

be presented to the Academy of Natural Sciences of Philadelphia.

The mother and infant are both doing well, the latter sucking like any other mammal, folding its trunk back over its head, as described by all reputable naturalists. The birth of elephants in captivity is not an uncommon occurrence in India. Unfortunately no one appears to have been present to witness the accouchement.

CHEMICAL REPULSION.

In a paper read on the 13th of January before the Royal Society, Dr. E. J. Mills claimed to have discovered a new order of chemical phenomena, which he has provisionally designated as "chemical repulsion." If a thin layer of a solution of chloride of barium be distributed evenly between two plates of glass placed horizontally (excess being removed by pressing the plates together), and then dilute sulphuric acid be brought into contact with it through a perforation made in the upper plate, precipitation takes place and continues progressively and uniformly from the perforation as a center; forming an increasing circle, for instance, if the perforation be circular. If the sulphuric acid be introduced through two perforations in the upper plate, two circles are formed, but as their circumferences approach each other development is retarded between the perforations, the figure of advance being no longer circular, but oval, and, however long the experiment may be continued, there always remains a line of demarkation of "no chemical action" between the two figures. When there are perforations at the four points of a square and one in the center, the center circle, having, as it develops, no way of escape from the surrounding four, eventually forms a square figure bounded by repulsion lines. Dr. Mills considers that the phenomena observed afford proof of two propositions: (1) That chemical action can take place at a distance; and (2) that two or more chemical actions, identical except in position, completely exclude one another.

Statistics Versus the "Big Farm Scare."

A great deal has been said about the multiplication of big farms in this country, and doleful predictions have been uttered by those professing to believe that the United States are destined to repeat the experience of England and Ireland in the monopoly of the land by a few. That there is no real danger of such an issue is clearly shown by the following statistics, which the *Tribune* compiles from the several census reports.

In 1850 the average size of farms in the United States was 203 acres; in ten more years the average was four acres less, and at the last census a further reduction of 47 acres appeared, and farms averaged only 153 acres. The decline between 1860 and 1870 was so general that the only exceptions in all the States and Territories were—an increase in California from 466 to 482 acres, from 94 to 133 in Massachusetts, and from 25 to 30 in Utah. Prior to 1850 land monopoly had some claim to existence in California; in ten years the average size of farms was diminished by a reduction of just 4,000 acres! In Texas the reduction was in the first decade from 942 to 591 acres, and in the second to 301 acres. The next census is expected to show a further decline. Minnesota had 157 farms in 1850, 18,181 in 1860, 46,500 in 1870, and now claims more than 68,000, and her farmers are not much frightened in view of the competition of half a dozen "monster" wheat farms! There were 5,364 farms of more than 1,000 acres each in 1860; in 1870 there were only 3,720. In the same period the number from 500 to 1,000 acres declined from 20,319 to 15,873, while all the classes of smaller farms increased, the ratio of increase getting larger as the scale of size descended.

The Mind in Eclipse.

At a recent meeting of the Medico-Legal Society, in this city, Dr. George M. Beard read a paper on "The Problems of Insanity," in which he said: "It is a paradox of astronomy that the sun may best be studied during an eclipse; and in psychology the mind may be studied best when it is eclipsed."

"Insanity is a disease of degrees; there is no plain dividing line between sanity and insanity. Insanity may be divided into two kinds—intellectual insanity, embracing forms in which there are delusions, and emotional insanity, in which there are no delusions. Insanity is a barometer of civilization, and as we advance higher in the arts and sciences so will insanity become more prevalent among us. Intense application, brain work, and indoor life are the agencies which most frequently bring it about. With savages or barbarians there is little or none of it. The intellectual activity of the women of to-day is another great cause of insanity. What the mother is, so will the child be in an intenser degree.

"Insanity is increasing most perceptibly in Europe and America among the poorer classes. Civilization grinds hardest on the poor, shutting them up in close houses, with bad air and poor food, and compelling them to struggle for existence. The brain cannot always bear up under the strain, for they have few recreations and amusements which can be indulged in for the relaxation of their minds. A diagnosis in cases of insanity is most difficult. The physician must know the subject psychologically; know he thinks, what he thinks, and all about his general disposition, passions, etc. The probabilities of cure in the case of insane persons depend greatly upon the advancement of the disease when the treatment is begun. It is better if the patient can

be treated out of the asylum, and if he is not confined or isolated altogether from the world, narcotics and stupefying remedies should not be used when their use can be avoided. Until a comparatively short time our inventions have tended to an increase rather than to a decrease of insanity. Of late, however, the inventions have been in the opposite direction, tending to give us more ease and rest, as, for example, the telephone, elevated railroad, and the electric light. If the latter is perfected, it may also enable us to breathe a purer air. An improved system of education, with less 'cramming,' would tend to reduce the increase of insanity. The eclipse of the mind cannot be predicted like the eclipse of the sun, but, with study, men may learn to detect it in its first stages, and, if treated early, it need rarely become serious."

Artificial Diamonds at Last.

Professor Story Maskelyne, who examined Mr. Jame MacTear's presumed "diamonds," an account of which was published on page 88, present volume, has written the following letter to the *London Times* on those produced by Mr. Hannay:

"SIR: A few weeks since I had to proclaim the failure of one attempt to produce the diamond in a chemical laboratory. To-day I ask a little space in one of your columns in order to announce the entire success of such an attempt by another Glasgow gentleman.

"That gentleman is Mr. J. Ballantine Hannay, of Woodbourne, Helensburg, and Sword Street, Glasgow, a Fellow of the Chemical Society of London, who has to-day sent me some small crystallized particles presenting exactly the appearance of fragments of a broken diamond.

"In luster, in a certain lamellar structure on the surfaces of cleavage, in refractive power, they accorded so closely with that mineral that it seemed hardly rash to proclaim them even at first sight to be diamond. And they satisfy the characteristic tests of that substance. Like the diamond, they are nearly inert in polarized light, and their hardness is such that they easily scored deep grooves in a polished surface of sapphire, which the diamond alone can do. I was able to measure the angle between the cleavage faces of one of them, notwithstanding that the image from one face was too incomplete for a very accurate result. But the mean of the angles so measured on the goniometer was 70° 29', the correct angle on a crystal of the diamond being 70° 31' 7". Finally, one of the particles, ignited on a foil of platinum, glowed and gradually disappeared exactly as mineral diamond would do.

"There is no doubt whatever that Mr. Hannay has succeeded in solving this problem, and removing from the science of chemistry an opprobrium so long adhering to it; for, whereas the larger part of the great volume recording the triumphs of that science is occupied by the chemistry of carbon, this element has never been crystallized by man till Mr. Hannay achieved the triumph which I have the pleasure of recording to-day. His process for effecting this transmutation, hardly less momentous to the arts than to the possessors of a wealth of jewelry, is on the eve of being announced to the Royal Society.

"I am, Sir, your obedient servant,

"N. STORY MASKELYNE.

"Mineral Department, British Museum, Feb. 19."

Nashville's Centennial.

The hundredth anniversary of the settlement of the city of Nashville, Tenn., will be celebrated by the holding of an exhibition of the arts and sciences, beginning April 23 next and continuing until May 29.

The Citizens' Centennial Commission announce that active preparations are making for a first-rate exhibition, and that a wide-spread interest in the undertaking is already aroused, giving promise of a display which shall excel anything Nashville has seen before. The Exhibition buildings are in the heart of the city, easy of access, and amply provided with facilities for the display of manufactures, machinery in motion, inventions, works of arts, and natural products.

The reception of exhibits will begin April 5 and close April 22. Exhibitors of running machinery are requested to have their exhibits in place by April 17. Applications for space should be made to Mr. B. J. McCarthy, chairman of the committee on assignment, space, etc., and for general information to Dr. G. S. Blackie, corresponding secretary, Nashville, Tenn.

Manufacturers of articles finding or seeking a market in the South will find this a good opportunity for placing their wares before a large and thrifty portion of the Southern public. Nashville is not only an important railway center, but is in the heart of a region rapidly increasing in commercial and manufacturing importance. No premiums are offered, and there is no charge for space.

An International Leather Show.

An International Exhibition of leather and leather goods, furs and pelts, tanner's materials, shoe and leather machinery, and the like, is contemplated from May to November, 1881, at Frankfort-on-the-Main. The circular of the provisional committee states, that this exhibition is intended to bring together from all parts of the world all the different raw materials, and to show in successive stages the manner and means of their being manufactured and adapted to the wants of man. It will show how art and science and labor and capital have been constantly and quietly working

for the advancement of civilization in this industry, fully as much as in any other.

Frankfort-on-the-Main has been selected as the central city of Germany, and a committee composed of prominent men in the principal industries, with men of science and art, will do all they can to make it a most complete and successful exhibition.

Steam Dredges Wanted for Erie Canal.

State Engineer, Horatio Seymour, Jr., reports the serious filling up of the State canals and the great need of steam dredges for the removal of the accumulating mud.

Many streams empty into the canals, carrying in time of freshets a large amount of mud and gravel. Every city and village along the line pours in more or less sewage. Offal is thrown out from boats, and through every city and village ashes and every other rubbish are thrown into the canal. This material which accumulates during the year, as a rule, must be within a few days removed in the spring. Every year a portion of this deposit is taken out, but the time is so limited, and the difficulty of handling it is so great, that there is not as much removed as comes in.

The consequence is that the canal has gradually been filling up. In order to allow boats to draw 6 feet of water, the levels of the canals have been raised, making it necessary to lift up the bridges to allow boats to pass under. The Erie survey of 1876 showed that the bottom of the canal had been worn away in the center under the boats to more than 7 feet in depth, but at the sides deposits existed varying from 6 inches to 2 feet high, and extending over one half of the bottom. The amount of this deposit was estimated to be about 900,000 cubic yards. This has increased since that time to about 1,000,000 cubic yards. Last spring a great effort was made on all the divisions to clean out the prism, but the time was so short (18 days) that not more than 100,000 yards were removed. Although but a small part of the whole deposit was removed, this work had a marked effect upon navigation, as the boatmen will testify. The whole of this material can be taken out by dredges, in the summer, without interfering with navigation, in four years, at a cost of about 12 cents a cubic yard, which will give to the canal a uniform depth of 8 feet. Experience shows that it cannot be well removed by hand, except at very great cost. Last spring, \$30,000 was spent on the Western Division for removing deposits. This sum would have purchased a dredge and paid the expenses of working it two years. The Champlain Canal is in an especially bad condition.

Household Water Motor.

In Zurich, Switzerland, the use of a portable water power, so to speak, is being extensively used for household purposes. Firewood, for example, is to be sawn into convenient lengths for burning. A small sawing machine on wheels is drawn by two men to the front of a house. They connect by a flexible tube with the nearest hydrant; the water flows to the machine; the saw dances, and cuts up the wood with surprising rapidity. A portable turbine has also been invented, and employed in many places in the same city, in driving a Gramme machine for the production of electric light. Water is very abundant in Zurich; but there are other towns in which this domestic water power could be advantageously introduced. Where it is any object to keep a record of the water used an indicator showing the quantity might be affixed to the machine.

The Best Fire Apparatus.

Norwich, Conn., is supplied with water from an artificial pond three and a half miles from the city. It is brought to the city in pipes by gravity pressure. The city is provided with two way hydrants located not more than 600 feet apart. A water pressure is obtained at the hydrants equal to 85 lb. to the square inch, which will throw an effective fire stream over any building in the place. Chief Carrier relies entirely upon the hydrant pressure. He uses four-wheel hose carriages, 600 feet of hose on each reel, and twenty men to each company. He has four steamers, but they only respond to second alarms, and have not been called out in a year and a half. The department controls all fires by means of the hydrant streams. This is the cheapest and best fire service to be obtained—fire streams direct from hydrants. Cities putting in waterworks should keep this point in view.

Onions.

From our own experience, and the observation of others, we can fully indorse the testimony of the St. Louis *Miller*, on the healthful properties of the above esculent. Lung and liver complaints are certainly benefited, often cured, by a free consumption of onions; either cooked or raw. Colds yield to them like magic. Don't be afraid of them. Taken at night all offense will be wanting by morning, and the good effects will amply compensate for the trifling annoyance. Taken regularly they greatly promote the health of the lungs and the digestive organs. An extract made by boiling down the juice of onions to a sirup, and taken as a medicine, answers the purpose very well, but fried, roasted, or boiled, onions are better. Onions are a very cheap medicine, within everybody's reach, and they are not by any means as "bad to take" as the costly nostrums a neglect of their use may necessitate.

M. THOLLON has recently observed, by the aid of his spectroscopic of high dispersive power, a solar protuberance whose height equaled one-sixteenth of the diameter of the sun, or about 55,000 miles.