

THE GATHERER.

New Use of the Telephone.

The more generally the telephone is employed, the wider are found the uses to which it can be put. The latest, or at all events one of the latest, is both ingenious and useful. M. Dohrn has for some time been conducting scientific explorations in the bed of the Bay of Naples, and it is in connection with these investigations that he has introduced the telephone. In consequence of this use of the instrument, the operations of the divers have become considerably facilitated. These submarine workers are able to communicate with the boatmen overhead, not only without loss of time, but with absolute accuracy. It will thus be seen that the telephone may be made the means of materially reducing the perils as well as the inconvenience and hardships of the diver's occupation.

A Protective Bloom for Steel.

Steel ornaments and utensils are of course liable to rust, and the new processes, such as that of Barffe, for coating the metal with a non-oxidisable skin of rust are now well known and very valuable. They cannot, however, be applied by any private individual, because they are protected by patent, and moreover require expensive apparatus. It is interesting therefore to learn that Dr. Guthrie has accidentally discovered a very cheap and simple plan for giving a beautiful bluish-black skin, or rather bloom, to steel watch-chains, keys, or other articles. This consists in plunging them for a short time in fused nitrate of potash or common nitre. The bloom is non-rusting, and makes the steel able to resist the corrosion of damp, and moist air. Any one can apply it for himself, as there is no patent to prevent him.

A New Thermograph.

An ingenious thermometer for constantly recording the temperature of a patient's body has been contrived by Dr. W. Adams. The principle is a combination of the ordinary metallic thermometer and the micro-tasimeter of Mr. Edison. The sensitive part consists of a delicate spiral spring, made of two fine strips of brass and iron soldered together, the brass being outermost. The unequal expansion of these two metals under a rise of temperature causes the spiral to press upon a small platinum piston, which enters a vulcanite tube filled with powdered plumbago, carbon, and silver dust. At the other end of this tube is a second plug of platinum, which is fixed, whereas the other is movable and under the control of the sensitive spring. A current of electricity flows through the conducting carbon-powder in the tube, and traverses an electro-magnet, which actuates a finely-pointed pencil, marking a line on a band of travelling paper. The spring operates like the metallic thermometer, and by its expansion might be made to actuate the marking-pencil direct; but far greater

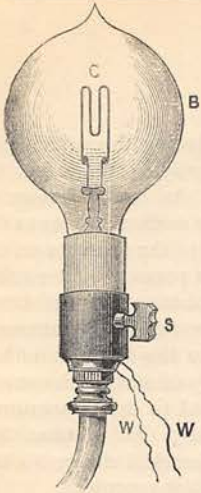
sensibility is obtained by introducing the principle of the micro-tasimeter, and magnifying the effect by means of the electric current. As is well known to electricians, the resistance of the carbon-powder to the electric current is proportional to the pressure on the powder; and when the piston is pressed by the spiral spring on the powder, the resistance of the latter diminishes, and the current correspondingly increases. This has the effect of adding to the strength of the electro-magnet, and consequently of moving the marking-point to a degree proportional to the temperature which deflected the spiral spring. Dr. Adams has also, we believe, applied this electrical device to the construction of a very sensitive pulse recorder.

Curious Optical Phenomena.

M. Treve is quoted as the authority for certain odd phenomena of optics and of vision. He mentions the circumstance that the flame of a lamp seems brighter, and that a vertical shaft, a post, or a mast is seen more distinctly, through a vertical than through a horizontal slit. On the other hand, he finds that a house, a landscape, or the face of the sun or moon is more clearly perceived through a horizontal aperture. He has noticed similar differences in photographs, according as the light passes from the object to the plate through a vertical or horizontal opening. He accounts for these varying effects by the action of diffused light.

Maxim's Electric Light.

It is now recognised by electricians that the kind of electric light suitable for domestic illumination is that in which a filament of carbon or other refractory material is heated to incandescence by the passage of an electric current. The arc lights, in which the electricity leaps across a gap of air from the point of one carbon rod to another, are so very powerful, and withal unsteady, that they are best adapted for the lighting of streets, factories, and other large areas. The incandescent lamps of Swan, Edison, and others are, however, eminently suited for lighting rooms and picture-galleries. Perhaps the best of these yet brought out, in point of beauty at least, is the incandescent carbon light of Mr. Maxim, of New York, recently introduced into London. As shown in the figure, the lamp consists of a glass bulb, B, containing a filament of carbon, C, bent into a double loop, and connected by suitable supports of platinum to the conducting wires, w w, which lead to the poles of the machine and convey the current to the loop. A screw-cock, S, turns on and off the current, and thereby the light—just as gas is turned off and on. When the current passes the carbon glows with a rich mellow lustre, resembling the flame of a wax taper, but still more pure and brilliant. The carbon is made by charring card-board, and the bulb is charged with



vapour of gasoline, which, by depositing carbon on the weaker and therefore hotter parts of the wick, thereby increases its durability. Thus far experience has shown that a burner of this kind will last from 600 to 900 hours. The lamps can be taken out of their sockets and replaced again in a moment, so that if any one should break down it can be readily superseded by a fresh one; and as they can be manufactured for a shilling each, the cost of an occasional breakage will not be heavy. The beauty of the light is of itself an inducement to adopt it in drawing-rooms or sumptuous saloons;

but being entirely enclosed it is free even from the fumes of wax tapers, and hence cannot injure furniture or taint the air. Moreover each globe gives off far less heat than a gas or candle flame, so that the atmosphere is not made oppressively warm. For mining purposes the light is well adapted, since it can be wholly immersed in a clear vessel of water, out of the risk of setting fire to the fiery gases in the drifts. With regard to the cost of this illuminant, it is claimed that a No. 20 Maxim generator can feed eighty-five Maxim lights, each of twenty-five candle-power, in consuming ten horse-power of energy.

Indoor Rowing

An ingenious framework for giving the body all the exercise of rowing in-doors has been imported recently from the United States. It consists of a sliding-seat, with oar-handles and foot-rests; and the whole is so connected together that by its means a skilled rower can train himself in any weather, and a beginner can learn the art. By adjusting the apparatus it can be adapted to the strength of any person, and even to a child of twelve.

A Folding Cradle.

In America the simple cradle of our forefathers has been improved as well as other things, and is indeed

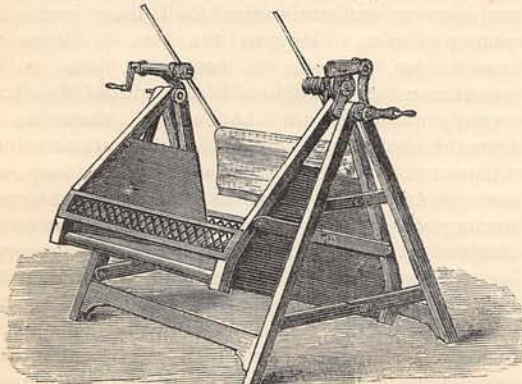


FIG. 1.

scarcely recognisable beside the rocking-box which still does duty in this country. The curious framework shown in Fig. 1 is the latest development of the American baby-bed, and it is specially designed for transport by land or sea. It consists of a swinging cot made of two triangular frames supporting a canvas bottom and wicker sides. These frames are hung from a pair of axles, and can be swung to and fro by means of crank handles, or if desired by string or treadle. A bent rod from which a cloth or paper fan is suspended moves with the cradle, but in an opposite direction, so as to create a cooling air over the little sleeper's face. The whole appliance is made to fold up into the form illustrated in Fig. 2, so as to pack in handy bulk.



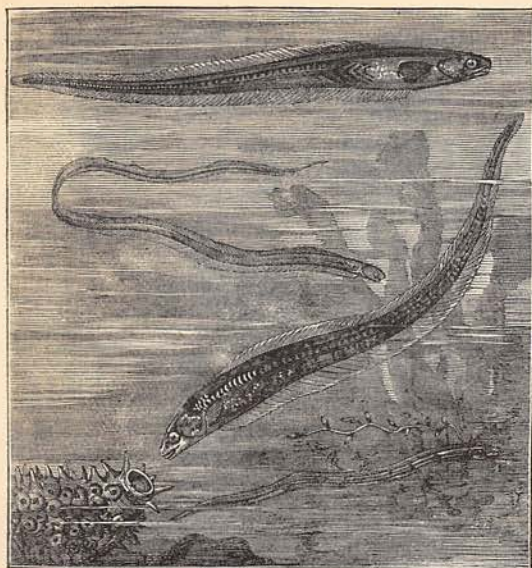
FIG. 2.

A Leech Barometer.

It has long been well known that the leech is highly sensitive to atmospheric changes, and Mr. A. W. Roberts tells us how a leech storm-glass may be fitted up. A tall candy jar is covered with a tin top in which several holes are bored, and at the bottom a floor of peat with two or three smooth stones is laid down. The jar is then filled with soft water, into which, after it has become quite clear, two or three medicinal leeches are placed. Heat being fatal to these animals, great care must be taken in summer to keep the jar in a cool shady spot, so as to lower the temperature as much as possible. So long as the weather remains calm and beautiful, the leeches lie motionless at the bottom of the vessel. On the approach of snow or rain, however, they will be found at the top, where they rest until the weather becomes again settled. A wind-storm coming on will cause them to gallop about in a lively fashion, while an approaching thunderstorm is a source of great uneasiness, making them try to seek a lodging above water, and move in convulsive-like threads. In clear frosts they lie constantly at the bottom. The water of the storm-glass must be changed every two weeks.

Smoke Abatement.

An exhibition of apparatus for the abatement of smoke is to be held this autumn at South Kensington, on the grounds of the world's fair of 1851. Heating, cooking, and lighting appliances of all kinds, artificial fuels, ventilators, chimneys, and so on will be displayed, and medals, prizes, and certificates are to be awarded to the successful exhibitors. The exposition will be of an international character, and under distinguished patronage. The date of opening is fixed for October 24th, the beginning of the winter season, and it will be illustrated by a series of explanatory lectures.

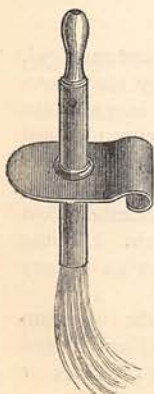


A Tenant Fish.

The Holothurian, or sea-cucumber, is a soft, fleshy creature of the snail description, with tubular feet, which help it over the sea-floor. They have long been supposed to harbour a curious fish within them; and recent investigation by Professor Emery, of Naples, has put the fact beyond a doubt. This naturalist finds that many of the Mediterranean Holothurians are inhabited by a small species of the *Fierasfer* fish, which lives in the cavity of the body, and seeks its own food by occasionally protruding its head. The creature is, therefore, not a true parasite, but merely a lodger, who has found in the interior of the sea-cucumber a safe retreat from his enemies. This uninvited guest is accurately represented in the accompanying illustration.

A Gas Fire-Lighter.

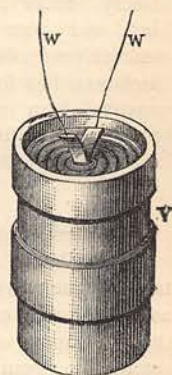
Wood and paper form after all a somewhat crude way of lighting a fire, especially when there is gas in the room. The little device of Mr. Fielding, which we illustrate, is therefore likely to recommend itself. It operates, as will be readily seen, by playing a strong jet of gas-flame on the coals. The gas is obtained by connecting the lighter to the nearest gas-burner by means of an india-rubber tube: and in six or eight minutes after the flame is applied to the coal-fire, the fuel will be thoroughly kindled. Since it was first introduced, a year or two ago, an improvement has been added to it in the shape of a small piece of gauze, which is screwed into the muzzle of the lighter, and prevents the blue flame flying back and burning

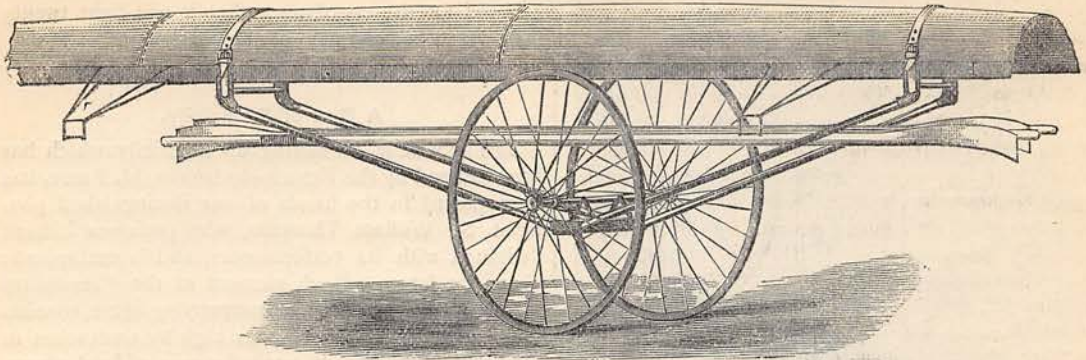


with a white light. With this recent addition, it is claimed for the contrivance that it will light twenty fires with a consumption of one pennyworth of gas.

A Box of Electricity.

The apparatus for storing up electricity which has been devised by the French electrician, M. Faure, has been placed in the hands of our distinguished physicist, Sir William Thomson, who professes himself delighted with its performances, and is enthusiastic about its future. Each element of the "secondary battery," as shown in the accompanying figure, consists of a lead vessel, *v*, nine inches high by five inches in diameter. Into this is packed a pair of lead plates, each coated with red lead and sheathed in felt. These plates are rolled up together so as to occupy a small bulk, and the felt is moistened with sulphuric acid and water. On charging this contrivance with the current from a dynamo-electric generator or an ordinary voltaic battery, by connecting the two lead plates by wires, *w w*, to the poles of the generator, the current is accumulated in the cell, which thus becomes a veritable "box of electricity." Not less than a million foot-pounds of electric energy—that is to say, a quantity of energy capable of lifting a million pounds through the height of a foot—can be stored in one of these boxes weighing seventy-five pounds, and sent by rail or cart to any distance. The same quantity of energy, however, is known to exist in $1\frac{1}{2}$ ounces of coal, so that a piece of coal is a far more portable form of latent power, even though only one-tenth of that potential energy can be turned into actual work by the best steam-engines. It is unlikely, then, that electric power will be conveyed from place to place in Faure accumulators on any extensive scale while coal is yet so plentiful. These apparatus will be chiefly used as local reservoirs of electricity, lodged in houses, as a water-cistern is, and periodically supplied with electricity for domestic purposes, by means of wires or other conductors. The electricity generated at a central station will be conveyed by a system of wires like water-pipes to the stationary accumulators of private consumers, where it can be employed to light their electric lamps, and drive their sewing-machines. Only under special circumstances will the batteries with their charge be transported in vehicles, and left at houses. In surgery, however, or in the working of military field telegraphs, and the explosion of mines or torpedoes, the Faure battery is likely to prove very serviceable. Already Professor George Buchanan, of the University, Glasgow, has performed the actual cautery with great success by means of the electricity bottled in one of Sir William Thomson's Faure batteries. By means of a fine platinum wire heated to incandescence by the current, he removed a nævoid tumour from the fore-tongue of





A COLLAPSING BOAT CARRIAGE.

a young lad in the course of a few minutes, and without the loss of a single drop of blood. The strength of the current and the compactness of the battery render it very convenient for work of this kind, and there is already a demand for it in the medical profession. We may also add that Professor Buchanan has found the Swan electric light, which consists of an incandescent carbon filament enclosed in a vacuum bulb of glass, very useful for illuminating inaccessible parts of the body.

Effect of Chloroform on Plants.

MM. Claude Bernard and Rabuteau have obtained some remarkable results from their experiments as to the action of anæsthetics on plants. They find that the vapour of chloroform and of ordinary ether retards the germination of seeds, bromide of ethyl and bromide of amyl having a similar effect. Grass seeds exposed for thirty-seven days to the vapour of bromide of ethyl or of amyl germinated, under proper conditions, in two days.

Experiments were also tried upon various plants in progress of growth. Growing cress after an exposure of two hours to an atmosphere saturated with vapour of bromide of ethyl became feeble, the leaves hanging down. After remaining in this enervated condition for two days it began to revive, but manifested less vigour of growth as compared with other plants of the same age. Acetate of ethyl is less powerful in its action; cress lives after an exposure of three hours to its vapour, though an exposure of six hours kills it. It is highly interesting to note that anæsthetics exert the same kind of influence upon plants as upon animals.

A Collapsing Boat Carriage.

The delicate boats of racing crews are not unfrequently damaged by transport on carts from the railway station to the regatta course; and yet a vehicle of some sort is necessary, for if the crew should attempt to carry the boat themselves the exertion might unduly fatigue them, and spoil their "form" for the coming struggle. A special boat carriage has therefore been introduced by Mr. F. E. Todd, and it is so light and

portable that it can be easily dismantled and carried in the boat itself. This condition renders the invention very suitable for canoe excursions on the lochs of Scotland, where a narrow pass or watershed often separates two lonely sheets of water. Different classes are adapted to carry different kinds of boats. The engraving, for example, represents a carriage for fine racing fours, or other light boats of great length and narrow beam. It is supported from the axle on india-rubber springs, and runs with great smoothness. A net spread from the supports carries the oars and portmanteaus or other light impedimenta, and the boat rests bottom upwards on an adjustable table, which can be widened or narrowed to suit the beam of different craft.

A Disinfecting Paint.

The internal decoration of houses is now a subject of great interest, and it is therefore useful to know that a new paint, called Dry Calsomine, is rapidly growing into favour in America. It is said to be clean, wholesome, and beautiful, besides possessing disinfecting properties. The colours are sold in a dry state, and simply require to be mixed with water, in order to be ready for use. Paste and paper are apt to become decomposed, but these fresco paints remain always fresh and sweet. They are sold in strong Manilla paper boxes of 1 and 6 pounds in weight, and they will keep for years.

Flexible Ivory.

Ivory, which is in its normal state so hard and rigid, can nevertheless be softened artificially by the following process:—It is to be first immersed in a solution of pure phosphoric acid of specific gravity 1.3 until it loses, or partially loses its opacity, and becomes translucent. It is then washed in clean cold water and dried, when it will be found as flexible as leather; but it speedily hardens on exposure to dry air. Dipping it in hot water will, however, soon restore its pliancy and softness.

Another method consists in plunging the ivory into a mixture of three ounces of nitric acid and fifteen ounces of water, and leaving it a-steep for three or four days, during which it softens.

The Corinthian Canal.

There is nothing new under the sun. Even the latest project of the enterprising French engineer has been in a measure anticipated. General Türr has been granted a commission by the Greek Government for the purpose of cutting a canal through the Isthmus of Corinth. It is curious that modern enterprise has not long since accomplished a feat which a glance at the map will show to be so obviously a convenience. The isthmus forms a slender barrier between the Gulf of Lepanto and the Gulf of Ægina, and consequently between the Adriatic and the Ægean. In the palmy days of Corinth the one drop of bitterness in the cup of its prosperity was the fact that it was obliged to possess two harbours, one on each side of the isthmus. To obviate the inconvenience a polished roadway was constructed, along which ships could be bodily dragged; and in the year B.C. 145 Nero, the Roman Emperor, turned his attention to the construction of a canal, the first works of which, or rather their ruins, still remain. The design was at length abandoned, although fortifications were erected that were found practically useless to the city, which would have greatly benefited by the construction of a canal. This most important undertaking will now be commenced. M. de Lesseps will do all he can to further the scheme. The benefits which must accrue to Greece, and particularly to Corinth, can scarcely be too highly estimated, and the new water-way will open a new era of prosperity for the modern Kingdom of Greece.

A Float Clock.

The ordinary clock is actuated by the descent of a weight, and regulated by the beats of a seconds pendulum; but both these functions are combined in a new time-keeper invented by M. Antoine, of Paris. The works are operated by means of a float, which descends gradually as the liquid in which it is floated is allowed to drain away. The descent is perfectly regular, and as there is no pendulum required, the clock has the advantage of being noiseless. It is, in fact, an indicating clepsydra of the most improved pattern. Where the clock-face is illuminated by a flame, the oil of the lamp is utilised as the supporting liquid.

Carving Glass.

It is generally a troublesome process to cut holes and lines in glass; but a German firm, Messrs. Richter and Co., of Chemnitz, have produced a very serviceable glass-cutter by impregnating small German silver discs with fragments of diamond. When fitted to a rapidly-rotating tool these grating surfaces abrade their way through glass or porcelain in a few seconds, and any desired pattern can be readily engraved, while the wear-and-tear of the disc itself is very slight indeed.

Metal Slates.

An American novelty of more than usual promise has been brought to this country in the form of metallic slates or shingles for roofing purposes. They are stamped out of thin sheet-iron, and are so shaped and corrugated as to interlock, and brave the stormiest weather. They are very light, easily laid, and pack in small compass. To prevent their rusting in the open air, they are coated with a special metallic paint, or with an alloy. More expensive ones are also protected by a glass enamel which is not liable to chip, and is not injured by a red heat. Altogether these iron shingles are well adapted for covering roofs, not only from their durability, but also on account of their immunity from fire. They have been found in America to remain uninjured by the fire of a neighbouring building, when a slate roof of another edifice flew to pieces under the intense heat.

Iron Statues.

Very handsome articles, such as vases, fountains, statues, bas-relievos, balconies, fire-grates, and stoves, are now made of cast or wrought iron and steel by the Société Française d'Inoxidation, of the Val d'Osne, near Marseilles. They are coated with a protective layer of bluish-black oxide of iron by subjecting them to a furnace-heat in a current, first of carbonic oxide gas, and then of carbonic acid. On being polished with oil this imperishable bloom takes a beautiful lustre, and it can be further ornamented by scraping away the surface into graceful designs, and inlaying these with an electro-plate of bronze, gold, or platinum.



Cooking by Electricity.

A surprise is in store for the scientific world. An ingenious Frenchman, M. Salignac, fired with the ambition to outdo his fellow-countryman M. Mouchot's feat of cooking food by sunshine, proposes, so it is said, to fit up an electrical cooking-range with the object of providing a variety of dishes cooked by the heat generated from the electric current. That an electric current is capable of producing an intense degree of heat, is of course well known; but whether this heat can be turned to anything like the same practical account as the light, remains yet to be proved.

Moth-Trap for Bee-Hives.

It seems that in certain localities in America moths are the pests of bee-hives, and an ingenious contrivance has been designed to prevent them from obtaining an entrance into the hives. The device is a trap which consists of a box or similar vessel furnished with two tubes, one inside the other, the inner one passing through the box into the hive, the outer leading into the box. The trap is to be placed in front of the aperture of the hive, and it is supposed to secure the moths in the following manner:—The intruder enters the tube, but the inner one being too small for it, it passes by way of the outer one into the box, where it is imprisoned; the bee, on the other hand, readily finds admittance through the smaller tube into its hive. We do not, however, quite see how the trap is to exclude the little moths.

An Electrical Omnibus.

The success of the electric railway at Berlin has been so marked that the line is about to be extended. It is found, however, that horses in crossing the line on the level sometimes get a shock, and one or two accidents have resulted from this cause. The drawback can, however, easily be overcome. The railway, too, is about to be rivalled by an electric omnibus, announced to ply between Zehlendorf and Teltau, Berlin. The electromotor will be carried by the vehicle between the two hind-wheels, and the electric current will be conducted to it by a slender chain in connection with the generators. The distance between the two stations above-mentioned is about four miles, and it is calculated that the omnibus will traverse it in twelve or thirteen minutes. While on this subject we may also mention that M. Trouvé has again been experimenting with the electric boat, which we described in a former note of the GATHERER. According to his latest results, a boat seventeen feet long by four feet across the beam, and carrying three persons besides the electric apparatus, can be propelled by a battery of twelve Wollaston cells, at a speed of four feet per second, or eighty yards a minute. He hopes, however, to improve very considerably on this achievement; and if he succeeds, we may expect that the nuisance of steam-launches on the Upper Thames will ere long be mitigated by electricity.

Kinder-Garten Teachers.

We have received a communication on the above subject (with reference to a paper which appeared in a recent number of this Magazine) from Miss Mary A. Ewart, who asks us to correct the impression formed by some of our readers that she is an Honorary Secretary to any institution for training Kinder-Garten teachers. The office she holds is that of "Honorary Secretary to a Committee for lending fees, without interest, to women students at Cambridge, Oxford, or elsewhere, or to those preparing for any of the University Examinations." Miss Ewart adds: "We do also lend fees to a *limited* number of Kinder-Garten students, but our aim is chiefly to help those who are likely to prove efficient teachers in High Schools and other institutions for the education of girls and women." Miss Ewart's address is 3, Morpeth Terrace, Victoria Street, London, S.W.

Prize Answers to Prize Acrostics.

BY CHARLOTTE P. MITCHELL.

III.

STILL tearful from the misery of the last,
I loosed the third, and ere a second passed,
From out the jar a subtle vapour rose,
Which stealing o'er me made mine eyes to close;
When I in thought beheld two fields of blood,
Hastings and *Edgehill* merged in one. I stood,
In awe and wonder lost, till there did beam
A sweeter picture on my moving dream.
'Twas the sweet vision of my own loved *Home*,
And I was hastening thither through the gloom:
Full was my heart, for floating through the air
Methought I heard my favourite sister's *Song*;
For this sweet hour my soul had waited long;
But ah! whose joys are sown without a *Tare*?
Scarce were my feet an *Inch* off home and rest,
When all my bliss is killed within my breast;
For lo! sweet home has faded from my ken,
And I am by far *Ngami's* shore again;
And *Gull*-like on the horizon of my dream
A fast-receding *Sail* afar doth gleam!

IV.

I oped the fourth, and slowly came to view
Paris the vast; and, rising ever higher,
Came grand old *Sarum* with its marvellous spire.
In one huge city blent the wondrous two
And then they vanished; but again there came
Paris as if my last adieux to claim.
Then seemed it that in restless mood I passed
From this great city southward, till at last
Through sunny *Andalusia* I roved,
Where purple grapes hung blushing in the sun,
And passed before me many a beauteous one
Of Spain's dusk, dark-eyed daughters—girls who moved
So gracefully that, as I looked, I loved!
Yet did I linger not, but, as in pain,
Passed home to *Rochester* across the main.
My soul from all sweet rest was fiercely driven,
For seemed it at my birth that I had given
An *IOU* to Death, and restlessly
Now sought him o'er the wide, wide world, that he
In payment might receive my life from me.
At last, when many wandering years were o'er,
Before old *Sarum* paused my feet once more;
And came a thought that here with peaceful breath
Rest would I, and nor seek, but wait for death.
Then came a voice, "Mortal! most wisely said;
Rest thou!" and at the voice the vision fled.