Communications.

Cotton Picking by Machinery.

To the Editor of the Scientific American:

Will you allow me space to answer a large number of communications received since the publication of my letter in your number of December 16 last?

Cotton is grown in rows or drills which are varied in the distance apart by the quality of soil. For instance, a rich soil produces large plants, and *vice versa*. Perhaps an average of distance would be 3½ feet. The drills are but little raised above the general surface when picking time arrives. If it were necessary for the successful working of a cotton picker, the plants could be grown in double rows, with a wider distance, especially in the poorer soils. The height of the plants varies from 12 or 15 inches upon poor soil to 6 or 7 feet upon the rich bottoms. The variation in a single field would be much less considerable. In general, the height may be stated as from 2½ to 3¼ feet. The plant is pyramidal in form, grows upright, and with a width proportioned to the height. It is rather woody, more so than elder, less so than the whortleberry. There is a central stem, which is perpendicular, and sends down deeply into the earth a tap root; from this, as a center, the roots below and the branches above radiate with some degree of regularity. The stalk would not be easily injured, as it is well protected by its branches. The size of the boll or pod, when fully grown and unopened, is about that of the black walnut, some being larger and some smaller. This pod bursts at maturity; the lint gradually unfolds itself and hangs down more and more for days and weeks, until at last it would drop out by agitation of the wind, if not gathered. The number of bolls to the stalk varies from ten or twelve to several hundreds. This varies with the size of the plant, and also with the selection of seed for prolific varieties. The bolls are situated upon foot stalks 2 or 4 inches in length, which make off from the main branches. They are borne upon all of the branches, both below and above. The bottom bolls are first to mature, and afterwards the others, upward in succession. The fruit is borne chiefly upon the exterior of the plant; but, as in the apple tree, some of it is to be found towards the center of the head.

The force required to extract the lint from the well opened pod is very slight. It might be represented by a weight of perhaps 1 oz. as the maximum, and from this down to nothing, when the lint falls of its own weight. The picking season in this latitude extends from September 1 to the close of December. The last of the crop is usually fully opened and ready for picking by or before the middle of November, and is constantly liable to damage until it can be picked out. The later piokings are usually more or less damaged by this delay, and command a lower price.

It would be difficult to state the average number of acres in cotton upon each farm and plantation; perhaps it might be put at 50 acres in this region, and further south 100 acres would be nearer the mark. The extremes could not be more definitely fixed than by stating them at from one acre up to two or three thousands. The yield of merchantable cotton per acre differs widely with soil and culture, as does corn, wheat, or any other crop. A fair average for this region would be probably 200 lbs. of lint, the extremes being from 30 to 1,000 lbs. One bag of 500 lbs. is a very successful crop upon the best lands without special fertilization.

Can the cotton be blown out of the boll? Yes, when it is very mature; but it is not likely that this could be a successful method of gathering. A draft of air might be useful to agitate the long locks of lint that card teeth might the more easily seize them. Would a team be likely to injure the plants? No, not if properly driven.

Personally I have no interest whatever in the growth or sale of cotton. I do not desire in any way to engage in the invention or sale of a cotton-picking machine. I am a physician, and do not desire to become anything else. My business carries me through the cotton plantations; I see a great and manifest agricultural want which I cannot supply. I have asked the use of your columns to bring this want before those whose business and whose interest it is to supply it. I have given my own thought upon the subject freely to the public; I cannot do more than this. In the invention of a successful cotton picker, I think I see in the near future an immense revolution in all the cotton industries of this country, the influence of which will be sensibly felt throughout our vast domain from Maine to Texas, from Oregon to Florida. ROBERT BATTEY, M. D.

Rome, Ga.

Boiler Explosions.

To the Editor of the Scientific American:

In No. 2 of the present volume of the SCIENTIFIC AMERICAN, there is a letter from E. G. A., headed as above. In this letter he says "that it is very generally conceded by scientific and practical men that the most common, if not the sole, cause of boiler explosions is low water." He also says: "if an explosion occur, and you ask the engineer his opinion of the cause, he has no theory; but one thing he is certain of, and that is that the boiler was full of water a few minutes before the catastrophe occurred; and here he is at variance with all scientific men and the public generally." I think that whenever the pressure in a boiler becomes greater than the boiler is able to bear, it will give away, and a new boiler is sometimes made in such a bad manner that it will not bear anything like the pressure that it is expected to

E. G. A. goes on to suggest the use "of automatic water regulators and low water alarms to prevent these explosions;" but he says, "when you go to the proprietor for permission to put one on his boiler, he goes to the engineer, who, on account of ignorance, objects to it." Now any man who will give this one moment's thought will see that it is unreasonable to lay this blame on the engineer, who would not object to anything that would lessen his duties or take any responsibility off his shoulders. To think that he would object to anything that would give warning in time to save an explosion, and thereby save his own life, would be at variance with the laws of human nature, especially when it does not cost him anything. But the trouble lays in the expense to the owner. I will relate a circumstance which I heard the other day. I have a friend an agent for the sale of a water regulator and low water alarm. I said to him that I thought he could sell one to my neighbor. He said he could not, and that he went to the engineer with the instrument, who, after examining it, said that he thought it was a good thing, and would like that I should go to the owner and sell him one. "So," said my friend, "I went to the owner and explained the matter to him as well as I could. Said he, 'I pay my man for looking after that boiler; I will not buy this and pay him too.'" D. KARNS.

St. Petersburg, Pa.

A Hint for a New Pomade.

Notwithstanding that we owe much to the Baconian philosophy, many discoveries have been the result of pure accident, and the "rule of thumb" has been the predominant feature in their development. When one reads of a Yankee specific for the growth of hair, which when spilt in the neighborhood of a doorstep over night resulted in a handsome door mat the next morning, one feels at liberty to exercise the fashionable faculty of scepticism. But when a British Consul tells a "plain unvarnished tale," we presume it must be received with becoming gravity. Still we cannot help remarking that the news conveyed by Mr. Consul Stevens in his last report to the Government on the trade of Nicolaieff would be indeed a blessing to bald heads, *if true*.

Mr. Consul Stevens states that a former servant of his, prematurely bald, whose duty it was to trim his lamps, had a habit of wiping his petroleum-besmeared hands in the scanty locks which remained to him; and after three months of lamp trimming experience and practice of his dirty habit, he found he had a much finer head of black, glossy hair than he ever possessed before.

Consul Stevens, therefore, tried the remedy on two retriever spaniels that had become suddenly bald, with wonderful success. During the summer of 1875 his attention was called to several cases of sudden baldness of bullocks, cows, oxen, and the loss of tails and manes among horses. His previous experience induced him to suggest the use of petroleum to the owners, and it was found that, while it stayed the spread of the disease among animals in the same sheds and stables, it effected a quick and radical cure on the animals attacked.

Consul Stevens says that the petroleum should be of the "most refined American qualities," and should be rubbed in vigorously and quickly with the palm of the hand. It should be applied six or seven times in all, at intervals of three days, except in the case of horses' tails and manes, when more applications may be requisite.—*Pharmaceutical Journal.*

Coal Miners' Relief Fund.

The Wilkesbarre Coal Company, after the occurrence of the Avondale catastrophe in 1869, established a benefit relief fund at the mines. The company gave the yield of the mines for one day, and the miners each gave a day's work, the amount raised being $6,000. Since that time this fund has been constantly and rapidly accumulating, every new miner giving the first day's work to the fund. The fund is deposited with the coal company, who pay 6 per cent. interest on the money. The trustees are selected by the miners. Since the establishment of the fund it has been changed, in order to include all the mines owned by the Philadelphia and Reading Coal and Iron Company, and more liberal provision has been made for families whose heads have been crippled or killed in the mines. It is provided that, "should any person, after having been in the employ of the company for upwards of one month, meet with a fatal accident in the discharge of his duty as a workman, his family shall be entitled for one year from date of death to the following benefits, provided that no person entitled to said benefits shall directly or indirectly engage during said time in the sale of intoxicating liquors: 1. $30 to be paid for funeral expenses. 2. $3 per week to be paid for maintenance of widow. 3. $1 per week to be paid for the maintenance of each orphan under 12 years of age." The total contributions to the fund, including interest, in the seven years have amounted to $93,217⅓. Of this $66,881½ has been distributed in benefits, and $26,335⅚ remains in the treasury.

The Great Ice Gorges.

An immense loss of property has resulted from the late great ice gorge on the Monongahela river. The flood, occasioned by the damming of the stream, on breaking its frozen barrier, swept the great ice masses before it, and these in turn destroyed everything in their path. Whole fleets of coal-laden barges were borne along like chips, to be crushed and sunk on striking a bridge pier or other obstruction strong enough to resist the terrible impetus. When the gorge reached Pittsburgh, seven large steamboats, besides a number of loaded coal packets and upwards of 300 barges, were swept away. Nearly all were filled with coal, of which it is estimated some 15,000,000 bushels were lost. The tipples used for dumping coal, built on the river bank, were destroyed for a distance of sixteen miles, and their wrecks, with those of the vessels, lie strewn over the shores in inextricable confusion. The loss in the vicinity of Pittsburgh is placed at $2,000,000, to which must be added the cost of clearing the channel of the *débris* which now impedes navigation,

At Cincinnati, the break-up of ice in the Ohio resulted in destruction almost as extensive, and 75 full and 200 empty coal barges, and several steamers, were sunk. It is estimated by coal shippers that the total damage caused between Pittsburgh and Cairo will not fall short of $12,000,000.

A Town Built on Ice.

A correspondent of the Detroit *Free Press* states that the fishermen on Saginaw Bay have erected a good-sized town of shanties far out on the ice. The dwellings are of thin wood, lined with thick building paper, and are attached to runners so as to be movable from place to place. The town already boasts a hotel. From this structure, which is larger than any of the dwellings, the view is truly astonishing, the shanties dotting the surface of the bay in all directions. The number is now about 300, and about 30 are arriving and being put up daily. The average number of occupants in each shanty is three men or men and boys, thus making, including the larger buildings and their occupants, not less than 1,000 persons already living on the ice. There probably will be twice the number on the ice by the first of February, and they can remain there in safety until the middle of March. Teams are constantly engaged in gathering together and hauling the fish thus caught by the men, who fish through holes in the ice to Bay City, whence they are shipped to all parts of the State. That all these people find it sufficiently profitable, to induce them to brave the perils and hardships attending this adventurous life, is proof that the aggregate revenue of the business must be quite large.

Heating Street Cars not Feasible.

Several newspapers of this city are advocating the warming of the street cars, a proposal which, in view of the manner in which those conveyances are used in New York, betrays a very decided lack of common sense. We suppose that there are few more disagreeable places on this mundane sphere than the interior of a Third avenue car in this season of the year, when packed with the average crowd which travels on that line. The floor is usually covered with slush and wet straw; and ventilation is conspicuous by its absence. Now to add to the reeking atmosphere of these cars the emanations of a hot stove would be simply to render the place unbearable to persons who fear aerial poison, and dangerous to health by the repeated sudden changes in temperature, due to the constant opening and shutting of doors. On some lines of cars which are crowded and which travel long distances, stoves may be, and we believe are already, used; but to place them on vehicles which are always thronged, and at certain hours literally packed, is certainly impracticable.

What is needed is good ventilation, a clean floor, and proper illumination at night. These can all be easily provided, and would do much toward rendering street car travel more comfortable.

Poisonous Fireworks.

Miss Helen Locke, a beautiful young lady living at Bristol, N. H., died recently from the effects of inhaling gas from "red fire," burned during a young ladies' tableaux entertainment, in which she took a part, given about six weeks before.

The above pyrotechnic mixture, "red fire," is quite a favorite at private tableaux exhibitions, but should be utterly banished from the parlor and the lecture room. Its fumes are highly poisonous. It is composed of nitrate of strontia, black sulphide of antimony, sulphur, and chlorate of potash. The crimson color is due to the strontia. The latter is a salt of the metal strontium, which is of light yellow color, nearly as hard as gold, and very ductile.

"Red fire" was formerly in common use in our theatres; but its poisonous character and danger as a combustible have caused its general abandonment. The same may be said of other firework mixtures. The lime light lanterns and lenses of different colors have been substituted, by which even greater brilliancy and variety of effects are obtained.

Fluids of the Mouth.

Dr. Hodson wisely calls attention in the *Medical Record* to the fact that, in any illness involving a feverish condition, the fluids of the mouth are constantly as intensely acid as respects the teeth as in any medicine administered by the physician, and, moreover, from the high temperature of the buccal cavity at such times, the power of these acids for evil is greatly augmented. Further, a direct consequence of these conditions is the especially rapid fermentation and decomposition of all food lodged between and around the teeth, and the consequent elimination of other deleterious acids. Dr. Hodson recommends rinsing the mouth with *liquor calcis* (lime water), diluted according to the sensitiveness of the mucous membrane, and flavored with a few drops of wintergreen or peppermint to make it agreeable.

THE relative strength of different forms of riveted joint, as compared with that of the solid plate, is as follows: The strength of the solid plate being 100, that of the single riveted joint is 56, double riveted 70, chain riveted 85.

Thomas Edward, Naturalist.

The name of Thomas Edward, of Banff, Scotland, appears as reference or authority on the pages of many standard British works on natural history; and he has the honor of giving his name to several new species of crustacea, discovered and classified by him. Birds, fishes, insects, zoöphytes, and crustacea have been in his principal lines of investigation. A working shoemaker, his researches have been conducted in the hours of daylight, after work hours and before; and the hours of the night have been employed for such hunts as could then be followed. He ambushed, or slept when he could no longer keep awake, in badgers' holes or other uninviting shelters, and he was on such terms with the inmates that they would let him alone. Weather, fair or foul, made no difference to him, except as it indicated what particular investigation he should follow. Of course, though little known abroad except among naturalists, he was a local celebrity. He was elected, in 1866, one of the thirty Fellows of the Linnæan Society, and afterward a member of the Aberdeen Natural History Society; and he received the diploma of the Glasgow Society. Neither of these appointments yielded any income, but his neighbors of Banff made him curator of their museum, with the not very munificent salary of four pounds four shillings, about $21, per annum. This was something tangible for a prophet in his own country; but his townsmen regarded him as "daft," nevertheless. The local magistracy gave him a special certificate, warning gamekeepers and policemen that he was not a poacher or vagrant, but a sober, respectable working man, engaged in natural history investigations. Nobody, however, could give him a certificate against the rheumatism, or against poverty; and now, at the age of sixty-three, he is spoken of as a "ragged, weather-beaten, rheumatic old man."

It is pleasant to add that better times have dawned on Thomas Edward. During the recent holidays, he received a letter of which the following is a copy:

"WHITEHALL GARDENS, CHRISTMAS DAY, 1876.

"SIR:—The Queen has been much interested in reading your biography, by Mr. Smiles, and is touched by your pursuit of natural science, under all the cares and trouble of daily toil. Her Majesty has been graciously pleased to confer on you a pension of fifty pounds a year.

"I am,

"Yours faithfully,

"BEACONSFIELD."

Now this was to the old man, who need be ragged no more, a most acceptable Christmas present. It exceeds what were his average earnings; when, in health, by full work he could earn a pound a week at mending shoes. The date, on an unofficial day, adds grace to the gift.

Mr. Samuel Smiles, author of "Self Help," "Character," "Thrift," and other books of an eminently practical character, mentions Thomas Edward in the book first named, published eighteen years ago. And he has just written an extended biography of the naturalist, which will doubtless be republished in this country and read with interest. In one thing Edward is not a model. He hated school, and played truant when he could; and when he attended, it was with pockets full of worse than rocks: bugs and reptiles to wit, which made him no eligible bench-fellow. Consequently, when he reached adult age, he was forced to learn as best he might how to read and write. His last appearance in any school was when a pet crow, concealed in his trousers, made responses during prayers, which were neither well timed nor edifying.

Steel Ship Building.

One noticeable feature in connection with the construction of the six steel corvettes now being built for the Admiralty by Messrs. John Elder & Co., of the Clyde, is the rapidity with which the work is being done. One instance of this may be discovered in the fact that the stem of each vessel is being cast in gun metal, a process which completes this portion of the work in a fortnight for each; whereas the old method of forging in wrought iron is said to require some four or five months' work. Messrs. Finlay & Davidson, of Port Eglinton, by means of their reverberatory or air furnace, which is capable of melting some thirty-five tons of pig iron, undertook the casting of the stems, each of which when finished is of the estimated value of $7,500. In outline each of these stems bears some resemblance to the prow of the war galleys of the ancients. Continuous at one end with the keel of the vessel, of which it is to form a prominent feature, the stem bends forwards and upwards, becoming about 15 inches thick along the anterior border, and attaining to about 4 feet as its greatest breadth. It then curves backwards and upwards, gradually becoming smaller towards the upper end, where it merges into the bulwarks of the ship; indeed, it may be said to consist of two curved arms meeting in the broadest part at a somewhat obtuse angle, and there becoming a sort of ram. Speaking roughly, each stem may be said to be about 45 feet long; and as it is all cast in one piece, it is not surprising to learn that in its finished state the casting weighs about 10 tons, and that its production necessitates the employment of a charge of 14 or 15 tons of metal.

Considerable care has, of course, to be exercised during the process of casting, which takes place much in the usual way, by the aid of loam and dry sand, and a wooden pattern. The essential ingredients of the metal are copper and tin, and in the casting of No. 4 stem the other day the charge consisted chiefly of old brass or bronze guns from Woolwich. At half past four in the morning the charging began, and by eight o'clock, there being a remnant from a former casting in the furnace, some 7¼ tons were melted down. Gradually adding some 5 tons of metal up to one o'clock, 10½ cwts. of tin were admitted, and by two o'clock all was ready. Just immediately before tapping, a number of slabs of zinc or spelter, weighing about 1¾ cwt., were cautiously slipped into the molten mass, and the whole well rabbled. It was so arranged that the finished metal in the furnace should have something like the following composition: Copper, 16 ozs.; tin, 1¾ ozs.; zinc, ½ oz., the resulting alloy being guaranteed to stand a tensile strain of 15 tons per square inch. In all about 4 tons weight of old guns were used in the production of the charge of fully 15 tons. The furnace used in melting this mass of metal is formed of two portions, at right angles to each other—that most distant from the fire terminates in the chimney stalk, and in it the tapping hole is situated. Its total length is about 20 feet, by 3 feet 6 inches in breadth, but prior to its use for these castings its internal capacity was considerably reduced by a layer of firebricks being built. The running of No. 4 stem proved as successful as the others, and among the many features which appeared strange to the ordinary ironmoulder was the reception of some 8 tons of the metal into a kind of reservoir from which it passed through a shutter, raised at will by a lever, and on through no less than thirty runner gates. The extreme liquidity of the metal and its easy flow afforded ample opportunity for manipulation outside of the furnace; and with the great care taken that every attention be paid to the various details of the work, Messrs. Elder & Co. are enabled to turn out what is considered a triumph in the shipbuilding world.—*Iron.*

Planting, and What to Plant.

The selection of trees suitable for various soils and situations should be carefully considered. On light, poor, hilly lands, and moderately exposed, the larch is the most profitable tree to plant for a main crop; when the altitude or exposure is too great for the larch, a shelter screen should be planted with Austrian, Corsican, and Scotch pines, planting the Austrians on the outside or exposed sites, as they are of a more bushy habit than the others, and the best pines grown for shelter. The Scotch and Corsican pines thrive well and make excellent timber on exposed, poor plains, where the larch has been found to be a failure. On the other hand, the larch generally is more vigorous and less liable to disease when grown on the declivities of hills with a southwest, west, or northwest aspect, than in other situations, the reason being that the sun's rays do not reach these aspects so early in the day, and thus the trees do not suffer from late spring frosts so much as when planted on east or southeast aspects. Firs should be planted in judiciously chosen positions to give the most pleasing and natural effects without stiffness and formality. The Douglas and Menzies spruce, Nordman's silver fir, and the Wellingtonia, which are now more plentiful than they have been, and may be bought at moderate prices, might also be introduced in smaller groups in the lower sites, where the soil is tolerably deep and the situation somewhat sheltered; they are all hardy, fast growing, and beautiful conifers, being very effective when planted in groups amongst deciduous trees.

Where hardwoods are planted to form the permanent crop on thin, poor soils, the beech, sycamore, and sweet chestnut are the best sorts to select. When the soil is of a loamy nature and resting on clay, the oak and ash should be planted; the latter, particularly, will prove a profitable tree to plant extensively where the land is suitable to its healthy growth, as the supply of copse or maiden ash timber is at the present time not equal to the demand, and likely to be still more scarce in the market. We would, therefore, say plant ash in preference to any other hardwood when forming new plantations, or filling up copses, wherever it is found to thrive. In copses on poor, hilly ground, sweet chestnut and hazel should be planted where blanks occur; in wet bottom land, alder, willow, and poplar are the most suitable sorts to plant; on chalky lands the hazel alone is sure to succeed best; it is a most accommodating plant, will thrive in almost every kind of soil, and is very profitable as underwood, always commanding a good price and ready sale where there is a demand for grate and hurdle wood.

Whenever the weather is favorable for planting operations, push forward without delay any forest tree planting that may be in progress, or the formation of any new plantations which may be contemplated during the present season; also drainage by means of open ditches and trenches, where naturally wet, or where there is not sufficient natural fall for surface water, likewise the enclosure of the ground by the erection of substantial fences to protect the young trees from damage by the inroads of cattle; and the cutting, clearing, and burning of furze, brambles, heath, or any other strong growing material of that kind that is likely to impede the work of planting or interfere with the healthy growth of the plants. These are all necessary preliminaries to forest tree planting that should have been finished ere this, in order that the work of digging the holes and planting the trees may progress speedily during seasonable weather, and when the ground is in a good condition to put in the plants. As soon as the latter are received from the nurseries, they should be taken without delay to the ground where the planters are at work, and heeled in thinly in a trench, their roots being securely covered over to prevent them from getting dry, and to protect them from frost.

[A correspondent of the London *Garden* gives the above information on the selection of trees adapted to various soils. We would add that the present is the season for removing and transplanting large trees; but it is necessary that provision should previously be made for taking them up with a large ball of frozen earth.—EDS.]

Selecting Timber.

There are certain appearances characteristic of good wood, to what class soever it belongs. In the same species of wood, that specimen will in general be the strongest and the most durable which has grown the slowest, as shown by the narrowness of the annual rings. The cellular tissue, as seen in the medullary rays (when visible), should be hard and compact. The vascular or fibrous tissue should adhere firmly together, and should show no wooliness at a freshly cut surface; nor should it clog the teeth of the saw with loose fibers. If the wood is colored, darkness of color is in general a sign of strength and durability. The freshly cut surface of the wood should be firm and shining, and should have somewhat of a translucent appearance. A dull chalky appearance is a sign of bad timber. In wood of a given species, the heavier specimens are in general the stronger and the more lasting. Among resinous woods, those which have the least resin in their pores, and, among non-resinous woods, those which have least sap or gum in them, are in general the strongest and most lasting. Timber should be free from such blemishes as "clefts," or cracks radiating from the center; "cup shakes," or cracks which partially separate one annual layer from another; "upsets," where the fibers have been crippled by compression; "rind galls," or wounds in a layer of the wood, which have been covered and concealed by the growth of subsequent layers over them; and hollows or spongy places, in the center or elsewhere, indicating the commencement of decay.—*Rankine.*

Whitewashing.

Samuel Smith claims, in the *English Mechanic*, that the following is a correct scientific and practical rule: Well wash the ceiling by wetting in twice with water, laying on as much as can well be floated on, then rub the old color up with a stumpy brush and wipe off with a large sponge. When this is done, stop all the cracks with whiting and plaster of Paris. When dry, claircole with size and a little of the whitewash. If very much stained, when this is dry, paint those parts with turps, color, and, if necessary, claircole again. To make the whitewash, take a dozen lbs. of whiting (in large balls), break them up in a pail, and cover with water to soak. During this time melt over a slow fire 4 lbs. common size, and at the same time, with a palette knife or small trowel, rub up fine about a dessertspoonful of blue-black with water to a fine paste; then pour the water off the top of the whiting, and with a stick stir in the black; when well mixed, stir in the melted size and strain. When cold, it is fit for use. If the jelly is too stiff for use, beat it well up and add a little cold water. Commence whitewashing over the window, and so work from the light; lay off the work into that done, and not all in one direction, as in painting. Distemper color of any tint may be made by using any other color instead of the blue-black—as ochre, chrome, Dutch pink, raw sienna for yellows and buff; Venetian red, burnt sienna, Indian red, or purple brown for reds; celestial blue, ultramarine, indigo for blues; red and blue for purple, gray, or lavender; red lead and chrome for orange; Brunswick green for greens.

The Nautigon.—A New Scientific Instrument.

An instrument for the use of navigators, patented in Europe through the SCIENTIFIC AMERICAN, has recently been invented by the Rev. Dr. Thomas Hill, late President of Harvard College, which is called by the manufacturer (C. H. Farley, of Portland, Me.) the Nautigon. It solves instantly, by mere inspection, without the use of tables, any problem in spherical trigonometry, with sufficient accuracy for the principal problems of practical navigation. It requires no more time and no more mathematics to work out an observation by this instrument than to take the sun with a sextant. Thus, with a sextant, chronometer, and nautigon, the navigator needs no logarithmic tables. An observation of altitude gives instantly, by inspection of the nautigon, the ship's time and the azimuth of the sun or star, enabling the observer at once to get his longitude and the deviation of compass. The time of rising or setting of any heavenly body and its azimuth is determined with the same ease. The course for great circle sailing is also visible from inspection of the instrument. If the chronometer is out of order, the nautigon gives the altitude of moon and star, making it only necessary to observe the distance with a sextant. The correction of the lunar distance is the only problem too delicate for the nautigon, which gives angles to the nearest minute of arc; it would be too expensive for ordinary use, if it were made for the nice adjustment of seconds of arc. Even here, however, the corrected distance can be found, to the nearest minute, by the nautigon, giving a valuable check on the computation, easily applied.

A NEW SUN.—M. A. Cornu, in a note to the Paris Academy of Sciences, gives an account of his spectroscopic observations of the new star, 4th to 5th magnitude, lately discovered in *Cygnus*. The light of the star, he says, appears to possess exactly the same composition as the envelope or chromosphere of our sun.

DWELLING HOUSES IN LONDON.—In a quarter of a century, from 1849 to 1874, more than 270,000 houses are declared to have been added to London, making an average of 10,813 houses per annum; and in one particular year of commercial activity, at least 18,000 were built.