5$ the "Elec. price $\$ 1$ by mail
trical Librarg
(7337) (i. A. K. writes: I am about to construct a telephone line (metallic circuit), and wish to run electric light wires on same poles for a distance of 7
miles, bare copper. Will want to carry sufficient current for about 610 to 80016 candle power incandescent lighte. What sized wire should I use. and will it require a 3 -wire line or will a 2 -line wire do for alternating current 9 How
much current will twenty 16 candle powerlightsconsum in one hour? Will there be any appreciable loss of cir rent tranemitted through 7 miles of bare copper wire if well insulated: A. You cau use single phase alternating current system, using two wires, each of No 6 B. \& $S$ gage, generating the current at 2,000 volts, transforming 110 volts volts for the line and again stepping down to 110 volts for the lamps. It would not be safe to use bare
wire on account of the high potential. There will be a loss of about 10 per cent in transmission under the above conditions. The amperes of current represent the rate
of flow, and depend upon the ivoltage as well as the efficiency of the lamp. Twenty 18 candle power lamps, a 110 volts, would consume about 10 amperes. If used for
one hour, it would be equivalent to 10 ampere hours. If the lamps were 55 volte, the current would be twice a
(7338) G. E. C. asks : 1. Is there a more lasting battery than the plunge battery described in th Otor described in March 17, 1888 number, or a more efficient motor than that one for run ning a sewing machine: I think of making one, and types of which will give as high an efficiency as the lower without you must consider that jou cannot hav riclds a good amount of current, it will consume its ma terials rapidly. 2. How would 8 cells of dry batter ivork, as it would be much cleaner and handier? A. You cannot use dry cells for ranning motors. Dry cells are for open circuits and intermittent use only. They run
down vers rapidly on a closed circuit. 3. And would the motor need to be so large for 1 machine as it is said to run 2 or 3 ? A. While a smaller motor might run 1 ma is little excess of power to meet a heavier load than the average. 4. Would 18 or 20 wire answer for smaller one A. Yes. 5. Is electricity of any value medrcally, if so, how should it be used for catarrh and neuralgia and rheumatism, or where can I get iuformation on that subject A. For the medical use of electricity, consult your physi-
cian. It is the only safe course. 6. Where can I get the cian. It is the only safe course. t. Wake can get the tery; also, the carbon and zinc plates? A. These mate rials can be had of any dealer in electric suppliek in you cily or New York. Glass jars can be used for the bat-
tery in place of gutta percha, and will be less expen-
(7339) S. W. E. asks: 1. Can a storage battery of 25 cells, each cell giving when charged $2^{11}$ volts, be charged by a 2 light dynamo producing 52 volts if so, in what manner ? A. Twent5-five storage cell
require $25 \times 2 \% / 2$ volts $=623 / 2$ volts pressure in the charg ing currrent. You would need to divide the battery into two parts in multiple to clarge it with your 52 volt dy two parts in multiple to charge
namo. You should also arrange a wire resistance-iron
wire is good encugh-to tase up the rest of the drop. wire is good ensugh-to tale up the rest of the drop.
Thus: $13 \times 216=33$ volts nearly. 52 volts are about 13 . Thus: $13 \times 21 / 2=33$ volts nearly. 52 volts are about $13 / 2$
times 33 , and you will require wire enough to have a resistance about $1 / 2$ as great as that of your 13 cells. Wha that is we cannot tell you. The charging wi'l be ver the charging will be at that rate per hour. Thus: If the Cells are 30 ampere hours, a current of 2 amperes will require 15 hours to charge them; and similarly for any rent, and so reduce the time of charging. 2. Can it be charged through one mile of No. 12 galvanized iron wire
I. Yes, if there is current enough; but we do not see why any one should waste current on a mile of iron wire It wonld seem to be a betterway to carry the battery to the electricity. ratber than to carry the electricity to the batelectricity. ratber candlc power lamps be manufactured to
tery. 3. Can 16 cor nise as low at 15 voics? A. Yes. Correspond with the rincipal lamp manufacturere.
(i340) R. C. F. writes: Will yon please give an answer in the next issue of your valued publica-
tion to the following problem which we clip from local paper and which has created a discussion: "We have a problem which we would like some of our resder farmer who sells a inorse to $B$ for $\$ 90$. The follow
for ing day he buys the horee back from $\mathbf{B}$ for $\$ 80$ and sclls him to $\mathbf{C}$ for $\$ 100$. What are $A$ 's profits in the tions is the difference A. The profit of all the trassac and what A had at the close of the operation, which y mouncs to $\$ 20$. A gained $\$ 10$ by the repurchase and
$\$ 10$ by the scerni sale over the first sale, or he received $\$ 110$, the first eale being $\$ 90$. The apparent discrepancy betireen the repurchase and last sale is misleading a first glance, and the difference between the first sale and the last sale only should be credited to the second sale, which shows the actual amount gained in the three transactions to be $\$ 110-\$ 90=\$ 20$ profit. In commer-
cial affairs, profits are not counted on purchases alone.

The selling advance is the real profit, which in this case will be
sale.
(7341) A. E. H. asks: 1. How long will a zinc last in an ordinary gravity battery of four cells, ered with copper deposit, it is difficult to tell just whe it is completely worn uut A. A zinc of regular weight will last for six months in a gravity cell. Take it out
once in a while and scrape or wash off the muddy coatonce in a while and scrape or wash off the muddy coating. 2. Is it not better to amalgamate the zincs in the above gravity cells? A. The zincs are not usually amal
gamated in the gravity cell. They are made, however of an amalgam, so that the mercury extends throughout the whole mass. Such zincs are called composite zinc and are in the market. 3. What is the right density o the solution around the zincs (epecific gravity) in gravity battery to obtain the maximum current; and does a small percentage of iron sulphate, which is con of the battery? A. The solution around the zinc but
out of the battery? A. The solution around the zinc be-
comes saturated in a short time, and the excess of zinc sulphate then crystallizes out at the top around the sides of the glass. This should be removed occasionall 'The iron has no effect. The largest current will be had with a very weak zinc sulphate solution, say sp. gr. $=1.02$,
but this cannot last long, since the action of the cell will raise the density of the solutiou around the zinc and reduce the current. An equally important condition for equally difficult to maintain, even if the zinc be amal gamated.
(7342) A. F. S. writes: I am building an arc lamp with a carbon fis inch diameter, to be uscd
on a 110 volt circuit. I want to feed the carbon in the usual way, i. e., by a break and magnet to reduce the same. 1. Is it proper to connect the magnet in parallel
with the la:n ? A. Yes; that is the usual was. what tresistance shall it be, what size wire shall I use to
whal get the same? The coil is 2 inches long by 1 inch diameter, core $3 / 8$ inch diameter. A. Give the shunt coil 100
times the resistance of the direct circuit through the carbons. Witb $3 / \mathrm{inch}$ carbon the resistance of the ar is 5 or 6 ohms; hence, you will require 600 ohms in the shunt circuit. Use No. 30, wind your spool full and put the rest in a separate coil within the lamp. 3. Would ou recommend an extra resistance coil to be used in What is the resistance of an arc flame at a gap of inch; also that of 14 inch with $s$ inch carbons? A ohms.
(7343) D. 0 S. writes: On page 408 of your book, "Experimental Science," there is decribed a
battery, concerning which I am in want of some information. First: What is the precise chemical change which takes place between the solution and the zinc and iron elements? Second: What is the office of the black oxide of copper, placed within the cell? Third: Wil wrought iron serve as well ascastirou? and, fourth, When this battery becomes exhausted, to what is this exhaus tion due? I want a battery to run a small motor, and wa
atracted to this one by the simplicity of its construction and the statement that it "will operate several month without replenishing." I have tried a bichromate battery, but the frequentrenewals necessary compelled me to abandon it. A The cell in question is the LalandeChaperon cell, which has been improved in the United States under the name Edison-Lalande cell. You wil find the chemical changes fully worked out in "Primary the action of the cellis to break up the caustic soda, zinc taking the place of the hydrogen in it. The hydroge then takes oxygen from the copper oxide at or near the rron, the negative plate forming water. and leaving the copper in a metallic state. The object is to get rid of
the hydrogen, which, if allowed to accumulate on the negative plate, would stop the current in a short time the hydrogen. Wrought iren is used in some forms for this cell. In this, as in all other celle, exhaustion is due to the chemical decomposition of the materials. Here the zinc is changed into a sodium zincate, $\mathrm{Na}_{2} \mathrm{ZnO}_{2}$ and the
copper oxide $\mathrm{CuO}+\mathrm{H}_{\text {a }}$ becomes $\mathrm{H}_{2} \mathrm{O}+\mathrm{Cu}$. When all the copper oxide $\mathrm{CuO}+\mathrm{H}_{2}$ becomes $\mathrm{H}_{2} \mathrm{O}+\mathrm{Cu}$. When all the
tnaterials are changed, the battery stops its working materials are changed, the battery stops its working
'There is in it no source of energy remaining. The iron it not affected by these changes, and an iron pail will last will be exposed to rust from theaction of the water in which the soda is dissolved.
(7344) A. J. L. asks for a formula for a polisi for polishing the nickel on bicycles, or if yo the number of the paper that it was in Ane the bright parta with roage and lard oil. You can purchase from any dealer in bicycle sundries preparations for cleaning the nickel parts of a bicycle in an expeditiou and safe manner. The polishing cloths now on
market answer admirably to keep the nickel bright.
(7345) C. A. C. asks : How canvas can be made mildew proof without injuring the fahric. A. then add 1 pound of sodium carbonate ; when dissolved add 2 ounces of tartaric acid. This holds the partially separated zinc carbonate without neutralizing the excese in this solution for 24 hours and theu dried without in this sol
wringing.
(7346) C. B. W. asks bow the paper i prepared of which dresses of dolls are made so that the solved in alcohol applied to artificial flowers or to the fabric pink when the air is humid ; when the air is warm and dry, the paper will be purple or blue. A solution of the same constitutes one of the sympathetic inks.
(7347) T. P. B. savs: Can you tell me if the phenomenon of lightning during a snow refer has occurred when the atmosphere has become suddenly warmed above the season's average normal
temperature. Lightning never occurs in cold weather without a current of warm air in the upper atmosphere.

NEW BOOKS, ETC.
The Social Mind and Education. By George Edgar Vincent. New York
The Macmillan Company. Pp. 154. Price $\$ 1.25$.

To give "greater unity and clearer purpose to our higher education" is the design suggested in "bares atline " in this book. It treats social philosophy as the
science of sciences," notes the development of socia and of individual thought, and discusses "the integration of studies," and a " tentative curriculum," from the view point of a professor of sociology in the University of
Chicago, the author endeavoring to bring conception Chicago, the author endeavoring to bring conceptions
from social philosopny to bear upon the problem of edufrom soci
cation.
TodD's New Astronomy. By David P
Todd, M.A., Ph.D., Professor of As tronomy and Director of the Observa tory, Amberst College. New York Book Company Pp. 500 . IllusThis amall testbook which Prof. Todd ba jut This small textbook which Prof. Todd has just pre ness of explanation and profuseness of illustration, together with the care which has been taken to give a all along the lines of recent investigation, which include sucha wealth of new knowledge in every department, and otably in that of astrophrsics, render this worknot only hensive review of astronomy up to date for tho ensive review of astronomy up to date for tho
who have studied that science before the spectroscop and the latest immense telescopes had contributed their quota of information as to the structure and com-
position of the universe. The beautiful pictures of the n, moon and planets convey lessons to the younge reader; and the simple and practical melhods of makin ing of the true north pole ( p . 22,116 ), and all the point of the compass. and the measuring of the diameter of the an (p. 259) and moon (p. 239), without costly apparatus, hould make many a youth an amateur astronomer. beautiful instance of simplif ying subjects which maypuz zle the student is the tub and hoop experiment to illus ate precession of the equinoxes, described and illu rated on page 128. From the very beginning the praccuous application of science to evergdas use is consp chapter viii, on the Astronomy of Navigation: in whic he author applies the science particularly to the vo 1896, to the "Coronet," in which he sailed for Japan, dicated to the Messers. James who provided this yach nd one of whom accompanied Prof. Todd in it to Japan Drafing. By C. J. Tracy and E H. Lockwood, Instructors in Shef ty. With numerous illustrations and full page plates. New York: Harpe
$\&$ Brothers. Pp. 115 . Price $\$ 1.80$. This is $a$ book for beginners, to prepare students for of the elements of geometry, but omitting machine an bridge drawing, and the more advanced applications mechanical drawing. The book also has a chapter com rehensively treaating of perspective.
The Barometrical Determination Surgeon United States Navy. Ne York: Spon \& Chauberlain. Price
$\$ 1$.

This brief monograph affords a practical method arometrical leveling and hypeometry for surveyors and ountain cilmbers, presenting formulm therefor whic re free from errors, which cannot be said of some o practice to give reliable results under all conditions.
The Sun's Place in Nature. By Si Norman Lockyer. London and New
York: Macmillan
Company.
Pp 360. Price $\$ 2.75$.

The interest in this book will be greatly heightened bs he fact that its author been at the head of one of olar eclipse, and the care which was taken to equip the party of which Sir Norman was the head is but the reult of his long series of studies in this specialline, th olume before us being only one of his numerous contri in 1887, of "The Chemistry of the Sun," when approz mate cstimates of the temperature of the sun's phot
sphere were carefully considered, there has been suct reatimprovement made in the instruments used and such a large accumulation of independent observations that the basis on which the problem is approached ha been very mach broadened, and yet withoit giving us
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rreet Cleaning, and the Disposa OF a City's Wastes. By George E
Waring. Jr. New York: Doubleday
$\& \quad$ McClure Company. Pp. 230. \& McClure
Price $\$ 1.25$.
It is not too much to say that the late Commissioner of imself a world-wide reputation in this particular line Coming to the task of the eupervision of the cleaning o in need of thorough and a time when they were sady he department had been for a long time suffering from syntof anything like efficient organization, he introduced
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Theauthor, a member of the American Society of Civil Engineers, presents here a collection of simple and acpractical use, touching the fundamental principles of the practical operation of the steam engine.
A Report Upon Salmon Investiga TIONS IN THE COLUMBIA RIVER Meek, United States Commission of Fish
1898.
The Fishes of the Klamath River Basiv. By Charles H. Gilbert, and Fisheries Washington. 1898.
The Fishes Found in the Vicinity Smith, United States Commission of Fish and Fisheries. Washington. 1898.

The Jack Rabbits of the United United States Department f. D culture Division of Biological Sur cuiture, Division of Biological Su
vey. Washington. 1897. Pp. 88 .
Outlines of Rural Hygiene. By Har vey B. Bashore, M.D. Philadelphia
The F. A. Davis Company. Pp. 84 Price 75 cents.
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(See noteat end of llst about opies of these patents.)

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 smmonium suiphate, apparatus for making, w












