

SCIENCE NOTES.

At a recent meeting of the Royal Institution, Mr. F. A. Abel, F.R.S., chief chemist of the War Department, delivered an interesting lecture on "Substitutes for Gunpowder." He opened his discourse by briefly referring to the attempts made without any success, to apply more powerful explosive agents than gunpowder, and especially gun-cotton, to artillery. He next alluded to the more promising results obtained in small arms, especially those arrived at by the Gun-cotton Committee in 1867-8 with the Snider rifle and compressed gun-cotton, the explosion of which was controlled by the superposition of inert material between the particles. He then described some results obtained during the search for a safe and powerful agent for use in shells, and illustrated by experiments the influence of various physical and mechanical conditions upon the susceptibility of substances to explode by concussion, &c. This was followed by an account of picric powder, one of the safest of violent explosive agents, which has been shown to be a satisfactory material for shells, in regard to safe use and manufacture. With respect to progress in the application of explosives to mining and engineering purposes, Mr. Abel especially commented on gun-cotton and nitro-glycerine, and explained how the latter, the most dangerous of explosives in its pure liquid state, had been converted by Mr. Alfred Noble into the solid or plastic form, termed dynamite, which can be conveniently and safely used. Some other preparations of nitro-glycerine resembling dynamite were then noticed, including lithofracteur; and the individual merits of gun-cotton and dynamite were compared with each other and with gunpowder. It was shown that the first two are about equal in regard to power, and that, though they are very superior to gunpowder where great violence and suddenness of action are required (as in the removal of rocks and in the demolition of military works), yet there are certain applications in which the gradually explosive action of gunpowder is the most valuable, and which, in fact, render it irreplaceable. The readiness with which nitro-glycerine preparations freeze at rather high temperatures, in which state their successful employment demands special arrangements, was noticed as an inherent defect; while their plastic condition when unfrozen was described as a decided advantage, since they can be tightly rammed into blast holes of irregular form, for which use compressed gun-cotton is not so well adapted. The absolute safety of the manufacture of compressed gun-cotton, its secure preservation in the damp state, and the expeditious restoration of its powers by drying, were demonstrated; and the keeping qualities of these explosives were shown to be much more reliable now than in former times, when the conditions of their pure and uniform manufacture were not so well understood. The cause of the Stowmarket gun-cotton explosion of August last was then examined, and demonstrated to have been clearly due to accidental causes, totally unconnected with the stability of the material itself. The results of some recent experiments, instituted by the Government Committee on Gun-cotton on the south coast, were described as having thrown considerable light on the cause of the violence of the Stowmarket explosion, and to have demonstrated the advisability of placing dry gun-cotton under the same restrictions as other explosive agents. In conclusion, Mr. Abel referred to some interesting results, recently arrived at by Dr. Sprengel and himself, indicating that the application of explosive agents is still a fruitful subject for investigation.

PHYSIOLOGICAL EFFECTS OF COFFEE.—An interesting communication was recently made at a meeting of the Academy of Science in Paris in regard to the value of coffee as an article of food. Attention was called to a statement of Mr. Gasparin, in 1850, that the miners of Charleroi preserved their health and great vigour of muscular force, by the use of less than half of the nutriment indicated as necessary by theory and daily observation. Using food containing less nitrogen and carbon than the daily ration of the monks of La Trappe, whose countenances are pale, and who exercise scarcely one-fifth as much as an ordinary workman, these Belgian miners were most industrious and energetic in their labours. The secret of the difference was stated by Mr. Gasparin to consist in the use every day by these miners of a pint of an infusion of about an ounce of coffee, prepared in two quarts of water, which served the purpose of counteracting the injurious effect of an insufficient supply of food. Reference was also made to an experiment in 1860, by Mr. Jousand, in which, by the use of a decoction of about an ounce and a half of powdered coffee, a young man was kept, with no other food whatever, in good health and strength for seven days, during which time he took more active muscular exercise than usual, without any special inconvenience. The particular deduction from these experiments appears to be that coffee has an important action in preventing denutrition and emaciation. An illustration of this is seen, according to the author, in the effect upon the urea. In one experiment, about half a grain of caffeine was consumed daily, and the amount of urea was diminished 28 per cent.; while an infusion of about two ounces of roast coffee diminished it by 20 per cent. This is asserted to be the result by very careful experiments of a physiologist upon himself, proving that caffeine and roast coffee diminish the oxidation of the system, and temper the process of denutrition. The excessive frequency and intensity of the beating of the heart was also found to be reduced in several instances. It is probable, according to the author, that a similar action is exerted by some other substances—the Paraguay tea, especially, which, it is well-known, enables the natives of the Andes to subsist for a long time on an incredibly small amount of food.

ANILINE COLOURS POISONOUS.—According to Drs. Vohl and Eulenberg, of Cologne, aniline colours are poisonous. Aniline itself is an acknowledged poison, and all colouring matters containing unchanged aniline are therefore capable of poisonous effects. In the preparation of the colours the strongest oxidizing agents are used, and of these many are violent poisons, as arsenic acid, chlorides of zinc and tin, antimony and lead compounds. If any of these substances remain in the manufactured colouring matter, of course the article is dangerous; not of itself, for this is innocuous, but from the metal poisons it contains, and from the acids combined with them, as hydrochloric, acetic, arsenious and picric acids. Moreover, many colouring substances are manufactured from the residues of aniline factories, and these contain the largest amounts of poisonous matters. These last, on account of their less cost, are exclusively used, principally for red carpets, toys, common articles of confectionery, bonbons, drops, etc.;

also for toys made from transparent rubber, and for nursing bottles. Cases of poisoning from woollen and mixed goods, dyed with aniline colours, are known. The same is true of phenil colours, and the subject demands strongly the adoption of sanitary regulations.

A NOVEL THEORY.—A German physician has lately started the theory that the fearful disease known as small-pox originates from an excess of albuminous matter in the blood, and that this is to be prevented by the administration of common salt. The habits of children in indulging too freely in sweetmeats he considers one great cause of this undue development of albumen, and coffee and tea, if highly sugared, tend also to excite it in adults. An organic acid, such as lemon juice, he considers the best means of freeing the blood, when clogged with too much albumen, and he alleges that by taking these simple remedies in the way of precaution, he has, for upwards of twelve years past, frequented or taken up his abode in the most pestilential small-pox hospitals of Europe and South America with entire impunity.

NARCOTIC ACTION OF TOBACCO.—Vohl and Eulenberg have investigated the narcotic action of tobacco, especially examining the action of tobacco smoke. As the result of their analysis, they are led to the opinion that the disagreeable symptoms of the incipient smoker and the chronic affections produced by excessive smoking, as well as the poisonous effects of tobacco juice when swallowed, are due to the pyridine and picoline bases, and not to the nicotine. They explain the fact that stronger tobacco can be smoked in cigars than in a pipe, by finding that more of the volatile bases are present in pipe smoke, more especially of the very volatile and stupefying pyridine; while in a cigar little pyridine and much collidine are formed.

MISCELLANEOUS.

OLDEN TIME MANNERS.—Lady Holland once sent her page round the table to Macaulay to tell him to stop talking. She told Rogers, "Your poetry is bad enough, so pray be sparing of your prose." At a dinner in South Street, she fidgeted Lord Melbourne so much by making him shift his place when he was seated to his liking, that he rose up, exclaiming, "I'll be — if I dine with you at all;" and walked off to his own house, fortunately at hand. She requested a celebrated dandy to move a little farther off, on the ground that her olfactory nerves were offended by his blacking; the blacking which he vowed was diluted with champagne. Shortly after M. Van de Weyer's arrival in England as Belgian Minister, he was dining with a distinguished party at Holland House, when Lady Holland suddenly turned to him, and asked, "How is Leopold?" "Does your ladyship mean the King of the Belgians?" I have heard," she rejoined, "of Flemings, Hainauters, and Brabanters; but Belgians are new to me." His reply was, "My lady, before I had the honour to be presented to you, I have often heard you spoken of not only as a woman of intelligence and wit, but as a woman who had read much. Well, is it possible that you in your many readings have never met the book by a person named Julius Cæsar, who in his 'Commentaries' gives to our population the name of the Belgians, and this name we have preserved till our days?"

The latest duel recorded in the French journals, and reproduced by the *Courier des Etats Unis*, is of a novel and bloodless description, although waged between two rival journalists. The weapons used were umbrellas! And each of the combatants exultingly claims the victory for his *parapluie* and himself. Each tells his tale in *Figaro*, the *Punch* of Paris. The combatants were MM. Rogat and Ratisbonne; the place—the public street, on the Boulevard Montmartre; the weapons—umbrellas. M. Rogat opens his story thus:—"The umbrella duel is one of the traditions of the *Journal des Débats*. For, once on the street did not Sainte-Beuve attack Villemain? and after a brilliant passage of umbrellas, Villemain, severely stricken, took to his heels, abandoning his arms on the field of battle, like Demosthenes, 'ingloriously leaving his shield behind him.' Yesterday I encountered Ratisbonne on the street. The god of battles for the first time inspired him. He sought to quarrel with and struck me with his umbrella. I, too, had an umbrella, which, compared to that of my adversary, was as a Toledo blade contrasted with an ordinary weapon. I charged furiously back upon him. His sword—I mean his umbrella—being an inferior one, lost courage, and broke in his hands. I then spared him. Ratisbonne, adjusting the pieces of his broken weapon with an air of satisfaction, cried aloud, 'I have long sought this!' which I repaid by giving him a little more over the shoulders. A sergeant of police intervened, took us to a police station, and then sent us different ways about our business." He then adds a lament that a journalist should have provoked "so ignominious a contest" so disreputable to "the profession." "But all is for the best under this best of republics!" *Per contra*, M. Ratisbonne sustains the honour of his umbrella in another letter, giving his version of the affair, but declares he "inflicted upon him the chastisement he merited," and that he "successfully parried" with his umbrella the thrusts of M. Rogat.

At a time when the question of Women's Rights is debated so keenly, a clever little pamphlet published by Messrs. Blackwood, entitled "Why Women cannot be turned into Men," may be read with profit both by the supporters and opponents of the movement. The writer attempts to show, with considerable success, that the radical intellectual difference between the two sexes lies in the uninventiveness of women as compared to men. If women had been left to themselves, he asserts, corn would still be ground as it is in the East, in hand-mills; the spinning-wheel and distaff would hold their ground in every cottage; and the sewing-machine would never have come into competition with the domestic needle. It may be observed, by the way, that this uninventiveness is not necessarily confined to one sex. In India and China, mankind as well as womankind have lain for generations in a kind of intellectual torpor, content to use the appliances of their remote ancestors, without ever discovering anything new. Reverting to our pamphlet, the author traces this intellectual divergency to the diverse occupations of the man and woman in their original savage state. But how about their descendants? This is where the author's argument breaks down. If men begot men, and women women, we could understand this difference being transmitted through successive generations, but he is obliged to admit that women have

fathers as well as mothers, and the assertion with which he qualifies this admission, namely, that in their physical conformation women take much more after their mothers than their fathers, is, we think, contradicted by experience. It is usually understood that children of both sexes follow the mother in mind, the father in body. But though we dispute our pamphleteer's premises, we do not quarrel with his conclusion, namely, that there is a rooted and ineffaceable mental difference between the two sexes. The tone of this little essay is altogether sensible, moderate, and kindly; it is equally free from the sneering cynicism which too often characterises the conservative side in this inter-sexual agitation, and from the vehement self-assertion which occasionally distinguishes the party of reformers, and which tends in the estimation of moderate people to injure a good cause.

According to the last accounts from Constantinople, a serious difference has occurred among the leading Turks there on the question of the succession to the throne. Under the law which has regulated the succession during the last 500 years, the crown always passes to the eldest male of the Imperial family whose father was on the throne at the time of his birth, so that as a rule the Sultans have been succeeded, not by their sons, but by their brothers. It was in accordance with this law that the present Sultan, Abdul Aziz, ascended the throne on the death of his brother, Abdul Medjid, (25th of June, 1861) though the latter left seven sons. Abdul Aziz has four sons, the eldest of whom, Youssouf Izeddin, was born on the 9th of October, 1857, and is consequently, under the above law, disqualified for the crown, since at the time he was born his father was not as yet Sultan. The lawful heir is the eldest son of Abdul Medjid, Murad Effendi, who was born during his father's reign, on the 21st of September, 1840; but a strong party at Court now urges the Sultan to introduce the European system of succession, and declare his eldest son his heir. The old Mahometan party, however, is strongly opposed to such a course, which it considers would involve a departure from the precepts of the Koran, and as under the Koran a Mahometan is only bound to obey his sovereign in so far as he keeps within its restrictions, this opposition might lead to very serious results if the Sultan were to adopt the above proposal. Moreover, it is feared that the Princes of Servia and Roumania, the Khedive of Egypt, and the Bey of Tunis, who as it is bear with impatience the suzerainty of the Sultan, would seize the opportunity for declaring themselves independent if a Sultan were crowned who, according to the law which existed at the time when they did homage at Constantinople, would not be the rightful heir to the throne.

NOTES ABOUT RATS.—A writer in *Science Gossip* relate the following curious notes on rats:—"A gentleman, who has passed many years of his life at St. Helena, told me lately several stories about rats, so curious that I thought them worthy of record. He said that at one time the common brown rat was extremely common all over the island, in fact, a perfect pest; and to avoid its attacks his father had constructed a large store, rat proof: namely, a rat once in could not get out again. A number, however, came in with produce and goods from the ships, and bred there. Around this store were venetian blinds to the windows, and one day one of his men, when it was raining, watched a rat sitting on the venetian and putting out his tail to collect on it the drippings of water at the edge: he then withdrew it and licked it. The servant told his master, who immediately understood that the rats could get no water inside the store, and therefore directed that a butter firkin should be cut down to four or five inches, and in the top a large circular wire rat cage trap should be fixed. Several small planks were placed for the rats to get up to the entrance to the cage, which exactly fitted the firkin. No food would have induced the rats to enter the trap, but water did, and many were thus captured. There is one peculiarity with these rats, namely, their very often building or making their nests in the trees. I have in India several times found rats' nests in trees; but they have always been stonemasons' nests, such as deserted abodes of the squirrel or sparrow; but here my friend, who is no naturalist, tells me that they construct them principally of fir spines, on the ends of the boughs some twelve or fifteen feet from the ground, in the common fir trees. The spots selected are just where the overlapping bough nearly meets the lower one. He said that all know the rats' nests, and that he had seen them fired at, when many rats were killed and fell out to the ground. He could tell me no more, and I think that, if original nests, as he held them to be, some grass must be woven in their construction, as fir spines have but little power of cohesion. The situation of these nests was worthy of notice, although there is scarcely a situation where a rat's nest has not been found.

Foreigners are frequently astonished at the fondness of Americans for moving houses upon rollers from one part of a town to another. The custom, however, is not entirely free from disadvantages—a fact of which the residents of Flushing, Long Island, have just at the present a lively sense. A few days since a Baptist church in that village undertook a trip across the town. The peripatetic church, with the dignified slowness befitting its sacred character, consumed several days in reaching the principal street, and when it had reached the centre of the highway, leaving it nearly impassable except along the curb-stone, an injunction suddenly brought it to a stop. It now blockades the street, and must continue to do so until the injunction is modified or removed. It must certainly be embarrassing to the Flushing citizen to find his chief avenue occupied by a wandering church—not to mention the probability that the midnight reveller will be apt to impute intoxication to an edifice that he finds occupying the gutter when it should be elsewhere.

The Rev. Dr. M'C— was one day dining at a large party, when Mr. Erskine and some other lawyers were present. A great dish of cress was handed round after dinner, and Dr. M'C— helped himself much more largely than any other person; and, as he ate with his fingers, with a peculiar voracity of manner, Mr. Erskine was struck with the idea that he resembled Nebuchadnezzar in his state of demnation. Resolved to give him a hit for the apparent grossness of his taste, and his manner of eating, the wit addressed him with: "Dr. M'C—, you bring to my mind the great King Nebuchadnezzar!"

The company were beginning to titter at the ludicrous allusion, when the reverend vegetarian replied: "Ay, do I mind ye o' Nebuchadnezzar? That'll be because I am eating among the brutes!"