Correspondence.

The Population of Pittsburg, Pa.

To the Editor of the Scientific American:

I notice in your issue of May 17, a communication from John T. Findley, of this city, in which he speaks of Pittsburg having a population of 450,000. Without doubt he has overestimated it. The 1880 census credited us with 156,000 inhabitants, and the average growth per decade of the whole United States is about 32 per cent, which would give us (approximately) a population of 206,000. However, we expect the coming census to show 225,000, on account of cheap fuel and other advantages. Mr. Findley extracts conclusive proof from our standing in the clearing house of our population. This is not a good basis on which to figure, as our clearings take in much contributory territory. Moreover, if that were a reliable index to our growth, we would be compelled to give New York City credit for comprising half the population of the United States. And even Mr. Findley would hardly like to go on record as giving that immense city a population of 30,000,000 or 35,000,000. CONSERVATIVE.

Pittsburg, May 15, 1890.

Preservative and Non-poisonous Paints.

To the Editor of the Scientific American:

We have noticed two or three communications in your paper from Louis Matern, Bloomington, Ill., concerning "what paint will best protect tin on roofs." He answers his question at once by saying that the best paint known to him is red lead ground in raw, cold-pressed linseed oil. As an example of its tenacity and weather-resisting power, he says: "I treated the roofs of my factory, eighteen years ago, with two coats of red lead on both sides of the tin, having since repeated the painting of the upper side every three or four years (through persuasion) with iron ore paint. The result is, there is little flaking of the red lead, but no end of trouble from the iron ore paint."

This example of lasting power is very like the old lady's broom that lasted forty years by hanging behind the door, while other brooms were worn out with the sweeping.

Your correspondent closes his rather remarkable letter with the still more remarkable statement that "All paints not poisonous, and requiring driers to insure hardening, are unfit for durable painting." It must seem strange to your readers to be told that if they wish a durable roof paint, they must have a poisonous paint. Now, as a matter of absolute fact, this is not true, as very many of your readers know, and little credit could be given to modern science if such a condition existed.

Nature has furnished in graphite a material that would seem to fulfill all the requirements for an ideal roof paint. It stands equally well the extremes of heat and cold. It is very light, one pound of graphite being three times the bulk of white lead and twice the bulk of mineral paints; hence, in use it will cover twice the surface, at least. Each particle of graphite is in the form of a flake, and in painting these flakes lap one on the other, making a flexible coating that will stand any amount of bending. Graphite is one of the forms of carbon. It is as pure and healthful as charcoal itself, and, as it is unaffected by contact with any known substance, it suffers no chemical change, but remains always the same. It is equally useful for shingle roofs, as it prevents the shingles from imparting their woody taste to the water.

If Mr. Matern had painted his factory roofs with graphite paint, he would probably have found, as others have found, that his roofs would not have needed repainting for ten or fifteen years, and he would have had a non-poisonous paint from which water would run sweet and pure. GEO. E. LONG.

Jersey City, N. J., May 20, 1890.

Successful Profit Sharing.

Profit sharing as a solution of the labor problem is not making the progress that its advocates hoped for a few years ago, yet in some industries where it has been judiciously applied and adhered to persistently it has proved a decided success. A large manufacturing concern near Cincinnati, which employs many operatives and has an industrial village of its own, adopted profit sharing some time since, and has just declared a semi-annual dividend amounting to 15½ per cent on the wages of the operatives, or 30 per cent per annum. That makes a very handsome addition to a workingman's income. For instance, if he earns $700 per year, his dividend amounts to $210, which he can very readily lay aside for a rainy day. It is needless to say that there are no labor troubles in that concern. The men have no disposition to strike and the interests of the concern are theirs to an unusual degree. They know that vigilance and industry will repay them in proportion as they benefit the concern, and the employers find that the increased activity and industry of the men fully compensate them for the large dividend of the profits paid to them.—*Springfield, Mass., Union.*

Wood, the Naturalist.*

If any one were asked to name the two most popular writers on natural history of recent times, the answer could only be Frank Buckland and J. G. Wood, and of the two the latter was perhaps the greater favorite. Every one has had his books in his hands on many a country ramble or seaside scramble in rock pools in search of "specimens" for the aquarium; and no other writer has done so much as the author of "Homes without Hands" to make natural history familiar to the unscientific mind and interesting to the general. His life, by his son, will undoubtedly be read with genuine appreciation by the thousands who have learned to observe "common objects" under his guidance. It is too long, and dwells too much on trivial details, but it is full of interest and of good stories, and makes the author, whom we all know by his books, a distinct personality, abounding in life and character.

Wood was, indeed, essentially what is termed a "character"—quite as much as Buckland. There was nothing, certainly, in his beginnings to foretell his future bent. Born in London in 1827, the son of a surgeon, he had only the advantage of delicate health to prepare him for intellectual achievements. Necessarily kept much at home, he soon developed a passion for reading; taken to Oxford for the sake of country air, he rapidly established intimate relations with the Cherwell, in or on the banks of which sacred stream he continually disported himself, till he knew all its inhabitants, their ways, homes, and tastes, by heart. The habit of observation thus early developed grew upon him. His rooms, when a scholar of Merton (where he entirely supported himself), were a menagerie of strange creatures. Grass snakes crawled about, to the terror of the bed-maker; five hundred "woolly bears" (we mean the caterpillar, not the Russian sort) colonized an ingeniously contrived asylum, whence they were removed, a few at a time, every day or two, bottled, and then dissected, in the course of a minute study of the growth of the tiger moth. Cages, boxes, nets, were scattered over the floor or hung upon the walls. Probably the specimens occasionally suffered from the fumes of rank tobacco exhaled, not by Wood, but by the Ghost of Nobody's Poker—on which remarkable phenomenon the book must be consulted. The natural taste for animal and insect life was confirmed and systematized by two years' study under Acland, at the Anatomical Museum, while waiting for the due time of ordination; and when (1852) appointed curate of St. Thomas Martyr, at Oxford, the old explorations of river banks and Bagley Wood still continued.

It must have been a sore trial to have to leave the country and take up his residence near St. Bartholomew's Hospital, of which he became chaplain in 1856; and six years later the craving for fresh air became so imperative that he and his wife moved to Belvedere, where his favorite studies could be pursued, notwithstanding vigorous assistance to neighboring parsons on Sundays, and in spite of being burned in effigy and cited before the Archbishop as a "ritualist" for, *inter alia*, collecting the offertory *in colored bags!*

Wood, despite his early delicacy, was a man of tremendous vigor. He was a great swimmer, skater, and gymnast (we all know him as Mr. Bouncer in "Verdant Green"), could fence and box well, made night horrible with the strident tones of his euphonium, ran three miles on end every day before breakfast till he was forty-five, and worked like a steam engine. He would begin work at five in the morning, and end at eleven at night, with but two hours' sleep in the afternoon. By such indefatigable energy he contrived to produce thirty or forty distinct works, besides compiling abridgments, and writing articles in magazines, of which he edited several, and giving, from 1879 to 1888, innumerable lectures in England and America. His great hit was made in 1857, when the ever popular "Common Objects of the Seashore" was published by Messrs. Routledge; to be followed in 1858 by the "Common Objects of the Country." So great was the run on the latter that 100,000 were sold in the first week, and printer and binder could not keep up with the demand. It is painful to learn that the author only received £30 apiece for these still favorite manuals, and still worse that the publishers did not recognize their moral duty to go beyond their bond. But Wood was essentially a careless man in such matters, though in some others he was curiously "natty" and methodical. In vain he "hasted to rise up early and so late took rest;" he cannot be said to have "eaten the bread of carefulness;" and though he was "beloved" by hundreds of thousands of readers and hearers, he was not "given sleep," but wrestled with the demon of insomnia.

He was careless in other things besides publishers' agreements and money matters. He would leave his clothes and books (and, worse still, other people's books) wherever he stayed; he continually missed his train, and for smashing his bones he had no rival. At different times he broke his right arm, right leg, collar bone (twice), six ribs, and nose, dislocated his ankle and many of his fingers; and, after all, he was not a penny the worse, except when he tumbled over a mud heap (he was always tumbling over something, gravestones, for example, owing to his short sight) broke most of the bones of his right hand, and, nevertheless, went on just as he was—performed the service at a neighboring church, administered the sacrament, preached a sermon, and then came home to have his fingers set! His hand never quite recovered from this severe experience, and he had to take to a typewriter—on which, by the way, he was working in a train, while suffering from acute peritonitis, two days before his death, in February, 1889. His was a singularly brave, persistent, unique character, impossible not to like and admire, and his son has done good service in portraying it so clearly and well.—*St. James's Budget.*

* "The Rev. J. G. Wood: His Life and Work," by the Rev. Theodore Wood. With portrait. (London: Cassell & Co. 1890.)

Growing Aquatic Plants at Home.

Lotuses, like water lilies and other aquatic plants, says a writer in that excellent floral and horticultural journal, *Popular Gardening*, can be grown in wash tubs sunk into the ground. It will be necessary, however, to have the tub strong and well hooped, so that it will not be liable to give out, the culture being the same as water lilies. We quote the following hints, concerning ponds and tubs, from O. J. Farmer:

Many persons are not aware of the ease with which water lilies can be made to grow and bloom in all their beauty and fragrance in the yard, with the trifling cost of constructing a small pond or sinking in the ground an old tub or barrel sawn in half, and kept filled with water during the summer, covering up with straw and boards in the winter to keep from freezing. The ponds should be made about two feet deep; for lilies bloom better in shallow than in deep water. Get some healthy, knotty roots, cover but slightly with rich mud, fill with water, and the job is ended. For tubs, take any strong barrel free from tar, oil, or salt; old molasses or whisky barrels are about the best, for the nature of their contents presupposes them strong and well hooped. If an old wagon tire be driven snugly on the bottom, and the tub well painted, they will last a dozen years or more. Now saw the barrel in two at the bung, fill each half full of fine loam, or if the barrel be a large one, only fill about a third full, lay in the roots, straighten out the small fibers, and cover to the depth of about two inches, and if it is intended to put fish in, overlay with coarse gravel to prevent the fish from burrowing down and exposing the fibrous roots, until all are well set. Now sink the tub to a level with the ground, and fill very gently with rain or river water; well water is not natural to aquatic plants. I venture that ninety per cent of the failures to grow plants in this way are the result of using well water. Replenish the tubs with water from time to time, to supply evaporation; this is all the care they need. If desirable, these tubs may be set on a platform on rollers, instead of sunk in the ground, and can thus be kept indoors during the winter. Kept filled with water, they will come out early in the spring.—*G. R.*

Men and their Hobbies.

A statement made by a wise man is that "Every honest man has a hobby." The man in question did not use these precise words, says the *American Cultivator*, but they amount to the same in substance.

A man who is always tinkering around, making something or other in the mechanical line, is never found spending his leisure hours in a gin mill or saloon. The young man whose hobby is study will be found at his books as soon as his day's work is done and supper is swallowed.

The chap who has "music on the brain" will be puffing or scraping his instrument early and late, until his friends almost wish he would quit his hobby and relegate himself to the rum shop.

Many young men ride a mechanical hobby, and are often building experimental machines, and making "young" steam engines. To such men, electricity possesses a most enticing field. There is no end to the directions in which thought may be profitably turned in connection with electricity. Well developed as it is, electricity is as yet an almost unknown thing, which will require lifetimes of study to reduce to the full understanding of all. Electricity is the future power of the world, as it has always been its life, although unknown and uncomprehended for ages.

That a young man will waste hours and days of his life in doing worse than nothing, when he has such a field before him, is scarcely to be comprehended, but it is a disgraceful fact. Let the young men awake to the idea that the advance of the world depends upon them personally; that the years to come may be better or worse as they choose to study or to be idle, and it seems as though they would quit beer drinking, dice shaking, and card shuffling instantly, to avail themselves of the privileges before them.

A man may be about what he makes himself nowadays, and if he chooses to become a sot, the way is open; if he chooses to become a power in the land, he can do so by going to work in that direction and keeping at it.

Success in Heliography.

A dispatch from Prescott, Arizona, mentions a great achievement in heliographing recently accomplished during practice in the Department of Arizona, by Lieut. Wittenmeyer, who succeeded in signaling a message by a single flash 125 miles from Mount Reno, near Fort McDowell, to Mount Graham, near Fort Grant, where it was received by Capt. Murray. The latter by turning his instrument flashed the message to Fort Huachuaca, a distance of 90 miles, making a distance of 215 miles with a single intervening station. The longest distance heretofore made with a single flash is said to be 70 miles.

A heliograph may be described as a simple instrument that is used for signaling by sunlight from a plane mirror. The signals are made by flashing reflections or by obscuring and revealing at will, by a movable screen, an otherwise constant light, which is technically called a "standing flash." The instrument working with a screen has been usually called by the inventor a "heliostat." That giving flashes has been called a heliograph or a heliotrope.

The word heliograph, however, is commonly used to denote both, and will no doubt continue to be the accepted name. A complete instrument consists essentially of two plane mirrors and a "sighting" rod, and, when a "standing flash" is used, a screen. The mirrors are firmly supported, usually on a tripod, and are fitted with vertical and horizontal tangent screws. By means of the tangent screws the mirrors can be turned on their supports so as to face in any desired direction toward the sky. When a movable flash is used, one of the mirrors is so mounted that a motion of three or four degrees about its horizontal axis can be given it independently of the tangent screw, so that the flash can be thrown on and off the receiving station at will, and quickly.

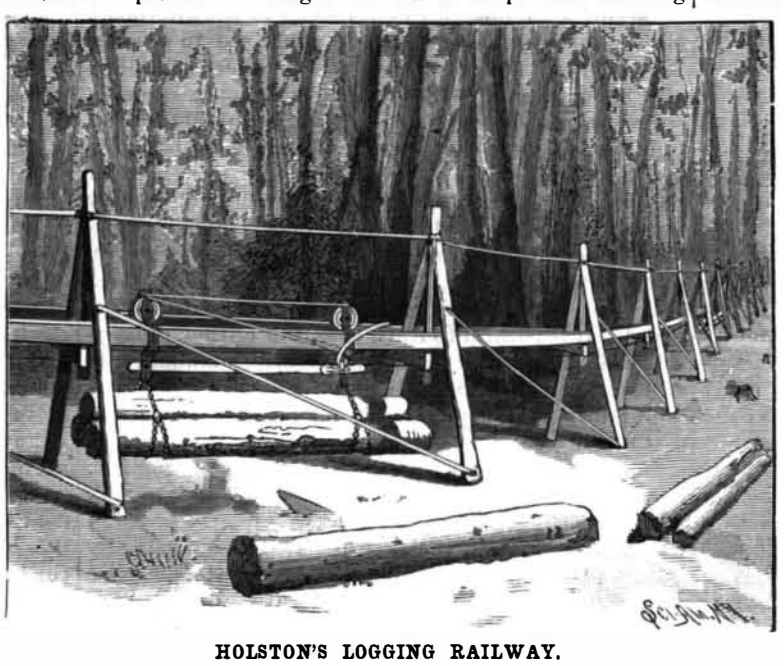
The screen, when used, is on a separate support, in order, when working, to avoid any shaking of the mirrors. Both mirrors are used when the signalman facing the receiving station has the sun in his rear. When the sun is in his front, or nearly at his right or left, only one mirror is used. The sighting rod, as its name implies, is an auxiliary used with the tangent screws, to put and keep the mirrors in such a position that the flash can be cast with certainty on the receiving station.

Unless the flashes are produced rather slowly, and the dots and dashes separated very clearly, there is great liability of confusion. Even very expert readers of these signals are liable to make mistakes, and to clearly communicate ideas the operator must observe constant care and "space" his dots and dashes with extreme nicety. The heliograph may be manipulated after night by means of a clever arrangement of two small lamps attached to the instrument. Flashes, long or short, can be produced by delicate adjustment.

Among the heliographic instruments heretofore described in the SCIENTIFIC AMERICAN is one by which, when a key is pressed, like a telegraph key, the flash of light is made of long or short duration, answering to the telegraphic dot or dash. Another improvement is that in which the flashing mirror is attached to an opera glass.

AN IMPROVED LOGGING RAILWAY.

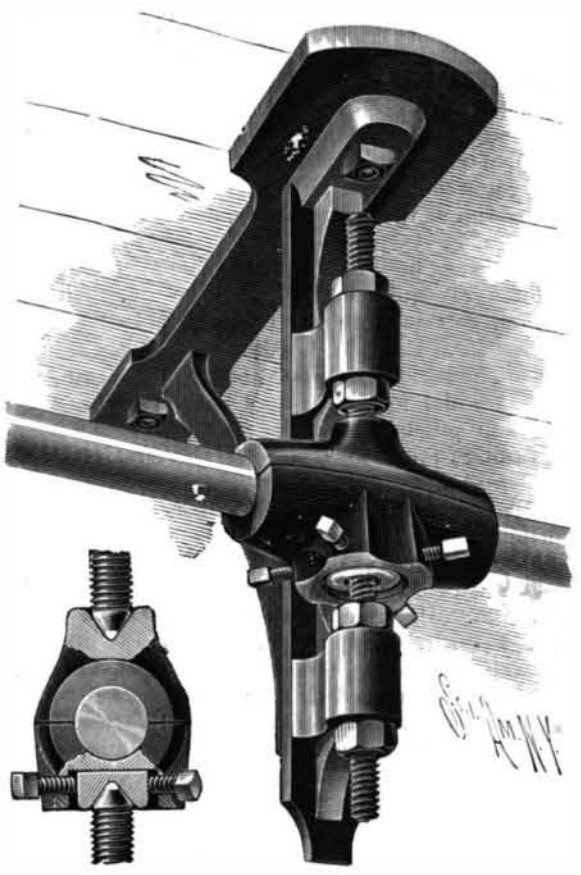
The illustration represents a simple form of logging railway designed to be expeditiously and conveniently built in any lumber region from the materials at hand. It has been patented by Mr. Frank V. Holston, of Bayfield, Wis. The supports or standards are formed of logs placed in the shape of the letter A, and between their upper contacting ends is secured a depending perpendicular log of about half the length of the standards, there being attached to this latter log and to one of the side standards a cross bar of hewed timber. The standards may also be connected by side and bottom brace rods when deemed necessary. The tracks are laid upon stringers resting upon the inner ends of the cross bars, and upon the tracks travels a carriage consisting of two or more hangers, connected by rods or bars, the hangers being bent upon themselves at their upper ends, where a grooved wheel is pivoted to travel upon the track. The lower ends of the hangers are carried beneath the track and connected by a log, and each hanger has a chain with a grab hook of any approved construction, whereby the logs to be transported may be held from the carriage at an elevation from the ground. To the upper curved extremity of one hanger is attached a cable designed to return the empty carriage, while a second cable, operated by power from any convenient source, is carried beneath the track and over a grooved roller on an arm attached to one of the hangers, in such position as to be readily gripped by a cam lever, when the logs have been securely attached to the carriage.



HOLSTON'S LOGGING RAILWAY.

AN IMPROVED SHAFT BEARING.

The illustration represents a universal shaft bearing adapted to adjust itself automatically to the position of the shaft, which has been patented by Mr. H. Schneider. The bearing support has vertical screw-threaded bosses in line with each other, threaded bolts with conical ends working in the bosses, the bolts being adjusted to position by set nuts. The bearing consists of an upper and lower section, which, when placed together, have the proper aperture to receive the shaft, and the upper section has a recess for the insertion of the conical point of one of the threaded bolts, while the other section has a recess within which is a bearing plate fitting the conical end of the other bolt, the recess for this plate being large enough to permit the plate to be shifted by means of radial binding screws working through threaded horizontal apertures in the raised rim or edge of the recess, and bearing with their inner ends against the sides of the bearing plate, as shown in the sectional view. The illustration represents the bearing as applied in connection with a hanger, but it may as readily be used in connection with a standard fixed upon the floor, or with wall brackets, the movable bearing plate being placed either above or below the shaft, as may be most convenient, the improvement giving the journal box or bearing sufficient play to enable it to yield or adjust itself automatically to any slight play or vibration of the shaft, thereby avoiding undue strain and the friction and wear incident thereto. The movable bearing plate also permits of lateral adjustment of the shaft bearing, even when the shaft is running, while vertical adjustment may be quickly effected by the adjustable upper and lower bolts or pivotal bearings and their respective binding nuts. For further information relative to this invention address Mr. H. Schneider, Dey Street House, No. 58 Dey Street, New York City.



SCHNEIDER'S SHAFT BEARING OR HANGER.

THE best quality precipitated chalk perfumed with orris root makes a good tooth powder or paste.

Purchasing Beets.

The several beet factories which have had a short existence in the United States experienced difficulties with farmers when purchasing beets. The uniform price per ton, regardless of quality, is evidently the most simple method of overcoming the difficulty. The farmer's main object in view would then be to raise large beets, giving a heavy yield per acre, but averaging a low percentage of sugar. One campaign of a factory working under these conditions would end in ruin. If it were possible to contract for roots at say a uniform price of $4 per ton, with ironclad rules respecting seed used, methods of planting, fertilizer, etc., the existing difficulties offered in California by the sliding scale of prices could be overcome.

On the other hand, experience in America has shown that farmers, while contracting to follow certain lines of cultivation, drift into their own methods without being aware thereof; hence there is a necessity of having a sugar beet overseer, his sole duty being the daily visiting of every portion of land where beets are being raised, and thus make certain that barnyard manure is not used the year of planting, and insist that the cultivator be run several times between rows of beets, so as to eliminate weeds, etc. In other words, his duty would be to follow out all the best rules laid down for the production of roots rich in sugar. Beets to be received at the factory should be analyzed and their exact locality of growing made known. In special cases the fertilizer used could vary. The work of practically carrying out such a method is expensive, but it has for ultimate effect the bringing about of perfect harmony between all parties interested.

We receive letters from California sources wishing to ventilate their grievances in print. We cannot publish such letters, but realize perfectly how difficult it is for them to understand why beets raised upon same soil, with same seed, by same methods of cultivation, should vary in price several dollars a ton. We are convinced that perfect conscientiousness exists on the part of the chemist employed by the factory. Why not do as is frequently done in Europe, *i. e.*, the farmers to have their own chemist, the expense, when divided among many cultivators, being but small, and then insist that the sample of beet selected at factory should be cut into two equal parts—the analysis obtained on the one hand should agree with that on the other. If a variance existed an average could be taken, and the price per ton thus determined would be more satisfactory than at present.—*Sugar Beet.*

Migrating Birds.

A dispatch from Cedar Rapids, Iowa, says: "A migrating bird wave which was passing over here on the night of May 17 encountered a severe rain and thunder storm. Attracted by the electric lights, the birds gathered about them and attempted to fly into the stores. As a consequence, more than 1,000 birds fell dead in the streets from coming in contact with the wires and the glass fronts. Few of these birds inhabit this region, and some rare specimens were captured alive and caged. Among them was a red-poll warbler, one of the rarest birds in the United States. This bird nests in Manitoba and Alaska in summer, and in the winter goes as far south as the Caribbean Sea. More than fifty different species of birds were found.

A Mysterious Olive Disease.

A strange disease has broken out in some of the olive orchards in the Pomona valley, and in many respects recalls to mind the mysterious vine disease. It was first noticed about two and a half years ago, and has been making headway ever since. So far no one has yet discovered its cause, whether it is bacteria in the sap or a disease of the wood. Its attack is indeed singular. The tips of the branches and smaller limbs begin to dry up and the wood turns a light brown, often taking in a whole limb. Many branches will show an apparently healthy twig on one side while on the other side a dead and withered growth tells the story of its presence. One tree may be apparently healthy with the exception of a single branch or shoot, while other trees are nearly from one-quarter to one-half dead. The affected portions convey the idea of having been scorched by a severe fire. The malady is reported quite universal throughout the valley, and is causing no little anxiety among the olive men. Specimens have been sent to Secretary Lelong, of the State Board, but so far no reliable information touching its cause and cure has been learned from any source. Prof. Coquillett has sent specimens of the leaves and wood to the department at Washington, and it is to be hoped that the mystery will be cleared up and a remedy found before its spread becomes serious. A "mysterious vine disease" is quite enough for Southern California, without the addition of a "mysterious olive disease."—*Rural Californian.*