On Chromatic Photo-printing, being a mode of printing textile fabrics by the chemical action of Light, by Mr. R. Smith.—The author proposes to employ the chemical agency of light in dyeing or staining textile fabrics; the cloth, whether of wool, silk, flax, or cotton, being first steeped in a suitable solution, then dried in the dark, and subsequently exposed to the action of light, those parts which are to form the pattern being protected by pieces of darkened paper, or some other suitable material, attached to a plate of glass. When the desired effect is produced, the time for which varies from two to twenty minutes, according to the nature of the process, the fabric has to be removed, in order to undergo a fixing operation, whilst a fresh portion of it is exposed to light. This may easily be effected by the use of very simple mechanical arrangements, so that a number of photographic printing engines may be placed side by side, and superintended by one person. From the trials which Mr. Smith has made, he believes that even the diffused light of a cloudy day will have power enough for the operation, though of course a longer time will be required for its perfection than on a bright and sunny day. In order to obtain a pale blue or white pattern upon a blue ground, Mr Smith uses solutions of citrate, or tartrate of iron, and ferrocyanide of potassium; steeping the cloth subsequently in a dilute solution of sulphuric acid. Browns and buffs are obtained by using a solution of bichromate of potash; the excess of salt in the parts not acted on by light being afterwards either washed out, leaving those portions white, or decomposed by a salt of lead which forms a yellow chromate of lead. By combining these two processes with the use of madder, log-wood, and other dye stuffs, a great variety of tints may be obtained.

On 'Fire-arms, by Mr. Wilkinson.—In order to form some conception of the improvements lately proposed, and wholly or partially adopted, Mr. Wilkinson briefly alluded to the earliest fire-arms, which are still in use in India and various parts of the world. Commencing with the different modes of ignition, Mr. Wilkinson then proceeded to give a rapid sketch of the progressive steps by which fire-arms have arrived at their present state of comparative perfection. He described and exhibited, first, the matchlock, invented about the beginning of the sixteenth century: previous to which hand-guns were fired by a lighted match applied to the touch-hole in the same manner as to cannon. Second, the pyrites wheel-lock, introduced into this country about the time of Henry the Eighth, and continued to Charles the Second; in which ignition was obtained by the rapid revolution of a steel wheel against a pair of iron pyrites. Third, the flint lock, introduced about 1692, and generally used up to the close of the last war. Fourth, the percussion lock, invented by the Rev. Mr. Forsyth, and patented by him, April 11th, 1807, was generally introduced into our army in 1840. He then proceeded to explain the nature of the rifle, and the theory of projectiles, which was illustrated by diagrams. Mr. Wilkinson stated, that it has been calculated by French writers that with the old flint musket and spherical bullet during the last war, the maximum effect was only one in 3,000, either to kill or wound; and one in 10,000 was the minimum. So that, in some engagements 10,000 ball cartridges were expended to kill or wound *one man*; and a writer in the *Times* stated, a short time since, that 60,000 cartridges had been fired at the Cape, and only twenty-five Kaffirs killed. He observed, however, that this would not be the case in any future warfare; it will be much more destructive for the time, but of shorter duration. The percussion musket effected very little improvement in the accuracy or range of the bullet, but it produced much greater certainty of fire. It is wholly to the introduction of rifles and elongated projectiles that the recent improvements are due. We are told by Robins a century ago that this would be the case, but it generally requires a hundred years to convince any government. Mr. Wilkinson then gave a brief history of the changes in the form of the bullet introduced more than twenty years ago, by M. Delvigne, though suggested nearly a century since by Robins, who pointed out that the spherical form was not that best suited for projectiles. Lately the cylindrical-shaped bullet has attracted great attention from the ingenious modification of it invented by Capt. Minie, who added a small iron capsule to the lower end of the bullet. Lastly, Mr. Wilkinson described his own improved bullet, the form of which is *cylindro-ogivale* having two deep grooves round the base; and the novelty of which consists in the bullet being expanded in the act of discharging the rifle, although the bullet is perfectly solid. At the close of his paper, the author explained the electro magnetic chronoscope a mode of measuring the flight of projectiles invented by Prof. Wheatstone. The principle on which was effected, consisted in the interruption of an electric current, by the breaking of a fine wire, when the gun was fired, the circuit being again completed by another arrangement when the target was struck; whilst a clock, with suitable stop-hands, was employed to indicate the interval of time between the discharge and the blow on the target.—Mr. Varley, jun. inquired if Mr. Wilkinson's bullets were intended to be fired with any covering. He had found the Minie bullet more effectual with a covering than without. Mr. Wilkinson said, he preferred to use nothing but the naked powder and ball: the latter being rubbed with Russia tallow, or other grease, to fill the grooves. The pressure on the grooves squeezed out the grease, which lubricated the whole extent of the bore, and diminished friction; so that 100 rounds could be fired as easily as one. In reply to an objection to the use of grease in hot countries, Mr. W. stated that, with the thermometer at 130°, 100 rounds had been fired in thirty-six minutes; the barrel and other iron work being so hot that it could not be handled. The grease in that case was still used, but with the addition of about one-eighth of bees'-wax, which overcame the difficulty.

Improvement in Boring Operations.—From the *Miners' Journal*, published at Pottsville, Pennsylvania, we learn that an improved boring apparatus, patented by Mr. Knight, has been severely tested, by boring into the face of a granite rock 18 feet depth, and 21 feet in diameter, at the rate of 18 in. per hour. The framework of the machinery could not be properly fixed at first commencing the cutting, but when the excavating has entered about 30 feet, it will be connected by sleepers and braces, as firm as the rock which it is cutting out. The patented apparatus has been adopted by the North American Coal Company who are now employing it to bore to a seam of bituminous coal, called the "Big White Ash Vein," which they expect to win at a depth of about 50 fms. The hole is 4½ in. diameter, which is drilled at the rate of 11 feet in five hours. The machine is so arranged that 10 drills can be worked in a certain space at one time by any motive power, and the *debris* is washed up by a current of water from a pump worked by the same engine. Mr. T. S. Ridgway, mining engineer, of Minersville, states that during the winter of 1848 and spring of 1849 he had employed this machine in boring the Artesian well at East Boston for the Land Company, which worked well to a depth of 325 feet, but where not sufficient water was found, the stratum being a hard clay-slate, overlaying the primitive rock. The patentee is prepared, we understand to sink shafts to any depth, and in any strata, in half the usual time of those performed by hand labor, and at about one-third the expense. The operation of drilling through hard rock is one of considerable importance, and if this apparatus effects all the advantages which are claimed for it, the invention will prove of considerable value to the mining world.

History and Astronomy—In a paper read before the Royal Institution, by G. B Airy, Esq., Royal Astronomer, 'on the results of recent calculations on the Eclipse of Thales and Eclipses connected with it.' The Lecturer stated, that the conclusion as to the general fitness of the eclipse of B. C. 585 for representing the circumstances of the eclipse of Thales, by inference from modern elements of calculation, was first published by Mr. Hind in the *Athenæum*; and he said, that he had examined in greater or less detail every eclipse from B. C. 630 to B. C. 580, and that no other eclipse could pass over Asia Minor,—and gave it as his opinion that the date B. C 585 was now established for the eclipse of Thales beyond the possibility of a doubt.

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