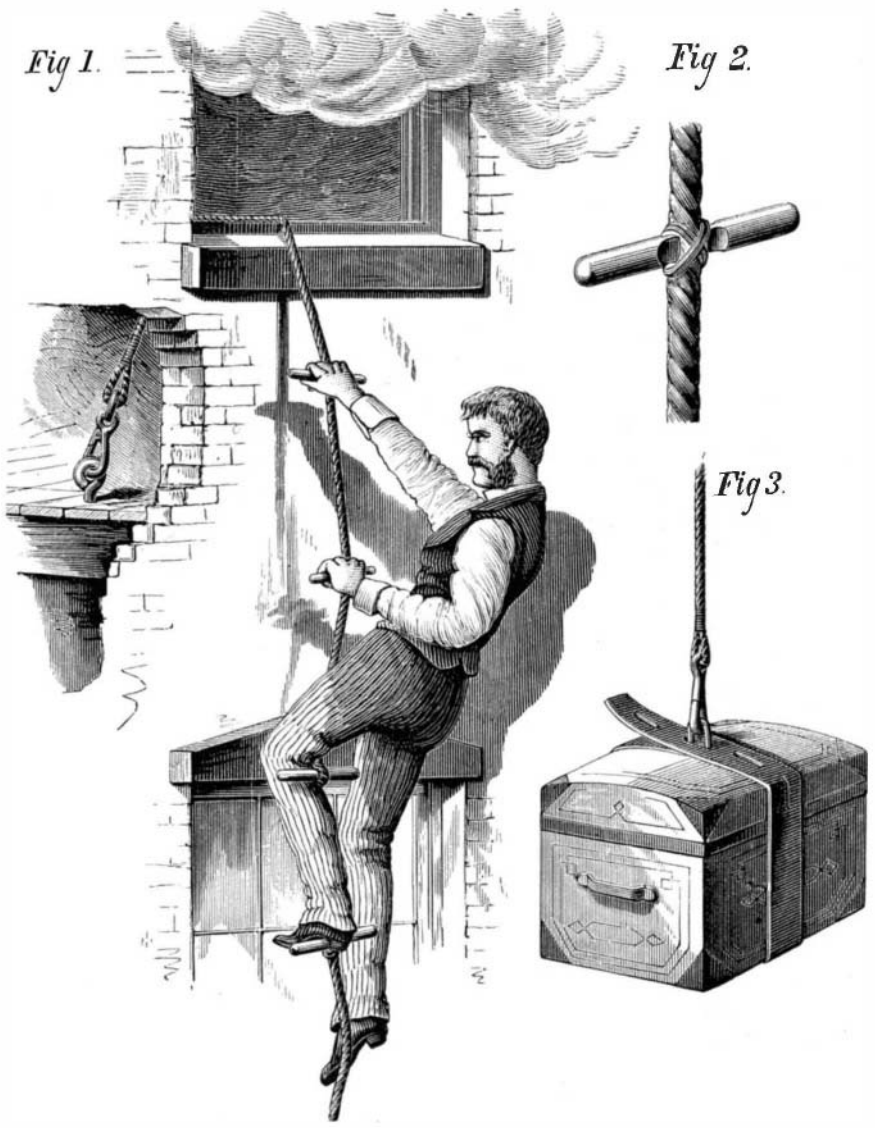
IMPROVED FIRE ESCAPE.

We noted last week the necessity existing for some simple and efficient fire escape, which could be rolled in small compassso as to be conveniently stowed in the traveler's satchel or trunk. The invention illustrated in the annexed engravings aims to supply this need. It consists of about a hundred feet or less of wire rope, one end of which is turned up to form a loop which is secured by wire seizings. In this loop, which is lined with leather to prevent chafing, a spring hook is secured. Along the rope, crossbars or rests are lashed with wire, at intervals of about 15 inches. These bars are of iron, having a portion of their surface flattened near the centers on one or both sides, and are inserted through the strands of the rope (Fig. 2).

The apparatus can be very quickly got ready for use, as it is only requisite to screw an eye into the woodwork or flooring of the room, attach the snap hook, and lower the escape out of the window, whence it forms a ladder, Fig. 1. The inventor also provides a strap, Fig. 3, which carries a staple to which, after the strap is passed around a trunk, the end of the fire escape rope is attached. The trunk is thus easily lowered; and after reaching the ground, it serves as a means of steadying the ladder. By the same means, women, children, or invalids may be lowered from windows.

Patented through the Scientific American Patent Agency, October 24, 1876. For further particulars, address the inventor, Mr. H. R. Houghton, West 42d street, New York city.



Age of Labor-Saving Appliances.

The *Manufacturing and Trade Review* thinks that the greatest reason why there is such an over-proportionate abundance of all kinds of products as compared with former times, and comparatively so few workmen are employed, is that these products are the results of mechanical appliances, one of which does the labor of numbers of workmen. Instead of hoes and spades, and sickles, and scythes, and flails, the cultivators, planters, reapers, and mowers, and thrashers are used. So with the production of the nail, horseshoe, cutlery, tools, clothing; in fact, what is not made by machines for the purpose is very far behind the age. The business of the world now is inventing, improving, and running machinery and appliances to make machinery and tools, and in producing the articles they make; and the aim of the present workman must be to thoroughly know the use and care of machinery, the strength and adaptability of materials for the manufacture of appliances. If the world seems to be already supplied with all these, then his business is to possess the machine or appliance and use it in producing the thing which his taste and judgment may suggest. It is useless to resist this march of machinery. Only the man who accepts, adopts, and enters most heartily into its use and product, will keep abreast of the present progress.

IMPROVED CALCULATING MACHINE.

The drudgery of mental computation, of all labor, is perhaps the most enervating and uninteresting; and an effectual device to remove or even lessen the mental effort will be readily appreciated by mathematicians, engineers, bankers, actuaries, and accountants.

The calculating machine, properly so called, must not be confounded with the simple slide rules, adding machines of various kinds, interest tables, and other devices called by the same name. This instrument is a piece of mechanism that performs its task in a direct and complete manner, taking in a great range of work, and using and giving numbers at full length and in plain figures.

The construction and operation of the apparatus as illustrated herewith are both simple. There is an upper cylinder, which is turned by the crank, and which itself drives a smaller shaft underneath. A slide, that can be set in eight different positions on the cylinder, carries eight figured rings that can be set to represent any number of eight or less decimal places. Each turn of the crank adds the number set up on the rings to the number represented on the ten recording wheels carried by the lower shaft. The multiplication process will best be understood by an example. To multiply 347 by 492, the three upper rings are set at 3, 4, and 7, respectively. The cylinder is then turned twice to multiply by the units figure of the multiplier. If now the slide is carried along one notch, where each ring will act on the next higher recording wheel, and turned 9 times, 347 will be multiplied by 90, and the product at the same time will be added to the product already scored. Another shift of the slide and four turns will complete the operation, and show the result, 170724=(347×2)+(347×90)+(347×400) upon the recording wheels. A half turn of the crank backwards erases this result, bringing all the wheels to 0, ready for the next operation.

Division is the reverse of multiplication. The dividend is set up on the wheels, the divisor on the rings, and the quotient records itself on the upper recording wheels. The machine of the size illustrated will use numbers of eight or less figures, and show the result in full, if not over ten figures, and its upper figures if more than ten places are necessary.

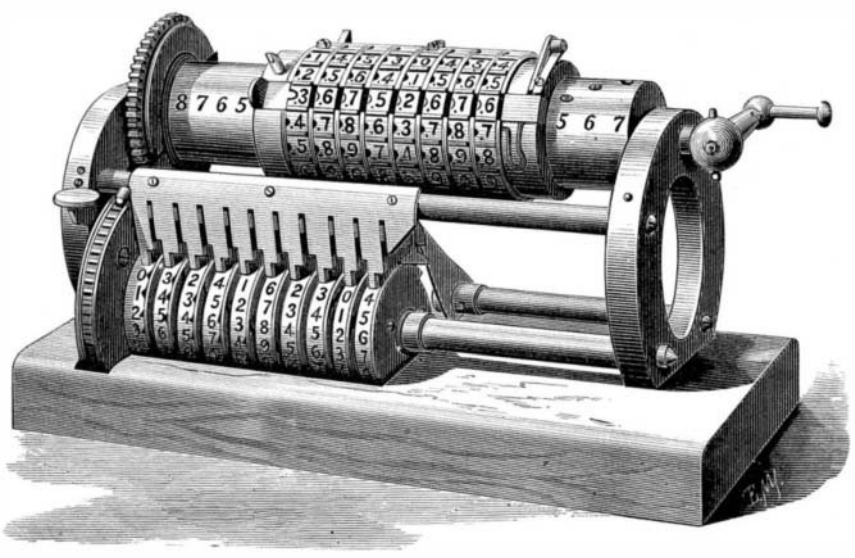
The dimensions of the instrument are 13×5×7 inches, and claimed to have an advantage of three to one over common logarithms; and it is quicker and easier to use natural numbers and natural sizes, tangents, etc., on the machine than to use the common logarithmic method.

The patentee and manufacturer is George B. Grant, 94 Beverly street, Boston, Mass. He will supply any further information.

HOUGHTON'S FIRE ESCAPE.

it contains but eighty working pieces of mechanism, none of them small or delicate. Made mostly of brass and iron, its smaller parts are of steel, portions of which are tempered. Its results are shown in plain figures, stamped on unpolished silver-plated surfaces and filled in black. All prominent parts are nickel-plated and polished.

The machine was invented in 1870, but was not manufactured for general use until this year. It was introduced to the public for the first time at the Centennial Exhibition; and the official report, signed by such well known men as President Barnard, of Columbia College, Professor Hilgard,



NEW CALCULATING MACHINE.

of the United States Coast Survey, Professor Joseph Henry, Professor J. C. Watson, and Sir William Thomson, says: "It is simple in construction, not liable to get out of order, its use greatly saves the mental labor of computation, and lessens the liability to error. It is deemed superior to all other instruments of its class yet produced." Other well known experts state that a saving in time of more than sixty per cent is effected over ordinary methods.

Upon work of four or five decimal places, the machine is

New Theory of the Origin of Petroleum.

The origin of the immense quantities of hydrocarbon oils which are found saturating strata of sandstones, or pent up in cavities of the older rocks, or escaping to the surface and collecting upon pools of water, has been the subject of frequent discussion. The theory generally accepted, and endorsed by such names as Hunt, Newberry, and Silliman, is that it is of organic origin, either vegetable or mineral. It has even been suggested that the bad smelling petroleum of Canada owes its origin to decayed fish. According to T. Sterry Hunt (*American Journal of Science*, March, 1863), "the pyroschists of Bosanquet belong to the Devonian series, and contain the remains of land plants, so that a partially decayed vegetation may be supposed to have been the source of the organic matter which is intimately mingled with the earthy base of the rocks; * * * but in the pyroschists of the Utica formation, the chief organic remains to be detected are graptolites, with a few brachiopods and crustaceans."

In view of these facts we are not a little surprised at the new and yet plausible theory advanced by the distinguished Russian chemist, Mendelejeff, before a meeting of the Chemical Society of St. Petersburg. The appearance of oil on the surface of the earth proves that it has a tendency to rise through the various strata of the earth, and this is no doubt due to its being lighter than water, which, being everywhere present, forces it upward. For this reason we are compelled to suppose that it was formed lower down in the earth than the places where it is now found. Another reason for this belief is that the sandstones, in which much of this mineral oil is found, contain no charred organized remains, which must be present where the oil was produced, if it be of organic origin. Since petroleum is found in the Caucasus in tertiary, and in Pennsylvania in the Devonian and Silurian, its origin must have been in the older rocks at a still greater depth. But in those ancient periods, like the Silurian, not many organized beings could have existed. Hence Mendelejeff thinks that it is very improbable that petroleum is the product of any decomposed organic matter.

Mendelejeff starts with Laplace's theory of the formation of the earth, applies Dalton's law to the original gaseous condition of the constituents of the earth, and calculates the probable arrangement of the metals in the earth from the density of the globe and the vapor density of the elements. Starting with the assumption, which is not improbable, that iron is the most abundant of metals, since it is present in large quantities in the sun and in meteorites, and admitting the existence of carbon compounds of this metal. not only will it be easy to explain the formation of petroleum, but one can understand all the peculiarities of its occurrence in those places where the earth's strata has been broken by the elevation of mountain chains. Breaks made in this way permitted the water to permeate to the carbonaceous metals; and at the high temperature, and under heavy pressure, it acted upon them, forming oxides of the metals and saturated hydrocarbons. The latter rose as vapors to the higher strata, where they were condensed, saturating the porous sandstones, which are capable of absorbing many oily products.

Many other phenomena of nature are explained by this theory of the formation of petroleum, such as predominance on the earth's surface of elements with small atomic weights, the occurrence of oil in straight lines or arcs of huge circles, its dependence upon volcanic action, which has been noticed by Abich and others, the magnetism of the earth, and many other natural phenomena.

Salicylic Acid.

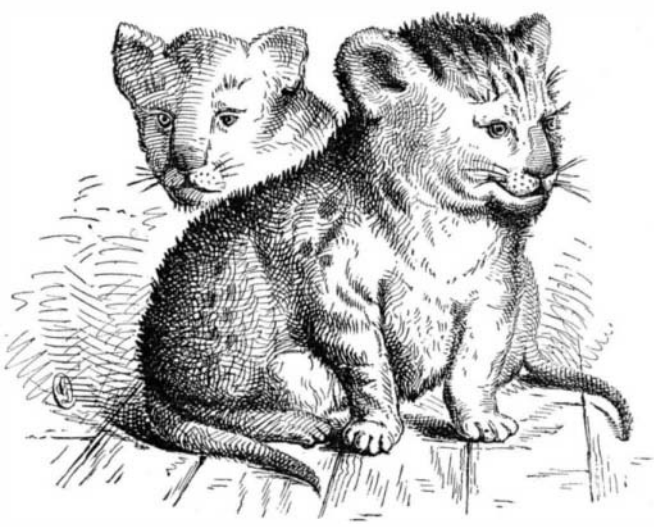
M. Blandeau, of Paris, states that, according to dentists, this agent has injurious effects on the teeth. English observers have noticed its effect on the bones, and necrosis of the tibia has been assigned to its use. It evidently possesses considerable affinity for the calcareous salts of bone, and we see the urine loaded with lime salts in an ultra-physiological proportion, from the internal use of the acid. The salicylate of soda presents the same dangers; and too much caution cannot be taken in the use of any salicylic preparation.

BABY BRUTES.

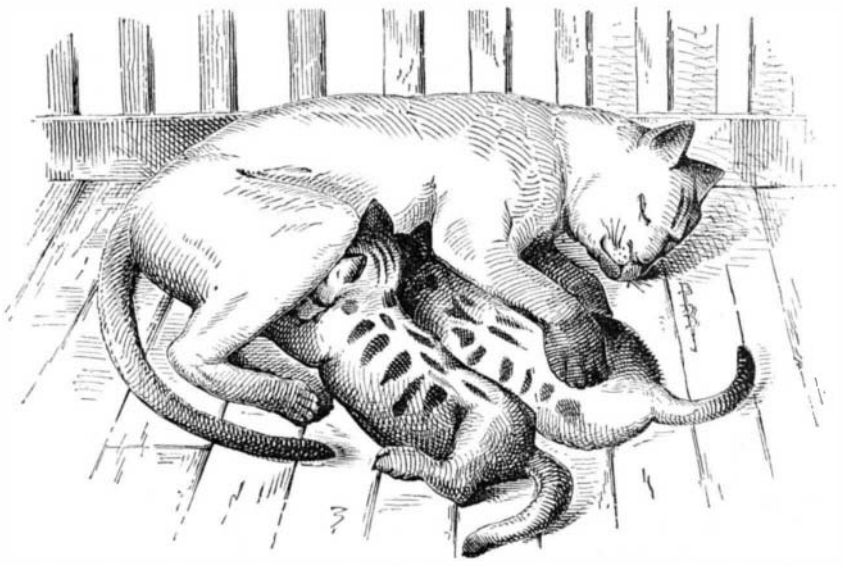
The Central Park menagerie, or rather Mr. P. T. Barnum, who is the proprietor of most of the animals exhibited free to the public during the winter, has recently become possessed of a litter of panthers, two lions, a baboon, and a dromedary, all born in the cages. Of the baby lions and panthers, engravings are given herewith. The lions are now nearly four months old, and are about as tall as a moderate-sized terrier dog. They are exceedingly fat, and, like all young of their species, are covered with a short downy fur, profusely mottled. They possess, in brief, all the characteristics of kittens, except gracefulness of motion; for they are the personification of clumsiness. Their legs are thick, short, and bent, their paws, which already possess formidable claws, appear too large, and their bodies are long and ungainly. The temper of the infants, despite their innocent and childlike expression, is none of the best; for they show ranges of white sharp teeth, and spit viciously on any stranger approaching their cage. The cubs are of especial interest to zoölogists from the fact of their being the offspring of a cross between the Asiatic and African species of lions. This mingling of breed has not before been attempted, and the characteristics of the young will be carefully watched.

The panthers are of the ordinary variety, peculiar to this country. As is the case with most untamable brutes, they breed unfrequently in captivity. The cubs are of the same age as the young lions; and were it not for their peculiar markings, resembling closely those of some species of young deer, they might well be mistaken for good sized cats. Their behavior, when stirred up, is a ludicrous mixture of fear, curiosity, and defiance. A slight poke from the end of a cane causes the cub touched to beat a speedy retreat toward the mother; then it turns and watches the stick with intense interest, relieving its feelings by an occasional spit. Finally one paw flies forward, and a spiteful dig is administered, and then another retreat takes place. This is continued as long as the intruding object remains in the cage.

It is curious to notice, both in the lioness and in the panther, that peculiar pride in showing their offspring which the domestic cat manifests in the most unmistakable manner. It seemed also as if the old animals regarded raps on the bars of the cage, or the introduction of canes to induce their progeny to take better attitudes for sketching purposes, in the light of grateful attentions; as, no matter how much the young ones spit and scratched, the mothers never showed the slightest resentment, but quietly crouched and stared at the interloper in abstracted calmness. The writer saw the lioness deliberately wake up her cubs, who were cuddled into an undistinguishable ball of fur, and spread them apart with a blow of her paw, for no reason that could be divined other than that she wished to display them. They manifested no hunger, but sat up, as they are shown in our engraving, and blinked like suddenly awakened babies, until their eyes became accustomed to the light.



YOUNG LIONS IN CENTRAL PARK, NEW YORK.



PANTHER AND HER YOUNG, CENTRAL PARK, NEW YORK.

Plating of Iron and Steel with Nickel and Cobalt by Immersion.

Mr. F. Stolba—in a German periodical which we should be glad to give credit to, if there were not six words and fifty-seven letters (including forty-two consonants) in its name—proposes the following simple process for nickel-plating polished iron and steel articles. To a dilute solution (5 to 10 per cent) of as pure chloride of zinc as possible, there is added enough sulphate of nickel to color it strongly green. This is heated to ebullition in a porcelain vessel. The objects, being completely cleaned of grease, are then suspended in the liquid so that they touch each other as little as may be; and the boiling is kept up for from half an hour to an hour, water being from time to time added in place of that evaporated. The nickel is precipitated in a brilliant white layer wherever the surface of the object is not greasy or rusty. The operation can be continued for several hours if desired; but the plating will not thus be rendered much thicker.

After removing the objects, they are washed with water holding chalk in suspension, and carefully dried. They may afterward be cleaned with chalk, and they take a fine yellowish-toned polish. The chloride of zinc used should contain no metal precipitable by iron. When it cannot be obtained of sufficient purity, it may be made by dissolving zinc scraps in hydrochloric acid, and allowing the solution, containing an excess of metallic zinc, to rest, in order that the metals precipitable by the zinc may separate. Filter at the end of 24 hours, and the solution is ready for use; each portion of zinc dissolved corresponds to about 2·1 parts of chloride of zinc.

The sulphate of nickel should also be as pure as possible, and the cold solution should not precipitate when a plate of iron is plunged in it, as would happen, for example, if it contained copper. When during the operation the liquor becomes a pale green, owing to the precipitation of nickel, more sulphate must be added until the intense green is regained. When the used liquid is exposed to the action of the air, it deposits hydrated oxide of iron, coming from the dissolved metal. It should be filtered, and more chloride of zinc and sulphate added, when it may be again used.

In the same way, polished iron and steel objects may be covered with a brilliant plating of cobalt, by using a sulphate of cobalt solution. The appearance of this plating differs little from that of polished steel. The distinguishing characteristic is the light rose-colored tint. The author states that the plating wears well.

A New Class of Blowpipe Reagents.

Of all methods of analysis, that performed in the dry way by means of the blowpipe deserves the palm on the score of simplicity. The reagents are only four or five in number, the apparatus so small and portable that it can be carried in the breast pocket; and yet in most cases, with a little skill, the results are quite as satisfactory as those obtained in a completely equipped laboratory. There are, however, some cases, unfortunately but few, where the blowpipe reactions are not as simple as might be desired: such are those with boron and the iodides; but Messrs. Ihles and Devereux recently have overcome these. One necessity of every blowpipe set has always been a bottle of strong mineral acid for decomposing carbonates, detecting limestones, etc. On a journey, as at all times, acids are unsafe companions in pocket or portmanteau. A recent discovery of Dr. H. Carrington Bolton helps us over this quicksand, and enables the analyst to dispense with liquids entirely. The new departure (which is original, we believe, with Dr. Bolton) consists in the use of dry crystalline organic acids, such as tartaric, citric, and oxalic. When required for use, a few crystals are thrown into water; the mineral to be tested, which must be in a very fine powder, is introduced; and then, with or without heat, as the case may be, solution is accomplished. The facility with which the mineral dissolves in one or the other acids aids to determine its name. Even sulphides and silicates may, in several cases, be brought into solution by organic acids; and when the acid alone fails, it can be mixed with saltpeter (potassic nitrate) and the mineral thus decomposed.

A new field of very wide extent and unlimited interest opens here, and we hope Dr. Bolton will explore it to its furthest boundaries. Perhaps a new kind of analysis will be developed, to which we would give the term organo-wetish-dry testing.

SOMEBODY has perpetrated the following on Captain Eads' work on the Mississippi: "Those willow mattresses at the mouth of the Mississippi make the bed of the river more comfortable, to be sure. But still the shipping don't lie there nearly as long as formerly. If they are bound to New Orleans, they 'get up' as soon as possible."

ZINC, it is said, may be purified by precipitating its sulphate with an alkali, mixing the oxide thus produced with powdered charcoal, and exposing the mixture to a red heat in a covered crucible.

Dangers from the Dead.

That the dead should kill the living seems a paradox; yet nothing is more true. Indeed, we venture to say that every year, in our land, corpses murder more people than assassins do. Not only have intramural interments poisoned whole blocks and quarters, not only has drinking water contaminated by graveyards yearly spread disease and death through country hamlets, but, before the process of decomposition commences, there is often a great and pressing danger from infectious disease. We quote a recent instance:

"Dr. Goldie, the Medical Officer of Health for Leeds, England, in his report to the local authority, states that every one of thirty people who attended the wake of an Irish girl, who recently died in that town from typhus fever, were attacked by the same disease, and no fewer than nine of the cases ended fatally."

So strongly have the needless dangers of exposure at funerals impressed the medical mind, that the Health Board of New York have now issued a circular recommending that no public or church funerals should be given to persons dying of either diphtheria, scarlet fever, measles, or whooping cough.

In Chicago, also, where scarlet fever and diphtheria have been severe this past winter, the recommendation of one hundred medical men in council was in these words:

"There should be no public funerals of any patient who has died of any infectious or contagious disease. Remember that the separation of the sick person from the well is the most certain means of preventing the spread of the disease."

A writer in the Baltimore *Physician and Surgeon*, last December, went so far as to advocate the passage of a law on the subject (the average American man looking upon a "law" as the cure-all on every occasion). He thought it should embody the following provisions:

1. Whenever any one dies of contagious disease, the publication announcing the death should state the cause of death.

2. No person except the immediate family should be permitted to attend the funeral, and the handling and burying the body should be intrusted to persons who devote themselves to that business.

3. A sufficient number of carriages should be kept for the special purpose of attending these funerals, and the hiring them for other purposes should be prohibited, under the severest penalties.

These are good suggestions, but people should learn and obey them out of a natural sense of sanitary propriety, not out of obligation to a statute.—*Medical and Surgical Reporter.*

On Vegetarianism.

A discussion on this subject took place at a recent meeting of the Medical Society of London. True vegetarians, it was urged, eat neither butter, eggs, nor milk.

Sir Joseph Fayrer related his experience of the effects of this diet among the natives of India, and said he had no doubt that people could live on vegetables alone. He had seen some of the finest specimens of the human race, as regards strength, power of endurance, and physical development, among the inhabitants of the northwest provinces of India, who were pure vegetarians; but he accounted for their condition from the fact that their food consisted chiefly of leguminous seeds, such as peas, beans, and the like, which contained a larger amount of nitrogen than other vegetables.

The President, Dr. Buchanan, remarked that in the discussion several factors should enter—as age, which was a considerable element, as no doubt people advanced in years appear to thrive on a vegetable diet, whereas children require almost a pure animal diet. Again, climate was a great factor; and in the treatment of disease it could be strongly advocated; while, lastly and chiefly, temperance must be strictly enforced, avoiding excess in the use of animal food, and taking, in fact, a middle course.

A Torpedo that Travels 275 Miles an Hour.

The most terrible invention for warfare that has ever been devised—if we may trust the reports of our English contemporaries—has recently been submitted to the Admiralty by a clergyman, the Rev. C. M. Ramus. The Whitehead fish torpedo has already proved its capability of travelling beneath the surface of the sea at the rate of 20 miles per hour; but the "rocket float," as the new machine is called, weighs 50 tons, and is propelled on the surface at the rate of 275 miles per hour for a distance of four miles. The apparatus is a timber or iron vessel, the bottom of which is a series of inclined planes. In the head is the explosive, and enough gun cotton can be carried to blow up the largest ironclad in existence, while the rocket, by the combustion of which the craft is impelled, is laid along the deck. The vessel is said to be easily guided by a rudder of very thin sheet metal.

If the coming British experiments substantiate the foregoing, it would seem that armor-plated ships have had their day, and that the naval vessel of the future should be of cork.