

THE NEW WORLD

OR

MECHANICAL SYSTEM.

TO PERFORM THE LABOURS OF MAN AND BEAST BY INANIMATE POWERS,
THAT COST NOTHING,
FOR PRODUCING AND PREPARING THE SUBSTANCES OF LIFE.

WITH PLATES.

BY J. A. ETZLER.

AS A SEQUEL OF HIS "PARADISE."

It is proved here from experience:—How to cultivate 20,000 acres by one machine and three or four men, with a capital of less than one dollar per acre, in the most superior mode—how to clear land from trees, stumps, roots and stones; fill and drain swamps, make dams, canals, ditches, roads, and perform any kind of work in the ground; build houses, and furnish as much inanimate power as desired, for ever, for any place and any stationary machine—all by the same system.

*The wise examines before he judges,
The fool judges before he examines.*

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OR

MECHANICAL SYSTEM.

INTRODUCTION.

MY "PARADISE," &c. surveys the great materials of the world, and shows the powers and means, *in general*, to make a paradise, not of superstitious and childish fancy, but of intelligence, and all the enjoyments that the present world affords to man, as far as the knowledge of the present age teaches, and as the most informed and enlightened men of the present day would wish.

The present book, as a sequel of my "Paradise," gives the details of a mechanical system, actuated by powers demonstrated in that book, to produce a terrestrial paradise of abundance without labour of either man or beast.

I prove here *minutely* what I have proved *in general* in my "Paradise," by experience known to every one.

To accommodate the dullest and laziest mind, I accompany this with plates of the machinery, of which every part is tested by practice, and give all the explanations and calculations required; and tender, in addition, models for inspection of the same system.

I offer contracts for the execution of the whole or any part thereof, on easy terms, say ten per cent. of the profit, or some equivalent.

The things I offer here to you, are, in short, these, viz.

Powers that are much stronger than all the men and beasts together you are able to muster, and as strong as you wish them, most obedient to your will, imperishable, indefatigable, working for you day and night, for ever, without food or wages, and which, with a few simple tools, cultivate all your land, build your houses, make all your desirable canals and roads, and carry you and your things from place to place as quickly as you please, and ultimately change your country—your unproductive woods and prairies, your dismal swamps and ponds, your mountains and vallies, and your poorly cultivated farms—into a general paradise.

These powers and tools will perform all the labours much better than either human hands or beasts could ever do.

They will make large reservoirs, in the most convenient places, for the double purpose of tilling, by the power of water-falls, and of irrigating the soil around each to the distance of miles. They will clear your ground from trees, stumps, roots and rocks, and prepare the land for the finest garden culture. They will cut out of the ground rocks in rectangular shapes, and fit them for pavements and buildings, without cement, and erect houses or lay pavements of them. They will make any excavation, elevation or applanation of the ground, such, for instance, as canals, roads, wells, mines, dams, fill swamps and ponds and drain them to make a fertile garden of them, confine waters into narrower appropriate channels, make them navigable where wanted, and render thus the country free from pestilential exhalations and salubrious for ever. They will form roads to move carriages on them without machine—they will drive your thrashing or pressing machines, your mills, your factories, in short, all your stationary machines. They will do that most important business of all, viz. after having prepared and laid out your land in gardens and orchards, and surrounded them with dams and ditches for fences—plough and pulverize the soil, sift it from small stones, roots, fibres, &c., sow, mow, gather and remove the crops to the place of their final preparation, by thrashing machines, presses, mills, &c. driven by the same power gratuitously.

To all this effect suffices the easy attendance of three or four men to one machine, not much bigger nor more complicated than a common wagon, with a capital less than an equal extent of land would require for the most common implements (such as ploughs, spades, hoes, axes, &c.) one dollar per acre, or 20,000 dollars at most for cultivating a garden of 20,000 acres, producing as much as 40,000 acres of your present best agriculture, enough for the wants of 40,000 men in this climate, and for more than 100,000 men in the tropical climates.

Ye, who are poor and of the labouring class, do not be alarmed at this invention. It will not deprive you of your poor pittance for sustaining life, obtainable now by your petty drudgery. When 20,000 acres of garden can be cultivated by three or four men, with but one dollar capital (once for ever) per acre, you may easily become share-holders of joint stock companies, by paying from twenty to thirty dollars, and even this small sum, partly or entirely, in work of from one to three months, once for ever, and then enjoy the produce of from ten to twenty acres for each share, without further trouble or expense—and then live like gentlemen and ladies, to much better purposes than those of a dull animal in a tread mill.

Ye capitalists are under no restriction of applying your means to

their full extent, and your greatest benefit. Your produces here are not limited by the demands of fancy and fashion, but co-extensive with the natural wants of all the nations of the world.

Ye, both rich and poor, may procure with the surplus of your produces all the things saleable in the world.

Do not longer be so silly as to imagine that wretchedness is the destiny of your lives—it is the destiny of brutes, who do not examine, nor reason.

Look to the vast extent of the globe!—How much of it is used as yet by the human race?—Not one hundredth part of it; the other ninety-nine hundredth part, and more, is yet a wilderness, waiting for the culture of man. The better half of the globe, the tropical regions, between thirty degrees north and south latitude, with a perpetual vegetation and mild temperature, are but wildernesses, producing ten thousand different kinds of plants, unexplored yet (except their names and exterior structures) for the food of man, uninvestigated yet as to their susceptibility of improvement in quantity, flavour and wholesomeness (as has been done, for instance, with our wheat, fruits, &c.).

What a strong evidence of general lack of intelligence (good sound sense)!

Dull domestic animals cling to their native or accustomed places—so dull man, in his natural ignorance, whether savage or civilized—to him his little country is his world—the intelligent will consider the whole globe as his legitimate home, and survey it, and select the best spot on it he can find for his abode—the intelligent is a cosmopolite, the dull and ignorant a mere local being.

See now how the savages kill and eat each other—how the civilized wrestle with each other, in a universal scramble, for their poor pittance of substances to fill their stomachs, cover their nakedness, shelter their bodies against the inclemencies of a hostile climate—to buy as cheap as possible, to sell as dear as possible, in order to obtain from each other what they want, while none has ever enough, and to escape as much as possible from hard, fatiguing, unpleasant labours and services—are the objects of every one through life. See how stinted and spoiled and few their pleasures of life are by the remembrance and fear of what they cost them, how accumulated their physical, moral and mental sufferings are!—They do not see the vast, beautiful, uncultivated wildernesses of the globe. They never thought, nor did their school-masters teach them to survey the resources (the powers and productions) of nature, and using them for the best benefit of man. Their study ever has been how to take from each other what little they possessed.

The savage and the civilized man act on the impulse of the narrow circumstances of the moment, the customs and their confined horizon.

Murdering or enslaving many millions of human beings, superstitious persecutions, search after a little yellow and white metal, and glistening pebbles of no utility, cultivation and traffic in useless or worse than useless articles, that form the staple of commerce (what is the utility of tobacco, coffee, tea, dyestuff for mankind, if it was not for silly habits?) some drugs, &c. have been as yet but the fruits of the discovery and conquest of the new worlds, that could be the happy abodes of a hundred times the population of all the civilized world.

With these facts before your eyes, are you yet willing to re-echo the boast of our age being an enlightened one? A most unfortunate notion, that keeps man a stationary being. Our age is richer in knowledge of the globe than any former, the civilized nations are more powerful, by their gunpowder and navigation, than any of the past ages—but our age wants enlightening, *i. e.* a rational use of this knowledge.

Rise, for once, above your present petty concerns, to a survey of the materials of your present world, within your reach, for a better existence. Cease, for once, the practice of blindly ridiculing with boyish levity every attempt to progress in science and improvements. Remember the disgrace to humanity, that neither Columbus, nor Robert Fulton, nor any man who did something towards the progress of the human race, could find *men*, but only *boys* to hoot at their propositions, instead of examining them and reasoning, like *men* ought to do, for their own benefit and that of mankind in general. Read, and read again, the brief and rich contents of my “Paradise,” and this present book, until you have comprehended them fully—they are yet the only books you have on the science to produce the substances of life and real wealth in abundance, by nature’s power—the only science necessary to mankind. There is nothing in them above the meanest comprehension—no fancy or guess work, but only plain material things, such as you can see and handle yourselves.—See whether you can discover any falsehood, any insufficiency of proofs, any thing that is not proved by experience within your own knowledge—examine and scrutinize the subject—exact investigation is the sign of intelligence (good sense); prejudice, that prevents examination, the sign of a brute, not of prudence or wit.—The examination, here requested of you, will cost you less exertion than your ordinary drudgery of one week, and the result of this little inquiry will save you and your friends and posterity for ever from all drudgery and poverty.

If I was rich enough, knowing as I do the repugnance to a little mental exertion, I would, for the benefit of the poor human species, cheat you into the task of learning and examining the matter laid before you. I would do as kind school masters do with their little

pupils—they will give to the pupils a little sugar for learning their lessons, and thus cheat them into learning. I would set a premium, not of sugar, but of money, for learning this my new science, say for instance, \$10 to any poor, and \$100 to any rich, lazy individual, and a still higher premium for discovering any material error or insufficiency of my proofs for the purposes expressed by me, say \$1000. This would be more than sufficient to cheat you all into learning the means for your own great fortune, for I know you will do much more for such a sum of money than the small trouble here required. But as the case is now, you will have to wait for such an irresistible inducement to examination, until I shall possess the wealth for it, or some other liberal body will do as much for you. In the meantime, you may take my good will for the deed.

GENERAL ILLUSTRATIONS OF THE SYSTEM.

THE principle and advantage of this, or any other mechanical contrivance, consists, as I have stated already in my “Paradise,” not in the mere machinery, but in the efficiency and cheapness of power to drive the machine.

People of sound sense are, therefore, not puzzled with inventing a machine for accomplishing a certain purpose, but they look for the power for it, and seek the advantage of machinery in the *cheapness* of the *power* for the machines or tools.

If this doctrine appears new to you, it is merely owing to your school masters, who did not instruct you of it, being a branch of mathematics, though the chief one of real utility, which they would, in all likelihood, think as foreign to a liberal education as the making your shoes and coats yourselves. These school masters may, however, be excusable for this lack of reason on the same plea as you, viz. : that their school masters afforded to them no better education. Still you may easily supply this defect by a little reflection of your own, for which no period of your life is too late.

To contrive a tool or machine effecting a certain purpose a little better than another, is but a small matter, though it may be of great advantage to some individuals.

I directed my study to the *source* of useful machinery, *i. e.* the powers, and then to the most useful of all machines first.

I investigated and surveyed the *great* powers in nature, in order to select the cheapest and most universal ones of them. Next to

this inquiry, I thought the machine to cultivate the land and multiply the substances of human life, the real wealth, to be the most useful of all others. I found, at the same time, the operations of agriculture to be the simplest and coarsest of all human works, requiring, therefore, the least complexity of tools. I found the cheapest powers to be those that cost nothing at all, and among them those the most preferable that are the most universal, viz. : wind and water.

It is generally the case that those things which are constantly before our eyes, attract the least notice of us. Some fellow, on being shown a forest before him, asked: "Where is the forest? I cannot see it, there are too many trees." "Why, my friend, these trees are what is called a forest," was the reply. "Oh, I have seen these trees long before this time," he rejoined, "is that all?"

Those, who are like him, will say, on reading of the power of wind and waterfall, in my "Paradise," &c.—"Oh, I knew all that long ere this: show me but your wonderful machines to do the proposed work—this is the mystery which you are unable to solve. When you will have made the machines, and in operation, I will come and see; but until then, let me alone with any of your reasonings."—And thus they imagine to have fairly dismissed the subject.

If such were the observation but of certain individuals or classes of people, we might dismiss them as mere idiots and not deem them deserving any further notice. But what shall I do, if this is the universal reception of my proofs? Why, if that is all I have to expect from my cotemporaries, not even any attention, not any examination, I may as well cry in the wilderness, and reason with monkeys; you confess then, it is quite as foolish in me to attempt reasoning with you. Science, reason, all proceeding from facts, have then no weight in the scale of your estimation. You want me first to make the machines and with them the paradise itself, before you will care for my arguments. You may wait then till doomsday, for I declare I am as little able to do all this myself as to build a palace, or a first rate ship, or make a railroad of a hundred miles with my own hands and means, though I know how to make them and prove their feasibility nearly as well as my machines and paradise.

I am forced to these remarks; for my "Paradise" has been before the American public and government these seven years, and before the British public these five years; it has been read by thousands, and come to the notice of hundreds of thousands—it proves by undeniable plain facts what I assert in it, and solicits but examination, and all without effect—this speaks volumes.

I published it not for amusement, but for study and reflection and causing application to me for further communications. I defy the world to disprove my facts and arguments derived therefrom.

When learning will descend from the heavens, and from the

rubbish of ignorant, barbarous antiquity, down to the plain material substances of our present world—when the study of plain real things will be valued more than obscure words of indefinite meaning—when governments will think it their business to provide for the well being of the community and to investigate the means for it—then my “Paradise” and this present book will become the paramount object of inquiry and the first science of every man, woman and child, until they can show a more important, a more useful one.

Must I then prove, that the productiveness of the earth, and the powers to cultivate it, are the chief, nay, the sole resources of human happiness?—When you admit the truth of my proofs, that both the productiveness of the globe and the powers of nature exist in superabundance, have your highly and profoundly learned schoolmasters cultivated your understanding so little, that you cannot draw any useful inference from these facts?—When you are taught how any portion you desire of those gigantic powers, in any place, can be made to cause any rotatory or vibratory motion of a wheel or shaft—can all this induce you to no conclusion, how then any machine may be connected with that wheel or shaft and receive the impulse of that power, which may thus be transferred from place to place and rendered operative on any machine? Could all these demonstrations of plain simple facts in my “Paradise” afford no ground to contrive then the adapted tools or machines for any mechanical purpose, or induce any person, or aggregate of persons, high or low, rich or poor, learned or unlearned, to comply with my request, to make themselves known to me and express their desire for a further communication on the minor details offered by me for the specified purposes, in case they could not, or would not, supply them themselves?

Perhaps the following simile will help to understand my reasoning.

Suppose somebody should come to a farmer and say; “I have invented a glorious machine, that will plough all your lands; so you need no longer leave your many hundred acres of woods and prairies idle; my invention will plough them all.” The farmer would probably be curious enough to see that useful invention; and lo! what should he behold?—a number of ploughs joined together, to plough many furrows at once! Upon this the farmer would justly ask: “What is to pull all these ploughs?” “Why what else,” would the inventor say, “but your horses or oxen.” “My friend,” the farmer would observe, “what is the utility of your invention of joining ploughs together, if I have to apply to them my beasts and drivers as well as before?” “But are not my ploughs very useful?” the inventor might say—and the farmer: “Yes, but it is not from want of ploughs, that I leave waste my land, but for want of horses or oxen, of food for them, and of wages for men to attend to them, which requires a good deal of money. If I had them, I could easily do

without ploughs; a limb of a tree shaped by me into a sort of hook would do the business then already, though good iron ploughs a little better."

On the other hand, let us suppose, somebody should come to a farmer and tell him: "I have found a most useful animal, that is a hundred times stronger than a horse, is most obedient, has no self-will at all, will never die, never tire, but work day and night, for ever, it neither eats nor drinks, nor sleeps, nor is in any way burthensome; and with all these precious qualities it is very cheap, it costs nothing at all, and you may have as many of such animals as you like—one driver is enough to drive a number of these mammoth animals. Now you may farm all your lands and much more of your neighbours', if you choose, much cheaper with these animals than they can afford to do." Suppose the farmer would reply: "What is the use of these animals; show but the machine for the use of such strong animals, or else I care not for them." The discoverer of these animals, if he should happen to possess more sense than those, who cannot see the use of my powers, would have to reply: "Why, my friend, what great machine can it require to break and crumble your soil, for receiving the seed and admitting air and moisture, if you have strength enough and to spare? Take a log, or a big harrow, with any sort of pricks or hooks, to hook and tear into the ground, and—put the strong animal before it—till you find somebody willing to accommodate you with tools a little better."

So it is with all the works of agriculture, and any other in, or upon, the ground; they are the very simplest and coarsest of all human operations, but the most useful and universal of all.

You have here the case of my "Paradise" and of the present work. My "Paradise" supplies you with the knowledge of powers and their management to render them operative on machines; my present book with that of mere tools.

People of sound sense and reflection appreciate my "Paradise" above all things—no matter that its materials were not unknown before—idiots value my machine only as the principal thing, until they will discover, that my machine also contains nothing new, like my "Paradise," still does the business purposed.

The value of my mechanical system consists then

1. In having powers enough and gratuitously;
2. In making them drive any stationary machine, and
3. In making the stationary machine drive a locomotive.

The first and second part is amply proved in my "Paradise," and the third pointed out in a general way, but will be minutely shown in the present book.

A water wheel, or in defect of it, a windmill, drives a locomotive,

called by me the *Satelite*, which performs the preparatory and agricultural works.

To create a constant power from an interrupted and irregular one, like wind, a windmill is to be erected, and by its power the *Satelite* to be driven, to form the elevated reservoir, and, if wanted, also a well.

When this is done, more windmills may be erected around the reservoir, and each of them raise water from the well or other water below up to the elevated reservoir, by an endless chain of buckets, or otherwise, until the reservoir is full. Then a water wheel at an outlet of the reservoir, to be turned by a waterfall from it, is to be constructed, which, thereafter is to drive the *Satelite*, or any stationary machine.

In cases where water can be collected into the reservoir from running water, from a higher ground, or from periodical rains, &c., the windmills will not be necessary. Such cases will occur on declivities of mountains, or in tropical regions during the rainy seasons almost any where.

The water power may thus be obtained for ever, of any amount, for any place, being transferable to places of many miles distance, through canals or pipes.

DESCRIPTION OF THE MACHINERY.

(1) *The Windmill.*

To save all attendance of men, I suggest a horizontal one, which requires no adjusting to the wind, and as the simplest I can think of, the following :

Fig. I. represents a vertical view from above, and

Fig. II. a horizontal view of such a windmill;

“ “ 1, 2, 1, 2, two beams crossing each other, and turning at their centre on a pivot, at 1;

“ “ 5, 3—5, 4, a similar cross parallel to the upper one;

Fig. I. and II. 7, 8, a ring with cogs, forming the centre of the cross 5, 3—5, 4.

Fig. II. 1, 5, a pillar, around which the ring, 7, 8, turns, on friction rollers, between them;

“ “ 2, 3—2, 4—6, 7—6, 8, bars to form frames with the two crosses 1, 2 . . . and 5, 3—5, 4.

Fig. I. and II., a vertical cog wheel to be turned by the ring 7, 8;

Fig. I. and II. 10, 10 planks or sails to fill said frames, each plank or sail at spindles a little above their middle, so that their lower parts being heavier, keeps them hanging in a vertical position ;

“ “ 11, 11, are bolts to stop the said sails in their vertical position, while the wind presses them on one side against them, and when their opposite sides are presented to the wind, their lower parts being the broadest, are lifted up by the wind, and kept in a horizontal position, presenting thus only their edges to the wind.

The wings on one side of the windmill will thus be always shut, and receive the full force of the wind, while those on the opposite side are open, and let the wind pass through their interstices.

Fig. II., 6, 2, 4, 8, represent a wing closed, and the opposite opened ;

Fig. I., 2, 2, 2, 2, 3, 4, 3, and } are ropes to strength-

“ II., 1, 3—1, 4—6, 2—6, 2—7, 3—8, 4 } en the resistance of the wings ;

“ “ 12, 13, the line of the horizon.

(2) *The means to form a Reservoir and Well, by an incompleated Satellite.*

Fig. I. and II., 9, 14, 15, a rope, its end at 9 wound around a roller, on the axle of the wheel 9 ;

“ “ 14, a pully or roller, to give to the rope its direction wanted, its pivot fixed into the ground ;

“ “ 15, 16, a carriage (called an incompleated Satellite) pulled by the rope 9, 14, 15 ;

“ “ 18, a cylinder (instead of fore wheels) with pricks or spades ;

Fig. I. and II., 19, a wheel of which the cogs or bars fit into the interstices of the rows of pricks of the cylinder 18, to clean them from dirt sticking between them ;

“ “ 17, a scoop or scraper, to take up the earth broken loose by the cylinder 18 ;

Fig. I., 20, a bar to steer or turn the carriage, by lifting and swinging its hind part ;

“ “ 22, 23, 23, gradual position of the carriage in swinging around 14, at its arrival there, and progress in the line from 23 to 20 while another rope is pulling around the roller 20 and at 9, the former rope 14, 9, and the wheel 9, 7, being disengaged ;

Fig. I. 24, the carriage in a third line parallel to the former, but opposite towards 26, being pulled in the same direction as at 15, 14, 9.

Fig. III. the same carriage as 15, 16, I. and II., without scoop or scraper, instead of which,

“ “ 1, 2, a diagonal log, before which the earth broken loose by the cylinder with pricks, will accumulate and glide along it, from 1 to 2, where it is left out of the track of the carriage.

“ “ 2, 3, 4, 5, a plough, to raise the earth accumulated along the bank of the excavation on a grade of 1 to 2 feet in height and width ;

“ “ 5, an inclined plane, its fore edge of iron, upon which the earth glides, while the carriage proceeds ;

“ “ 3, 4, a board screwed to the diagonal log, inclining over to the higher grade, to press the earth ascending on the plane 5, and deposit it on the higher grade.

Fig. IV. the profile of the commenced bank along the excavation ;

“ “ 1, 2, the line of the horizon ;

“ “ 3, the bank ;

“ “ 4, first grade ;

“ “ 5, second grade ;

“ “ 6, the plough, fig. III. 2, 3, 4, 5.

Fig. V. a front view of the cylinder 15, 16, fig. I. and II. without pricks and with two felloes edged of iron, to cut across small roots, fibres, &c. in, or on, the ground, in lines of every direction.

Fig. VI. a profile of a well, in the different state of progressing excavation by the means described ;

“ “ 1, the carriage ;

“ “ 1, 2, the rope pulling the carriage ;

“ “ 3, 4, the line of the horizon ;

“ “ 5, a position of the carriage in the progress of the work ;

“ “ 4, 6, the rope pulling the carriage ;

“ “ 3, 7, 4, the bottom of the excavation made ;

“ “ 8, position of the carriage in the further progress of the work ;

“ “ 4, 8, the rope pulling the carriage.

Fig. VII. plan of a reservoir and well ;

“ “ 1, the reservoir ;

Fig. VII. 2, the well ;

“ “ 3, the water wheel ;

“ “ 4, 4, 4, 4, the dam ;

“ “ 5, 5, 5, 5, the bottom of the ditch on a level with that of the well ;

“ “ 6, 7 the channels for leading raised water into the reservoir. The crosses represent the wind mills.

“ “ 8, 9, the line in which is taken the profile.

Fig. VIII. the profile of the reservoir's dam and ditch ;

“ “ 1, 2, the line of the horizon ;

“ “ 3, the bottom of the ditch ;

“ “ 4, the top of the dam.

(3) *Contrivance to raise water.*

Fig. IX. endless chain of buckets ;

“ “ 1, 2, the ring 7, 8, fig. I. and II. ;

“ “ 3, 4, the vertical wheel 9, fig. I. and II. ;

“ “ 5, 6, a box, through which the chain of buckets runs ;

“ “ 7 and 8, rollers, around which the chain winds, the upper one being a hollow tube ;

“ “ 7, 9, 10, 7, the buckets connected with each other by bolts merely.

Fig. X. the vertical view of the same contrivance ;

“ “ 1, 1, the wheel 1, 2, fig. IX. ;

“ “ 3, 4, the wheel 3, 4, fig. IX. ;

“ “ 5, 6, the box 5, 6, fig. IX. ;

“ “ 7, 7, the roller 7, 7, fig. IX. ;

“ “ 8, 9, one bolt, 2 buckets.

“ “ 11, 11, 8, 9 and 12, 12, space between two buckets, through which the water falls when arrived within the box 5, 6 ;

“ “ 13, an opening for the water falling into the inside of the tube, which makes the roller 7, 7, fig. IX. ;

“ “ 12, 14, 14, 14, the outside of the roller 7, 7, fig. IX. ;

“ “ 7, 7, 15, 15, the inside of the hollow roller ;

“ “ 11, 16, the spindle of the same ;

“ “ 17, 17, the pillar of fig. I. II. 1, 5, in which the said roller turns.

(4) XI. *Contrivance to use the full power of a Water-fall of a great Height.*

“ “ 1, 2, the outlet of the reservoir ;

- Fig. XI. 2, 3, the fall of the water through a tube ;
 " " 4, the water-wheel.
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(5.) THE SATELITE.

A. *To advance the Satellite by alternate pulling of two ropes.*

- Fig. XII. represents a vertical view from above of a completed satellite ;
 Fig. XIII. a horizontal view to one side of the same, in a direction at right angles with it.
 Fig. XII. 1, 2, 3, 4, and } the frame, with wagon wheels at its
 Fig. XIII. 1, 2, } hind end ;
 Fig. XII. and XIII. 5, 6, the cylinder with pricks or spades ;
 Fig. XIII. 7, 8, 9, three cogs, at each end of it, always one at one end between two of the other, at equal distance ;
 Fig. XII. and XIII. 10, 11, stokes to push at 8, with its prominence against one of the cogs 7, 8, 9, alternately at each end of the cylinder ;
 Fig. XII. 11, hinge of the said stokes in the balance beam 11, 12, Fig. XII.
 " " 13, 13, 13, 13, teeth of
 " " 13, 14, 13, a disk turning on a pivot at 17, to push fore and backward.
 Fig. XIII. 11, 12, balance beams ;
 Fig. XII. and XIII. 15, 16, a long balance turning on the pivot at 17, united with the disk 13, 14 by
 " " 18, a bolt, by which the position of the long balance may be accommodated to the direction of the ropes, as they alter, from time to time, shifting the holes for the bolt, 13, 14 ;
 " " 15, 16, pullies.
 " " 20, 21, two rollers, one above another, and detached from each other, turning on the pivot 17 ;
 " " 19, 15, 20, 22 and 19, 16, 20, 21, 23, two ropes, at 22 and 23, wound around
 " " 24, 25 and 26, 27, a windlass, to wind on or off, by
 Fig. XIII. 23, 24, a handspike, the ropes for prolonging or shortening them, as the distance of the Satellite may require.
 Fig. XII. and XIII. 27, wagon wheels to prevent the pricks from touching the ground, when not to be used ;
 " " 28, sticks to keep the propelling stokes in their directions.
 The alternate pulling of the ropes 19, 15 and 19, 16, will thus cause

the cylinder 5, 6, to revolve, and, by it, the Satellite to advance.

B. *To steer the Satellite.*

Fig. XII. 3, 4, is an axle-tree ;

Fig. XII. and XIII. 29, 30, a bar at its centre, 31, hinged with its centre, within a slit of the axle-tree, so that the bar may be turned, by a push of the conductor, at its pivot, from one side to the other while the axle-tree revolves. When the bar forms right angles with the axle-tree and being sunk with its fore end to the ground so as to stick against it, the progress of the Satellite makes it rise in a vertical position and stand on one end, and lift thus the hind part of the Satellite above the ground, which is to balance on the bar ; this is the moment, when the conductor has to push it on that side he wants, to alter the Satellite's direction as required.

“ “ 32, 33, or 34, 35 are the different directions to be given to the bar 29, 30.

C. *To break the Ground.*

The cylinder's pricks effect this already, for which purpose the wagon wheels 27, fig. XII. and XIII. are to be taken off.

Fig. XII. 36, 36, represents stiff brushes of some elasticity, scratching the sticking dirt from the interstices of the rows of the pricks or spades.

Fig. XIII. 36, 1, 36, the space which the brushes may occupy ;

Fig. XII. 37, 37, a beam, or two beams, holding the handle of the brushes.

Fig. XIII. 37, the line of the horizon.

D. *To Plough.*

Fig. XII. and XIII. 38, 38, a diagonal beam fixed in the frame, with plough shares, each screwed or bolted into it from below by two screws or bolts, the beam held between two blocks at each end, where it can be raised or lowered and fastened at will.

E. *To pulverize and sift the Soil.*

Fig. XII. and XIII. 39, 39, a beam hinged in the frame,

“ “ 39, 40, knives fastened into the beam 39, 39, forming tines of a comb, to cut into small pieces the clods.

In their situation represented, they will also cut harder substances, as wood, stones, &c. When brought into the situation 39, 41, XIII. the objects, if hard, will pass over their upper edges, and may drop into a box behind the comb, as indicated between the lines 25, 26, XIII., to be emptied by the conductor from time to time.

When in a vertical position 39, 42, the harder objects may be cut, or will accumulate before the comb, which may be turned the lower edge backward from time to time, to leave the sifted objects in a pile on the ground.

F. *To level the pulverized Soil.*

Fig. XII. and XIII. 43, is a log or board, which can be raised or lowered at will, in a fold at each end, to strike the surface of the ground at a proper level; if raised at one end a little higher than at the other, it may give to the surface of the soil a gentle inclination so as to prevent stagnation of water.

G. *To Sow.*

Fig. XII. XIII. 44, is a board, its lower edge dentated, to strike small furrows or grooves into the prepared soil, for receiving the seed.

“ “ 45, 45, a beam hinged at both ends on the frame;

“ “ 46, 46, 47, the seed box, fastened at said beam;

Fig. XII. 48, 48, and } the bottom of said box with holes, or slits, 48
Fig. XIII. 47, 47, } to let the seed pass through.

Fig. XII. 49, 49, 49, 49, a cylinder, its upper convexity fitting into the concavity of the lower side of the seed box;

Fig. XII. 50, 50, dotted lines, and } represent grooves to receive the
Fig. XIII. 50, 50, } seed from the seed box, drop-

ping through the holes at the bottom, and from the grooves, by the cylinder's revolving, they will drop then into the furrows of the ground underneath, drawn by the dentated

board, 44. At the outside of the frame are wagon wheels, at the cylinder fixedly, and large enough to prevent the cylinder from touching the ground.

Fig. XII. and XIII. 51, 51, a board to strike the ground and cover the seed with earth, either by levelling it, or with a dentated edge, draws furrows between the rows of the seed, to raise the soil above it.

H. *To extirpate Weeds, and dress the Soil between Plants.*

Fig. XIV. and XV. 1, 2, an axle tree ;

Fig. XIV. 3, 4,—3, 4, high wagon wheels ;

Fig. XIV. and XV. 5, 6, sticks each with a hole, through which passes the axle tree ;

“ “ 7, 8, the line of the horizon.

This contrivance is to be put into the place of the cylinder, 5, 6, XII. and XIII. The satellite is then to be so directed that the shovel ploughs pass between the rows of the plants, and the wheels are to be high enough that the axle tree passes above them.

I. *To Mow.*

Fig. XII. and XIII. 52, 53, a balance beam turning on the pivot

“ “ 17, and bolted to the disk, 13, 14, at 14 or 18, to vibrate with the balance beam, 15, 16 :

“ “ 54, 55, the scythe, with four blades, their edges outward, and arched, to strike the objects in a very small and equal angle ;

Fig. XII. 52, 56 and } a vertical board to receive and throw to
Fig. XIII. 52, 54, 55, 56, } the side the objects cut ;

Fig. XII. 57, 57, 58 and }
Fig. XIII. 54, 57, 55, } hones.

“ “ 52, 57—56, 57—58, 56—58, 52 and } handles of the
Fig. XII. 54, 57—57, 55 } hones swinging at

“ “ 52, 56 and } hinges, at each swing of the scythe, to strike
Fig. XIII. 57 } on the edge of the blades, to keep them
sharp, if too much, the hones' weight is to be decreased, if
too little, increased.

J. To gather and remove the Crops.

Fig. XII. 59, the bottom of a cart ;

“ “ 60, 60—61, 62, side boards, of triangular form, the back side high ;

“ “ 60, 62, back boards ;

“ “ 60, 61, a log with teeth in front, to take the objects up from between the stubbles ;

“ “ 63, 63, wheels ;

“ “ 64, 65, bars to fasten the cart to the satellite.

K. To hammer.

Fig. XVI. a side view, } of horizontal pieces to be fixed in the
Fig. XVII. a back view, { frames, XII, XIII,

Fig. XVI. 1, 2, spindles to turn in the places 17, 66, XII. and 1, 66, XIII ;

Fig. XVII. 2, 1, 2, is the beam 1, 2, XII. and 1, XIII.

All the tools for agriculture are to make place for this contrivance,

Fig. XVI. and XVII. 3, 4, a piece of the disk 13, 14, XII. and XIII.

“ “ 5, 5, the teeth 67, 67, XII. ;

“ “ 6, 7, a cog between them, turning at a pivot in a mortice at 7, XVI. fore and backward ;

Fig. XVI. 7, 8, a counterpoise to 6, 7, to move it out of the teeth 5, 5, by sinking into the position,

“ “ 7, 9 and 7, 5, respectively, unless drawn by

“ “ 6, 10, a cord,

Fig. XVI. and XVII. 10, 11, a beam mortised on 1, 2, XVI., to be slid on it at will, by shifting in the holes,

Fig. XVI. 12, the bolt,

Fig. XVI. and XVII. 13, a sledge, hammer or wedge of adapted weight, its lower part of iron.

By one swing of the balance beam 15, 16, XII. XIII. the cog 6, 7, XVI. XVII. is pushed to one side, and thereby the hammer lifted up in the position 11, 10, 13, XVII., at the opposite swing the cog 7, 6 falls back in the position 7, 5, XVI. and disengages thus the hammer, which then falls down, on the object, or on a wedge placed into the spot intended. The repetition of these blows on the same spot must break any object. The handle may be perforated with a series of holes to shift the hammer's place on it, and the handle also along the beam, 1, 2, XVI. and also from one to the other side of the

satelite, so that the extent of the hammer's operation may be from one to two rods square at each side and more, without moving the satelite from its place. When thus 6 to 10 square rods are operated upon, the satelite may proceed to another stand.

L. To Saw.

Fig. XVII. the same contrivance, except the hammer 13,

“ “ 14, 15, a bar, joined to

“ “ 16, 17, another bar, part of it a cylindrical box, into which fits

“ “ 17, 16, a cylindrical stick, with

“ “ 18, 19, a slit, fitting to

Fig. XVII, 18, 20, a crosscut saw, held by a bolt at 19, at 17 is a screw to fix the stick 17, 18 in its box; this is to bring and fix the saw in any inclination desired,

“ “ 20, the object to be sawed, lying on the ground,

“ “ 21, 22, the line of the horizon.

In this operation the cog 6, 7, XVI. and XVII. remains in its position fixed; the beam 1, 11, XVII., is to vibrate from one side to the other, to move on the ground back and forward the beam 14, 15 with the saw, which the conductor has to direct at 20 at the commencement of the cut. The bolts at 1, 2, XVI. XVII. in both beams 14, 15 and 1, 11 may be shifted in their holes respectively, and thereby, the operation extended along each side of the satelite and distanced from it to an area of two rods long and two to four rods broad on both sides, or of about eight to sixteen square rods, without moving the satelite from the spot. Thus this saw may cut lying or standing trees and stumps, and also, with blunter teeth, rocks.

To cut wood (trees, stumps, roots, &c.) and rocks out of the ground and in rectangular shapes, the same contrivance may be changed into the following:

Fig. XVIII., 14, 15, the bar, and 17, 20, the saw, with its joining piece, 16, 17, to be removed, and in its stead,

“ “ 23, 24, a bar connecting the bar, 1, 11, with

“ “ 25, 26, which bar, with the two others

“ “ 26, 27, and 26, 28 holds

“ “ 27, 25, 28, 29, 31, 30, a saw blade, its toothed edge forming an arch of a circle, of which

“ “ 32, the centre hangs in a pin, fastened into

“ “ 33, 34, a beam, fastened on a side beam of the satelite's frame, and may slide on it,

“ “ 35, 34, at the end of 33, 34, is a cylindrical stick turning in a box, and to be screwed tight by a screw,

Fig. XVIII. 36, by which means the saw may be brought and fixed into any inclination. The vibratory motion of this saw being an arch, sufficiently great, of a circle, so that alternately one or the other end of 29 and 30 comes out of the cut and above the ground, throws the saw dust out of it at each move.

“ “ 26, 32, is a slit, through which the bolt 35 passes easily, that the weight of the saw may press with its edge upon the object to be cut sufficiently while progressing.

M. How to cut Trees, Stumps, Roots, Stones, &c., out of the ground by the latter contrivance.

Fig. XVIII. and XIX., shows oblique incisions of the saw, crossing each other, to detach the object from the ground.

Fig. XVIII., 1, 2, the line of the horizon,

“ “ 3, 4, a stump or tree,

“ “ 5, 6—5, 7,—8, 7—6, 10—7, 10—9, 15—10, 14—15, 14—3, 13—25, 13—3, 11—10, 11—13, 12—11, 12—11, 21—14, 21—14, 19—21, 20,—14, 21—19, 20—16, 19—18, 22,—17, 16—16, 23—15, 16—24, 23—23, 22 incisions, one after another in the order of succession as enumerated, to take out the whole piece 25, 13, 12, 11, 21, 20, 18, 23, 24, cutting the same at each end vertically successively.

Fig. XIX., a rock to be sawed out of the ground in rectangular pieces. To be effected in a similar way as fig. XVIII. and the dotted lines in XIX., show.

N. To notch Rocks, &c.

Fig. XX. and XXI., rectangular pieces of rocks, viewed from different sides

“ “ 1, 2, 3, 4 and 5, 6, 7, 8, the profile of two such rocks, notched,

“ “ 9, 10, 11, incisions across reliefs 12, 13—12, 13, which fit into the incisions of other stones,

“ “ 14, 14, 14, 14, reliefs that have at their respective centres an incision across, not visible here,

“ “ 15 is such an incision,

Fig. XXI., 1, 2, a relief crossed in its centre by

“ “ 3, 4, an incision,

And so on every side alternately, which being but straight cuts, can be effected all by the saw 18, 20, fig. XVII.

Such stones (or logs) being joined close together so that their reliefs and grooves alternately fit into each other cannot slide either way.

O. To raise objects high upon a particular spot.

Fig. XVII., the contrivance for raising the hammer 13, may also be used for raising any object, it being attached in the place of the hammer, for which purpose the beam 1, 11, is to be proportionately long.

P. To pull down Trees, and other objects out of the Ground.

Fig. XXII. 1, 2, a standing tree,

“ “ 3, 4, the line of the horizon,

“ “ 2, 5—2, 5, may be incisions previously made by the saw fig. XVII., to weaken the trees' resistance, except when it is desired to take its root out of the ground at once with it,

“ “ 6, 7, an iron hook fastened by a rope wound around

“ “ 7, 8, a light pole, sticking at eight against the ground,

“ “ 7, 9, a strong rope or chain, fastened to

“ “ 4, 5, a piece of the hind part of the Satellite, while this is moving from the tree the rope 9, 7 is pulled, the pole 6, 8 raised with its hook, when high enough, the conductor directs it sideways to clasp the tree, then kicks the end 8 on the ground off the ground, and the force of the Satellite pulls the rope at the hook 6, 7, while the pricked cylinder of it takes firm hold into the ground like anchors, until the tree 1, 2, comes into the position 2, 10, when its own weight finishes its fall.

The hook may be applied also for pulling roots, stones, &c., out of the ground.

Q. To make any Excavation, Elevation, or Applanation.

AFTER all the impediments of wood or rocks are cleared by the afore described means, a scoop or scraper is to be put in the room

of the agricultural or other tools, such as described of the incompleated Satellite, fig. I. and II., 17, or, for linear excavations or elevations of the ground, apply the diagonal log as described of the incompleated Satellite, fig. III., and indicated also in fig. XII., 11, 68, together with the plough described of fig. III. and IV. and fig. XII., 68, 69, 70.

R. To make small Ditches.

THE same plough is to be placed in the middle of the Satellite's frame, as indicated by the dotted lines 67, 71, 72, 73, fig. XII. the pricks or spades of the cylinder may be taken out, except in its middle for the width of the ditch, to break the earth loose for it; the plough will then scoop the earth out and leave it along on one side of the ditch; then a return in the same track may increase the ditch and leave the earth on the other side of the ditch.

S. To level the Earth.

A TRANSVERSAL log as described and indicated of the fig. XII. and XIII. by 43, will effect it, by passing and repassing the Satellite in the same track, which at each time breaks, by the pricked cylinder, more soil loose, while the said logs shoves it before itself ahead, filling thereby hollow places underneath, and lowering eminences gradually.

T. To form Terraces on Declivities.

THE diagonal log 11, 3, fig. XII. is to be applied while the Satellite, by putting a log or higher wheels on the lower side of the slope, is kept level—the earth will then be broken loose by the pricks of the cylinder on the higher side, and shoved off by the said log to the lower, and the repetition continued of this operation until the terrace has its desired level.

U. To operate in Water or Mud.

THE same contrivance as described in the respective cases, are

used, only with the addition of a high place for the conductor to be above water on the Satellite.

V. *To excavate Mines.*

VERTICAL pits are to be made by the Satellite in the same mode as described for excavating wells, fig. IV.

Horizontal shafts may be excavated by the hammer, fig. XVII., 13, driving a wedge by its fall into the earth or rock, ahead of the satellite—and the objects thus broken loose to be dragged out by a hooked scraper.

(6) THE CONNECTING MEANS BETWEEN THE SATELLITE AND THE STATIONARY POWER.

THE ropes fig. XII. and XIII. pulling at the balance's 15, 16, ends run to a roller.

Fig. XXIV., 1, turning on a pivot fixed in the ground,

“ “ 2, 3, represents the Satellite,

“ “ 4, 1, 5, the agitating ropes which are wound several times, to prevent slipping, at 1,

“ “ 1, 6—1, 7, another rope wound upon the same roller, below the other,

“ “ 6, 8—7, 9, wires, or wooden poles, or chains, lying on the ground, or on rollers at proper intervals, as indicated at

Fig. XXIV. 10, 10, to diminish friction.

The wires are composed of convenient pieces, which at their ends are joined together in the mode indicated by

Fig. XXVII. 3, 4, two rings to pass into the position

“ “ 1, 2, knocked by a few hammer-strokes on, for joining, and off, for disjoining the pieces,

Fig. XXIV. 11, 11, indicate the joints of such pieces, at

“ “ 12, 12, ropes or chains are attached to connect the wires with

“ “ 8, 9, a balance beam, turning horizontally on a pivot at 13, which is fixed in the ground,

“ “ 14, 15, another balance beam on the same pivot,

“ “ 16, 17, a bar to connect both balances, for shifting the balance's (8, 9,) direction, whenever the direction of the wire lines, are to be altered,

“ “ 15, 18, a pole, at 15 on a pin, at 18 on a crank of

Fig. XXIV. 19, 20, a wheel turned by the stationary powers,
 “ “ 21, 21, a bridge over the wires, consisting of a board to be laid
 over whenever the Satellite is to cross the wire line.

Fig. XXIII. a cart to support the ropes of the Satellite, for the purpose that they do not touch the ground while sweeping over it,

“ “ 2, 7, 5, a front view } horizontal,
 “ “ 10, 12, 14, a side view }
 “ “ 8 and 9 and 11, 12, wagon wheels,
 “ “ 8, 9 and 15 the axle tree, crossed by
 “ “ 13, 14, a pole with small wheels at its ends 13 and 14,
 “ “ 2, 7, and 5, 7, 10, 11, and 16, 17, two poles, hinged on
 the pole 13, 14,
 “ “ 1, 2, 3 and 4, 5, 6, the ropes, supported by the poles, which
 vibrate on their hinges as the ropes are pulled back and
 forward
 “ “ 18, 19, the line of the horizon.

The cart to be as light as possible, the wheels 13, 14 being smaller than the other two, the foremost of them will only touch the ground, and by it incline the poles 10, 11 and 16, 17 forward, which will guide in consequence, by their being dragged by the sweeping ropes of the Satellite, the cart in concentrical course.

The slackness of these ropes may be at the rate of sinking, one-tenth of their length between their points of support; consequently, if the supporting poles be 20 feet high, the height of the ropes at the Satellite, 4 feet, the distance between the

Satelites and the cart may be then,	$4 \times 10 + 20 \times 10 \text{ ft.} = 240$	feet,
From that cart to the second cart,	$2 \times 20 \times 10 \text{ ft.} = 400$	
From the second to the third cart,	“ = 400	
From the third cart to the roller 1, fig. XXIV,	= 200	

In all 1240 feet.

The utmost distance be only 1000 feet, which will then require two or three carts.

(7) PROCEEDING OF THE SATELITE WITHIN THE EXTENT OF ITS ROPES.

Fig. XXIV, represents, by the dotted lines, the beginning of the Satellite's track, which may be in a spiral line, if the terrain presents no obstacles to it, if otherwise, any other found the most convenient, may be chosen. As the Satellite

removes from the centre 1, carts to support the ropes, are to be used, till the Satellite reaches its utmost distance of about 1000 feet.

Such an extent of ground, I call an *Orbit*. If the Orbit be circular and its radius 1000 feet, its area will be about 70 acres.

(8) PROCEEDING OF THE SATELITE WITHIN THE EXTENT OF THE WIRE-LINE.

Fig. XXV. represents all the Orbits within the compass of the wire line,

- “ “ 1, a reservoir, within its wind-mills and buildings around it,
- “ “ 2, the well,
- “ “ 3, the water power,
- “ “ 4, 4, Orbits, 18 in this case, each may be of about 70 acres, in all 1330 acres,
- “ “ 5, 6, wire lines in activity,
- “ “ 6, 7, ropes,
- “ “ 7, the Satellite.

The dotted lines the direction and extent of the wire lines for each Orbit, one after another in succession being operated upon.

To shift the wires and Satellite from one Orbit to the next, a roller, like that 1, fig. XXIV. is to be ready in the next intended Orbit, also the wires to its centre from the water power—then the Satellite is to move to the skirt of the new Orbit—then its ropes to be detached from the centre of the old Orbit, and ropes from the centre of the new one to connect the Satellite with the new centre, and thus the connection between the Satellite through the centre of the new Orbit, to the water power being effected, the Satellite begins to move in the new Orbit. The wire lines need, as the figure XXV. shows, never extend beyond the second Orbit, or the length of 4000 feet. The wires around the reservoir may be stationary. All the Orbits together within the reach of the wires, and depending for their power from the same centre, I call a *Circuit*.

(9) THE EXTENT OF OPERATION OF ONE PRIMARY STATIONARY POWER.

If the primary power be the power of wind mills, the reacting or secondary power is that of a waterfall.

If a waterfall is used already, without being created by wind power, the primary power is this waterfall itself.

In both cases, any power derived from one and the same reservoir at a distance, I call a *secondary* power.

Each Circuit is to have at its centre, a stationary power, which may be a secondary one, derived from a distant reservoir through a canal or pipe.

It follows, that a number of Circuits may have one common reservoir, supplying the centre of each Circuit with a water power, driving a water wheel.

The extent of land for one primary power, whether it consist of one or more Circuits, I call a *Dominion*.

Fig. XXVI. represents a *Dominion*, each hexagon of it a Circuit, to the number of 55, each may be about 1400 acres, in all about 80,000 acres, with a radius of about eight or nine miles, each Circuit having one mile for its radius.

The lines from centre to centre of each Circuit indicate the feeding canals or pipes, to be conducted between the Orbits, in a serpentine direction in consequence, to avoid needless obstruction to the tracks of the Satellite.

As one Satellite may cultivate 20,000 acres, such a *Dominion* would then require four Satellites. I call the extent of the operation of one Satellite a *Range*.

A *Range* may be in more than one *Dominion*, and consist of connected or unconnected Circuits. Circuits or Orbits ought to be as regularly, and nearly circularly, shaped as possible, for the sake of economy of time and expense.

The forms of *Ranges* and *Dominions* are regulated but by local circumstances.

DEMONSTRATIONS.

§ 1. If the Satellite's track is one rod wide, and it moves two miles per hour, it ploughs in one hour 4 acres, in twenty-four hours, 96 or nearly 100 acres, and in one hundred days 10,000 acres; if moving four miles per hour, in one hundred days, 20,000 acres.

§ 2. If the Satellite moves with a sithe of two and a half rods in radius, with a sweep of five rods, and moves six miles per hour, it will mow in one hour $5 \times 12 = 60$ acres, in twenty-four hours 1440 acres, and allowing one-sixth of the time for shifting the Orbits, remain 1200 acres for one day, and for 20,000 acres $\frac{20,000}{1200} =$

17 days, say 20 days.

§ 3. Suppose the crop of one acre to weigh five tons; the crops of 20,000 acres will weigh 100,000 tons.

If the Satellite carry 20 tons for each load, the number of loads will be for 100,000 tons 5000.

The radius of the Orbit to be 1000 feet, about equal to the average distance to the places of deposit, in the corners between the Orbits, makes 2000 feet for each transport. To remove the crops of 20,000 acres will then require 5000×2000 feet, or nearly 2000 miles to travel with the Satellite. If this be done at the average rate of four miles per hour, the removal of 20,000 acres will require $\frac{20,000}{4 \times 24}$ days = 20 days nearly.

§ 4. Suppose the agriculture should require a second ploughing between the plants for extirpating weeds, &c.

The shovel ploughs (fig. XIV.) may be extended one-half rod further at each side, in all to two rods across the Satellite's track, and the Satellite move at the rate of six miles per hour, it will plough then in one hour 24 acres, in 24 hours 576 acres, allowing one-sixth of the time for shifting the Orbits, about 500 acres, per day, and for 20,000 acres it would require then $\frac{20,000}{500}$ days = 40 days.

§ 5. The cultivation of 20,000 acres, inclusive mowing, gathering and removing the crops, will then be done,

for the first ploughing (§ 1.) in	100 days,
“ mowing (§ 2.)	20 “
“ gathering and removing crops (§ 3.)	20 “
in all	140 days
If a second ploughing of 20,000 acres be done (§ 4.)	40 “
then in all,	180 days.

This leaves then about one-half of the year for other operations, not belonging to agriculture.

§ 6. If in soil, cleared from all impediments and softened by proper irrigation, one plough will be drawn by one horse, and sixteen ploughs be carried by the Satellite, the ploughing of the Satellite would be effected by sixteen horses at the rate of about four miles per hour. The power to be added for turning the pricked cylinder will be gained in ploughing since that operation has then broken the ground. The hind part of the Satellite may be made not to exceed two tons' weight, and being on wheels, would require less than four horses' power in addition. Allowing further for the operation of the comb, levelling and sowing eight horses' power, and for friction, though very trifling, four horses' power, the whole requisite power would amount to $16 + 4 + 8 + 4$ horses' power = 32 horses' power. But say fifty horses' power.

§ 7. If one horse's power is equal to 200lb. raised, or removing a resistance equal to it, two feet per second, it follows, that 50 horses' power is equal to the raising of $200 \times 50 \text{ lb} = 10,000 \text{ lb}$ 2 feet per second, and, if at the rate of 4 miles per hour or about $\frac{20000}{60 \times 60}$ feet $= 6$ feet per second, the same power of 10000lb at 2 feet is equal to $\frac{10000 \times 2}{6} \text{ lb} = 3400 \text{ lb}$. nearly at 6 feet per second.

§ 8. If the motion of the ends of the balance beam (fig. XII. and XIII., 15, 16) be made 10 times as great (by the proportion of the balance's length) as that of the advancement of the Satellite, the force required will be (§ 7.) $\frac{3400}{10} = 340 \text{ lb.}$, say 400 lb.

§ 9. The tendency of swinging the Satellite at its hind wheels, by the pull of the ropes at the balance beam's ends, will be in the inverse ratio of the wheel's distance from the fulcrum, at the pivot of said balance, which being shorter, it may be rated at $400 \times \frac{3}{4} = 300 \text{ lb.}$ which is less than the weight of the hind part of the satellite requires to move it sideways. But if it were not, it might be increased, and besides the felloes of the hind wheels might be made sharp so as to cut into the ground.

§ 10. The ropes pulling at the said balance beams' ends, having to overcome but 400 lb. weight or resistance (§ 8.) will be sufficient of one half to one inch diameter.

Their weight for the maximum of their length (of 1000 feet) will then be about 150 to 600 lb.

§ 11. If these ropes are carried by three carts at intervals, each will have to carry less than 50 to 200 lb. of the rope. If each cart weighs 100 lbs. the total weight of all three carts and loads will be then 450 to 900 lb. The rate of their run will be in proportion to their distance from the orbit's centre (1 fig. XXIV.) and the average rate of all three carts then about one half of that of the Satellite. Suppose 900 lb. drawn on wheels at a common horse's walk (i. e. of the Satellite's motion) be done by one horse; the half of that rate of motion will then require one half horse's power, and 450 lb. one quarter of one horse's power.

The additional power requisite to move along the three carts and their ropes is, therefore, less than one horse's power, or at most one quarter to a half horse's power, i. e. $\frac{1}{200}$ to $\frac{1}{100}$ of the whole power.

§ 12. An iron wire of one line or one-twelfth of an inch in diameter can bear about 300lb. before it tears, being suspended at one end. If the wire be one-quarter of an inch in diameter, it will bear then $3 \times 3 \times$

300 lb.=2700 lb; the weight it has to sustain in the pulls at the Satelite is 400 lb. (§8) or nearly one-seventh of its strength.

§ 13. If the utmost extent of the wire lines (fig. XXV.) be 4000 feet, the two wires then 8000 feet long, and a quarter of an inch in

diameter their solid contents will be $\left(\frac{1}{8}\right)^2 \frac{3.141... \times 8000}{144} = \frac{3141}{1152}$

cubic feet, or about 2 and three-fourths cubic feet. Suppose one cubic foot of iron to weigh about 500 lb., the wires will then weigh $2\frac{3}{4} \times 500$ lb.=1375 lb.

Suppose the component pieces 20 feet long each, and at each joint to be added two rings and two light wheels of 6—8 inches in diameter, in all weighing 1 lb., the number of joints being then $\frac{8000}{20} = 400$, their additional weight will be 400 lb.

The weight of the wires and appurtenances, in their utmost extent, will then be $1375 + 400 = 1775$ lb., say 1800 lb.

§ 14. According to experiments of Mr. Bevan, British engineer, a load on wheels on a sandy road is moved by one-fifth of its weight, and on a beaten gravel road by one-thirty-third of its weight. Consequently the weight of the wires, being 1800 lb. (§ 13.) would require

in the first case $\frac{1800}{5} = 360$ lb., or nearly as much power again as

the satellites motion, and in the second case $\frac{1800}{33} = 55$ lb., or about one-eighth of the same power in addition.

In the first case the aggregate power for the Satelite would be $50 + 50 = 100$ horses' power; in the second case only $50 + \frac{50}{8} = 56$ horses' power. The roads for the wire lines are but a few inches wide, and may easily, and by but one passage of the Satelite with a narrow roller bearing the whole weight of the Satelite, be compressed as hard and level as any beaten gravel road.

The aggregate power at the water wheel, with the addition of one half horse's for the ropes (§ 11.) would then be fifty-six and a half horses', say 60 horses' power.

§ 15. The sum of power required will not be altered, if the motion of the pulls be made shorter and slower, which may be done by making the diameter of the lower part of the roller 1, fig. XXIV. less, than the upper one for the ropes, to produce the same effect, though the wires are then to sustain a proportionate greater strength and to be thicker; for the increase of weight will be balanced by the decrease of motion in proportion. Say for instance, instead of a quarter, half inch the diameter of the wires, their weight then 4×1375 (§ 13.) +

400=5900 lb. their motion will be but one-quarter of that in the former cases (§ 74.) stated.—To cause a slower vibration of longer stokes or pulls, and accelerate the Satellite's motion too, at will, the diameter of the pricked cylinder may be increased, or an intermediate cogwheel between the propelling stokes and the cylinder be applied so as to make the latter revolve a greater portion of its circumference at each stroke.

§ 16. Suppose the water-fall 35 to 40 feet deep, its descent in the water wheel six feet per second; one cubic foot of water will then, sinking six feet per second, balance the raising of three cubic feet, two feet per second and be about equal to one horse's power, and the sixty horses' power will require sixty cubic feet at that rate of descent in a water wheel of about thirty feet in diameter.

§ 17. If one third of the wheel's circumference, or about 30 feet, carries water to the amount of 60 cubic feet, it will make for each foot's length 2 cubic feet, and if for each foot's length one bucket, being in the form of a wedge, the buckets will have to be about two feet deep, by nearly two and a half feet's breadth.

§ 18. The water required for 60 horses' power is, then, at the rate of filling 6 buckets each of 2 cubic feet, or 12 cubic feet, per second; consequently in 24 hours $12 \times 60 \times 60 \times 24 = 1,036,800$, say 1,000,000 cubic feet, and in 30 days 30,000,000 cubic feet.

§ 19. Suppose, for example, one reservoir for four Ranges or about 80,000 acres, as fig. XVI. represents; it will have to spend in 30 days $4 \times 30,000,000$ cubic feet = 120,000,000 cubic feet of water. If the depth of the reservoir be 20 feet, its area will have to be for

that case $\frac{120,000,000}{20}$ square feet = 6,000,000 square feet; if a square, each side will be 2500 feet nearly, its area in acres 136. The square for its enclosure will be about 100 feet broad, this will make its outside 2,700 feet long, its area, inclusive

enclosure, 158 acres, say 160 acres, which is $\frac{160}{80,000} = \frac{1}{500}$ of the whole Dominion. If the height of the reservoir be twice as great or 60 feet, its area will have to be the half of it, or about $\frac{1}{1000}$ of the Dominion.

§ 20. The evaporation is in the hottest and driest days one-third of an inch, which would be in thirty days ten inches, which is of the whole mass of water in the reservoir $\frac{10}{20 \times 12} = \frac{1}{24}$.

§ 21. If the average power of one windmill, as described, be equal to twenty horses' power, it follows, that the supply of water for sixty horses' power would, in case no calm should exceed thirty

days, require three such wind-mills, and for all four Ranges twelve wind-mills, which are indicated at the figure of the reservoir. But they may be increased to any number required.

§ 22. The beginning of the Satellite's operation is to be made on the highest spot of the intended Dominion, by a windmill previously erected, in case no water power exist already near it. The clearing of the ground of the projected reservoir from trees, &c., is the first operation, if not free of them already. This, as well as all other operations of the Satellite, is to be effected in Orbits.

§ 23. The Satellite begins at the outside of the Orbit in one of the corners between the Orbits, and proceeds in a strait line to the centre of the Orbit, tearing down trees, sawing them into convenient pieces and removing them into that corner as close together as well feasible, always taking a small patch at a time, till having cleared the road to the centre. Then the Satellite may tear down a row of trees on both sides of this avenue, and when come round to the same spot of its commencement, saw one tree after another in as small pieces as necessary for removal, and remove the pieces to the same corner. Thus it continues tearing down, sawing and removing the trees, &c., always taking a row of about forty feet's width, until reaching the two next corners, to which then the pieces are removed, in the further progress, and so on till the whole Orbit is cleared all around the centre.

§ 24. Suppose the Satellite moves during the operation of pulling down trees, at the rate of five hundred feet per hour, pulling down every tree one after another within a track forty feet wide, this will make for every hour, $40 \times 500 = 20,000$ square feet $= 73$ square rods; if the area of the Orbit be seventy acres, and the half of the three surrounding corners about ten acres, the whole area to be cleared for one Orbit will be eighty acres, of which the uprooting of all the trees will consequently require $\frac{80 \times 160}{73} = 175$ hours or about seven days.

§ 25. Suppose the Satellite extends its sawing operations at each of its stands to one rod in length and two and a half rods in breadth, and performs them in ten minutes; eighty acres will then require for the sawing operations $\frac{80 \times 160}{2\frac{1}{2}} \times 10 \text{ minutes} = 36 \text{ days}$.

§ 26. For hauling the trees, &c., to the respective corners of the Orbit, the mean distance may be estimated at four hundred feet, which to and fro makes eight hundred feet, for each voyage, of which ten may be then performed in one hour. If each stand (§ 25.) of the Satellite's operation of sawing should require one voyage for the removal of the trees, &c., within its two and a

half square rods, the time for eighty acres would then be for all removals $\frac{80 \times 160}{2\frac{1}{2} \times 10} = 512$ hours = 22 days nearly.

§ 27. The Satellite may then travel over all the area of the Orbit to hook out of the ground the remaining smaller roots and stones, &c. If this be done at the rate of one half mile per hour, it will make one acre per hour, and the seventy acres of land of the Orbit will require seventy hours or nearly three days, and supposing the removal of the objects out of the Orbit to require six days more; this will make in all nine days for one Orbit. Occasionally the hammer may be used.

§ 28. The sharply edged rings at the ends of the pricked cylinder, fig. V. may be used in all these operations.

§ 29. The Satellite may then travel once more over all the Orbit, ploughing and tearing out of the ground and sifting the small remnants of roots, &c., and depose them in piles along its track. If this be done at the rate of one and a half miles per hour, it will take for seventy acres one day.

§ 30. The Satellite may then level the ground, in taking off the prominences and filling the deeper places, by passing and repassing with the pricked cylinder and the transversal board.

Suppose the mean difference between the higher and lower places be ten feet, the mean of it then five feet, the height taken off and filled with it lower places six inches at each passage; it will require then 10 passages; if this be the case all over the Orbit of seventy acres, and the Satellite move at the rate of four miles per hour, it

will make for each passage $\frac{70}{8} = 9$ hours, and for ten passages ninety

hours or about four days.

§ 31. The ditches for irrigation, and the trenches with their banks around the Orbit for fences are then to be made. Suppose the ditches for irrigation to run in a spiral line four rods apart, they will then be about nine miles long, and be run with a single caving plough as indicated fig. XII. 71, 72, 73 in two hours, and back, in two hours, in all four hours. The trenches and dams for enclosure around the Orbit are about six thousand feet long, and the bottom and top respectively of both equal to the width of the Satellite's track, or eighteen feet, and four feet at most below and above the level, forming thus a dam eight feet high. If each passage of the Satellite takes but two inches out of the trench, and another passage puts the same

upon the bank along (by the diagonal log), it will require $\frac{48}{2} \times \frac{48}{2} =$

48 passages, each six thousand feet. If two are performed in one hour, it will take twenty-four hours for the whole. On the outward

slopes of the trench and dam, and also the top of the latter may be planted useful and ornamental hedges, to consolidate the dam and increase the impediment to the access of animals.

§ 32. All the preparatory works of one Orbit, to change wild woods into a perfect garden, consist then,

According to § 24, for pulling down the trees,	7 days,
“ “ 25, “ sawing “	36 “
“ “ 26, “ hauling “	22 “
“ “ 27, “ taking away smaller objects,	9 “
“ “ 29, “ rough ploughing,	1 “
“ “ 30, “ levelling,	4 “
“ “ 31, “ ditching,	1 “

in all 80 days.

§ 33. The preparatory works on prairies, or cleared lands, will be reduced to,

according to § 29, for rough ploughing,	1 day,
“ “ 30, “ levelling,	4 “
“ “ 31, “ ditching,	1 “

in all 6 days,

§ 34. The formation of the reservoir will generally consist in forming a dam around its place, which at most needs to be twenty feet high, with a ditch at its outside of thirty feet deep, as the figure VII. shows. Suppose the Satellite takes at each passage but one inch of soil away in the ditch, and that it requires, in an average, two other passages, to shove and raise that loose earth over to the place of the dam, as described, by the diagonal log 11, 68, fig. XII.; for each half inch, three passages, makes for twenty feet, $3 \times 20 \times 12 = 720$ passages. At each half foot's rise of the dam, the Satellite may pass with a smooth cylinder, instead of a pricked one, over the top of the dam, to compress the loose earth of it into compactness, which requires then forty passages more, $720 \times 40 = 760$; say 800 passages, will be then required.

In the case supposed of a reservoir for four ranges, the inside being 2,500, the outside 2,700 feet, it makes a mean length of 2,600 feet or about a half mile for each side of the square, and consequently, for each of the four Satellites to be applied, eight hundred passages at a half mile, in all four hundred miles which the Satellite has to travel. If this be done at the rate of two miles per hour, or about fifty miles per day, it will require then in all $\frac{400}{50} = 8$ days, for the reservoir.

The well, if any is to be excavated, may also be formed by four

Satelites at once. The well's bottom being at a level with that of the ditch around the reservoir, in the case supposed then thirty feet deep, the slopes at an angle of forty-five degrees, will make it thirty feet all around wider at the top than at the bottom, which may be twenty feet in diameter. The upper diameter of the well will then be $20 + 2 \times 30 = 80$ feet. The cubical contents of the earth to be taken out will consequently be, its shape being a truncated cone,

$$\frac{40 - 10}{3} \times 3.141 \dots = 63,000 \text{ cubic feet nearly. Suppose the}$$

Satellite carries at each of its passages diametrically through the well, as fig. VI. shows, 100 cubic feet of earth; it will require then

$$\frac{63,000}{100} = 630 \text{ passages, and with four Satelites } \frac{630}{4} = 160 \text{ passages}$$

nearly. Suppose each passage to be about 200 feet long, the Satellite would have to pass $160 \times 200 = 32,000$ feet, or about six miles, which may be performed then in six hours. In all other cases, where either the well has to be excavated deeper or the bottom of the reservoir is higher in relation to the level of the water outside of it, the extent of the reservoir, and consequently also of its dam and ditch, are less.

If the work can be accomplished in less time by the scoop or scraper, it is to be preferred. The time required for the formation of the reservoir and well is then not more than eight days.

§ 35. If at the beginning windmills are applied for the formation of the reservoir and well, one-half of the time may be calculated for the loss during calms; and therefore the double amount, *i. e.* sixteen days, be required.

§ 36. To transfer the water power to the centre of each Circuit of the Dominion, dams with small canals or ditches on their tops are to be constructed. The length of all the dams for one Range of fourteen Circuits, in the Dominion represented by fig. XXVI. may be estimated at about twenty-five miles, its height equal to that of the reservoir, say twenty feet, and its breadth somewhat less than that of the reservoir; be it equal. If (§ 34.) one half mile requires eight days, twenty-five miles will require $25 \times 2 \times 8 = 400$ days, for all the dams. The canals or ditches on their tops will but require two passages of the Satellite with the excavating plough, that is $2 \times 25 = 50$ miles, which may be effected in one day. The whole time for the dams and canals throughout the Dominion be then estimated in a round number to four hundred days at most, which amounts for each Circuit to about $\frac{400}{14} = 30$ days.

§ 37. Suppose the worst case that can be, where in a country of several hundred thousand acres no elevated place above the level of

twenty or thirty feet of water could be found, but all to be a dead level with water up to the surface of the land, a swamp for example. In this case the bottom of the reservoir would have to be raised by carrying earth from the ground around it to the place to be raised, which for four Ranges, as in the fig. XXVI. represented, would be 2,700 feet square. Suppose this to be raised twenty-five feet high. The solid contents of the earth required for that purpose would then

have to be $2,700 \times 25 = 182,250,000$ cubic feet. The distance to carry the earth may be averaged to 1,000 feet, and a passage to and fro of the Satellite will then be 2,000 feet. If the Satellite carries at each passage 400 cubic feet, it being on a level ground and a firm compressed road, the number of passages will have to be $\frac{182,250,000}{400} = 455,625$; each of 2,000 feet makes $2,000 \times 455,625$

$= 911,250,000$ feet or about $\frac{911,250,000}{5000}$ or 182,250 miles ; this will

make for each of the four Satelites to be applied, 45,550 miles, which at the rate of four miles per hour, will be performed in $\frac{45,550}{4}$ hours $= \frac{45,550}{4 \times 24}$ days $= 474$ days. Suppose the wind blows but half

the time, the time required will be $2 \times 474 = 948$ days.

§ 38. As this operation requires but an incompleted Satellite, such as described of fig. I. and II. the increase of a few of such would be but a small matter, and there may be as many at once as wind-mills are to be erected thereafter, which may then be constructed at once in their full number, and for each one an incompleted Satellite. The number of them may amount to twenty instead of the supposed four. The operation for raising the ground of the reservoir twenty-five feet high would then be reduced to $\frac{948}{5} = 190$ days or about six months, which time is to be added to that of the preparatory works, as calculated above.

ESTIMATIONS OF EXPENSES AND PROFITS.

THE data are given in the preceding demonstrations, which include all the cases that may possibly occur. The circumstances of locality, and prices of labors and produces being very various, no exact estimation for any case can be reasonably expected here ; but it must be inferred from the data given, as far as they can be found correct and applicable to the case. Still some general state-

ments as examples, for the maximum and minimum of expenses and proceeds, may serve as guides for any estimation of a particular case.

I shall therefore state a case of the most difficult and most expensive nature, with the smallest amount of means, also the same with strong means; also a case of the most favourable nature, with the smallest and the largest amount of means well applicable; and finally, also a case for a small extent of means and land.

Most cases that will occur in practice will be of a mixed nature of some of these cases, and may be modified accordingly to the examples given.

Some extraordinary circumstances that would increase much the time and expenses, and which will, of course, not be chosen for a beginning and only for after ages of a greater population and richer means, when better places can no longer be found uncultivated, may merely be mentioned here.

Such are;

1. The ground being very broken, and requiring, therefore, leveling by the Satellite in taking off gradually the tops of eminences and filling therewith the lower places, which is to be done by the hammer, the pricked cylinder and scoops.

2. Swamps, ponds, periodical inundations, requiring to be drained, are respectively guarded against by dams: the Satellite has to raise ground and draw ditches, fill the low places up to a certain level and form dams where necessary, to confine running waters into narrower channels.

3. Sterile ground, rocky or sandy, desired to be changed into fertile land, which is to be effected by the Satellite's taking, by its scoops, fertile soil where it can be spared, and covering therewith the sterile places.

4. The hills may not admit of regularly shaped Orbits and Circuits as described, which require to be changed into terraces by the Satellite with the scoop or diagonal shoving log; also rocks to be battered by the hammer and carried away by piecemeal.

In all these cases there is but an incompleted Satellite, as described of fig. I, II, III, required, and a great number of such may be applied at once with a comparatively small addition of expenses.

EXPENSES AND PROFITS OF THE FIRST TEN YEARS.

A. *For a Range of 20,000 acres, consisting of woods, and with the application of but one Satellite and four men :*

According to demonstrations § 32, all the preparatory works of one Orbit require 80 days,

therefore for four Orbits or 280 acres, - - -	320 days,
according to § 34 and 35, the reservoir, - - -	16 "
suppose for extra works at the beginning - - -	29 "

In all - - - 365 days.

The expenses may then be estimated :

For the first year :

for the Satellite - - - -	\$2000 to 5000
" 4 windmills - - - -	600 " 1000
" water buckets for raising water - -	200 " 400
" 1 water wheel - - - -	200 " 600
" connecting means, viz :	
2000 feet of ropes (§ 10.) - - - -	50 " 200
" " for reserve - - - -	50 " 200
8000 feet wires (§ 12. 15.) 1400 to 5600 lbs.	150 " 600
4000 " " for reserve - - - -	40 " 160
400 pairs of small wheels (§ 13.) - -	66 " 130
200 " " for reserve - - - -	34 " 70
3 carts (§ 11.) to support the ropes -	60 " 140
wages for four men - - - -	1000 " 2000
extraordinary expenses - - - -	550 " 1500
At the end of the first year—sum - - -	\$5000 " 12000

For the second Year:

wages for four men - - - -	\$1000 " 2000
extraordinary expenses, - - - -	200 " 1000
Expenses at the end of the second year -	\$6200 " 15000
Produces of 280 acres, at \$10 to 50 per acre	2800 " 14000
Leaves at the end of the second year expenses	\$3400 " 1000
In the second year one Satellite will cultivate	
280 acres in - - - - 3 days	
Perform the preparatory works of four Or-	
bites or 280 acres more in - - - 320	
And for about one half Orbit or 35 acres in 42	

In all - - - 365 days.

For the third Year:

Expenses as in the second year - - -	1200 " 3000
At the end of the second year total expenses	\$4600 " 4000

Carried over	-	-	-	-	\$4600 to 4000
Produces of eight Orbits or 560 acres	-	-	-	-	5600 " 28000
					<hr/>
Nett profit at the end of the third year	-	-	-	-	\$1000 " 24000

If the Satellite prepares every subsequent year four Orbits more for cultivation, in 320 days, leaving thus 45 days of the year for its other works, the sum of prepared Orbits will be 40, of which will yield produces, in the fourth year 12, and in the tenth 36,

therefore on an average every year, $\frac{12+36}{2}$ and in 7

years $\frac{12+36}{2} \times 7 = 168$ Orbits, or 11,760 acres, at

\$10 to 50 per acre, makes	-	-	-	-	117600 " 588000
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Total revenues then	-	-	-	-	\$118600 " 612000
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Expenses from the fourth to the tenth Year.

Current expenses, per year \$1200 to 3000.

In seven years then	-	8400 to 21000
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For two water wheels more	400 " 1200
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Nett profit of ten years	-	-	\$109800 " 589800
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To house and thrash the crops will require an additional capital, which may be repaid amply by the profit accruing from their use. Thus, the sheds for housing the crops, consisting only of a roof on posts for each Orbit, may be built of boards and beams, sawed by a stationary sawmill in each Circuit, for all the purposes of machineries, buildings, &c. occurring, and their expenses would only consist in the small amount of wages for their erection and transports of the materials required, and the straw, &c. of the crops yielding fodder for live stock would far over pay the same.

The sawmills would not form an object of capital or current expenses in this agricultural view, they being for the most part of the time employed for other purposes far overpaying again their expenses.

The thrashing machine may be of the simplest kind, transportable, and one sufficient for the whole Range. A row of horizontal beams, resting on pivots, and one of their ends being lifted up by a shaft with cogs for each beam, driven in the manner of the Sateelite, would answer already the purpose—a kind of rake might be added to drag from time to time the bundles required from the shed under the

thrashing beams, and from thence the straw away to some other place of deposit. The further requisites for the final preparations of the produces are more than repaid by the increase of the price of the produces.

B. For a Range of 20000 acres on Prairies with one Satellite and four Men.

The time required for all the preparatory works of one Range is (§ 33.) for each Orbit 6 days, and consequently for each Circuit of 19 Orbits, - - - - - $6 \times 19 = 114$ days

To which is to be added for its dam and ditch (§ 36) 30 "

In all for each Circuit - - - - - 144 days

In the first year may then be prepared :

One Reservoir (§ 35.) in - - - - - 16 days

Dams and ditches of three Circuits - - - - - 90 "

Two Circuits, or about 2800 acres prepared - - - - - 228 "

Cultivation of one Circuit or 1400 acres - - - - - 14 "

For other small unforeseen works - - - - - 17 "

In all - - - - - 365 days

Expenses will be as at A in the first year \$5000 to 12000

Two water wheels in addition - - 400 " 1200

Total expenses - - - \$5400 " 13200

Produces at the end of the first year of 2800 acres - - - - - 28000 " 140000

At the end of the first year nett profit - \$22600 " 126800

Every subsequent year expenses the same, but produces increased of two Circuits, in an average; till the Range is completed. Therefore produces

In the 2d year of 3 Circuits

" " 6 " 10 "

In average each year of $\frac{3+10}{2}$ Circuits

and in five years $\frac{3+10}{2} \times 5 = 32\frac{1}{2}$ "

Carried over,	- - -	\$22600 to \$126800
each of 1400 acres, makes	45500 acres	
In the 7th year of	20000 "	
and in the last three years	60000 "	

Total amount of	125500 acres	
At \$10 to 50 per acre	- - -	1255000 " 6275000

Total revenues of ten years,	\$1277600 " 6401800
Expenses every year for wages, \$1200 to 3000, makes in 9 years	\$10800 27000
For 11 water wheels more	2200 6600
	13000 " 33600

Nett profit of 10 years	- - -	\$1264600 " 6368200
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C. For a Range of twenty thousand Acres of Woods with five Satelites and one hundred Men.

There may be applied at once one complete, and four incomplete Satelites, as stated (§ 38, Demons.) in the following mode:

1 Satellite with but the pricked cylinder and a hook, to pull down trees (§ 32. Demons.) for 1 Orbit, with	1 man in 7 days,
1 Satellite with 5 saws, to saw, being 3 rods longer, and having for each saw 2 men,	10 " 7 "
1 Satellite with but a thin smooth cylinder, around which, while lifted above the ground, wind 4 ropes or chains for hauling, the Satellite being fixed on the ground, for each rope 2 men, in all	8 " 6 "
1 Satellite with but a pricked cylinder and hooks, for hooking, taking out of the ground and removing smaller objects, with	4 " 7 "
1 Satellite for rough ploughing, levelling and ditching with	2 " 6 "
Then for watching and regulating the connecting means at the stationary power,	8 " "

5 Satelites in all and 33 men in 7 days.

To be employed 8 hours in 24 requires 3 releases, as maximum, each of 33 men, makes 99 men, and one for superintendence makes 100 men.

A Circuit of 19 Orbits requires then $19 \times 7 = 133$ days, and for

its dam and ditch (§ 36, Demons.) with the same means as above stated, instead of 30 only 6 days, makes in all for 1 Circuit 139 days, which is less than in the case at B stated.

The progress of the preparatory works, and, in consequence also the produces, in the first 10 years will then be the same nearly as at B.

The expenses may be estimated thus :

In the first year :

as at B.	-	-	-	-	-	\$5,400 to	13,200
in addition for 4 incomplete Satelites	-	-	-	-	-	2,000 "	4,000
" 5 windmills	-	-	-	-	-	1,500 "	3,000
" waterbuckets	-	-	-	-	-	1,000 "	2,000
" 12 waterwheels	-	-	-	-	-	2,400 "	7,200

Connecting means, viz :

8000 feet ropes for 4 Satelites	-	-	-	400 "	800
32,000 feet wires for do.	-	-	-	600 "	2,400
1,600 pairs of small wheels (§ 13, Dem.)	-	-	-	250 "	600
12 carts to support ropes,	-	-	-	250 "	600
20,000 feet chains for hauling, &c.	-	-	-	2,000 "	4,000
Wages for 96 men more	-	-	-	30,000 "	40,000
Unforeseen expenses	-	-	-	1,200 "	5,200

Total expenses of the 1st year	-	-	\$47,000 "	81,000
Produces in the 1st year as at B	-	-	28,000 "	140,000

Nett expenses of the 1st year	-	-	\$19,000	
or Nett profit of the same	-	-		59,000

The current expenses for every subsequent year until the preparatory works are finished will be

for wages of 100 men	-	-	-	\$31,000 to 42,000
extraordinary expenses	-	-	-	1,000 " 5,000

in all \$32,000 to 47,000

The produces, as the calculation at B shows, overbalance already in the 2d year the expenses, and increase every subsequent year with those of 2 Circuits or 1,400 acres, until they reach their maximum in the 8th year, of the whole Range, when the annual expenses will be reduced for ever to the wages of 4 men and small contingencies or about to \$1,200 to 2,000.

The expenses of the 2d year being then	\$32,000 to	47,000
The produces, as at B, of 3 Circuits or		
4,200 acres	-	-
	42,000 "	210,000
of the 2d year surplus	-	-
	\$10,000 to	163,000

Carried over, - - -	\$10,000 to	163,000
therefore, in the 3d year of 2,800 acres more	38,000 "	283,000
" " 4th " " 2,800 " more	66,000 "	423,000
" " 5th " " 2,800 " more	94,000 "	563,000
" " 6th " " 2,800 " more	122,000 "	703,000
" " 7th " " 2,800 " more	150,000 "	843,000
" " 8th " " 1,400 " more	164,000 "	913,000
" " 9th and 10th years of 20,000 acres more	400,000 "	2,000,000
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Nett profit of the last 9 years - - -	\$1,044,000 "	5,891,000
Expenses of the 1st year - - -	19,000	
or Nett profit of the 1st year - - -		59,000
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Nett profit of 10 years - - -	\$1,025,000 to	5,950,000

D. For a Range of twenty thousand acres on Prairies with five Satelites and one hundred men.

The 5 Satelites will effect, with 6 men's attendance each at a time, and 18 in all, and 2 Superintendents, making 20, for all 5 Satelites then 100 men, all preparatory works of the Range in one-fifth of the time calculated at B, that is in $1\frac{1}{2}$ year.

The expenses for materials will be somewhat less than calculated at C in the first year, requiring less ropes and chains; but suppose them to be the same, viz: in the first year \$47,000 to 81,000
 Produces in the first year of 4 Circuits or
 5,600 acres - - - - 56,000 " 280,000

Nett profits of the first year - - -	\$9,000 to	199,000
Expenses in the 2d year:		
for 6 months wages for 100 men -	\$16,000 "	24,000
for 6 months wages for 4 men -	600 "	1,000
small expenses - - - -	400 "	1,000
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Total expenses of the 2d year - - -	17,000 "	26,000
Produces of the 2d year of about 8 Circuits, or 1,1200 acres - - - -	112,000 "	560,000
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Nett profit of the 2d year - - -	\$95,000 "	534,000
Nett profit of the first year - - -	9,000 "	199,000
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Total nett profit of the first 2 years - - -	\$104,000 "	733,000

Carried over	-	-	-	-	\$104,000 to 733,000
Every subsequent year the expenses for 4 men, &c.,	\$1,200 to	2,000			
The produces of 20,000 acres	200,000	"	1,000,000		
Nett annual profit	198,800	"	998,000		
Makes in 8 years	-	-	-	-	\$1,570,400 " 7,984,000
Total nett profit of 10 years	-	-			\$1,674,400 " 8,717,000

E. *On the smallest scale, for 1 Circuit or 1400 to 2000 acres with 1 Satellite of $\frac{1}{4}$ of the width of that described, or 4 feet's track, on Woodland.*

For the first year's expenses:

The satellite	-	-	-	-	-	\$500 to 1000
1 windmill	-	-	-	-	-	150 " 250
Water buckets	-	-	-	-	-	50 " 100
1 water wheel	-	-	-	-	-	100 " 500
Connecting means, viz:						
2200 feet of ropes, $\frac{1}{4}$ to $\frac{1}{2}$ inch in diameter	-	-				15 " 50
10000 feet wires, $\frac{1}{6}$ to $\frac{1}{8}$ inch thick	-	-				50 " 200
600 pairs of small wheels (§ 13, Dom.)	-	-				100 " 200
3 carts to support the ropes	-	-	-	-	-	35 " 50
Small expenses	-	-	-	-	-	110 " 300
Wages for 4 men	-	-	-	-	-	1000 " 1200

Expenses of the first year - - - - \$2100 to 3850

Every subsequent year only the last two items of \$1100 to \$1500 are to be expended. The produces will increase every year of 1 orbit of 70 acres more.

Therefore, the expenses and profits are as follows:

	<i>Expenses.</i>	<i>Profits.</i>
1st year	- - - - \$2100 to 3850	
2d "	- - - - 1100 " 1500	\$700 to 3500
3d "	- - - - 1100 " 1500	1400 " 7000
4th "	- - - - 1100 " 1500	2100 " 10500
5th "	- - - - 1100 " 1500	2800 " 14000
6th "	- - - - 1100 " 1500	3500 " 17500
7th "	- - - - 1100 " 1500	4200 " 21000
8th "	- - - - 1100 " 1500	4900 " 24500
9th "	- - - - 1100 " 1500	5600 " 28000
10th "	- - - - 1100 " 1500	6300 " 31500

Total: \$12000 to 17350

\$31500 to 157500

From the 3d or at most from the 5th year all expenses will be repaid, and thence a clear profit accrue every subsequent year, increasing with the produces of 70 acres, till the maximum of 1400 to 2000 acres are under cultivation.

F. *The same means and extent on Prairies or prepared land, of 1400 to 2000 acres.*

For the first year :

The Satellite may prepare in 6 months 6 Orbits (§ 33, Dom.)

Expenses as before	-	-	-	-	-	\$2100 to	3850
Produces of 6 Orbits or 420 acres	-	-	-	-	-	4200 "	21000

Nett profit of the 1st year	-	-	-	-	-	\$2100 "	17150
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For the 2d year :

Expenses	-	-	-	-	-	1000 "	1500
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leaves profit	-	-	-	-	-	\$1100 "	15650
Produces of 18 Orbits on 1330 acres	-	-	-	-	-	13300 "	66500

Nett profit of 2 years	-	-	-	-	-	\$14300 to	82150
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Every subsequent year about the same profit.

From these 6 different cases of estimations, containing the maximum and the minimum of expenses and profits, it appears, that the capital in any case may be refunded within 1 to 5 years from the proceeds ; and thereafter an increase of profits be reaped, till the maximum of produces is attained, that is, those of 20,000 acres for 1 Satellite and 4 men's attendance. No speculation can be shown equal in profit to this present case, unless it be a particular and direct fraud and robbery.

It is to be expected that the stated estimation of prices of produces will hold good for at least 10 years, considering the natural animal apathy of men to stick to their old dear customs, which will not allow them to imitate promptly the presented new means, and retard their becoming universal for probably a longer time yet. But, be it as it may, the gradual sinking of the prices of the produces will cause no loss to any speculator in this matter, since at all events, and even in the ultimate case, the produces of becoming so cheap and abundant as water, the owners of such Dominions will have gained a "Paradise" for ever, requiring no further addition, and only 4 men's easy attendance to 1 simple contrivance for 20,000 acres.

When this time will arrive, then other objects, more worthy of

rational creatures, will come into view, such as are presented in my "Paradise." At present, I know, that nothing can engage the attention of my cotemporaries as the acquisition of wealth, or, its representative, money. And, therefore, this present book will be quite enough for them. To reason with them further, and on the most proper application of these means, and of their first consequences, wealth, would be like offering music and splendor to a hungry beggar.

The results of these estimations can surprise only those, who cannot comprehend what it is to have powers that cost nothing at command to an unlimited extent, and that it is the power that does the work and not the tool (or machine).

The maximum of time employed for cultivation of land in the climates with a winter is, as stated, only six months of the year. The other six months will be left for accomplishing any other work of the Satellite.

MODES OF APPLICATION.

THE best mode of applying this system will at once appear to any mind not stupified by the prejudices of custom, from comparing the different estimations stated. None, but a fool, will choose of two things the worst and the most costly, when the difference of both is shown to him. It is manifest from the foregoing six estimations, that the largest scale affords the greatest advantages, and that prairies afford much sooner the maximum of profits than any other land, which is previously to be cleared of impediments to perfect agriculture.

However, the clearing operations may, and ultimately will, when society is prepared to act on a large scale, be effected much easier and with much less expense of time than stated in my above estimation, viz: The trees may be pulled down and uprooted in rows, on a tract of many square miles, then left for some years to dry, and then be burned up at once in one general conflagration. There is no timber required except for some few buildings, for which particular spots of woods may be preserved.

Still for the present generation, and for several generations to come, there would be prairies or savannahs enough in America, if they be preferred, and the other parts requiring more preparatory works might be left for after ages.

But there are farms and uncultivated tracts in parts of denser population, that are held at high prices—moreover the same are parcelled in pieces of tens and hundreds of acres. The owners of such parcels

and in such parts will like to know, what use of my system may be made for their little farms. I have spoken as yet only of thousands and tens of thousands of acres cultivable by one machine. People, who are not in the habit of reasoning much, may rashly infer from these my statements, that my system be not applicable to their lands, and only qualified to rich owners of large tracts of land.

It is true, to supply every little farm of fifty to one hundred acres with a stationary power or Satellite and connecting means between them, would be as ridiculous as furnishing every spinster with a card and spinning machine to spin her wool, or supplying a small skiff with a little steam engine to save to one or two men the trouble of paddling with their hands.

People, who never reasoned yet on what the advantages of machines consist of, are to be informed that no machine affords any advantage, except by *saving labour* of men, and, next to it, that of beasts. But as it is rather difficult to find a machine which will have the goodness to work of itself, we have to find the *power* to compel the machine to work. Now, if labour of men is required to procure that power, and labour of men to make the machine, and then men to attend that machine in its operations, we have first to balance the account of the expenses, that these labours and materials will cost, with those of common manual labour to the same effect, in order to find out which affords the best advantages, the machine or the manual labour, to do the business proposed. Now if three or four men can cultivate a small farm without machines, there would be no great advantage, if the same three or four men had to attend a machine to do their work—they may then as well do it with their own hands.

Still there are ways and means to extend fully the benefits of my system to the smallest farm and kitchen garden.

In a tract of 20,000 acres, for but one Satellite, may be found a hundred farms, more or less, and out of them some farmer who is either willing and able to establish on his little farm a stationary power as described with one Satellite, or, if not, to sell or lease his farm, for a good price to some speculator that calculates. A stationary power with one Satellite may thus be established in one or the other way, sufficient for the cultivation and respectively preparation of 100 or more farms around. The operations may then begin on the few acres of this farm. When they are finished, the next neighbours may then be invited to look at them, if they should not come on their own accord to behold the strange phenomenon. One after another of them may then be asked, whether he would not like to be freed of the trouble and expense to farm his land, and reap the same benefit or more than he could effect with all his labour, his men and beasts. The machinist might, for instance, propose to a farmer: "I will cultivate your land as a garden, fence it (by ditches and

dams) level it, provide it with ditches, irrigate it whenever useful, clear it from stumps, &c., clear and change into a garden your wood lands, as far as you desire, and improve your farm as much as you see mine, for a certain share of your crops—you may name yourself this share—and I warrant you as good crops as those you see on my farm.”

I think it likely some of the neighbours would not be quite so stubborn as to resist the temptation, seeing in this proposition no risk, no inconvenience, but only profit, and themselves rid of all labour, hardships and inconveniences.

Thus by degrees the machinist would become the farmer of all the hundred farms around his own little farm, to the profit of his own and all his neighbours'; and every neighbour within his *Dominion* would soon think it as foolish to farm himself his land, as he now would think to build and attend a mill on his own farm for his mere private use. What a miller with his mill is now to the farms around it, the machinist with his stationary power and Satellite will be to the cultivation, &c. of the farms in the neighbourhood. Those farmers, if any there should be, who would prefer their old laborious custom to farm, may enjoy their privileges of staid customs, as long as Rip Van Winkle slept before he awoke of his 20 year's sleep, till nobody wants to pay their dear labour, but every body prefers to buy his wants from the machinists at about $\frac{1}{10}$ of the price Mr. Rip Van Winkle's relation would ask.

Having now done with the difficulty of farming little farms and highly prized land of less real value, by my system, it is now proper to consider what is to be done in less difficult circumstances. I allude to the 1,000 millions of acres which are to be found within the United States alone, having no owners yet, except the nation at large. There is then a choice of any suitable tract of land, for little or no price. I shall not here speak of what laws or arrangements might be made in regard to public lands—I have done it already in the second part of my “Paradise.” But viewing the circumstances such as they now are; it is evident at once to every one, that my system is independent of the petty calculations of present settlers in new countries. Their wants are anterior to their produces; and in my system the produces and preparations of dwellings, &c. are anterior to the wants of the settlers. Only half a dozen of men are necessary for the beginning in the first year—and the land produces enough for hundreds of families, without requiring their labours, their long privations of the finer social pleasures as now is the case with new settlers.—All the machinists have to care for, is to choose the most suitable place for the stationary power, with the best tract of land

around it, and then for the neighbourhood of some navigable water, and the practicability of a road to it from the inland, in order to export their produces in great masses cheaply.

They will naturally look first to prairies, the cheapest, most convenient and most valuable for the cultivation by my system.

The owners of large tracts of wild land bought only for selling it again, may avail themselves of my means in two ways, either by cultivating them by my means and selling the produces, or the improvements themselves, or by inducing settlers to cultivate the land by my system, affording them a credit of the purchase price of the land, and if they choose also the materials in part or entirely for the machines, &c. on suitable conditions—by which they will enhance the value of their land and the annual revenues of it for ever.

The speculators of capital may procure to themselves tracts of land, such as are the most suitable to my system, and carry it into practice upon it. They may either export and sell the produces in mass, or induce people to settle on their improved lands, by holding to them out good houses, and gardens, &c. for their use and profits, by paying a certain amount of money per acre and house either once for ever, or for any definite period, or annually—either in cash, or in labour wanted on the establishment for its further enlargement and improvement. This would be what land speculators generally practise in laying out a certain tract of lots for houses, which lots they then sell or let to the highest bidder. But there would be this great difference, that the settlers would not merely pay for the permission to build and to live on the lot, but for the dwelling, food and other things and enjoyments to be derived from the establishment.

If there should happen to be any wealthy speculator, who, besides making money for his own purse, should also be interested in the moral and intellectual improvements of his neighbours, I have to refer him to my “Paradise,” which furnishes him ample materials for it.

To tell to the wealthy how to get wealthier, and to the usurer how to extend his usury to his heart's utmost desire, may seem to those who are not in the happy position to make use of the advice, an odious business. Still it is after all the wealthy or usurers that govern the world, the republics as well as the monarchies and aristocracies, since nothing but money or money worth can buy the good will and respect of the people. I think, therefore, I owe to the gentlemen usurers, (often misnamed speculators) the same respect as common people do pay them, and have placed therefore them in the first rank of my consideration, in speaking of the mode of application of my proposed means; for I think they will continue to govern the world, ill or well, a few years longer.

After thus following the usual rule of good breeding, to pay to those

of the highest consideration of my cotemporaries, the wealthy usurers, the first compliment, before descending to take notice of inferior ranks, I may be allowed to speak of the great bulk of the people, the poor and labouring class, who, faithful to the commandment and "curse," "eat their bread in the sweat of their brows."

Those, who are not pleased with this "curse," and wish to get rid of it, are then hereby informed, that it is now placed into their power to become all wealthy and happy and free from any compulsive labour, even more so than any of their wealthy neighbours they now may behold, who buy their exemption from that "curse" by their money, the fruit of usury or something worse—they may all live like ladies and gentlemen, even with better enjoyments, habits and acquirements, than any of the rich ladies and gentlemen that now can be found to possess.—For the particulars as to these new superior habits or acquirements, see my "Paradise."

If there are pious people, who think their conscience ought not to allow them to deviate from that "curse," I beg leave to inform them, that they always will remain at liberty to work or keep holy-days just as they please. I hope there will be liberality of sentiments enough among the people, to *allow* only, and not to *compel* them, to keep every week seven holy-days instead of one. Nay, if they should be at a loss to know how to fulfil this "curse," though nobody nor themselves should want their labours and services, I will serve them with my advice freely and from pure good will. They may still volunteer their pious work; they may, for instance, dig a hole one day and fill it up the next, and so on through life, if they choose. Nor will they, in so doing, be without precedents. Thousands of pious Christian souls have already even done more, they have scourged and lacerated their own backs, to please their Maker and expiate their sins. The fact is, I do think, as I have already expressed in my "Paradise," people, who toil and drudge all their lives, do it in consequence of their sin—the most grievous sin that man can commit—the sin of not reasoning—the only sin which sinks man to the level of a stupid beast—and by which he has effectually forfeited the Paradise. What is to beasts and to men, who like beasts, do not reason, the beautiful half of the globe, with a perpetual summer that *might be* a perpetual paradise of abundance and delight, and *is* but a frightful wilderness of starvation and conflicts—what are the mighty powers and productiveness of nature to brutes and brutish men?—They cannot see the use neither of one nor the other. The inferior half of the globe with a periodical death of nature is chosen, which forces unreasoning men to perpetual labour and conflicts, with the climate, and with their fellow creatures, for the poor pittance of their wants, that nature supplies but scantily there.

What I have to propose here is again, like all the rest of my propositions, nothing but an old practice (I take pains to avoid the unpardoned odium of novelty), only to more profitable purpose than any yet, viz: "joint stock companies," accessible to the poorest individual.

Look at my estimations B and D in regard to prairies.

As long as they be not bought away by land speculators or otherwise disposed of by the government, they will be of the greatest advantages.

A capital of less than \$20,000 for 20,000 acres is required which may be refunded within one or two years. If you divide this capital in 1,000 shares, each share will be less than \$20, and amount to 20 acres' property, and nearly the produces of 20 acres of the finest garden culture annually, after less than 7 years, and within the first 2 years an insurance of the supply of the natural wants of life for each shareholder and his family. These shares may be paid either in cash into some good bank, or to some responsible person, or in work on the land, such as will be required in the making of, and attendance to, the machinery for the preparatory works and cultivation. One to three months may be the extent of the labour of a shareholder, to insure to him, for himself, his assignees or heirs, for ever, the produces of 20 acres, with a few per cent's deduction for administration.

Pay for land will not be necessary, either by obtaining, on application, special grants of the government, or by buying it on credit, as the capital for it will in a few years be but a small portion of the annual revenues, as the estimations show.

If wood land is chosen, the full revenues will ultimately be the same, but so many years later, as the estimations show.

All what is then to be done, is to take any of the joint stock companies' regulation you think most convenient, for your pattern; this will save you even the trouble of thinking for yourselves—there are plenty of them in the country.—You may have yours incorporated by the government. A few meetings as preliminaries, an organisation of a company, perhaps then a further enlargement of it by sending your subscription list to such persons you choose to accept as partners—then selection of land, by one or more persons, and at last one director and three or four labouring hands, if you do not choose the plan C or D, may be your executors—this is all the business necessary.

As soon as sufficient land is cultivated, you may have your houses built by the Satellite in the mode suggested, either of wood sawed by stationary saw mills, or of stones sawed by the Satellite, or of bricks formed and compressed by a great pressure, at the stationary machines, into coherent bricks, without fire or water, as practised

already, or of vitrified sand and clay as indicated in my "Paradise." Your houses may all be built in the corners between the circular Orbits (as the figure shows of the Circuit) in beautiful groves of orchards and shrubberies and pastures, through which places are to pass all the lines of communications, the canals and roads. After the preparatory works are finished, the Satellite is only 6 months (in climates with a winter) engaged for the cultivation of the land, and the other 6 months of the year it may be employed to construct dams and roads from corner to corner around every Orbit. These roads may at proper *Stations*, such as locality suggests, be divided into *Sections*. Each Section is to be at one end higher than at the other, so as to form a gentle inclination calculated to cause any carriage, placed on the higher end, to run by its own gravity down to the lower end: there then the carriage may be pulled, by the stationary power at the Circuit's centre, upon a steeper declivity to the higher end of the next Section; from whence it will roll again down to the next Station, and so forth, from Station to Station, in any direction desired within the Dominion. Wherever another Dominion joins to it, the same conveyance may be through that continued; and ultimately the whole country, in whatever direction it possesses a line of Dominions, may have such roads, on which the carriages move with any speed desirable by their gravity, which is but the reaction of the stationary power applied for their raising at the Stations.

These roads will thus bring any carriage to any place of the Dominion or lines of Dominions within, at most, 1000 feet.

There is then also superseded all use of animals.

Next to these roads, one navigable canal at least may pass through the Dominion, fed by its reservoir, for the exportation to the next navigable river or other water. Not only the produces, but also small floats of logs may be floated to, and down, the next river. These floats may be joined in any number and to any shape desired, to form one great float at their entrance into the sea, and may be disjoined into smaller ones again whenever required. These floats may then be propelled by those powers, which I have shown for it in my "Paradise," and be used for those other purposes stated there.

These floating islands may form then your secure and rapid intercourse with the distant parts of the globe, to exchange with them, for your surplus of produces, what you may want. You may then collect all the materials for such botanical and experimental gardens and museums, and all the objects, representative images and books, of which my "Paradise" speaks, for your and your children's information and use of every thing known in the world, and worth knowing to every human creature. Then, and only then, when the mind is stocked with the correct knowledge of the materials of the

present world, will the time commence to reason on moral and intellectual improvements.

The advantages of my system will be still far greater in tropical climates. They will afford in their wet seasons water-power, without the use of windmills, wherever there is some inclination of the ground to admit of gathering water into elevated reservoirs. Since it is known that fertility of soil is only constituted by heat and moisture. In those climates a proper management by my system of the rains during the wet seasons, any, even the most sterile places, sandy deserts themselves, may be rendered as fertile as any soil, by irrigation. There will then be a perpetual luxuriant vegetation of the choicest produces of the globe, affording on one acre more nutritious stuff than 50 in other climates. And in this region there are yet many thousand millions acres uncultivated.

But this latter consideration is only addressed to cosmopolites, not to mere local beings.

I might state many other things feasible by these means, but from fear of crowding your mind with too many notions at once, that might lead you to loose sight of the main objects I have shown, I omit those of less importance as yet.

For instance :

You never thought of cooling the summer's heat down to a pleasant healthy temperature, nor to heating your chilly winters, in your rooms, by mechanical means. Yet, this may be done.—I take this too, like all my system, from your own knowledge and experience, of which you have yet made but poor, or no, applications. You know, any hard body grows hot by rubbing its surface. Now, if you take, for instance, two iron disks, put them together like two millstones, and make them revolve upon each other, their friction may make and keep them red hot, which you can do by my abundance of powers that cost nothing. You are then at liberty to heat your rooms and cook your victuals without consuming materials, except an insignificant trifle of iron that may gasify by the process.

The same power may also *cool* your rooms. You know, compression of air and then sudden expansion of it to its former state, produces a momentary cold, enough to freeze water into ice. Thus you may manufacture as much ice as you desire, stow it into your ice-cellars, and cool from them not only your beverage, but your rooms by air-draughts issuing from them through your rooms, which, at the same time, will banish all troublesome insects from your abodes.

It may occur to your mind that there are various small works to be done in agriculture not mentioned by me yet. To describe them all would be too tedious here, since the very inspection and practice of my Satellite will suggest the ways to apply the Satellite for them.

I might as well attempt to describe all the things that can be made with a knife or axe to a person unacquainted with the use of iron. For example, will you be at a loss to know how to dig out of the ground and gather your potatoes, turnips and other roots and pulps, without using your fingers?—Only look at the comb of my Satellite—make the tines of it a little longer if necessary, and place the comb in a proper inclination to the ground, so as to hook into it and below the potatoes, &c. which will then slide upon them to the upper edge of the comb from whence they may drop into some large box behind it in the frame of the Satellite, while the loose dirt may drop through the interstices of the tines.

You may think of gathering green peas, beans, melons, pumpions, cucumbers or any other fruit of vines from a large extent of ground. Well, the Satellite suffices to do the business. While moving slowly on high wheels above the plants, the conductor (or more persons) may sit upon the Satellite (under a tent if they choose) and cut off with an adapted pair of shears the objects as quickly as they see them and drop them into a box on the Satellite.—When the fruits are dry and hard, such as dry peas and beans, the vines may be mowed, as described, with the Satellite, and then thrashed by usual thrashing machines, like other grains.

You may think of cotton picking (in southern climates) and the like operations.—This you may effect also with the Satellite as fast as it can move—that is at the rate of 6 miles and upwards per hour, while picking all the ripe cotton from 2 to 4 rods in front at once, and leaving the other parts of the plants untouched. The cotton cultivation will be found useless when people will become rational enough to make use of my proposed fabrication of pliant stuff for all uses stated. In the meantime it may last for some years yet. Cotton cultivators, who apply my Satellite, shall be supplied by me, at their request, with a contrivance for cotton picking by the Satellite at the rate of 300 to 500 acres per day with the use of but *one* man.

REVIEW OF MY SYSTEM.

Now, for the experiments.

But, pray, what experiments would you like to see?—Is it the whole system, or only a part, and which part of it you would wish to have ascertained by experiments?—

I want to satisfy you with *experiments*. I am not like your school-masters, who serve you with assertions to be received on trust and authority. I acknowledge no other test or authority but that of your own knowledge and experience. Let us come then to a fair

understanding, and see what you want to have proved by experiments of my system. There may be some things in it, that you know and can see every day—such, of course, you would not want me to teach you by my experiments. Let us then sift these things known by you as old practices, from those that you do not know yet, in order to simplify the business of experiments, and extend it merely to the latter (unexperimented) parts of my system.

As my system begins with windmills, we have to take them first into consideration.

Well, do you doubt that wind will turn a windmill with some power?—

If you do, apply to me and I will show you some in practice these many years already. So this part is proved by *experiment*.

The next object may be the raising of water by windmills.

How to raise water with pumps or endless chains of buckets, &c. by turning a wheel or shaft, is in practice these many years already. If you think *that* something new, and to be tried yet by experiments, I can gratify you with experiments of it in plenty, on your application to me—other people have saved me the trouble making *experiments*.

The next thing is a reservoir holding water.

I can easily satisfy you with *experiments*, with dams confining water at canals, ponds, &c.

The reservoir of my system is to let its water run out and fall upon a water wheel, to turn it.

Do you want to see an *experiment* of this? Go to your next water-mill.

But probably these are not the parts of my system—neither the wind nor watermills, nor the raising, nor confining of water into a pond—which you doubt, and want to see the experiments of.—There are perhaps other parts of my system new and strange to you, which you cannot believe until you see the experiments of them. Let us see and review every other part, that nothing may escape to your scrutiny, in order to discover what requires yet to be ascertained by experiments.

If there be no mistake in my stationary powers—nothing what is to be ascertained first by experiments, but *is* ascertained—then we have to look to the locomotive machine, the Satellite, that novel thing, which has to perform so many wonderful things for you.

To move a carriage by turning its axletree with two wheels fixed at it, is nothing *new*—you may see it every day done at a steam wagon; the turning of its wheels is produced by a vibratory (to and fro) motion by means of a crank at a shaft turned by the steam engine's alternate pushes—the same is done at my Satellite by alternate pushes caused by alternate pulls of two ropes.

If you think the contrivance of steam wagons for turning the wheels better than mine, you are at liberty to choose them—you may also see at my model how my contrivance works.—But if you want to see *experiments* on that part, only look to steam wagons.

The moving ahead of my Satellite by alternate pushes is then proved by *experiments*.

If you want to have an *experiment* to ascertain how by a lever with a little strength a heavy wagon may be advanced—only take a long stout pole (or hand spike) apply one end to some of the upper spokes of one wheel, and near it against some point at the axletree, and at the long arm 10 or 20 times longer than the other of it pull with your hands; you will find, that it will turn the wheel, and advance the wagon, without deviating from the course in which the wagon is directed.

To learn by *experiment* the fact, that my Satellite can be steered, you need only to think of the case, when a driver has to turn his wagon out of a hole in the road—he will lift the hind part of the wagon, with a hand spike or other lever power applied properly, and shove it side ways—this is the same thing what at my Satellite is to be done to turn it from its course, only that the lever is always ready at its place and, by sticking against the ground, will lift without trouble the hind part of the Satellite, in its advance. You may make the same experiment at the hind axletree of a wagon.

So the practicability of the advance and steering of my Satellite is proved to you and me by other people's *experiments*, which we can witness every day.

What is it then, that you can discover, to be proved yet by experiments, at my Satellite?

Since its practicability as to its motion is proved by practice, it must be in its operations that we have to look for experiments to ascertain *them*.

First, you will notice its pricked cylinder. With all the strains of my brains I can nothing else discover, but that its weight will press the pricks into the ground and break its surface. I have seen the same operation with pricked cylinders rolled over land by horses, with some brushes fixed behind it, to clean the dirt from it, without that I have reason to suspect that the ploughboy who directed the machine, had learnt it from me. So you may have seen such things also. If not, *that* experiment will cost you very little, if you want it. Only take any log, hammer some pins into it, and a pin at the centre of each of its ends, put your horse before it and do the same thing as related. It may not be superfluous to notice to you that the pricked cylinder is not very apt to glide on the ground while its pricks are sticking in it and that it is revolving, and drag along with it any thing attached to it—unlike the wheels at steam-

wagons with smooth felloes on smooth roads. If you doubt *this* effect, only hammer some pins into the felloes of a wagon-wheel, turn it then, and see whether it will not make the wagon follow with a heavy load.

The next object presented to your sight at my Satellite is the ploughing. Do you require an experiment with your common ploughs?—Or you doubt, perhaps, the practicability of the row of ploughs fixed at the Diagonal leg, as shown in my Satellite?—If so, you are at liberty to hang your ploughs in any mode you please at the Satellite; they will be dragged along with it and draw furrows as well as when your horses drag them. So I hope you will consider this matter as settled *by experiments*.

Then I suggest pulverizing the soil by a comb with knives. Perhaps this is something new in practice. But you may compare it to a common rake, with which you crumble and pulverize your garden, after having digged it; my comb or rake is only a little longer, and cuts the clods a little better by its knives than the tines of a rake. But if you had rather use your common harrow, you may hang it at the Satellite, which will pull it as well as your horses can do, so my pulverizing operation is the same as your plough-boys know from their *experiments*.

We have to turn our attention then to the other operations of the Satellite, to find what experiments there are required.

The *sowing* and *mowing* are practised already by machines in various ways, consisting of a sort of carriages pulled by animals. You may consult those practices then, and choose any of them, you should find preferable to my contrivance. So you have also the practicability of the sowing and mowing by machines proved by *old experiments*.

But the *gathering* of crops by machines may not be found in practice, since on a few acres of land it may not be deemed very profitable to do that job by horses or other greater power, and to perform it on thousands of acres, would require greater farms than we can find.

My contrivance for it shows nothing but a common rake or broad pitchfork with a receptacle behind it for receiving the straw or grass, &c., while the Satellite is advancing. If you, while walking, shove before you a pitchfork and with its handle a board on the ground and under the swathes of a field of mowed grass or grain, you have the same *experiment* on a smaller scale—a row in front of several of such pitchforks and boards, is what the Satellite shows in one piece. Though you may not have seen large rakes drawn by horses for raking grass, &c., this *experiment* of your own, if you think it necessary, will prove to you the practicability of *gathering* crops by the Satellite by *experiments* without expenses.

The great business of the Satellite of making any excavation, elevation or applanation of the ground—reservoirs, wells, canals, ditches, &c.—is done either by a scoop or scraper, by an excavating plough, or by a transversal or diagonal log at the Satellite.

The use of the scoop or scraper I expect you will not want me to teach you by experiments of my own. You may see that every day in full practice, if you go to places where canals, &c., are made. First the ground is ploughed and then scraped or scooped by horses or oxen. Since you know, now, that ploughing or breaking the ground can be done by my Satellite, the scooping or scraping of the loose soil is in this case, as easy as in any other case of old practice, and a matter then of *old experiments*.

To shove loose crumpled soil off its place by a log is no great novelty to you either, since that is often practised, accidentally or designedly, with sledges drawn on soft ground, or snow in an oblique or transversal way; the ploughshare in turning the earth to the side of the furrow does the same thing.

But if you wish to see an experiment in exactly the same way as at the Satellite, just take a log, tie a rope at each of its ends, and pull it transversely or diagonally to its course, through loose crumbled soil, which will recede before it, and, if struck in an oblique direction, as it is with the diagonal log, it will be shoved to the side of the log.

The excavating plough to raise the loose crumbled soil two feet high to a bank close by it, is a thing of old practice. A shovel-plough, shoving the earth out of the furrow at both sides, will make already a ditch and raise the earth one foot or more.

So all the Satellite's operations of scooping, scraping, ditching, canaling, forming dams, roads, reservoirs, wells, are proved by *old experiments*.

I come now to the novelty of *sawing* on the spot of growth by the Satellite. Here let us first consult the common practice of one or two hands sawing with a cross cut saw. All they have to do is to direct their saw to the spot of the intended incision and shove it to and fro in a straight line.

I request the same thing in the sawing at the Satellite—only the hand needs not push or pull the saw, which is done by the machine's arm holding the saw—so while it saves the exertion of the human arm it may at every time give a long and strong pull of more effect than that of 10 or 20 men. You are at liberty, in this operation, to stick a two tined fork into the ground or the log at each end of the cut so as to hold the saw blade between the tines and keep its direction without further assistance of the hand.

My arched saw, for sawing into the ground with a pendulous

motion requires nothing else than what the other saw does ; only it has this advantage, that its cut may indefinitely be prolonged.

At every sawing operation, in one or the other case, you can make the Satellite, by its weight, and by pinning it (by hammering one or two pins into the ground through some parts of the Satellite) in any way to the ground, as firm as you please, as well as any part of its sawing contrivance, instantly.

So, in this *sawing* operation, I have nothing else to show but your own old practice of handling the saw, for *experiment*.

To raise a hammer and let it fall by a machine, is so common a thing as to be known to every person. Therefore, the hammer of the Satellite has no claim to novelty either, and its raising and falling is proved by *experiment*.

But to pull down trees is perhaps novel to you. Well, let us see : To raise a pole with one end, at which is tied a hook, to hook a tree, is nothing novel. But to pull powerfully enough at its chain to make the tree come down, may be something startling to some of you.—Did you never see how by a slow motion and a small power, even that of a few men, a great resistance was overcome, or a great weight, even that of several hundred tons, was raised ? A house or a large ship is sometimes raised up into the air suspended by a small power. Have you no idea of levers, and in what proportion its power may be increased ?—Am I to instruct you, perhaps, that lever power is increased in the inverse ratio of its motion ?—Suppose at the ends of the Satellite's pricked cylinder instead of 3 cogs, 30, and the balances for pushing against them so proportioned, that at each ropes' pull but one cog is moved—the motion of the Satellite will then be 10 times as slow, its power consequently increased (for its advance) 10 times, and, if 50 horses' power are applied, that power will then be equal to 500 horses' or 5000 men's. So you may increase that power as much as you please.

Or are you, perhaps, afraid the Satellite will not move, but give away on the ground ? Do you not see the many shovels or anchors at the pricked cylinder sticking in the ground as deep and broad as any ship's anchors ?—And to what power does not one ship's anchor resist ?

Or are you afraid the chain for pulling will tear ?—Well, you are at liberty to make it strong enough, or double, triple, &c., it. And if you are afraid of the price for that material, take any thin log, or pole, (say from 2 to 6 inches thick,) prolong it as far as required by tying others to it by rope-yarn or cords as sailors do, and substitute it to the chain. They will not tear asunder. If you do not know the strength of these materials, any informed individual can instruct you of it, or you can test it yourself by an experiment which costs you nothing but a little stick, for instance, $\frac{1}{4}$ to $\frac{1}{2}$ inch thick, which you

may hang up at one end and tie at the other as much weight, increasing it by little and little, as will tear the stick asunder. This operation of pulling down trees is then *proved* by *experiments* amply.

As I have now named every part and every operation of the Satellite and shown of it, that it has been in practice long ere this, and thus *proved* by *ample experiments*, where is then the novelty which I have yet to prove to you by *experiments*? It cannot be in that strange thing, which I call the Satellite—for, as you have now seen, every particle of it is old and in practice.—Nor can the novelty to be experimented be in those parts composing my stationary powers, as I have proved before.

Perhaps it is in the connecting means, between the stationary power and the Satellite. It is certainly most important to ascertain this part of my system. Let us then be most exact in the examination of these connecting means.

They consist in two different parts, viz. 2 ropes sweeping above the ground without touching it, while the Satellite is moving in the Orbit around its centre—and 2 chains of wires or poles lying on the ground in straight lines.—The one and the other are alternately pulled to and fro some feet (20 or more).

The said ropes are in their minimum but a few (50 to 100) feet and in their maximum 1000 feet long, and at proper intervals carried by light carts.

The wire chains are in their minimum 1000, and in their maximum 4000 feet long, and may lie on rollers or wheels at proper intervals to diminish friction.

Do you want to see now the proof by experiment, that, when the ropes are pulled at one end sufficiently, the other end will pull too?—Or, when one end of the chain on the ground is pulled sufficiently, the other end will pull too?—Or, when one end of the ropes is pulled above ground sufficiently and the other end be attached to some thing, the ropes can be tended and raised enough so that they do not touch the ground?

If you want to see the experiment, with ropes kept above ground while pulled at a distance of from 100 up to 1000 feet, go and look at canals and rivers where boats are towed by horses or men walking on the bank. At rivers the tow rope has often to be extended to several hundred up to 1000 feet, without being supported between the boat and the towing animals, on account of shallowness of the river near its bank or other impediments, and still the rope's end at the boat pulls as well as its other end on shore is pulled. My supporting carts are, therefore, not necessary, but only a facility, in imitation of the rope at flying bridges, where the one end of the rope is attached at a fixed point, the other at a ferry boat, and the rope between is supported by intermediate skiffs, to prevent its touching the

surface of the water, while sweeping over it ; its length is to be more than half the width of the river, consequently in some cases of much more than 1000 feet.

The one part of my connecting means, as to ropes, is then *proved by experiments*.

As to the other part of them, the chain lying on the ground, I can gratify you with experiments too, if you will take the trouble to go and look at any rail or other road, where wagons are pulled up hill by ropes or chains lying on the ground (on rollers too) to the distance of even more than mine (4000 feet). If you will not take this trouble, you may tie together a number of thin poles ($\frac{1}{2}$ to 1 inch thick) at their ends, until they form thus a chain of such a length as wanted by me, from 1000 to 4000 feet, and pull sufficiently at one end, and see whether the other end will not pull too if some thing is attached to it.

This second part of my connecting means is then proved by *experiments* too.

And thus the whole contrivance of my connecting means, has, after all, no novelty in it, but consists only of two old practices, viz. the pulling of ropes *above* ground 100 to 1000 feet long, and that of chains *on* the ground 1000 to 4000 feet long, *all proved by experiments*.

I have thus proved to you by *experiments* the practicability of

- windmills,
- raising water,
- confining water in reservoirs,
- watermills,
- advancing the Satellite by alternate pulls of ropes,
- steering the same,
- revolving and keeping clean the pricked cylinder,
- breaking the surface of the ground by the same,
- ploughing by the Satellite,
- pulverizing the soil by the same,
- sowing, mowing and gathering the crops by the same,
- scooping and scraping loose soil by the same,
- shoving loose soil out of its track or into deeper places in it,
- excavating small ditches and raising earth 1 or 2 feet high by a plough at the Satellite,
- sawing wood and stones above and within the ground, by the Satellite,
- hammering to batter rocks, and break loose earth, roots, &c.,
- pulling down trees and small roots and stones out of the ground,
- by a hook at the Satellite,
- transferring power to the Satellite by ropes above ground from a distance up to 1000 feet,

transferring power from stationary machines by chains of poles or wires on the ground up to a distance of 4000 feet.

This is all I pretend to do by my system.

I have then *proved* my system, to its full extent, by *experiments of many years*.

I have thus availed myself of your own knowledge and experience—so there can be no dispute about my proofs. I have shown in my whole system nothing else but what has been in practice these many years. So I have taken from the mind the freight of novelty, this bug-bear of lazy, stupid souls, who do not inquire nor reason, and mistake that for caution what is but apathy of mind. They are like a flock of sheep when they have to pass over a bridge—none of them will dare to advance, in spite of dogs and all the driver's exertions, until one is taken by the neck and pulled over it—then one after another will follow of themselves—they are all for seeing first the experiment—but will not reason.

After I have taken so much pains to avoid introducing to you any thing else but what is an old practice of yours—you are now at liberty to say, that I have invented nothing new, and that any one of you might have done the same thing. So any kitchen woman might have said at the introduction of steam engines: "See the cunning men; they have availed themselves of my old experience—I knew long before that my pot if tightly closed would burst, though of iron, by the force of steam from boiling water in it. Now, they have but made a somewhat larger pot, with some valves, pipes, pistons, shafts, wheels, cranks, screws, &c.—all things which I have seen and known before as well as they."

Yet though some people, with some attention to what I have stated before, should discover at last, that all things I have expressed, are feasible by means that are in practice—they may now say: "Oh, granted, that these things are feasible, your system may cost perhaps much more, and effect much less, than you have calculated, and then after all be of no profit."—My answer can only be then: Examine my calculations, derived from facts of your own experience, and see whether and where I be mistaken.—"Oh, I care not a fig for your calculations"—may be then their reply.—Indeed, if you care not for my calculations, then I am at a loss to know how to communicate and to prove to you any thing at all. What would you think of a fellow, who should buy of you 100 bushels of corn, or 100 yards of stuff, each at the rate of one dollar, and, on making out your bill to him of 100 dollars, the fellow would serve you with the same answer: "Oh I care not for your calculation—I am all for practice—I shall pay you one dollar as often as you give me one bushel of corn, or one yard of stuff." I have to notice to you, if you did not perceive it yourself yet, my case is exactly parallel to that case.

I have given to you for my calculations all the simple facts that are in your power to ascertain as exactly as you please, without expense. The measure of wind and water power for 1 horse's power in square and cubic feet respectively—the measure of 1 horse's power for ploughing and other agricultural works—thence the power required for the purposes stated and the quantity of power required for hours, days and months—thence the number of windmills, the size of the reservoir, of the water-wheel, of the machinery to be used—thence the strength and weight and expenses of the materials to be applied—the track of the Satellite's operations, its march for hours and days in rods and miles—and the resulting amount in acres per hour, days and years—thence, at last, the expenses and profits according to usual experience.—All these simple facts of your own experience you may find either correct, or below, or above my statements—you may ascertain every one, on which I have based any of my calculations—every one of them requires but the steelyard, or the yard-stick, or the mere looking at some of the every day's practices pointed out by me. All these calculations require no more than simple addition, subtraction, multiplication and division, which every school-boy learns.—So it is in your power, if you can read and cypher at all, and understand the meaning of the most common words of your mother language, to ascertain any and every one of my calculations as well as in any of your common dealings. When you have ascertained the time for one rod or one acre of a certain operation of my Satellite, cannot you calculate thence as well as I, how much time in hours, days, &c., it will take for so many more rods and acres?—Suppose you would like to know how much time it would require with the Satellite to clear 100 acres, or any other number: examine on the densest spot of your woods how many trees there are on one square rod, or one acre—how many cuts every tree in an average would require to be removed in convenient pieces—how much time it will take for sawing each cut by hands, when laying on the ground—how much less time a cut may require when having as much power for it as desired—could you then not compare the facts, thus ascertained by you, with mine?—If, then, your facts turn out to be below or above those stated by me, and how much this difference may amount to, could you not then rectify accordingly my calculations? They may, in some circumstances and localities be more, and in others less, favourable, as I have mentioned in its place.

When you will have made yourself acquainted with all the things stated, you will not be astonished at the necessary consequences of my calculations. Silly people are astounded to hear, that a steam wagon can travel 1000 miles in 24 hours, while they would not think it a very difficult matter to move it 1 mile in $1\frac{1}{2}$ minute, or 40

miles in 1 hour. So they will likewise find it utterly strange that a thing not much wider than one rod should plough 200 acres in a day with one man only for its guide—they will find it still stranger that the same thing should perform the ploughing of 100 times 200 acres, or 20,000 acres, in 100 days—but they would find it not very wonderful to move a thing 4 miles in one hour under the guidance of one man. The reason of this silly inconsistency is, they do not calculate.

CONCLUSION.

I HAVE now finished my proofs of my mechanical system—I have shown the abundance of inanimate powers that may be had freely, their change into constant ones for ever, for any place, to any amount—I have shown the tools for these powers to multiply and prepare the very substances of life—the many thousand millions acres of uncultivated lands of the best soil and climates, enough for the wants of 1000 times the human population on earth—I have proved all this from the well ascertained knowledge of the age, from the most common practices of every day—I have in the last Review taken pains to show that I have invented no new things, but only combined a few old ones—I have taunted, at every item of my proofs, the world to show any error or deficiency of my proofs, of my simple facts and mathematical deductions therefrom—I have applied to society at large, and to the government of the United States since 7 years, to examine my propositions.—I have begged every association, that professes any purpose for the good of mankind, or for any portion thereof or for their own selves, to examine what I proposed and offered in my “Paradise.”—I have called there upon every individual that claims the rank of man, to examine what I proposed and offered.—I have shown the contrast between the condition of man such as it is, and such as it can be made by my means,—I have pointed out the true and undeniable sources of the evils of man, especially in civilization, such as it is—the first causes, want and fear of want, of all the evils in society, that generate all the conflicts between man and man, the injustices and retaliations—the universal poverty of possessing less than desired, where none is rich enough to desire not more or think his wants secured.—Thence the universal scramble to appropriate to one’s self the produces of other men’s labours, and to escape to the necessity of doing the disagreeable labours one’s self. My system proves how this miserable scramble and universal poverty and sufferings may be made to cease for ever.

What a stuff to the bitterest men hater and satyrist for his utmost

hearts' delight, and to the lover of men, for his deepest grief, when they see after this the futile efforts and vain boasts of the councils of nations, of the leaders and teachers of society, of the voluntary associations, or of any individual, of high professions of any benevolent or scientific purpose for relief and improvements, in the midst of the chaotic conflicts of individuals, resulting from poverty or the fear of it,—when they see devising one petty scheme after another, to benefit some individuals to the injury of others—how they compliment each other of their profound wisdom, enlightened humanity, and the rapid progress of the age—or reproach and recriminate each other with folly and dishonesty?—while they pay no attention to the undeniable things here exposed to their face, which would make an end for ever of all these evils of poverty in the simplest infallible manner!

I have sought, and am seeking men to examine exactly my propositions, that they may be enabled to judge on them, and make such use of them as they see fit.

To whom shall I then apply?—

Whoever will show to me, in the wide range of the civilized world, any government, or any institution, willing to examine, and to take interest in, my system, for the benefit of themselves and of society at large, is requested to do so, and may stipulate for his own benefit as large a share in the reward he hopes from it, as he pleases, I shall be liberal enough to him, and if he desires, I shall enter with him into any compact tending to good purposes.

Whoever means to avail himself of my system merely for his individual profit, is welcome to do it. In applying to me for any agreement on terms analogous to the rate of 10 per cent. of the nett profit accruing hereafter from the application of my inventions, I shall be as liberal as any person could wish, that has not the will to exclude me entirely from *all* benefits of my inventions and sacrifices made for this great purpose. Models, or the machines themselves of any scale, for any purpose stated in this book may be had on application to me or my agents. I shall do my best to satisfy applicants.

But in whatever way or in whatever part of the world this system will come into practice, the consequences will ultimately be the same.

I shall use the means coming into my power to accelerate these consequences in the best mode I can think of.

Can any man in his sound sense conceive the possibility, that the practice of this system, to produce and prepare the stuffs of life for many thousands by 3 or 4 men and a comparative trifle of capital will stop at the mere pecuniary gain of some speculators?—Can any person, capable of connecting logically two ideas together, expect the businesses of life, the state of society, of the individual man and of things will remain the same as now among the mass of people, who

see the practice and consequences of this system, and how all, even the poorest of them, can reap the benefit of it for ever, that will supply him and his family and friends, at least, with all the natural wants and free all from odious toil and sufferings of poverty?—Is it possible, that the confined views and ignorance, of the mass of all nations will remain the same as now, when leisure and means and new chances for information on all general subjects are afforded to all, not the mere information of *letters*, but of *things*, they can see and handle and hear themselves? When they have once tasted a better happiness, seen a larger horizon of the world with its things for human life. Whatever once is known cannot be made unknown to the world.

If any body will look beyond his little individual concerns to the concerns of the mass of the people and of the age, he will easily foresee now the next consequences of my system.

Our age wears features different from those of past ages. It is not the fanaticism of superstition that now absorbs the minds and feelings of the leading classes of the leading nations, as it was in former ages, though the mummary of it may have some influence yet in remote parts and on the low ignorant rabble. The mass of the civilized nations turn their minds now more to the earthly improvements of life? It is no longer the broils and wars of nations that engage the attention and desires of the great mass, nor of the heads of their governments. They have learned by long experience, that wars destroy, but never create—that even the most successful conqueror has to pay more for his conquests than they will benefit him. The mass of the people are no more so stupid machines as to be used like dogs of a hunter, to be slaughtered for sport and glory of a few individuals—they do no longer expect fortune in war. They know they never gain any thing by it, but have to risk and lose every thing, life, limb and property. But there is a revolutionary spirit fomenting from one extremity to the other throughout all civilized nations. They all want a change for the better of the state of things and men. Civil wars and revolutions are on the eve and have been breaking out from time to time. They are dreaded—the man of property fears the plunder. This is the sole cause that checks them yet. The mass of nations seek now their salvation in the mere change of governments and of men for their leaders. The machines in some branches of human labours, begin to deprive some labouring classes of the miserable pittance of sustenance.—*Revolution* is the watchword. The people are like the wild animal, that is caged or tied to a stake by a string. It will run madly all around, again and again, mistaking its liberty to move to the right and left for the liberty to escape—ever and anon seeing before its eyes no escape, and hoping to find it at one or other side, forgetting again and again,

that it tried its escape already at every point all around its cage or stake. Of what avail is any social reform, when the desires for the requisites of happiness of the individual must remain unsatisfied; when the contentment of poverty is demanded as a virtue or a necessity, while the rich neighbours tantalize the poor—when wealth is considered as the highest good, and denied to the mass—when the rich deem labour a suffering and a disgrace, and claim it from others—when in all forms of society devised, the labours and services of men for others are deemed unavoidably necessary, while every member of the society wants more of them from others than he is willing or able to do himself. What is all the claimed or boasted liberty and equality of political rights, when every one, with the exception of perhaps a few very rich individuals, must buy (more or less) his wants of life by his servility and labours, and be glad for the chance of it, when he must remain for ever very limited in the possession of means for his desired and desirable enjoyments?

Let my system be known to those poor struggling masses, who seek amelioration of their condition in some change of mere governmental or social forms and leaders—and what will become of their revolutionary ideas and desires?

It is for you, you leaders, real or imaginary ones, of revolutions, to think of that now—and you will see a much more glorious field for your activity before you, than any sterile change of governments and social forms.

It is peace, wealth, happiness, not at the expense of your fellow creatures, but by creative means applied to the, as yet, unused rich resources of nature, you have to look for, and which is here plainly before you.

Study, for once, the *creative* means within your reach, they only will, and can, be the glory of a more intelligent age. Your present *destructive* means, that hitherto have absorbed the mind, will soon cease to be effective, and the heroes of mere destruction will obtain that rank of mankind which is due to them, the rank of mere barbarous brutes—100 intelligent men will defeat all the glories and heroisms of mere sanguinary military chieftains—and do more than armies of millions, whose soft flesh and bones cannot resist to a few small unfeeling machines driven by some of those gigantic powers of nature, (pointed out in my “Paradise,”) on land or on sea, and renders all bloody heroism abortive, and wars impossible.

Do you not see these means yet, and will you ask them of me too?—

Show me first a *rational* society, worthy of them, and I can accommodate you with them too.

What do I mean by *rational* society? Why, simply this:

The first society that will be something like *rational*, will cer-

tainly not employ *one thousand* men for what can be done by *one* man. Therefore, *one* Satellite with four men will keep the land in the highest state of improvement, including transport and houses, for a population of 100,000 individuals. *One* foundry will supply all the hard parts of machineries and utensils, with three or four men.—*One* small establishment will supply the same population with all pliable stuffs wanted for all purposes of that kind. There will be no spinning, weaving, sewing, or any other of the tedious processes now in use, but all the articles of pliable stuff, for whatever purpose, made like paper now is made, only with other ingredients and some additional operations. For each article of hard or of pliable stuff is but one type required for a whole country.

These three different simple means will then be the only ones for supplying man with all his physical wants, requiring about 10 men's attendance for the wants of 100,000 men. The business of life will then consist in social, moral and intellectual pursuits, in the enjoyments for which life is made, and as my "Paradise" indicates.

It is then that this *rational* society will make the most rational use of all the fine and coarse things that now exist, and which occupy and absorb the activity of man. They will then carefully collect them, at least one piece of each kind, and place them conspicuously in their museum for instruction to their children. "Look here, dear children," they will say then, "these are the produces of our ancestors; who thought themselves very enlightened."—See what pains they took to acquire so much skill as to make them, and then what use they made of these produces.—See here a coat of many cornered patches, sewed together in a particular manner; you may count many days before you can finish the counting of all the stitches, there are some hundred thousand stitches at this little coat—it is made of many thousand fine threads, and protects neither against wet, nor heat, and very poorly against cold; it soaks, rather, the water in—they wore it only for show—and most people were eager to possess several of such coats, of different colours and make, for different occasions, and thought themselves only then to be decent people.—See here the other pieces of similar construction for one suit of dress.—See there a little golden chain and watch, to show the time of day, nearly, of which they made a very unprofitable use. This trinket would cost as much as the work of a whole year of one labourer, working every day 12 hours or more, to get enough to eat and sustain life against the inclemencies of weather.—See here a string of pearls; they would cost as much, or more again, though there is no use, nor art, nor work whatever at them; but you have to know, little children, your ancestors could not procure them, except in a very small quantity, and with much risk of life of divers, who fetched them from the bottom of the deep sea. Though glass

pearls would do the same service, and could be had for a very small trifle; yet your ancestors thought themselves too intelligent to give the preference to what they called worthless things.—See here other trinkets for show or ornament of gold, silver and jewels. As much of them as you can hold in one of your little hands would have made the fortune for life of any of the many millions of poor people, and liberated him from compulsive labour and made him respected—they were of no use whatever, but your ancestors, who thought they understood the value of things well, would give as much for them as would feed and clothe, and shelter a family for 50 years and longer. They would give their houses, lands, produces, and many years' labour, any thing dear to them, even their children and wives, to obtain a handful of these precious useless trinkets. You have to know, that these precious trifles could only be found deep in the earth and in small quantities; therefore, they required very much labour and patience to find them. Glass, or any other yellow or white glistening little thing, that could be had for almost nothing, might have done quite as well for the purpose. But your ancestors scorned them, for they thought themselves very wise. And because they thought themselves wise, they killed those people, who inhabited such countries, where these little glistening things could be found, in order to rob them, and compelled many thousand other people to dig deep holes into the earth, to find more of those valued things, not minding much what grew on the surface of those lands, which could make so many millions of human beings happy.—Look here, the long knives and guns, with which they used to kill each other, because they thought that very glorious.—Look there, some pieces to put some of their little things on or into them. Here is a table of wood with boxes, composed of rare and therefore highly valued stuffs, and joined together with much art and labour—it would cost as much as a house for a family. There is a box of many little boxes, similarly made, and equally valuable, to put their little things in it.—See here are many other things of similar make, use and value.—The owner of such things would pride in the possession of them very much, and feel himself very unhappy, if he had to do without them, because they would cost the labour of many men for years, though tables, chairs, boxes of cheap wood and make, that would hardly cost one day's labour of one man, would answer quite as well the use. See here a model of a big house, with 50 rooms, large enough to hold 100 people or more. It would cost the value of 1000 men's labour for one year, or the labour of one man for 1000 years. It was owned by but one man, who would now and then use it with a number of his servants, men and women. Its value in labour would have been enough to feed, clothe and shelter 500 men for life, though the house would in our days not be good enough for storing our lumber.

Although their houses cost them such immense labour, they were built chiefly of wood and other combustible materials, and many thousands of them close together, which they called cities, inhabited promiscuously by all classes of people in tens of thousands—they were in consequence subject to frequent conflagrations, caused by the least inadvertency in the use of fire, or intentionally for stealing or from revenge, destroying the houses by hundreds and thousands, together with all the moveable wealth they used to store in them, and which they appreciated so dearly, even more dearly than their own lives.—See here a model of their best ships. Such a vast hollow building, with such a thin wooden wall, was nearly as breakable as a bottle of glass. Even a little hole would sink it. It carried, as you see, long poles, with many patches of expanded sails, held by many ropes. It took a long time for many men to climb upon these things, and adjust so many patches, with much danger of life. So, sometimes, when high winds shifted or rose suddenly, they would capsize the ship, or tear poles and sails to pieces, before the men could take them in. These frail things would be sunk at any touch upon some hard thing under water, and the men be drowned; for they did not think even of providing themselves with boats incapable to sink, for saving their lives. From bad food and putrid water in the ship's hold they engendered pestilential diseases, and spread them over the land at their arrivals.—See here some of their books, used every seventh day in their meetings, held for the purpose of being told that they were a very sinful and foolish people, and that they ought to be good and wise—but when they were offered the means for enabling them to become better, wiser and happier, they would scorn and ridicule them as impossible things without investigation, believing what their teachers used to tell them, that the world was made to be wretched.—They laboured from morning to night, from day to day, from year to year, through life, to make such trifles as you see here, in order to buy with the money of their sales other trifles from other people. They spent all their skill to produce their trinkets and things of little or no utility, but have left to us no indication, whatever, of any ingenuity or endeavour to produce the things that make human life happy.—See here their poor tools, which they took into their hands to use the strength of their feeble arms for cutting their trees and stones, for digging and ploughing their lands, and reaping and preparing their crops—the axe, the hand-saw, the spade, the plough, the sickle, and others—it took, therefore, a man's lifetime to do the work of necessity and utility for a family's meanest sustenance and comfort. It required ten labourers and servants for one man to live, what they called decently, and 100 to be respected by all classes of the people. One man would have a number of cooks, waiters, grooms, and other servants, besides the makers of their dress,

harness, carriages, tables, seats, boxes, and an innumerable host of other working people, occasionally employed for him. They would with all this live a very uncomfortable, unhealthy life, shortened by disease and mental excitements, in consequence of bad food and drink, and lodging and dress, and sufferings and vexations, from envy, fraud, and offences of their friends and servants. You behold here, little children, all the variety of things, of which you see no more use, nor we either, than that of pebbles and straw, for which our ancestors toiled or fought through life, and which they valued above all things.—It was for such poor objects that one nation plundered another, that they destroyed reciprocally their lives, their produces, their houses, their cities, which had cost them so much labour. It was for these glistening little bits of yellow and white metals and pebbles, that they underwent the most perilous sea voyages in their miserable frail vessels, to plunder distant parts of the globe of them, and when they found them, killed millions of the native inhabitants, and made other millions slaves, to work in these new discovered countries for such trinkets. These are the things they called wealth and luxury, for the acquisition of which they preyed upon each other in peace and in war—they had many laws and prisons, and all manner of frightful punishments for poor robbers, while they worshipped, as great men, those who robbed and killed the people by thousands. Every one's business through life was to buy as cheap as possible, and to sell as dear as possible—which they called an honest way of living, while none cared for the sufferings of his neighbours; for every one, or every family, lived separately, and watched what little they possessed with as much anxiety and excitement as a dog will watch a piece of meat in his paws when other dogs approach—for none had enough for himself.—Their jealousy and distrust to each other would not allow them any union of many individuals, except in the works of destruction and revenge in wars, when they compelled each other to fight for their own defence, or could make up money enough to pay hired robbers and men killers. They could not conceive how any great thing for the good of all members of society could be effected; and lived separately, each family or individual, like helpless savage animals, while the beautiful half of the globe was but an uncultivated wilderness, capable of producing the wants of 1000 times the population on earth.

What would you say to all this?—Is it, perhaps, an exaggeration or fiction?—Or is there not rather a plain reality in it, which, to dispute, will baffle all sophistry?

Do not grieve then at seeing the means of my “Paradise” and this present book, make of this old foolish, miserable world a much happier NEW WORLD.

ADVICE TO CRITICS.

YE, who have assumed the high function of enlightening the public on all subjects, this matter ought to be a glorious chance for you to exercise your learning and talents to some great good purpose, and justify the confidence reposed generally by the public in your judgment and candour.—Your honour is at present at stake; therefore I would friendly advise you, to examine first carefully before you venture to give your judgment on the subject. For your name and true character, good or bad, will thereby become known to the intelligent portion of the present generation and to posterity hereafter. If your object is your own honour, and the good of mankind as far as it be in your power, I need not tell you what course you have to pursue in any of your critics on this subject—a most careful examination of this mathematical subject and a candid acknowledgment of the result is all which is required—the same as any geometrical demonstration would require, pointing out distinctly the points of it that be not conclusive, or assenting to those which are demonstrated—it is but ignorance and very obtuse intellect that applies any vague opinion to a mathematical demonstration, and confounds science with mere indefinite opinion. But if your object is only the momentary gratification of gaining the applause or mere laugh of an unreasoning, uninquiring, and therefore easily to be duped multitude, you have a very easy task. You may attain this object in various ways, without deviating in the least from established custom, viz :

First, criticise only the style—take here and there some phrases you think fit for the purpose, and measure them by your erudition, dissecting them in the most cutting manner you can think of, and fulfil thus your high vocation as a man of letters. I hope, for your own pleasure and that of your readers, who may delight in it, that those persons, who have the care of printing this book, will not deprive you of that gratification by correcting my style. For I have been very careless of it. My object was to be plain and intelligible to every one, who desires to understand me—as to the others, I have neither the good will nor the talent to make myself understood by them.—I think, if somebody should receive, as a present, a bag full of gold, he would care very little for the colour and texture of the bag, and not be over scrupulous with examining the quality of the bag, but turn his attention rather to the substance contained in it. So I cared but for the substance of my book, to make its true value plainly understood by the reader, and I defy any critic to prove *that* to be false.

Besides the *style* you may easily venture any judgment you please on the *substance* of the book, without putting yourself to the trouble to examine, and consequently without understanding any thing of it. For instance, express your doubts on the practicability of the system, by some general unmeaning phrase, a proverb, &c. Say, for instance, that many a theory, more plausible than this, proved to be false in practice—that perhaps something might be found useful in it, but that you could hardly believe the possibility of cultivating 20,000 acres by four men with one machine, and one dollar capital per acre—that you are rather afraid the author has made some miscalculation, and would find it rather difficult to apply his or any other machine to clear woods and cultivate broken, rocky ground—that the reservoirs, dams, &c., he speaks of, might cost more than the supposed advantages of the machines, &c., &c.

Such insinuations look like modesty and prudence, and becoming to a thoughtful gentleman, and are suitable to all events.—For if the thing succeeds well, you will be found to have been in the right to doubt a little—and if not, or any little difficulty, supposed or real, should occur in the attempt for practice, your cautious judgment will be deemed fully justified—and, in all cases whatever, your sagacity and foresight will be admired, instead of suspecting you for a dull, lazy, uninquiring blockhead.

To be more decisive in your judgment, you may indulge in the pleasure to take out of the book, here and there, a phrase, that expresses some great results of preceding demonstrations, as specimens suitable to the most malicious sneers that your heart can be capable of.—Say, for instance: “Only look, my enlightened readers, to novelties like this of a most presumptuous fool: he pretends to know more than all the wise people that ever lived, and to teach to old farmers how to clear their lands by wind—to plough 20,000 acres by wind or water-wheels, and three or four men only—and to do such and such other marvellous things.—Such statements wear on their face the stamp of the most ridiculous absurdity—and I will not offend my intelligent readers with saying more on the subject, and dismiss it as a product unworthy of further notice.” Or, in following the hint I have given, say: “The author himself allows that he has invented nothing new, but he gives a few most exaggerated calculations, not worth mentioning, to prove, that you and your horses may now eat and drink and be merry or sleep, and work no longer, since wind and water alone will do all your business, change your woods into gardens, and make them produce the richest harvests, put them into your garners, and make the whole world a paradise.—We declare that this vision beats all the visions we ever heard of—but such trash will not do for our enlightened community—

the people are too enlightened to be humbugged by buying such books." You need not fear any bad consequences.

Suppose the truth should come to light at last, and your false colour be discovered by seeing the machines in practice. Suppose, even, some better-informed people should hereafter find in your critic nothing but a common every day's silly blackguardism. What could it matter to you?—You stick to the majority—and if the majority hereafter should change their notion on the subject and find the invention after all a very useful thing—well, what then?—you change then, too, with the majority, and extol the foolish thing to the sky.—Do not be scrupulous about contradiction. You may say, then, for instance, as others have used to say in similar cases: "We did not understand rightly the author; he did not speak plainly enough; we understood he meant so and so—it was altogether his fault—we meant no harm, and are not given to the study of such things."—In siding with the majority you can never do any thing amiss.—Nay, you may be chosen still hereafter for some director of some Dominions of my system, as a person eminently qualified for such business, and reap more benefit from my inventions than ever I shall do.—To encourage you, if you should feel too faint-hearted for committing such blunders or dishonesty in your critics on this subject, I will cite a fair precedent for you of that kind. It is stated, that *Walter Scott*, that great man, who wrote such pretty stories, was at London when the gas light was spoken of. *Walter Scott*, on his return to Edinburgh, being in company of some very intelligent gentlemen lawyers, and of other learned professions, told the novelty of pretending to lighten London by coal smoke. He, and the intelligent company, broke out into a hearty laughter at this piece of novelty. "Gentlemen," *Walter Scott* observed, "I must confess such fools as this man with his coal-smoke light, are worse than other fools—they are the most stubborn fools, and cannot be dissuaded in any manner from their monomania." Some twenty years thereafter *Walter Scott* was chosen by the Edinburgh gas light company for their director.

The intelligent laughs at Robert Fulton's steamboats give you another example of this kind.

Now, I assure you, that I give you these pieces of advice from the purest sincerity of my heart, and shall not be displeased with whatever course you will choose to follow.

For, in the first case, where you have to examine exactly the subject before you judge and be candid—I shall conceive you pursue what is right and honourable, and I am sure you will but be respected for it, now, and hereafter, by every friend to humanity, justice and science, and I shall be your friend too.

In the other cases, where you follow but the dictates of vulgarity and ignorance, coupled with dishonesty, I shall be also pleased with it—for in that case I shall *not* be your friend, nor conceive any respect due to you; and, then, the more disgrace you heap upon yourself, the better I shall be pleased.

☞ For further communication on the subject of this book, please to apply by letters, *postage paid*, to

J. A. ETZLER,

Philadelphia.

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