For example, with the ¼ inch objective and A eye piece of Power and Leland, I find the field of such a single layer of blood as that above described shows 3,000 red disks, and that in ten fields displays about 100 white globules. Dividing now 100 (the number of the leucocytes) into 30,000 (the number of red disks in ten fields, each ½ a mm. wide), I obtain the fraction $\frac{100}{30000}$, or reduced to its lowest terms $\frac{1}{300}$, as the proportion which the white bear to the red corpuscles.

In doubtful instances the leucocytes may be distinguished from the red disks by turning the fine adjustment so as to raise the lens a little, when the white corpuscles usually display a peculiar fatty luster. Care must be taken to avoid mistaking unusually large aggregations of the fatty (?) molecules of the blood for leucocytes.

Having thus obtained the true ratio of the white globules to the red, it becomes an easy matter to calculate the actual number of the leucocytes in each cubic millimeter of blood, after we have determined by the aid of Hématimètre, of Hayen and Nachet, or of Malassey, the number of the red corpuscles in that quantity of the circulating fluid.

Dr. Richardson gives 5,000,000 as the average number of red disks to the cubic millimeter in the blood of a healthy subject.

PRESERVATIVE FLUIDS FOR MICROSCOPIC SPECIMENS.—The following formulæ are by F. Meyer:

(*a.*) For larvæ, hydræ, and nematodæ: Glycerin, chemically pure at 124, 1 part; distilled water, 2 parts. To ten parts of this mixture add one part of the following solution: Pyroligneous acid at 1040, 100 parts; salicylic acid, 1 part.

(*b.*) For infusoria: Glycerin, 1 part; distilled water, 4 parts. To ten parts of this add one part of the above solution of salicylic acid.

(*c.*) For algæ: Glycerin, 1 part; solution salicylic acid, 1 part; distilled water, 20 parts.

TROY SCIENTIFIC ASSOCIATION.—The annual soirée of the Microscopical Section was held on the 4th inst., at the house of Dr. R. H. Ward. The plan adopted was most excellent. Fifty-eight objects were shown by eleven gentlemen, each of whom exhibited specialties in some particular field of microscopy. Twenty-nine microscopes were employed. Those arranging similar soirées would do well to obtain a copy of the printed programme from Dr. R. H. Ward, of Troy, by which they will notice the general arrangements.

Communications.

Locomotive Strokes.

To the Editor of the Scientific American:

In the SCIENTIFIC AMERICAN of March 9, 1878, it is suggested by Mr. F. G. Woodward that our locomotives might be made more efficient and serviceable for freight work by giving them just one half of their present piston area and doubling the length of their stroke. I cannot agree with Mr. Woodward that there is any gain whatever. From my standpoint I will say that the proposed change has no practical or theoretical advantage.

For example, let us take two locomotives of the same weight, boiler capacity, and tractile force, one, as at present constructed, with a 12 inch crank and cylinders of 16 inches diameter by 24 inches stroke; the other (as proposed) with a 24 inch crank and cylinders of 8 inches diameter by 48 inches stroke.

As the cylinder is where the power is applied, we must commence there. The area of our 16x24 inch cylinder, we find, is 201·0624 inches, and it has a cubic capacity of 4,825·4976 inches contents of one cylinder, while we have another on the other side of the same dimensions. To ascertain the full area and cubic contents, we simply multiply by 2, which gives us 402·1248 inches area, and 9,650·9952 cubic inches. Let us pursue the same course with Mr. Woodward's proposed cylinder, one half of the above diameter and twice the stroke. We have a cylinder of 8 inches in diameter and 48 inches stroke, of an area of 50·2656 inches and 2,412·7488 cubic inches. Both cylinders represent an area of 100·5312 inches and 4,825·4976 cubic inches. The difference found in total areas in favor of the standard engine is as 4 to 1, while the cubic capacity is just 4 times that of Mr. Woodward's plan.

Suppose we use a little steam in our 16x24 inch cylinder, at a pressure of 125 lbs. per square inch, and cut off at 8 inches. We have 1,608·4992 cubic inches of steam to expand into 16 inches before exhausted in one cylinder, and twice that in both cylinders, namely, 3,216·9984 cubic inches. The same with Mr. Woodward's plan would represent 402·1248 cubic inches in one cylinder and 804·2496 cubic inches in both cylinders, with 40 inches to expand before exhaustion.

We find the ratio of expansion in the former to be 1 to 2, the latter 1 to 5, provided there is nothing lost by condensing in either case; in other words, our cubic inch of steam would be exhausted at one half of its pressure in the former and one fifth in the latter case, assuming that there is none consumed to overcome the friction in either cylinder.

The suggestion presents itself to me in the following light: We have a 16x24 inch cylinder with 1,608·4992 cubic inches of steam exerting its force on 201·0624 inches area of surface (cut off at 8 inches), and forcing that surface through a space of 16 inches and exhausting itself in the air at one half of its pressure; on the other hand, we have 402·1248 cubic inches of steam exerting its force on 50·2656 inches area of surface (cut off at 8 inches), and forcing that surface through a space of 40 inches, exhausting into the air at one fifth its pressure. This result presents itself: The more inches of area there are, and the less space to travel through, the greater the power; while the less area and greater distance to travel, the less power we have. The difference in favor of the 16x24 cylinder will be readily seen by the following:

16"x24" cylinder	*versus*	8"x48" cylinder.
201·0624 area	"	50·2656 area.
1,608·4992 cubic in. (cut off at 8"),		402·1248 cubic in.

Or four times the power in favor of 16"x24", with the 12 inch crank. Assuming that Mr. Woodward would gain twice the power on the crank, we have yet twice the power in favor of the present locomotive.

JOHN A. HOLMES.

East Buffalo, N. Y., March 8, 1878.

The Prevention of Explosions in Mines.—An Invention Needed.

To the Editor of the Scientific American:

Permit me through the columns of your journal to call the attention of inventors in general to a matter of vital importance to thousands of our laborers, and which will amply reward the successful inventor who turns his attention thereto. I refer to the discovery of some method or plan by which the explosions of inflammable gases in coal mines may be prevented. Accidents, nearly always fatal, are of almost daily occurrence in the anthracite coal regions of Pennsylvania, and aside from the loss of life and mutilation of the miners, the damage done to the property of the mine owners is almost beyond computation. The inventor who succeeds in effectually preventing these disastrous explosions will not only prove a public benefactor, but the fruits of his invention will enrich him to an extent greater than the profits of any average business could reward him for a lifetime of labor. To those who will turn their attention toward this matter I would say that the most perfect system of ventilation alone will not effect the object sought, and most mines are so constructed that it is next to impossible to force more pure air into them than is barely necessary for the support of the miners' existence. The proper ventilation of mines is provided for by law in this State, and nearly all mine owners comply with the law to the extent of their ability; but there are natural obstructions to thorough ventilation. In such cases the miners are compelled to work in the gas, using the safety lamp, which in many cases has unfortunately proved to be a safety lamp in name only. Old practical miners, men who have spent their whole lifetime in the mines, assert that the most destructive explosions always occur in dry mines, while wet workings are to a great extent free from such dangers. They explain this by saying that in all dry workings the atmosphere is charged with finely powdered coal dust, which alone is dangerous, but when mixed with the explosive gases forms a matter tenfold more dangerous in case the gas is fired. I quote below Section 7 of the mine ventilation law for the guidance of those who may wish to pursue the investigation of this subject:

"SECTION 7. The owners or agents of every coal mine or colliery shall provide and establish for every such coal mine or colliery an adequate amount of ventilation, and not less than fifty-five cubic feet per second of pure air, or thirty-three hundred cubic feet per minute, for every fifty men at work in such mine, and as much more as circumstances may require, which shall be circulated through to the face of each and every working place throughout the entire mine, to dilute and render harmless and expel therefrom the noxious, poisonous gases to such an extent that the entire mine shall be in a fit state for men to work therein, and be free from danger to the health and lives of the men by reason of said noxious and poisonous gases, and all workings shall be kept clear of standing gas. The ventilation may be produced by using blowing engines, air pumps, forcing or suction fans, of sufficient capacity and power, or other suitable appliances, so as to produce and insure constantly an abundant supply of fresh air throughout the entire mine, but in no case shall a furnace be used in the mine, where the coal breaker and chute buildings are built directly over and covering the top of the shaft, for the purpose of producing a hot up-cast of air; and there shall be an in-take air way, of not less than twenty square feet area, and the return air way shall not be less than twenty-five square feet."

Now it has always been considered impossible to free a mine entirely of explosive gas by trying to expel the gas with the force of a current of pure air, and yet we have never heard of any plan of preventing danger and explosions excepting the ventilation method. In some mines (a very few) it works well enough to answer all practical purposes, but in a large majority of cases, and in all large mines, it fails to be effectual simply because as the mine is worked gas is being constantly freed, and miners are liable at any time to strike a "feeder" or current of gas which the air is powerless to expel. It may be that some one of our inventors will devise a plan of ventilation that will prove more perfect than those now in use, but the chances are that no such system will ever prove a perfect safeguard against explosions. What is needed and what we think is the key to the whole subject is the discovery and application of some neutralizer which will destroy the explosive nature of the gases. To dilute the gases with air and allow them to become impregnated with the atoms of coal floating in the mine atmosphere renders the gases more dangerous than when in a pure state, and the knowledge that the gases are diluted renders ignorant miners much more careless at a time when they are in imminent danger. A substance or method that will abate the destructive power of mine gases will enrich the discoverer beyond the most sanguine expectations, will make him a public benefactor, and will enroll his name on the scroll of Honor and Fame in letters that will endure for centuries to come.

HORACE B. MCCOOL.

Pottsville, Pa., March 7, 1878.

Power Required to Run a Velocipede.

To the Editor of the Scientific American:

In your issue of February 9, G. O. A. asks: "Is there a practical velocipede, that is, one which would enable a man of ordinary muscular development to travel a distance of 20 miles on a good country road in less time and with less fatigue than he could do it on foot?"

In your issue of 16th inst., a correspondent, Jno. B., replies in the negative, and though it would appear from his communication that his experience ought to be considerable, yet I am (from experience also) compelled to differ with him, and before giving my experience, I may state that I am not the possessor of any extraordinary amount of muscular development; on the contrary, I am rather under the average in that respect, my weight being about 140 lbs.; yet I have ridden a velocipede on "a good country road" in one day, a distance of 52 miles, the actual running time, or the time deducting stoppages, being 7½ hours, a feat which I could not have performed on foot under any circumstances, yet I accomplished this without feeling any unusual fatigue. This is the greatest distance that I ever had occasion to make in one day, but have frequently ridden a distance of 30 miles for amusement.

Your correspondent, Jno. B., says that it "is impossible, under any circumstances, to run a velocipede through a given distance with the same expenditure of power as that required to walk the given distance;" but let us look at it for a moment, and it will be evident that in walking the whole weight of the body must be supported on each foot alternately, which, in my case, would mean a force of 140 lbs. expended every step, besides that required to propel the body forward a distance of about 33 inches. Now let it be remembered that in riding the velocipede, the whole weight of the body is borne by the vehicle, and allows the rider to exert all the power employed for the purpose of propelling himself forward; and it must also be remembered that in riding the velocipede with, say, a 42 inch wheel, the rider at each step can propel himself forward a distance of 126 inches, or $3\frac{27}{33}$ times the distance that he would move in walking at an ordinary gait.

I have never actually tried the force required to be exerted on the pedals of a velocipede to propel myself forward, but I am satisfied that it does not require more than that which is required to sustain the weight of the body and propel it forward in walking.

I might draw your correspondent's attention to the fact that one man can move a loaded car on a level railway track, yet no one would expect him to carry it.

Your correspondent's idea of a man going on a journey and drawing a velocipede after him is simply ridiculous, and reminds one of a person who, in attempting to draw a saw log lying on the ground, would refuse to attempt to draw it on a truck on account of the additional weight.

I am perfectly satisfied that a man of "ordinary muscular development" can travel a distance of 20 miles on a properly constructed velocipede with a less expenditure of power than he could walk the same distance.

Hoping some of your correspondents will give a more scientific exposition of the reasons why than I am able to give, I remain yours, VELOCIPEDE.

Chatham, March 11, 1878.

[For the Scientific American.]

PLANT MIND.

I.

THE SOUL OF PLANTS AND MODERN SCIENCE.

Vegetable physiology has made but slow progress. Although its beginning may be traced to the period when Malpighi aided it with the microscope, its real origin does not date earlier than the last century, when, by his beautiful experiments on the nutrition and transpiration of plants, Hales explained some curious phenomena in the vegetable world.

From that time naturalists began to study attentively the phenomena of vegetation.

The observations of Linnæus and Holff, the numerous experiments of Bonnet and Senebier, the works of Duhamel, Ludwig, and Mustel, the investigations of H. de Saussure and Hedwig—all these efforts tended toward the same end, namely, reuniting scattered materials and forming a regular whole. Some of these in studying the life of plants examined more particularly the form, structure, and development of their organs; while others attempted to explain their play and functions. The result of these labors was the birth of two new sciences—vegetable physiology and organography.

Modern physiologists have observed some extraordinary phenomena in plants, with which they have been differently impressed. They all, it is true, recognize a sensible analogy between these facts and certain animal instincts; but some see in these only isolated phenomena of secondary importance, and propose to explain them by altogether mechanical or physical theories; while others, on the contrary, attracted by the singularity of these facts, have studied them with close attention, and as the result of their observations have come to the conclusion that a plant is an animated being. This is substantially admitted by Vrolik, Hedwig, Bonnet, and Ludwig in their writings upon the phenomena which seem to reveal a vegetable instinct. They all incline to the belief that plants experience every order of sensations.

F. Edward Smith, the English botanist, thinks that plants can feel, and are capable through that faculty of a consciousness of well being and felicity.

Percival believes that plants perform voluntary actions when they turn their branches to the light.

Among the philosophers of the eighteenth century who saw animated beings in plants must also be ranked Dr. Erasmus Darwin, the grandfather of the celebrated naturalist, whose recent works have thrown some light upon the vexed question of the origin of species. In that book, too little known, but the delight of Goethe ("The Botanic Garden"), Dr. Darwin plainly asserts that in his eyes the plant is an animated being—a creature capable of numerous sensations, as of existence, of pain, and gladness.

Dr. Martius, one of the most eminent men of modern science, accords to plants not only the faculty of feeling, but also an immortal soul. To the voice of that celebrated botanist there has been lately added that of another, namely, Theodore Techner, an independent thinker, and not the least inspired among his German cotemporaries. He was one of the first to enter into the questions which bear upon the development of the soul in plants. The new ideas and original views with which his book abounds entitle it to be considered as the first advance towards a true vegetable psychology. A soul in plants was recognized by the ancients. Empedocles, Anaxagoras, Democritus, Pythagoras, and Plato believed plants to be animated, and consequently ranked them with animals.

Entire peoples—the Hindoos, for example—have also regarded plants as animated beings. Among the laws of Manu, laws which in India are believed to have emanated from God, and to be more ancient than those of Moses, are to be found doctrines and commandments as follows:

"It is good and equitable that each father of a family, without prejudice to his children, should reserve one part of his wealth for other animated beings, to wit: plants and animals."

"Plants and animals have internally the sentiment of existence, and also of pain and happiness."

According to Loubère and some other travelers, the priests of Siam and Laos apply the law forbidding to kill not only to men and animals, but also to living plants. They exhibit as much repugnance to the destruction of a tree, or simply the cutting of a branch, as to the mutilation of a man; and they refuse to eat of green fruits lest their development should be arrested. These views are entirely opposed to those which belong to the people of the Occident. From earliest childhood, in our schools and elementary books, children are taught that men and animals have the faculty of motion and are living beings, and that plants attached to the soil live, it is true, but are not animated.

But, as M. Techner has observed, it would be quite otherwise if the preceptor said to his pupil, "Animated beings are divided into classes. One is composed of beings which possess the power of transporting themselves from place to place; these are men and animals. In the other class we find beings fixed in the soil where they are born; these are plants. The latter resemble us less than animals, yet live and grow as we do." For these and many other reasons we believe them equally animated. If our children are thus taught they will be less indisposed when older to deprive the plant of its soul than we are to recognize its existence at the present day.

Such numerous and striking analogies in the vital functions of beings in the two kingdoms, animal and vegetable, are revealed by physiology every day, that no one can refuse to reflect upon the facts or reject without a candid examination the proposition we are about to consider in a succeeding paper, that the plant is an animated and sentient being.

R. C. K.

WILD BEAST EXTERMINATORS WANTED.

It is somewhat strange that with the full knowledge that is possessed of the frightful numbers of human beings yearly slaughtered in India by wild beasts, some efficient means are not taken for the extermination of the latter. In 1875 20,805, and in 1876 19,273 people perished from this cause. This is considerably beyond the total mortality produced by wars before the invention of breechloaders and machine guns. For example, in 1855 statistics were published in England showing that in 22 years of war 19,796 people were killed. In nine great battles, including Waterloo, 4,740 fell. Even at the present time such a number of deaths occurring in a two years' war would be deemed large, and if they occurred through a pestilence in a great city the situation would be considered very grave. Yet to prevent such mortality in both instances every refinement of medical ingenuity and skill would be exerted; in the present case nothing is done beyond offering small rewards for the killing of the wild animals.

The loss does not end with that of human life. During the above two years the aggregate of cattle killed by tigers, snakes, and wild beasts generally aggregated 101,635. One tigress is known to have slaughtered 127 people, and stopped the traffic for many weeks on a public road. Another killed upwards of 50 people and caused the abandonment of 13 villages. Against the death rate of victims we can place the amounts paid for rewards for killing the animals, namely, for 1875, $52,326, and in 1876, $54,314, which is absurdly small in view of the magnitude of the evil to be prevented.

We look in vain through Dr. Fayrer's exhaustive paper on this subject, recently read before the Society of Arts, for a suggestion of a practical plan for checking these inroads. But one project is proposed, that of Captain Rogers, and that is the clumsy expedient of setting spring guns, which can with doubtful economy be made, we are informed, of old muskets. In connection with this system, which seems like the patent double-ender gun, dangerous alike to friend and foe, it is proposed to organize hunting parties of natives. These expeditions might also be considered as of doubtful value if we are to credit the assertion elsewhere made that the inhabitants have a "deep-rooted prejudice against killing a snake." Unfortunately the snakes have no deep-rooted prejudice against killing the inhabitants, as the latter succumb to poisonous bites at the rate of some 1,200 a year.

We have no means of knowing the exact value in which a Hindoo's life is held by the British Government, unless we divide the number killed by the amount paid to stop the source of death, and the result is two dollars and sixty-six cents per life; but from a humanitarian point of view it seems that the need of some potent means of eradicating this scourge is pressing. This consideration might be especially commended to the philanthropic gentry who so mercilessly condemned Stanley for his destruction in battle of a few dozen African savages. But if British ingenuity, which, by the way, still stands nonplussed over the grave problem of intercommunication between railroad carriages and locomotive, cannot suggest a feasible project, we venture to believe that the offer of an adequate reward will speedily bring forth plans from this side of the Atlantic. There are plenty of adventurous geniuses in the West who probably would willingly organize a corps of tiger exterminators to employ machine guns, hot water projectors, Greek fire, poisonous chemicals, or potent explosives, as their ingenuity might suggest, provided somebody made it an object to them to do so. Why cannot we have a "Scientific Expedition," under the auspices of the projectors of that much advertised one now begging Congress for a boost, to undertake this work? If participants cannot otherwise be obtained, there is the question of how to dispose of tramps still open.

THE PROGRESS OF ASTRONOMICAL PHOTOGRAPHY.

Astronomical photography comprises, first, the representation of the surface of celestial bodies sufficiently near to us to give a magnified image when observed with the telescope. Thus the sun with its spots and faculæ, the moon with all the details of her surface, and such large planets as Jupiter, Mars, and Saturn, have all been photographed. Secondly, it is possible to obtain by this means exact images of star groups, and thus to determine at once the relative situation of certain stars for a given epoch. By means of photography it is possible to observe as it were automatically passages of planets before the sun, eclipses, occultations of planets by the moon, and passages of stars at the meridian for the determination of absolute time. By its aid also we are enabled to reproduce the solar spectrum with all its lines, and to extend the limits thereof beyond the visible rays. Photographic pictures in the stereoscope also show very clearly the sphericity of the bodies represented. Lunar craters, the rings of Saturn, the spots and faculæ of the sun, there appear in high relief, and the observer is enabled to see that the faculæ are elevations and the spots depressions.

The finest astronomical photographs have been produced by Warren de la Rue in England, the late Father Secchi in Rome, Mr. Lewis Rutherford in this city, Ellery at Melbourne, Negt at Ghent, Gould at Cordova, and Janssen at Paris. Mr. Rutherford has obtained superb views of the moon with an exposure varying from one fourth second for full moon to two seconds for the first and last quarters. With these photographs M. Elie de Beaumont has shown how much may be deduced geologically with reference to the lunar surface, which is not affected by the destructive action of water or of any atmosphere. The comparison of photographs taken at long intervals apart also allows of the recognition of any changes which may have occurred in the lunar surface. It is now reasonably certain that active forces are at work in the moon's interior, and the disappearance some twelve years ago of a cavity which is shown on the maps of Maedler made in 1829 has educed the theory that it was filled up by an eruption of white material. This can only be verified by comparisons of photographs taken over many years.

Astronomical photography has recently, however, assumed a higher place than as a mere mode of reproduction of the images seen through the telescope. It has, in fact, become an important means of discovery, and the researches of Janssen have shown that photographic pictures reveal phenomena otherwise totally invisible. It was through such prints that he discovered the photospheric network around the sun. The great difficulty encountered in studying the solar photosphere has been to determine the exact form of the granulations or "willow leaves" which appear to form currents of semi-liquid matter. Small photographs showed little or nothing of these, and the reason is found in the phenomenon of irradiation, which causes the image formed by a very intense light to extend beyond its real boundaries and so to assume a false form. This was especially noticeable in all photographs of total eclipses; the images of protuberances trenched on the lunar disk often to the extent of 10 or 20 seconds. The same effect is produced on the eye. Now the average diameter of the granulations of the photosphere is but a second of arc, and it is therefore easy to perceive how a very small degree of irradiation suffices to confuse all the details of their form. Janssen has overcome this difficulty by enlarging the image and shortening the time of exposure. In a minute fraction of a second he obtains an image 10·8 inches in diameter. On this can be seen, first, a fine general granulation covering the solar surface. The grains, more or less rounded, have diameters varying from some tenths of a second to 3 or 4 seconds. The illuminating power of these granular elements is very unequal, doubtless because they are situated at very different depths, and those which attain maximum luminosity occupy but a very small portion of the solar surface. The most curious result, however, derived from an inspection of the photograph is that the photosphere appears divided into a multitude of compartments, having rounded or polygonal contours, the dimensions of which attain sometimes a minute or over (the diameter of the entire solar disk is about 32 minutes). In the intervals between these figures the grains are clear and well defined; in the interior they are half effaced, broken, and often absent. It may be supposed that in these spaces a violent commotion has mixed together or confounded the granular elements, and thus a new confirmation is afforded of the fact that the activity of the photosphere is always very great even when no spots are visible.

We have already fully described the apparatus used by the various expeditions for photographing the transit of Venus of 1874. It may well be asked if the immense labor spent upon the observation of that phenomenon has served to fix a value of the solar parallax more exact than that already obtained by other methods. All that is known at present is that the parallax deduced by the British Astronomer Royal from the direct observations of English astronomers (8·76″) is a little less than that determined by Professor Newcomb by taking the average of the best known results (8·85″). Examination of the photographs has further resulted in proof of the existence of an atmosphere around Venus.

Mr. Rutherford, of this city, has the honor of being the first to photograph the star groups, and he uses for that purpose a refracting telescope, 13 inch objective, mounted equatorially, and moved by clockwork. The duration of exposure depends upon atmospheric conditions, but about 4 minutes suffice for stars of the 10th magnitude. Mr. Rutherford has obtained very exact charts of the Pleiades, of the constellations Præsepe and Perseus, and of the stars near 61 Cygni. Gould, at the observatory of Cordova, has also achieved remarkable success in this line. Last November he possessed proofs suitable for the micrometric measurement of 84 celestial bodies, of which three fourths were star clusters. The plate representing the cluster of Eta of the Ship showed 180 stars, many of which are of the 9th magnitude. Mr. Gould has also obtained fine photographs of the moon, Jupiter, Mars, and Saturn.

THE NEW EGYPTIAN COTTON.

The Bahmian cotton, a new kind of plant not long since discovered in Menoufieh, Egypt, is puzzling botanists to determine whether it is a hybrid or some foreign kind accidentally brought into the country. It appears to be a cross between the Bahmian (*Hibiscus esculentus*) and the ordinary plant (*Gossypium barbadense*), the former having fertilized the latter at the time of blooming. The new plant presents marked characteristics. It has several straight stalks, of which the largest grow to a height of about three yards. In place of branches there are two or three pods, springing from the junction of the leaves and the stem which they surround. While the ordinary kinds of cotton resemble a shrub or bush, with one or more stems carrying a number of branches, sometimes much extended, bearing the pods (though often with intervals of two, three, or four leaves, without any at their junction), the leaves of the Bahmian cotton are large, strongly indented, and are of a much darker green than those of the other plants. The flower is yellow with interior purple spots, very like the ordinary cottons, though generally rather larger and carried on long stalks.

The report of the Egyptian Government on the plant points out that if it be a hybrid, the fact is of great importance scientifically, for such instances are rare in horticultural records between species so different; and those which have been produced to this time are generally sterile, while the new plant is more fruitful than the ordinary description. Last year all the great Egyptian growers tried the seed, and the crop is reported to be from 6,720 to 7,680 lbs. per acre. It is claimed that this will increase nearly 30 per cent with carefully selected seed and plants not overcrowded.

New Agricultural Inventions.

A Household Press for Fruits, etc., has been invented by Miss E. A. Stears, of Brooklyn, N. Y. This apparatus may be described as a box having formed on it a support for the nut of a compressing screw, and containing a drawer for receiving the juice expelled by the press, and having fitted to it a removable perforated cylinder for containing the fruit or other article to be pressed.

In an improved Plow and Seeder, or machine for scattering seeds and plowing them in, invented by Mr. P. H. Elliott, of Greenville, Texas, the essential addition is a rotating flanged drum composed of two perforated cylinders, one of which is adjustable about its axis, for the purpose of filling it with seed and also regulating the size of the discharge openings. This revolving seed distributer is placed in front of turn plows, applied to the draught frame.

An improved Grain Bagging Machine has been invented by Mr. F. H. Relph, of New York city. The chief element of the apparatus is a horizontal rotating frame carrying the