ASTRONOMICAL NOTES.

OBSERVATORY OF VASSAR COLLEGE.

For the computations of the following notes (which are approximate only) and for most of the observations, I am indebted to students. M.M.

Positions of Planets for May, 1874.

Mercury.

Mercury rises on the 1st a little after 4 A. M., and sets a little before 5 P. M. On the 31st, it rises about 5 A. M., and sets near 8 in the evening.

In the first week of May, it should be looked for before sunset, and near the last of May after sunset. It is too near the sun, in apparent position, to be seen between the 15th and 29th.

Venus.

Venus rises on the 1st at 5h. 50m. A. M., and sets at 8h. 20m. P. M. On the 31st, Venus rises at 6h. 7m. A. M., and sets at 9h. 21m. P. M.

On the evening of the 3d, Venus and Mars will have very nearly the same right ascension, and will differ little in declination, Venus being a little further south in declination. Mars passes the meridian one minute later than Venus.

Mars.

On the 1st, Mars rises at 5h. 53m. A. M., and sets at 8h. 27m. P. M. On the 31st, Mars rises at 5h. 8m. A. M., and sets at 8h. 12m. P. M.

Mars is very small at this time, but its ruddy light will enable one to recognize it after sunset, and its nearness to Venus on the 3d will be a very marked phenomenon.

Jupiter.

Jupiter rises on the 1st at 2h. 39m. P. M., and sets at 3h. 11m. the next morning. On the 31st, Jupiter rises at 0h. 41m. P. M., and sets a little after 1 the next morning.

Although we are moving away from Jupiter, and it is becoming smaller, it is still the great beauty of our evening skies, and its satellites, with their varied changes of position, can be seen with an ordinary ship's glass. On the evening of the 10th the second satellite will be invisible to glasses of small power by being between us and the planet until after 8 P. M., and the fourth will become invisible after 9 P. M., by the planet's passing before it, or between the satellite and the earth.

Saturn.

On the 1st, Saturn rises at 1h. 33m. A. M., and sets at 11h. 35m. A. M. On the 31st Saturn rises at 11h. 38m. P. M., and sets the next forenoon at 9h. 25m.

Saturn should be looked for in the morning, as it comes to the meridian at 6h. 25m. on the 1st, and at 4h. 29m. on the 31st. Although it is in southerly declination, and is only 31° above the horizon in this latitude, its ring can be seen with a glass of low power.

Uranus.

On May 1, Uranus rises at 10h. 45m. A. M., and sets at 1h. 10m. the next morning. On the 31st, Uranus rises at 8h. 51m. A. M., and sets at 11h. 15m. P. M.

Neptune.

Neptnne rises in the early morning and sets about 6 P. M. on the 1st and 4 P. M. on the 31st. It requires a very good telescope.

Sun Spots.

The record is from March 14 to April 18. Observations have been seriously interrupted by cloudy weather, and high winds have in some cases prevented good definition. Spots have, with one exception, been small, and, like those of last month, have shown sudden and decided changes from day to day. This was noticed particularly on March 27, when there was not a trace of several spots which had been scattered over various parts of the disk on March 25. Again, all those seen on March 27 had disappeared by noon of March 28, and several new ones had broken out. On the other hand, a group which appeared on March 30, just within the eastern limb, remained invariable in its regular passage across the disk as long as the weather permitted it to be seen. This group was quite large, so that it could be seen through smoked glass. Faculæ have usually been noticed.

Barometer and Thermometer.

The meteorological journal from March 15 to April 18 gives the highest barometer, April 13, 30·55; the lowest barometer, April 10, 29·56; the highest thermometer, March 18, at 2 P. M., 62°; the lowest thermometer, March 24, at 7 A. M., 11°.

AMOUNT OF RAIN

The rain which fell between the night of March 16 and the evening of March 17 amounted to 0·57 inches.

The rain which fell between the morning of April 7 and the morning of April 9 amounted to 0·82 inches.

American Agricultural Machinery in Germ ny.

A German correspondent writes in the New York *Herald* that, until a very recent date, Messrs. Ransome & Sims, with a few other English manufacturers of agricultural machinery, monopolized nearly all the trade of the European continent. Now American makers are running them hard. The imports of agricultural machinery from America into Germany commenced about seven years ago, and the business then has rapidly developed into an important branch of commerce. The chief depots of American agricultural machinery are Bremen, Hamburg, and Stettin. The principal articles sold are mowers and reapers. Lawn mowers are the largest item. Pitchforks come next. A very little has as yet been done in threshing machines.

In 1873 about 8,000 American mowers and reapers were sold on the European continent. During the present year, it is estimated that there will be orders for at least 12,000 mowers and reapers, which will represent a sum of $1,000,000, or thereabouts, payable to the United States as a net result of the transaction.

The firms at present doing the largest business are: Messrs. Adriance, Platt & Co., of New York; D. M. Osborne & Co., New York; W. A. Wood & Co., Hoosick Falls, New York.

The German manufacturers cannot turn out good agricultural machinery. Many attempts have been made by them to copy American workmanship, but none have been satisfactory. Buyers on the European continent, though hard to convince, are now agreed that American cast iron is the strongest in the world. It has an advantage of twenty-five per cent over German cast iron in strength, and is nearly 16 per cent stronger than English cast iron. So the export of agricultural machinery to the European continent has become a prominent feature of American trade, and is susceptible of a still further development.

Wherever the emigration movement is active, a large number of agricultural machines are always salable. In the city of Breslau especially, where estates are large and farm laborers constantly becoming fewer, there is a promising market, which has already yielded good returns, and is likely to do so for a long time to come. The loss of hands in Germany during the French war, and the fact that the landlords have much money and few workmen, should induce American manufacturers of agricultural machinery to direct their attention to Germany with a careful and attentive eye. The profits of the business are satisfactory, and payment generally prompt or easily enforced, so that there is the smallest possible risk of bad debts.

Curious Origin of Fires.

Alfred Tozer, of the Chief Fire Station, Manchester, England, communicates the following paper, on the origin of great fires from a natural history point, to Hardwicke's *Science Gossip*.

At a recent meeting of the Lower Mosley Street Natural History Society, I submitted a piece of leaden water pipe, sent to me by Captain Drew, who received it from Mrs. Bakewell, St. Mary's Gate, in January last. It appears that Mrs. Bakewell's kitchen in St. Mary's Gate is infested with rats: they have, on several occasions, bitten through the water pipe and flooded the place. The pipe has been twice bitten through, and the hole soldered up. The rats, no doubt, being thirsty, bit through the pipe to allay it. Two instances have occurred at Phillips' warehouse, Church street, one in 1851, the other in 1856: in both cases the rat gnawed through a leaden gas main pipe a few inches above the floor. Other similar instances have occurred of rats gnawing a gas in mistake for a water pipe: it has been thought they heard the water bubbling in the gas pipe, and have not found their mistake until they have penetrated the pipe. Phillips' warehouse was on both occasions damaged by fire through some of the employees seeking for the escaping gas with a light.

A fireman, in the performance of his duty, often meets with many curious and interesting instances of causes of fires, a few of which I will give, which you may, perhaps, think worth while to find a corner for in your interesting *Gossip* on natural history, etc.

I have attended and traced several instances of fires occurring through rats and mice gnawing lucifer matches. Matches are now dipped in paraffin wax instead of sulphur, as before; the rats or mice have carried them under the floor for the purpose of gnawing off the wax; in doing so, their teeth have come in contact with the phosphorns at the ends, and so fired them. In 1856 I attended a fire at the Sultan's Palace at Scutari, Asia Minor. After the fire, I gathered from under the flooring a quantity they had been gnawing. Some years ago a fire occurred in London, caused through a jackdaw getting at a box of lucifers, and pecking them until it set them on fire.

Fires have occurred through rats and mice conveying, under the flooring boards, oily and fatty rags, which have afterwards spontaneously ignited. This is rather a common cause of fires in cotton mills.

The following is an extract from the *Journal* of the United Service Institution, Whitehall yard, London, No. 52, for 1868: "One of the presents sent to the Museum of this Institution is a rat's nest and young. The nest was set on fire by a lucifer match, ignited by the old rat as she worked it into her nest. Lieutenant A. H. Gilmore, R. N., states that a fire occurred on board Her Majesty's ship Revenge from a similar cause."

Cats and dogs have caused fires in various ways; such as upsetting explosive and inflammable things into fires and lights, also through lying inside fenders and under fire places. Hot coals have fallen and adhered to their backs, which caused them to beat a hasty retreat, no doubt being anxious to get rid of the annoyance as soon as possible. They have sometimes succeeded by rolling or rubbing on carpets, curtains, beds, straw, shavings, and other inflammable things. The last instance I recollect occurred at a baker'sshop in Albion street, Gaythorn. A dog was lying under an oven fire, a piece of chip fell from the fire on to his back; he immediately ran to some shavings, rolled upon them, at the same time setting them on fire before the eyes of his master. In 1863, three distinct fires were caused in one room of a gentleman's house in Canonbury, Islington, through a cat lying inside the fender, when some hot ashes fell out of the fire on to its back, which caused it to rush about the room, when the cinders were deposited in different places, which set fire to the carpet.

That mischievous animal the monkey has lent its aid to the devouring element. Fires have occurred through its agency, in a similar manner to cats and dogs, also through its playing with fire in various ways. In one instance a monkey upset a charcoal brazier, and set a room on fire. Many—yes, very many—fires have occurred through our domestics hunting bugs and other small fry by the light of a candle or lamp. In their anxiety, especially, to hunt fleas, they forget they may produce an enemy much more to be dreaded. Many fires also occur through persons fumigating apartments to get rid of bugs and various kinds of vermin.

A few instances have occurred through the concentration of the sun's rays upon glass fish globes. On the 16th October, 1845, at two P. M., Mr. Philbrook's residence. Mill street Worcester, was set on fire through the concentration of the sun's rays upon a water croft standing upon a table. Colored bottles in chemists' shops, cracks, and bull's eyes in glass have been known to focus sufficient heat from the sun to set buildings on fire.

Fires have occurred through the spontaneous ignition of pigeons' dung under the slates and tiles of houses. Professor Buckland traced two fires to this cause. See *Builder*, 28th September, 1844.

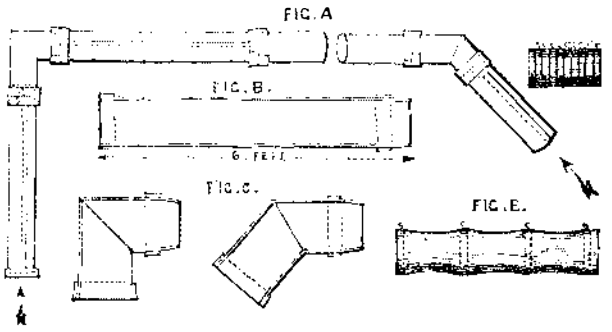
Birds' nests under the eaves and wooden crevices of houses have been frequently set on fire through sparks from a neighboring chimney, and have contained sufficient inflammable matter to set fire to the buildings.

Although I have given the dogs the credit of producing work for the firemen, still it would not be fair if I were to omit to mention that they have frequently discovered and given timely notice of fires; and many an anecdote can be told of the very great interest dogs take in and at fires.

Flexible and Wrought Iron Air Tubing for Mining Purposes.

A correspondent of the London *Mining Journal* states that air drifts have lately been driven by the aid of sheet iron tubes fitted into each other, spigot and faucet fashion. A great saving has thus been caused by doing away with the necessity of driving, in many cases, an expensive temporary drift as a return for the main drift, to be abandoned when the desired point is reached and the ventilation established.

The great difference in cost between driving an expensive air way and using the tubing will be appreciated by mining engineers; and in the case of the drift, it may not be required after the holing, while the tubes may be used over and over again. Good mining has often been done with a brattice wall, but the drift or heading has, in nearly all cases, to be made larger than eventually required, making the cost of the wall much more than the tubes, besides being a much slower and more tedious operation. In many cases these tubes are invaluable, such as opening places much broken and fallen, in which it is impossible to erect any of the ordinary modes of brattice. Being made of stout sheet iron (Figs. A, B, C, showing the lengths of pipe, angles, and



manner of joining), riveted and with well fitted joints, and having bends of all angles, we have an air way vastly improved over the old forms of brattice, either of timber or cloth, which cannot be made thoroughly airtight, being therefore, for long distances, quite useless, especially where strong currents of air are requisite to enable blasting powder to be used. The writer saw, in Belgium, a long single drift being driven to some workings on the opposite side of a synclinal, or basin, in the coal measures. Iron tubes were led in of about 15 inches diameter, and air was propelled through them by a small engine driving a fan. The drift was driven by means of the Villepique perforator, which was worked by compressed air, advantage being taken of this power to work the small engine. Large quantities of gunpowder were daily consumed, and the immense amount of smoke generated thereby was efficiently cleared away by these means.

A very handy tubing (Fig. E) made of brattice cloth, kept in a circular form by means of hoop iron rings, was also used; to each ring is fastened a hook, so that the tubing is easily and rapidly hung up to the roof. Their portability is a great recommendation to miners, as they pack up like a concertina, as shown in the engraving, hundreds of yards thus occupying a very small space.

Both of these air tubes are destined to be largely used in collieries; and for mines where the wooden box has so long been used, they will certainly be a great boon.

Perils of Ballooning.

A party of seven persons, two females and five men, under charge of the aeronaut Barbier, essayed an aerial excursion recently at San Francisco, in a balloon carrying 60,000 cubic feet of gas. A strong wind blew at the time. The ascension was a success, an altitude of 7,000 feet was attained. The descent was disastrous. The anchor rope caught on a building and the rope broke. Up darted the balloon 400 feet, when a crack was heard; the balloon burst open and down it came, thumping the passengers upon the ground with great violence, capsizing the car, entangling the passengers in the rigging and dragging them along the ground for a third of a mile. Finally they were rescued, bruised sadly, but no limbs broken.