

to them all the time. I could understand but a part, yet would gather such expressions as these: 'Look! see what a mighty powerful people they are!' meaning white people. 'We are fools! We don't know anything! We just like wolves running wild on the plains!' Such an effect on the war chiefs and warriors cannot but be very salutary, and must conduce much toward deterring them from going on the war path against such a 'mighty powerful people.'

SCIENTIFIC AND PRACTICAL INFORMATION.

THE LIGHTING OF LONDON.

The streets of London have an aggregate length of 2,500 miles, requiring about 5,000 miles of gas mains, and upwards of 54,000 public lamps, which consume something like 1,000,000,000 cubic feet of gas a year, or about 3,000,000 a day. The gas supply of the entire metropolis is about 14,000,000 cubic feet a year, or 38,500,000 cubic feet a day, requiring for its production the coking of 1,500,000 tons of Newcastle coal. The cost of the coal is reported to be \$8,750,000. The value of the residual products, such as coke, breeze, tar, and ammonia liquor is, as much as \$3,500,000. The gas rental of the city is \$15,000,000, of which \$1,250,000 goes for street lamps.

THE CUCUMBER IN RUSSIA

What the onion is to the Spaniard, or the potato to the Irishman, that the cucumber is to the native Russian. It is the indispensable part of every Russian peasant's every meal. In the account of his trip up the Volga to the great fair of Nijni Novgorod—which, by the way, packs the greatest amount of instructive and entertaining description in the smallest space of any book of travels printed the past season—Mr. Munro Butler Johnstone remarks the profusion of water melons and cucumbers everywhere offered for sale. At the fair and on the road thither, pyramids of melons, like cannon balls in an arsenal, were heaped up in every direction; and as for cucumbers, one couldn't help thinking that a plague of cucumbers, like locusts, had descended upon the earth. All along the Volga, from Astrakhan to Nijni, the whole population seemed engaged in eating water melons, which were sold for three copecks, equivalent to one English penny, two cents. At every station the trade in melons was rivaled only by the traffic in sunflowers.

But if the water melon and the sunflower are luxuries and pastimes, the cucumber is a law and a necessity. One never sees a Russian peasant at dinner without a lump of black bread and a cucumber. "A moujick's dinner may be said to consist of x + cucumber." The x will consist of his favorite cabbage soup, with or without meat in it, and sometimes, in addition to it, the famous grit porridge; sometimes the soup is without the porridge, sometimes the porridge without the soup, but in either case the cucumber is always there; and should x equal zero, then the ever-faithful cucumber does duty for all the rest.

In the hot and arid regions of Southern and Southwestern Asia, these succulent vegetables are highly appreciated, and with good reason. Juicy and cool, they cannot but be always refreshing where water is a rarity; but in a climate like that of Russia, the cucumber is the last thing one would expect for a national dish. Mr. Johnstone suggests that their price—about the fifteenth part of a cent—may help to explain the anomaly. We are rather inclined to think it likely that the Russian peasant eats cucumbers, not so much because they are cheap, as because his remote ancestors, who came from the South, were cucumber eaters. To the one the taste for cucumbers was the natural result of climatic conditions; with the other it remains an inheritance and a national eccentricity, in spite of a naturally unfavorable climate.

NEW MODE OF HARDENING SANDSTONE.

In Saxony, sandstone is soaked in a solution of alkaline silicates and of alumina. The liquid penetrates some inches into the stone, and renders the surface so hard that it resembles marble and will bear polishing. On being heated to a high degree, the surface vitrifies, and it may be colored at pleasure.

A PAVEMENT ANIMALCULE.

Professor Leidy, of the Academy of Natural Sciences, describes in recently published proceedings of that body a curious animalcule which he discovered on street pavements. It is named *gromis* and resembles a cream-colored ball about one sixteenth of a line in diameter. When placed in water, it in a few minutes projects, in all directions, a most wonderful and intricate net. Along the threads of this net (which are less than one thirty thousandth of an inch in diameter) float minute *naviculae* from the neighborhood, like boats in the current of a stream, until, reaching the central mass, they are swallowed. Professor Leidy states that during dry weather the creature remains quiet in the dust, and that when rain falls it spreads its net and gathers food.

PREPARING BAMBOO FOR PAPER.

We mentioned recently Mr. Thomas Routledge's investigations relative to the utilization of bamboo as a paper making stock. The following is the method in which he treats the young plants: The stems are first passed through heavy crushing rolls, in order to split and flatten them, and at the same time crush the nodes. The stems then go through a second series of rolls, which are channelled or grooved in order to divide them into strips. The latter, being cut into convenient lengths by a guillotine knife or shears, are delivered by an automatic feeder direct to the boiling pans. Both the boiling and washing processes ordinarily in vogue for producing half stuff or semi-pulp, Mr. Routledge conducts in a series of vessels connected by pipes and furnished with

valves, so that communication between the vessels may be regulated as desired, and in such method that, the receptacles being charged in succession, the heated lye (composed of caustic alkali) can be conducted from vessel to vessel. The lyes are thus used over and over again until exhausted, fresh lye being continually supplied, until by degrees the extractive matters combined with the fiber have been rendered soluble. In the same manner hot water is admitted to remove the matters rendered soluble, leaving the fibers sufficiently cleansed. A final cooling stream of water is run on and through the fiber, which is drained and pressed. The semi-dry material is next submitted to the action of a "willow" or "devil," by means of which it is opened or teased out and converted readily into a tow-like condition, when it is dried by a current of heated air, induced by a fan blast. When baled up for storage, it may be kept for an indefinite length of time; and when received by the paper manufacturer, it has only to be soaked down and bleached in order to fit it for making paper.

WAFER CAPSULES FOR MEDICINES.

Among the latest devices for the administration of medicine is the wafer capsule, by means of which any dose, however unpalatable, can be taken without the slightest disagreeable taste. Capsules, generally speaking, are nothing new; but in the present case the novelty lies in the shape, which is much better than the gigantic elongated pill form ordinarily adopted, and also in the fact that the capsule is made of flour and water wafers, and may be supplied to druggists empty, and may be, by the latter, easily filled when medicines are dispensed. They are simple disks cut out of a thin wafer sheet by hollow punches. To render them concave, they are dampened between cloths and placed between two curved plates of tin, by which they are quickly shaped. The medicine is then placed between two wafers, the rims are brought together and moistened, and a slight pressure closes the edges tightly. Some simple apparatus for this purpose has been devised by Mr. E. M. Boring, of the Philadelphia College of Pharmacy.

ASTRONOMICAL NOTES.

OBSERVATORY OF VASSAR COLLEGE.

The computations and some of the observations in the following notes are from students in the astronomical department. The times of risings and settings of planets are approximate, but sufficiently accurate to enable an ordinary observer to find the objects mentioned. M. M.

Position of the Planets for February, 1875.

Mercury.

On the 1st of February, Mercury rises at 7h. 58m. A. M., and sets at 6h. 42m. P. M. On the 29th, Mercury rises at 5h. 31m. A. M., and sets at 3h. 41m. P. M.

Mercury, which was west of Saturn before January 28th, passes east of Saturn at that time, is again very near Saturn in right ascension on the 7th of February, but some degrees further north in declination, and too near the sun to be easily seen.

Venus.

Venus will be brilliant all through the month, setting at 7h. 50m. on the 1st of February, and at 8h. 55m. on the 29th. The moon will be in conjunction with Venus on the 28th.

Mars.

On the 1st of February, Mars rises at 9h. 41m. A. M., and sets at 10h. 13m. P. M. On the 29th, Mars rises at 8h. 36m. A. M., and sets at 10h. 4m. P. M. The moon will be in conjunction with Mars on the 29th.

Jupiter.

On the 1st of February, Jupiter rises at 2h. 15m. A. M., and sets at 11h. 52m. A. M. On the 29th Jupiter rises at 0h. 38m. A. M., and sets at 18h. 11m. A. M.

The most noticeable phenomenon connected with the motions of Jupiter in February is its near approach to the star β *Scorpii*, and the possible occultation of the star, by the planet, on the early morning of the 28th.

β *Scorpii* is a star of the second magnitude, and with an ordinary glass may be seen to have a companion star of the fifth magnitude.

Saturn.

On the 1st of February, Saturn rises at 8h. 3m. A. M., and sets at 6h. 21m. P. M. On the 29th Saturn rises at 6h. 21m. A. M., and sets at 4h. 49m. P. M.

Uranus.

On the 1st Uranus rises at 5h. 38m. P. M., and sets at 7h. 34m. A. M. of the next day. On the 29th, Uranus rises at 3h. 40m. P. M., and sets at 5h. 42m. the next morning. It is among the stars of *Leo*, and can be seen with an ordinary glass; its motion among the stars is toward the west.

Neptune.

Neptune can never be seen without a good telescope, and at present is not well situated.

Occultations.

On the 3d of February, the path of the moon will be among the beautiful stars of the *Pleiades*, and the moon will occult, or hide from our view, several of the small stars, and also γ *Tauri*, a star of the third magnitude. As the moon will be just past the first quarter in high northern declination, and the phenomena will occur in the evening hours, a fine opportunity will be afforded to those who love to watch these changes. To the astronomer, observations of occultations are valuable for determinations of differences of longitude.

Sun Spots.

The report is from December 18 to January 18 inclusive. Photography and observations have been much interrupted by clouds. Three pictures only have been taken, of the dates

December 22, December 23, and December 27. The photographs of December 22 and December 23 show, on the western limb, a large group or spots, which disappeared before the next picture, December 27. In the picture of this date, a pair of small spots was seen on the western limb. From December 27 to January 9, whenever observations could be made, the sun's disk, as seen through a glass of three inches aperture, was free from spots. On January 10 a very small group was observed on the western limb, but after that could not be found.

Success in Labor.

Mr. George W. Childs, of the *Philadelphia Ledger*, is one of the most successful newspaper publishers in the land. He is the friend of the laboring man, and practises himself the precepts which his paper advocates. The following editorial from a recent issue characterises the man—the publisher:

"There is nothing more essential to prosperity than the establishment in the popular mind of the intimate connection between efficient labor and true success. In one sense they are synonymous. Success consists not so much of the reward a man reaps from labor as the value of the labor itself. He who, by honest work of hand or head, is constantly enriching the world is intrinsically the successful man, whether riches or poverty fall to his lot; while he who amasses millions by speculation or fraud, leaving none to bless his memory when he is gone, has made his life a disastrous failure. We trust the time may arrive when this shall be the common acceptation of the word success, but at present it is not so. We usually measure it by what is gained—not by what is given; by the reward which labor brings—not by the intrinsic value of the labor itself. Even by this gage, however, the connection is still closely preserved. Eventually each one's personal welfare is strictly dependent upon his value to others. There may seem to be exceptions to this. Idleness and unfaithfulness may occasionally appear to reap the fruit that belongs of right only to honorable industry; but in the long run it is not so. The cheat is discovered, character is sifted, and justice is indemnified for her dishonored claims. Faithful, patient labor, of some sort that benefits mankind, is the only road to personal prosperity, and the success that seems to follow quicker and easier methods is short-lived and illusory.

"Few, however, believe this in their hearts. To many, work is only a disagreeable necessity, to be taken like medicine, in as small quantities as possible and dispensed with as soon as may be. They do not love it for its own sake, they do not care for its importance to mankind, or its reflex influence on their own characters. They do not specially desire to attain excellence in it, and they only put enough energy into its performance to accomplish immediate and necessary results. Their hearts are not in it; they are ever looking beyond and over it to find objects of interest. Other things excite, stimulate, and inspire them; their work alone is dull and irksome. Labor thus performed can never be of superior quality, can never greatly add to the happiness or progress of mankind, can never bloom into true success. It has no soul to animate, no hope to inspire, no vital power to develop it. A life spent thus, in unwilling and compelled labor, in which the heart has no place, is surely one of the saddest of failures. There are others again who fail in their life work because they are ashamed of it and think it beneath them. They blame fortune or circumstances for having condemned them to a toil which they conceive degrading. If their lot had been cast differently, they think, they might have made some mark in the world; if their work had been of a higher grade, they could have pursued it with energy and zeal; as it is, they only follow it from necessity and with no more assiduity than they are compelled to exert. Such persons make a fatal mistake. It is in them, not in their work, that the fault lies. For if they do not perform what is committed to them with fidelity and zeal, how can they be fitted for a higher post? Besides, this separation of work into ranks and grades is altogether artificial and unauthorized. Who can decide which labor is higher or lower than another, which is of more or less value to mankind? It is not the kind of work, but the manner in which it is done, that determines its value. The faithful day's work, in the field, the workshop, or the forge, in the kitchen or the factory, is far more honorable, useful, and elevating than that of the scheming politician or the flushed and eager speculator, who count his votes or his gains by the thousands, but whose labors add nothing to the prosperity, happiness, or virtue of the community.

"It is certainly important for each one to find his own appointed work in the world, that which he loves best, and can do best, as far as practicable; but it is folly to sit down sullenly and give way to despair and lethargy because he imagines he ought to occupy a more prominent or important post. Nine tenths of the changes made under this delusion prove to be for the worst instead of the better. The character and capacity that fail of success in the one case fail yet more signally in the other. Froude well says: "You cannot dream yourself into a character—you must hammer and forge yourself one;" and it is only by laying hold earnestly and vigorously of the work that lies nearest to us, and raising its value by putting into it all the vigor and energy, all the patience and fidelity, all the thought and ability we can command, that we have any right to expect success in any of its meanings."

The simplest way to dye billiard balls red is to soak them for ten or fifteen minutes in very dilute nitric acid, wipe them dry, and place them for the same length of time in an ammoniacal infusion of cochineal; repeat this until the desired color is obtained.