KITE TAILS AND TELEGRAPH WIRES.

To keep the telegraph lines free from entangling alliances in a city like New York is no easy task, and the chief of sinners in this respect is the small boy's kite tail. As though presuming on the service to telegraphy rendered by one of their class in the hands of Franklin, these playthings—of future Franklins, let us hope—are incessantly taking liberties with the wires, breaking thereby their own continuity, and endangering the continuity of the messages the wires are intended to convey. To assist the kite tails in this mischievous work, naughty boys tie stones to strings and strips of cloth, and then sling them so that they wind round the wires, and suspend the stones—a perpetual menace to passers underneath. In this way the wires in many neighborhoods are made to resemble the limbs of an African prayer tree, with its burden of rags, tags, and strings hung on by pious wayfarers.

The effect is not ornamental, nor does it add to the efficiency of the wires, especially on rainy days. At almost any moment on the side streets you may see the telegraph men climbing the poles to remove the strings, or reaching for the nuisances with long rods like stout fishpoles, which they twist among the strings until they are firmly attached, then by main strength strip them from the wires, sometimes at imminent risk of the integrity of the wires and their attachments. We never see the operation without wondering at its clumsiness. Why not burn the strings? It would be an easy matter to attach a light to the end of a slender bamboo pole, so that the flame could be slid along under the wire, charring any string or rag it might encounter, thus dislodging the snarls that are so hard to remove by force. The light could be hung, if need be, so as not to touch the wire or in any way interfere with the transmission of messages. A simple hook, or a grooved wheel at the top of the pole, would enable the apparatus to run along the wire so that it would be no trouble to guide it.

INFLUENCE OF THE EARTH'S FIGURE ON GEOLOGIC CHANGES.

The slow oscillation of portions of the earth's surface, now above, now below, the mean level of the sea, has long been recognized as an occasion of geologic changes, with their attendant alterations of climate and consequent successions of living forms. The cause of such oscillations has never been satisfactorily explained. The latest hypothesis comes from the Canadian geologist, H. Y. Hind, who shrewdly suggests that it may be due to the wavelike movement of the equatorial bulge which gives the earth the figure of a squeezed orange.

The reader may not be familiar with the fact—which has been established but a short time, comparatively—that the equatorial circumference of the earth is not a circle, but an ellipse, the diameter which pierces the earth from long. 14° 23′ E. to 194° 23′ E. of Greenwich being a little more than two miles longer than the diameter at right angles thereto. This gives on each side of the earth an equatorial ridge fully a mile high, which may have been much greater in earlier geologic epochs, when the crust of the earth was in a more plastic condition.

It is scarcely possible that this element of the earth's figure should form an exception to the universal rule of change, and be immovable. In case it does move, its influence would be felt on the elevation and depression of land, especially near the equator; on the simultaneous elevation and depression on opposite sides of the earth; on ocean currents, consequently on climate, etc.; on the thickening and thinning of formations to the east and west; on the flow of rivers, hence on river and lake terraces, beaches, etc. The geology of North America tallies singularly well with the effects of such a cause. The successive risings and sinkings of the continent appear to have always taken place very gradually and with a progressive motion from west to east and from east to west, as though produced by a vast equatorial undulation, moving, with extreme slowness, eastward at one epoch, westward at another.

The latest evidences of this great earth wave are seen in the stupendous escarpments which rear their wall-like fronts above the Ontario, Red River, and Saskatchewan plains, and in the symmetrical terraces and lake beaches so largely developed throughout the northern part of the continent. Mr. Hind looks to it, also, to account, in part at least, for the changes which diverted the water of the Great Lakes to the eastward, sending their drainage into the Gulf of St. Lawrence, instead of the Gulf of Mexico whither it originally flowed, leaving their ancient outlets southward to be filled with drift from 200 to 600 feet in depth.

Should corresponding effects be observed on the southern slope of the "bulge," and also on the opposite side of the earth during the same geologic periods, it is possible that geologists may find in the movements of this (now hypothetical) undulation the measure of time which they have been so long in want of.

OUR SIX LEGGED RIVALS.

It is a remarkable circumstance that those creatures which mimic man most nearly in mental and social development should be not his nearest allies among the vertebrates, but members of an entirely different order. It is something more than remarkable that they should stand to their order—the articulata—precisely in the same relation that man bears to the order with which he is classed.

Though surpassed in every detail of physical accomplishmentby his subordinates, man nevertheless excels them all in intellectual power and capacity for self-improvement. Similarly our six legged rivals, though the least of the articulates, are first in grade of development, surpassing the next below them—the bees and the wasps—as man surpasses the lower mammalia. This in itself is not surprising; but it does surprise one to see them excelling the higher vertebrates also, and pressing hard upon man's prerogative.

Accustomed to find brain power associated with and measurably related to brain bulk, it is simply astounding to discover a few microscopic specks of nerve pulp—the ant's cerebral ganglia—harboring a degree of intelligence such as the infinitely more bulky brain of man alone gives evidence of.

We have printed a good deal of late in regard to the manners and customs of these interesting creatures, and think the facts will warrant the position we have taken.

The question is not one of difference between undeveloped reason and a high order of instinct, but of difference between instinct and instinct, reason and reason. In the first, which we are too apt to consider an attribute peculiar to the lower forms of life, the ant might possibly be accounted our superior. But ants also reason, profit by experience, make a judicious use of new means for the accomplishing of new ends or the overcoming of new obstacles, and in many ways exhibit a degree of quickwittedness and intelligence which we may look long for among many tribes of man.

The completeness and complexity of the social organization of ant communities, the magnitude and variety of the works which they plan and execute, the perfection of their military and industrial discipline, the evident scope and flexibility of their language, their sympathetic regard for each other in times of distress or danger, their forethought and calculation, have been celebrated by every observer of insects from Solomon to Belt; and the more they are studied the more do their various civilizations and the motives which animate the members surprise and delight us.

Now we see them roaming about as independent warriors or hunters—formic Ishmaelites or Indians—fierce, vindictive, self-reliant, and marvelously fertile in tricks and traps for the securing of their prey. Again they appear in organized armies, nomadic swarms without settled habitation, like the Tartar hordes of Gengis Khan, marching from conquest to conquest, sweeping all before them. Others are pastoral in their habits and more or less permanent in their habitations. In temperate regions they rear and maintain, on suitable plants, herds of honey yielding aphides and beetles, which they tend with assiduous care, transporting them from pasture to pasture, and defending them from their enemies and the elements as zealously as the shepherd does his sheep; in the tropics the same kind offices are performed for domesticated scale insects and leafhoppers, in return for the honey-like secretions they emit. Some constitute themselves standing armies for the defence of plants which yield them subsistance directly or by affording pasturage for their cattle. Others are a scourge to plant life, gathering leaves by wholesale to make hot beds for the cultivation of fungi in underground chambers.

The harvesting ant—which provideth her meat in the summer and gathereth her food in the harvest—has been proverbial for thrifty wisdom, certainly since Solomon commended her ways to the sluggard: how much longer, we have no means of telling. Had the wise man enlarged upon the way some of her kind have learned to secure plenty without labor by the enslaving of others—the raiding ants of our correspondent in Arkansas are probably given to the practice—his advice would doubtless have been more highly appreciated by lazy humanity, too many of whom have hit upon the same expedient without the help of revelation.

But wiser than the common harvesting ants are the agricultural ants of Western Texas—the only Simon Pure and original Grangers—who have solved the transportation problem, by bringing not the grain but the grain fields to market. They have learned—possibly through the gradual desiccation of that now almost desert region—that chance productions are but a precarious support in a climate like theirs, so they surround their communities with fields of rice grass, which they protect by killing all rival growths, and in due season harvest their crops, doing all by well timed and concerted labor. Could there be a happier illustration of that ideal state of organized industry and mutual helpfulness, which philosophers have dreamed of and enthusiasts labored for since Plato planned his Republic? As in Sir Thomas Moore's Utopia (reading ant for man), every ant has a right to everything; and they do know that, if care is taken to keep the public stores full, no private ant can want anything; for among them there is no unequal distribution, so that no ant is poor or in any necessity; and though no ant has anything, yet they are all rich.

We have seen how all the common attributes of mankind are mimicked by these six legged rivals of ours, to a degree unapproached by any other class of animals. But man, we are told, has a faculty higher than thrift, higher than fellow feeling, higher even than reason. It is the faculty of reverence, the basis of religion, whether manifested in the fetichism of the Fantee or the faith of the Christian. This the theologians are wont to declare is shared by no other terrestrial creature. But here comes the French observer M. Lespés, with a story which disturbs our sole remaining ground for pride of peculiarity, raising the suspicion that ants too may have a religion!

In the nests of certain ants, and nowhere else, there is found a species of blind beetles which appear to be entirely dependent on their voluntary guardians for food and shelter, yet make no material return for the kindly services they enjoy. To complicate the matter, some of the communities of this species of ants are found to be destitute of beetles, which they greedily devour the moment the beetles are exposed to them. On the contrary when the beetles are placed near the nests of the communities which possess them, they are straightway fed and cared for most tenderly, and defended as resolutely as the ants defend their own young. Clearly the strongest of natural instincts, appetite, is somehow restrained in the case of these little keepers of asylums for the blind. What is the restraining influence?

Similar conduct on the part of a tribe of men would be unhesitatingly attributed to a rude sort of religious feeling; and Sir John Lubbock wonders whether something of the kind may not actuate these ants, whether they do not regard their helpless though relatively gigantic wards with a feeling akin to reverence. Is it possible that they have arrived at a stage of development parallel with that of the beetle-worshipping Egyptians?

In our pride of bulk, we despise the ants for their littleness. But suppose they were as big as horses, proportionately strong for their size, as thoroughly organized and as intelligent as they now are, where would we be?

SMALL ENGINES AND BOILERS.

A cursory examination of the correspondents' column of the SCIENTIFIC AMERICAN will show that many of our readers are building model engines and boilers. We endeavor, as questions in regard to their proper construction arise from time to time, to give useful hints; but in the limited space devoted to the answers, we have not been able to treat the subject as fully as seemed desirable. We have, however, taken note of the various points arising in connection with this subject, and it is our intention, at an early day, to give some general directions and rules for the proportions of small engines and boilers. Many of our readers can render us valuable aid in preparing a complete article on the subject, and we feel confident that they will be glad to help us, when the way is pointed out.

We desire to receive accounts of the performance of small engines and boilers, embracing the following data:

Description and dimensions of boilers, manner of setting, and means adopted for heating the water. Size and description of engine, pressure of steam, number of revolution, and work performed. Amount of water evaporated by the boiler per hour, expressed in cubic inches or cubic feet, also temperature of the feed. We hope that those of our readers who have small engines will take note of our request, and let us hear from them as soon as possible.

SCIENTIFIC AND PRACTICAL INFORMATION.

EFFECTS OF TORPEDOES.

Experiments are now being conducted at Cherbourg, France, in order to determine the effects of submarine torpedoes. An apparatus charged with 3,300 lbs. powder was sunk to a depth of 50 feet. On explosion a column of water 500 feet in hight was thrown into the air, and a hulk anchored at a distance of 18 feet from the spot was broken completely in two. The earth at the bottom was torn up, making a hole 40 feet in diameter and about 5 feet deep.

NEW GLAZING FOR POTTERY.

A kind of lead glazing is used upon common pottery, the employment of which often causes cases of lead poisoning among the workmen. M. Constantin, of Brest, France, has recently devised a substitute which is said to be much superior and to possess the hardness and inalterability of glass. He uses silicate of soda, pulverized quartz, chalk, and a small proportion of borax. This glazing may be colored green by copper and brown or violet by manganese. It is already coming into use in many of the largest French potteries.

WATERPROOFING LINEN.

Professor Kuhr gives the following directions for this purpose: Pass the linen first through a bath of one part of sulphate of alumina in ten parts of water, then through a soap bath, of which the soap is prepared by boiling one part of light colored rosin and one of crystallized carbonate of soda with ten parts of water until the rosin is dissolved. The rosin soap thus formed is to be separated by the addition of one third of common salt. In the soap bath the rosin soap is dissolved, together with one part of soda soap, by boiling it in 30 parts of water. From this bath pass the articles fixally through water, then dry, and calender. Made-up articles may be brushed with the solutions in succession and be rinsed in the rain. Wooden vessels may be employed.

A COMPOUND ENGINE ROCK DRILL.

M. Jules Garnier, according to the *Revue Industrielle*, has lately devised a modification of the compound engine which he employs with great success in connection with rock drills. In M. Garnier's engine, the two cylinders are placed end to end and the two pistons are attached to the same rod. Two slide valves are so arranged that one serves to admit live steam to the small cylinder, while the other distributes the steam directly from the latter to the large cylinder. By this means the steam does not become condensed in passages or reservoirs between the two cylinders, and hence power is economized.

The inventor adapts this arrangement to drills which operate by compressed air. Ordinarily air at full force is used to drive the drill into the rock, and a second supply is needed to lift the tool back, the latter operation, of course, not requiring so much power as the down stroke. M. Garnier uses the air directly from the compressor to give his powerful stroke, and then exhausts it into a larger cylinder and uses it over again to lift the drill back. The single piston rod is retained working through the partition between the two cylinders. Further details of the machine, which will convey an accurate idea of its construction, will be looked for with interest.