Correspondence.

An Invention Wanted.

To the Editor of the Scientific American:

A serious accident in this city, this afternoon, from blasting rock, in excavating for the foundation of a new building, suggests the query whether some safer method than blasting may not be invented, for excavating in thickly populated cities. As crosscut saws are used for sawing stone in the yards, it occurred to me that *circular saws*, with both horizontal and perpendicular movements, might be used for cutting stone in its native bed, into small cubes, which might be used for building purposes.

As similar accidents are following each other so rapidly in different parts of the country, it becomes philanthropists to agitate the subject, while it would probably pay inventors to consider it from a practical standpoint of view. Some practicable invention is evidently needed for such excavations, and there ought to be inventive genius enough in the nineteenth century to produce it.

ROBERT SINNICKSON.

Trenton, New Jersey, June 13, 1884.

Distances of the Fixed Stars.

Mr. David Gill, F.R.S., H. M. Astronomer at the Cape, recently lectured at the Royal Institution on "Recent Researches on the Distances of the Fixed Stars, and Some Future Problems in Sidereal Astronomy." Lord Rosse occupied the chair. Mr. Gill said that the study of sidereal astronomy is specially fascinating; we look upon the galaxies and suns which surround us, and wish to learn whence we come and whither we are drifting in the realms of space, and what is the position of our own sun in the concourse of the stars. Are the nebulæ ever to retain their ghost-like forms, or are they condensing into suns? The discoveries of the past show that "art is long and life is short," and that in the long run careful observations are superior to the most brilliant speculations. He would not, however, undervalue the imaginative mind which seeks after truth, for without it no man is fitted for the work to be done, or can be sustained during the watches of the night in his noble labor of love.

Before 1832 the parallax of no fixed star had been rendered sensible, and by regular observations between November, 1835, and August, 1838, it was discovered that α Lyræ had a parallax of one-quarter second of arc, a point as difficult to determine as the measurement of a globe one foot in diameter at a distance of eighty miles. He also stated that a silver threepenny piece a mile off would represent the size of the orbit of the earth as seen from 61 Cygni. These early measurements were taken by ascertaining the changes of position of certain stars in relation to each other, but the first to make a direct measurement of their parallax was Henderson, of the Cape Observatory; the second was Bessel. Of late years he—Mr. Gill—and a young American astronomer, Dr. Elkin, had been measuring the distances of some fixed stars in the southern hemisphere by means of a telescope with a divided object glass, and with the following results as expressed in the number of years in which light travels from them to the earth: α Centauri, 4·36 years; Sirius, 8·6; Lacaille (9352), 11·6; ε Indi, 15·0; ● 2 Eridani, 19·0; ε Eridani, 23·0; § Tucanæ, 54·0. So far as observations have yet gone α Centauri is the nearest of the fixed stars, and eye observations as to the relative brilliancy of stars are no guide to their relative true distances. He believed, with Mr. Lockyer, that the future of astronomy depends much upon photography, especially since the recent feat of exquisitely photographing the nebula of Orion had been so efficiently accomplished. It would take ten years to make a complete photographic map of the heavens. Dr. Elkin was willing to do it in the northern hemisphere, and he—Mr. Gill—wished to do it in the southern hemisphere, if the necessary apparatus were supplied; this, from the kind consideration he had always received from the Lords of the Admiralty, he anticipated would be done. He concluded by quoting the words of Sir John Herschel, that such things are quite as worthy of struggles and sacrifices as many of the objects for which nations contend, and exhaust their physical and moral energies and resources. They are gems of real and durable glory in the diadems of princes, and conquests which, while they leave no tears behind them, are forever inalienable.

The Army Worm Again.

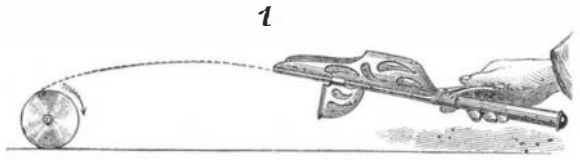
This troublesome pest, we see, has made its appearance in various places in New England, notably in Tolland County, Conn. A correspondent says the selectmen of Willington took measures at once to cut off the advance of the worms. A large number of men were called out, who hastily dug a trench partly about the field, but abandoned the attempt when they found that the adjoining lots and pastures were alive with the marching enemy. The army appears to be marching north, and detachments have been seen along the northern limit of the county.

In No. 306, SCIENTIFIC AMERICAN SUPPLEMENT, an illustration of the army worm and its mode of attack upon the fields is shown, and its life history, habits, and the best modes of extermination are given. This is a valuable paper to circulate among the farmers in the worm affected districts. Sent by mail on receipt of ten cents, or may be had at all news agencies.

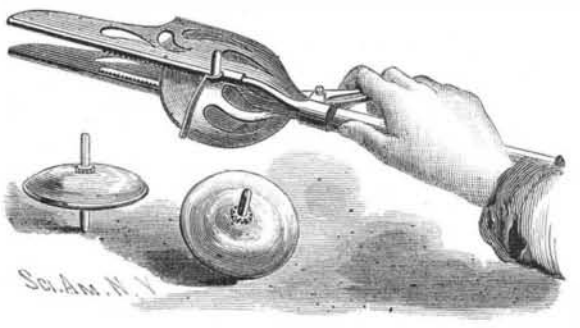
A NOVEL TOY.

The handle of the toy is made hollow, and forms a guide for a rod, on the outer end of which is firmly secured a carrier for the wheel or projectile of the toy. Within the handle is a spring that serves, by its pressure on the rod, to impel the carrier to the position shown in Fig. 1. On the handle is fitted a trigger, so arranged that when the carrier and its rod are forced back against the pressure of the spring it will engage with the carrier to retain it in a locked position. The carrier is provided with clips which slide along ribs formed upon opposite sides of a channel-like guide extending outward from the handle. The wheel is mounted on a spindle, which enters recesses formed upon the opposite sides of the forward end of the carrier. On the spindle is a pinion which, when the wheel is set within the carrier, is in contact with a rail or rack on the guide. There may be a rack along each side, and also duplicate pinions. When the wheel is thrown out by the action of the spring, a very rapid positive revolving motion will be imparted to it by the gear. The toy may be used either for shooting and rotating the wheel in the air, or impelling and rotating it over the floor, or for spinning it as a top on its spindle, as shown in in Fig. 2. When the toy is held with the carrier below, as in Fig. 1,

1



2



A NOVEL TOY.

the wheel will roll backward after it has overcome the inertia it received from the spring.

This invention has been patented by Mr. C. A. Volke, who may be addressed in care of Dr. R. Marctner, Stapleton, N. Y.

Wood Pavements.

At a recent meeting of the Institution of Civil Engineers, London, a paper read was on "Wood Pavement in the Metropolis," by Mr. George H. Stayton, C.E.

The author directed attention to the nature and extent of the various wood pavements in the metropolis, and to a comparison of the results obtained. The aggregate length of the streets of London was 1,966 miles, of which, excluding 248 miles in course of formation, 1,718 miles were thus maintained by various authorities, namely:

Macadam	573	miles.
Granite	280	"
Wood	53	"
Asphalt	13½	"
Flints or gravel	798½	"

The existing area of wood pavement was 980,533 square yards, and its estimated cost £600,000. Not more than 4·38 per cent was east of the city or south of the Thames. The method of construction adopted by the author was described and illustrated. His practice was to set out the levels of the channels so as to allow a rise to the crown of the road equivalent to 1 in 36 above the mean channel level. The inclinations of the channels should not exceed 1 in 150, and numerous street gullies should be provided. An extra cost of 4 per cent for gullies was money well spent. The foundation of the Chelsea pavements consisted of a bed of concrete 6 inches deep, composed of 5¼ parts of Thames ballast to 1 part of Portland cement; the entire cost for materials and labor when completed was 2s. 3½d. per square yard. The use of old broken granite as a substitute for Thames ballast, although cheaper, was not recommended. Concrete made from that material was less homogeneous than pure ballast concrete.

The greater part of the wood pavement in London was composed of rectangular blocks of yellow deal. Before adopting wood pavement the author inspected the various kinds of pavement then laid, and came to the conclusion that a plain but substantial system was the best. The blocks were 3 inches by 9 inches by 6 inches, and were specified to be cut from close and evenly grained, well seasoned and thoroughly bright and sound Swedish yellow deals (Gothenburg Thirds). The author knew of no more suitable wood in the market, which so satisfactorily stood the wear of traffic and atmospheric changes. Of hard woods, pitch pine took a high place in point of wear, the ascertained annual vertical wear of the section in King's road during four and a half years being 0·055 inch only. Neither elm nor oak blocks would withstand the atmospheric changes to which street surfaces were exposed; larch would probably take a high position, but the available supply was limited. In many pavements the blocks had been dipped in a creosote mixture; in a few instances they had been creosoted or mineralized, but at least one-third had been laid in their natural condition. The ordinary dipping process was of little value as a preservative, but might be utilized as an external discoloration for inferior blocks. The author had tried creosoted blocks, but experience had convinced him that they were not more durable than plain, that their surface was less clean, that the system was 20 per cent more costly, and that it tended to produce premature internal decay. The wood pavement in Chelsea required 40 and one-half blocks per square yard; they were laid upon the concrete in their natural state, with the fibers vertical, and with intervening spaces three-eighths inch wide. The joints were filled with cement grout composed of three parts of Thames sand to one part of Portland cement; they were kept parallel by means of three cast iron studs fixed in each block, which rendered the pavement firm and steady until the grout was thoroughly set. A top dressing of fine gritty material completed the work. If practicable, traffic should be excluded from a newly laid pavement for at least one week after completion. The result of five years' wear convinced the author that the plain system comprised all the essentials of a sound pavement; that it provided a quiet and smooth surface for vehicles, and safe foothold for horses; that the cement joint adhered to the wood, effectually resisted wet, did not unduly wear below the wood surface and thereby allow dirt to accumulate in the joints, neither did it displace the blocks. The net cost was 10s. 6d. per square yard, and but comparatively slight repairs had been found necessary. The blocks were originally 5·87 inches deep, but their present average depth was 5·22 inches in King's road, and 5·60 inches in Sloane street, their probable life being seven and eight years respectively.

Particulars of wood pavements in various parts of London were given at considerable length; and in those instances where the approximate weight of the traffic per yard width was known, the details of cost, maintenance, durability, ascertained vertical wear of wood, etc., were described.

The essentials of good management consisted in the prompt removal of defective blocks, the constant use of hand scrapers and brooms in removing horse droppings and mud, and the judicious application of water and sand. The cost of this service was 4½d. per square yard per annum, as as against 11d. per square yard for macadam previous to the substitution of wood. The author considered it undesirable to lay blocks of a greater depth than would provide for a life of seven years, as very few pavements retained a good surface after about six years' wear. Experience suggested that 5 inch blocks were preferable. Taking the life of the blocks in King's road at seven years, the first cost, repairs, renewals, and cleansing, spread over twenty years, amounted to 1s. 9d. per square yard per annum, and over fifteen years to 2s. 1¾d.

On the whole, the author submitted that wood pavement was economical and convenient, that notwithstanding many failures the modern system had achieved a fair amount of success, and that there was no apparent reason why its use should not be extended.

The paper included tables and statistics showing the first cost and annual cost of various wood pavements, the comparative vertical wear of wood in various streets as reduced to a traffic standard, together with the ascertained and estimated life of the blocks.

The Teeth of the Future.

In an able address recently delivered, Mr. Spence Bate, F.R.S., has drawn attention to some remarkable features which it may be interesting and instructive to take into account. In the teeth of the Esquimaux, the Red Indians, and the natives of Ashantee, as well as those found in the ancient barrows of England, the so called interglobular spaces, seen so frequently in sections of modern teeth, appear not to exist; nor, indeed, are they to be detected in the dentine of the best developed structures of the modern European. Not only is the dentine getting deteriorated, but the enamel would seem likewise to be undergoing a modification—becoming too opaque. In addition to the histological changes, the external form and character of the teeth are sustaining an alteration. This seems to be in relation to an important feature in the history of their evolution.

The tendency for the cranium to develop at the expense of the face and the jaws is seen to occur as we ascend the scale of the vertebrated series of animals. Owing to this atrophy of the jaws, the proper space for the full play and development of the normal teeth would seem not to be available. At birth the bones are not sufficiently grown to receive the teeth in their normal arch; and, as in the human mouth the premaxillary bones are firmly united a short time after birth, it follows that the posterior part of the jaw is the only place where growth can occur. Any delay in the development and consolidation of the symphysis must have the effect of contracting the space required for the teeth at this site. In the course of vertebrate evolution there is a marked tendency for teeth to disappear. The lower vertebrates have four molars on each side in each jaw, the higher have three, while in man the number is reduced to two.—*The Lancet.*

[The inference is, the teeth are being gradually evolved into brain matter, and as man increases in intellect his masticators become unnecessary. The future man will have a large brain, but no natural teeth. He will have to depend on the mechanical dentist.]