Table II.—*Comparing the relative vitality (or ability to resist destructive influences) of the Blind, at different periods after admission, according to the combined experience of seven American State Institutions for the Blind, with that of the population of Massachusetts and England respectively. Calculated by Mr E. B. Elliott, Consulting Actuary, Boston.*

Years.	Number of Persons Admitted (known as Surviving or Deceased).	Number Deceased (previous to the middle of 1859).	Number Surviving in 1859.	Average Age on Admission.	Average Number of Years Elapsed (to middle of 1859).	According to Elliott's Massachusetts Life Table. Number that should be Surviving (in 1859.)	Deficiency of Actual Survivors, relative to the Number that should Survive. Number.	Per cent. 3 Year Group.	Per cent. 7 Year Group.	According to Farr's English Life Table. Number that should be Surviving (in 1859).	Deficiency of Actual Survivors, relative to the Number that should Survive. Number.	Per cent. 3 Year Group.	Per cent. 7 Year Group.
1832	13	4	9	12·7	27	9·7	0·7			10·1	1·1		
1833	49	17	32	16·4	26	36·3	4·3	7·1		37·6	5·6	10·4	
1834	29	7	22	15·9	25	21·8	0·2[1]			22·6	0·6		
1835	26	8	18	17·1	24	19·7	1·7		12·5	20·4	2·4		15·6
1836	33	12	21	15·5	23	25·5	4·5	17·8		26·5	5·5	20·7	
1837	45	18	27	16·3	22	35·1	8·1			36·3	9·3		
1838	41	12	29	14·9	21	32·6	3·6			33·8	4·8		
1839	30	12	18	14·5	20	24·2	6·2	12·3		25·0	7·0	15·4	
1840	37	8	29	16·6	19	29·9	0·9			31·0	2·0		
1841	47	7	40	14·2	18	39·0	1·0[1]			40·2	0·2		
1842	56	16	40	16·5	17	46·5	6·5	6·0	8·7	47·9	7·9	8·4	11·1
1843	70	13	57	12·7	16	60·2	3·2			61·6	4·5		
1844	68	14	54	13·9	15	58·6	4·6			59·9	5·9		
1845	43	11	32	14·6	14	37·3	5·3	8·9		38·3	6·3	11·0	
1846	51	9	42	15·3	13	44·6	2·6			45·6	3·6		
1847	35	8	27	14·2	12	31·2	4·2			31·7	4·7		
1848	43	12	31	16·3	11	38·3	7·3	11·1		39·1	8·1	12·6	
1849	60	8	52	16·8	10	54·2	2·2		7·6	55·1	3·1		9·1
1850	54	9	45	18·5	9	49·0	4·0			49·9	4·9		
1851	38	4	34	15·3	8	35·2	1·2	4·4		35·6	1·6	5·5	
1852	28	1	27	11·5	7	26·7	0·3[1]			26·7	0·3[1]		
1853	40	0	40	12·6	6	38·4	1·6[1]			38·3	1·7[1]		
1854	30	5	25	14·5	5	28·8	3·8	5·0		28·9	3·9	5·2	
1855	34	4	30	15·7	4	32·8	2·8			33·0	3·0		
1856	23	5	18	16·8	3	22·4	4·4		4·4	22·5	4·5		4·6
1857	16	0	16	17·6	2	15·7	0·3[1]	6·4		15·8	0·2[1]	6·7	
1858	23	0	23	18·0	1	22·8	0·2[1]			22·8	0·2[1]		
1859	40	0	40	16·2	0	40·0	0·0			40·0	0·0		

Note.—This table may be read thus:—Of the 68 persons admitted to the before-mentioned institutions during the year 1844, 14 died previous to the middle of the year 1859, and 54 were surviving in that year. The average age on admission of the 68 persons was 13·9 years, and the average number of years elapsed between the time of admission and the middle of the year 1859 was about 15 years. According to the Massachusetts Life Table, the number that should be surviving in 1859 was 58·6, showing the number of actual survivors to have been 4·6 less than the number demanded by such table. The deficiency (4·6 + 5·3 + 2·6 = 12·5) of actual survivors relative to the number that should survive of those admitted during the three years 1844, 1845, and 1846, was, according to the Massachusetts Table, 8·9 per cent. of (58·6 + 37·3 + 44·6 = 140·5) the number demanded; and the deficiency of actual survivors relative to the number that should survive of those admitted during the seven years 1839 to 1845 inclusive, was, according to the same life table, 8·7 per cent. of the number demanded. In like manner may be read the results derived from comparison with the English Life Table.

Table III.—*Summary of the results presented in the two preceding Tables, comparing the relative vitality (or ability to resist destructive influences) of the Blind, at divers ages of life, and also at divers periods after admission, according to the combined experience of seven American State Institutions for the Blind, with that of the population of Massachusetts and England respectively. Calculated by Mr E. B. Elliott, Consulting Actuary, Boston.*

Deficiency in the number of the Blind that survived in 1859, *relative to the number that should then be surviving.*

Ages on Admission.	According to the Massachusetts Life Table. Elliott. Per cent.	According to the English Life Table. Farr. Per cent.	Date of Admission (in Periods of *Three* Years).	Average Years Elapsed (to middle of 1859).	According to the Massachusetts Life Table. Elliott. Per cent.	According to the English Life Table. Farr. Per cent.	Date of Admission (in Periods of *Seven* Years).	Average Years Elapsed (to middle of 1859).	According to the Massachusetts Life Table. Elliott. Per cent.	According to the English Life Table. Farr. Per cent.
0–6	...	...	1832–34	25·8	7·1	10·4	1832–38	23·6	12·5	15·6
6–10	9·6	9·9	1835–37	22·8	17·8	20·7	1839–45	16·6	8·7	11·1
10–14	8·6	9·4	1838–40	20·0	12·3	15·4	1846–52	10·2	7·6	9·1
14–18	6·1	8·4	1841–43	16·9	6·0	8·4	1853–59	3·2	4·4	4·6
18–22	15·1	17·5	1844–46	14·1	8·9	11·0				
22–26	3·4	5·6	1847–49	10·8	11·1	12·6				
26–30	8·1	9·4	1850–52	8·2	4·4	5·5				
30 and over	15·4	15·2	1853–55	5·1	5·0	5·2				
Age not specified	10·4	12·4	1856–58	2·0	6·4	6·7				
All ages...	8·9	10·3								

Note.—This table may be read thus:—Of the number of persons admitted to the above-mentioned institutions, between the ages of 10 and 14, the number that was surviving in 1859 was 8·6 per cent. *less* according to the Massachusetts Life Table, and 9·4 per cent. *less* according to the English Life Table, than the number that should then be surviving. Of the number of persons admitted during the *three* years 1838–40, from which the average time elapsing to the middle of 1859 was 20·0 years, the number that survived in 1859 was 12·3 per cent. *less* according to the Massachusetts Table, and 15·4 per cent. *less* according to the English Table, than the number that should then have been surviving. Of the number of persons admitted during the *seven* years 1839–45, from which the average time elapsing to the middle of 1859 was 16·6 years, the number that survived in 1859 was 8·7 per cent. *less* according to the Massachusetts Table, and 11·1 per cent. *less* according to the English Table, than the number that should then have been surviving.

[1] Excess.

According to the first table, it appears that, of the entire 1102 persons admitted whose after-history is known, 878 now survive, whereas the Life Table of Massachusetts calls for about 979 survivors, thereby indicating that the power of the blind, represented by the returns of these institutions, to resist destructive influences is about 9 per cent. (10·3) *less* than that of the population of all England, and that the number of deaths is from 60 to 80 per cent. *greater*, according to the tables employed for the comparison, than the number required by such tables.

If we could draw our statistics from the blind as a whole, and not from the favoured few who have been taught in schools, the average duration of life would be much less. We should probably find the average amount of vital force, or power to resist destructive agencies, to be nearly one-fifth less than that of ordinary persons.

It is well known that the blind as a class are happy, contented, and cheerful. There are exceptions, of course, and it is unfortunate that Milton should have been one of them, because his eminence as a poet and scholar makes his example conspicuous, and his words to be taken as the natural language of a class of unfortunates. There have been others more admirable in this respect, for they set forth in their lives and conversation the sublime moral height to which men may attain by grasping courageously the nettle misfortune, and 'plucking thence the flower' happiness." (F. J. C.)

BLOCH, Mark Eliezer, a German naturalist, born at Ansbach, of very poor Jewish parents, about the year 1730. Having entered the employment of a surgeon at Hamburg, he was enabled by his own exertions to supply the want of early education, and made great progress in the study of anatomy, as well as in the other departments of medical science. After taking his degree as doctor at Frankfort-on-the-Oder he established himself as a physician at Berlin, and found means to collect there a valuable museum of objects from all the three kingdoms of nature, as well as an extensive library. His first work of importance was an essay on the different species of worms found in the bodies of other animals, which gained the prize offered by the Academy of Copenhagen. Many of his papers on different subjects of natural history, comparative anatomy, and physiology, were published in the collections of the various academies of Germany, Holland, and Russia, particularly in that of the Friendly Society of Naturalists at Berlin. But his greatest work was his *Allgemeine Naturgeschichte der Fische* (12 vols., 1782–95), which occupied the labour of a considerable portion of his life, and is considered to have laid the foundations of the science of ichthyology. The publication was encouraged by a large subscription, and it passed rapidly through five editions in German and in French. Bloch made little or no alteration in the systematic arrangement of Artedi and Linnæus, although he was disposed to introduce into the classification some modifications depending on the structure of the gills, especially on the presence or absence of a fifth gill, without a bony arch. To the number of genera before established he found it necessary to add nineteen new ones; and he described 176 new species, many of them inhabitants of the remotest parts of the ocean, and by the brilliancy of their colours, or the singularity of their forms, as much objects of popular admiration as of scientific curiosity. In 1797 he paid a visit to Paris, in order to examine the large collections of such subjects of natural history as had been inaccessible to him on the shores of the Baltic; and he returned to Berlin by way of Holland. His health, which had hitherto been unimpaired, began now to decline. He went to Carlsbad for its recovery, but his constitution was exhausted, and he died there on the 6th of August 1799.

BLOCK MACHINERY. A block is a case with its contained pulley or pulleys, by means of which weighty objects are hoisted or lowered with facility. There is nothing in the appearance of a block which, to an unpractised eye, would seem to require any stretch of mental ingenuity or of manual dexterity to manufacture. It is a machine apparently so rude in its structure, and so simple in its contrivance, that the name was probably given to it from its general resemblance to a log of wood, as is obviously the case with a butcher's block, a barber's block, the block of the executioner, &c. Of the two constituent parts of a ship's block, the external *shell* and the internal *sheave*, every carpenter might make the one, and every turner the other; but still block-making is a separate branch of trade, and it is necessary that it should be, for the whole efficiency of the block depends upon the proper proportions being observed between the various parts and the accuracy with which they are adjusted.

Mr Walter Taylor of Southampton took out a patent in the year 1781, to secure the benefit of some improvement he had made in the construction of the sheaves. He also shaped the shells, cut the timber, &c., by machinery driven by water, and carried on so extensive a manufacture of blocks as to be able to contract for nearly the whole supply of blocks and blockmakers' wares required for the use of the Royal Navy. Mr Dunsterville of Plymouth had a similar set of machines wrought by horse-power. Both his blocks and Taylor's were said to be superior to those constructed by the hand, though still deficient in many respects.

It would appear that it was the enormous quantity of blocks consumed in the course of a long protracted war that first called the attention of the Admiralty or Navy Board to the possibility of some reduction being made in the expense of so important an article, and to the imprudence of depending entirely on a single contractor. On these considerations, it seems to have been the intention of Government to introduce, among other improvements in Portsmouth Dockyard about 1801, a set of machines for making blocks there. About this time, too, Mr Brunel had completed a working model of certain machines for constructing, by an improved method, the shells and sheaves of blocks. This model was submitted to the inspection of the lords commissioners of the Admiralty, and it was decided to adopt Mr Brunel's more ingenious machinery.

The advantages to be gained were those common to all cases in which machine work supersedes hand labour, and consisted in the fact that, after the proper sizes of each part had been determined by careful calculation and experience, the machine could be made to observe these sizes with unerring accuracy, and so avoid all variations due to the carelessness or ignorance of the workman; these considerations are in blocks, perhaps more than in most things, of the utmost importance. Another advantage was, that the blocks could be made by Brunel's machinery about 30 per cent. cheaper than hand-made blocks had been previously obtained by contract, and the importance of this to the Admiralty in those days, when all ships were so heavily rigged, having no steam to supplement their sail power, will be sufficiently seen when it is stated that the remuneration which Brunel was to receive for his invention was agreed to be the savings of one year, and that these savings were estimated at £16,621; in addition to this he received an allowance of a guinea a day for about six years while engaged on the work, and was paid £1000 for his working model—the total amount paid to Brunel for the invention amounting to about £20,000.

The process may be described as follows:—Pieces of wood are cut roughly to the size of the block, and the first operation is then performed by the *boring-machine*, which bores a hole for the pin, and one, two, or three holes, as the case may be, for single, double, or treble blocks, to receive the first stroke of the mortising chisel; the block is next taken to the *mortising-machine*, where the mortise or mortises for the sheaves are cut; after this, to a *circular saw*, conveniently arranged for cutting off the corners and so preparing the block for the *shaping-machine*, which consists principally of two equal and parallel circular wheels moving on the same axis, to which one of them is firmly fixed, but on which the other is made to slide; so that these two wheels may be placed at any given distance from each other, and blocks of any size admitted between their two rims or peripheries. For this purpose, both rims are divided into ten equal parts, for the reception of ten blocks, which are firmly fixed between the two wheels. When the double wheel with its ten attached blocks is put in motion, the outer surface of the blocks, or those which are farthest from the centre, strike against the edge of a chisel or gouge fixed in a movable frame, which, being made to slide in a curved direction in the line of the axis, cuts those outward faces of the blocks to their proper curvature. A contrivance is attached to the cutting tool which allows of the curvature being altered in any required way. One side being shaped, the ten blocks are then, by a single operation, each turned one fourth part round, and another side is exposed to the cutting instrument moving in the same direction as before. A third side is then turned outwards, and after that the fourth side, when the whole ten blocks are completely shaped.

The velocity with which the wheels revolve, and the great weight with which their peripheries are loaded, would make it dangerous to the workmen or bystanders, if, by the violence of the centrifugal force, any of the blocks should happen to be thrown off from the rim of the wheels; to prevent the possibility of such an accident, an iron cage or guard is placed between the workman and the machine.

The last operation is performed by the *scoring-machine*, which cuts a groove to receive the binding or strapping of the block. The binding may be of iron or rope, and is very frequently of wire rope.

The Sheaves.—The machinery employed for making this part of the block consists of a *circular saw*, by which the log is cut into plates of the thickness required for the sheaves, according to their several diameters. These plates are next carried to a *crown saw*, which bores the central hole, and at the same time reduces them to a perfect circle of the assigned diameter. The sheave, thus shaped, is next brought to the *coaking-machine*, a piece of mechanism not inferior in ingenuity to the shaping machine for the shells. A small cutter, in traversing round the central hole of the sheave, forms a groove for the insertion of the *coak* or *bush*, the shape of which is that of three semicircles, not concentric with each other, nor with the sheave, but each having a centre equally distant from that of the sheave. The manner in which the cutter traverses from the first to the second, and from this to the third semicircle, after finishing each of them, is exceedingly ingenious. So very exact and accurate is this groove cut for the reception of the metal coak, and so uniform in their shape and size are the latter cast, the casting being made not in sand but in iron moulds, that they are invariably found to fit each other so nicely that the tap of a hammer is sufficient to fix the coak in its place. The coaks are cast with small grooves or channels in the inside of their tubes, which serve to retain the oil or grease for the pins.

The sheave, with its coak thus fitted in, is now taken to the *drilling-machine*, which is kept in constant motion. In casting the coaks a mark is left in the centre of each of the three semicircles. This mark is applied by a boy to the point of the moving drill, which speedily goes through the two coaks and the intermediate wood of the sheave. Rivets are put in these holes and clenched by hand. The next operation is performed by the *facing-machine*, which has two cutters, so arranged as to finish the side and groove the edge simultaneously; then the hole for the pin is enlarged to its exact size by the *broaching-machine*. The pins, which form a very important part of the block, are now made at Portsmouth, not of *iron* but of *steel*, carefully tempered by special appliances. They are turned by a *self-acting lathe*, and are then reduced to the exact required diameter, and polished in the *pin-polishing machine*. They are also, in this machine, subjected to a proof strain proportional to their sectional area, and thus the strength of the pin is guaranteed.

The blocks are invariably made of English elm, the grain of the wood running lengthways of the block; but in Germany recently, blocks have been made with the grain of the wood running across the block, the reason being that they are less likely to be split by the pressure on the pin of the sheave. The sheaves are made of lignum vitæ.

Three machines of each description for each operation, up to and including the facing-machine, are required. The smallest sized machines will make blocks of from 4 inches to 7 inches in length, the second size from 8 inches to 11 inches, and the largest from 12 inches to 17 inches. Two sizes of the *broaching-machine*, and one *pin-polishing machine*, are sufficient. Blocks larger than 17 inches are made by hand, 26 inches being the largest used in the Royal Navy.

As will be seen from the foregoing account, all machine-made blocks are cut out of a solid piece of wood; whereas hand-made blocks, larger than about 8 inches, are usually made in pieces, filled in at the ends and riveted together. It is questionable whether a block so made is not stronger than one cut out of the solid, as in the latter case the short-grained wood at the ends of the mortises is very liable to give way. In hand-made blocks the brass coak or tail of the sheave is not made of the peculiar shape described for machine-made blocks, but is usually of a circular shape.

The machinery for Portsmouth Dockyard, on Brunel's plans, was made by Maudslay, whose firm—now the very eminent firm of Maudslay Sons and Field—has since supplied block-making machinery to the Spanish, Turkish, and Russian Governments, and also to Chatham Dockyard; the last mentioned, however, has never been used, as the machinery at Portsmouth is capable of supplying all the dockyards, the demand for blocks being much less for the steamships and ironclads than it was formerly for the old sailing ships. The first cost of this machinery is so great that no private firm has yet ventured to set it up, and the whole of the blocks used in merchant ships are made by hand-labour, assisted by a lathe and two or three other simple mechanical contrivances. (T. M.)

BLOCKADE. It appears to have been the ancient practice of belligerents at the outset of a war to forbid by proclamation all trade on the part of neutrals with the enemy, and to treat as enemies all those who contravened the proclamation; and neutrals acquiesced tacitly in this practice until the commencement of the 17th century. In the course of that century the ancient practice came into question, as imposing on the commerce of neutrals an inconvenience not justified by any adequate necessity on the part of belligerents, and it has since fallen into desuetude. Belligerents, however, have still maintained, without any question on the part of neutrals, the practice of intercepting supplies going over sea to an enemy under certain conditions, namely, when a belligerent has invested an enemy's port, with the intention of reducing the enemy to surrender from the failure of supplies, and for that object a stoppage of all supplies to such port has become a necessary operation of the war. Any attempt, under such circumstances, on the part of a neutral merchant to introduce supplies into the invested port is a direct interference with the operations of the war, and is inconsistent with neutrality, and it accordingly subjects the offending party to be treated

as an enemy by the belligerent. The question, What constitutes such a belligerent investment of an enemy's port as to create an obligation on the part of neutrals to abstain from attempting to enter it, has been much controverted since the "armed neutrality" of 1780; but all uncertainty as to the principle upon which the decision in each case must proceed, has been put an end to by the declaration of the powers assembled in congress at Paris in 1856, that "Blockades, in order to be binding, must be effective, that is to say, must be maintained by a force sufficient really to prevent access to the enemy's coast." The question of fact will still be a subject for judicial inquiry in each case of capture, whether the conditions under which a blockade has been maintained satisfy the above declaration. If an asserted blockade is maintained in a manner which satisfies the above declaration, there is no limit to the extent of an enemy's coast which may be placed under blockade. There is also a general consent amongst nations that a neutral merchant must have knowledge of a blockade in order to be liable to be treated as an enemy for attempting to break it; but there is not any uniform practice amongst nations on this subject further than that when a blockade has become notorious, the knowledge of it will be presumed against every neutral vessel which attempts to enter the blockaded port. On the other hand, where a blockade is not notorious, it is in accordance with the practice of nations to give some notice of it to neutrals; and this notice may be communicated to them either by actual warning given to each neutral vessel which seeks to cross the line of blockade, or by a constructive warning to all neutrals resulting from an official notification of the blockade on the part of the blockading power to all powers in amity with it. It is a growing practice, if not altogether an established practice, amongst nations which accredit to one another resident envoys, for belligerents to notify diplomatically to the neutral powers the fact that they have placed an enemy's port under blockade; and it is the rule of the prize courts of Great Britain and of the United States of America to hold that, where such an official notification has been made, all the subjects of the neutral powers may be presumed to have knowledge of the blockade. Other powers, amongst which France may be mentioned, have been accustomed to direct their blockading cruisers to give warning of the blockade to each vessel that attempts to cross the line of blockade, and not to capture any vessel unless she attempts to break the blockade after such warning; but the practice of France agrees with the practice of other powers in not giving such warning after a blockade has become notorious. There is, further, a general practice amongst nations to treat the act of sailing with an intention to enter a blockaded port as an unneutral act, which will warrant the capture of a neutral merchant vessel by a belligerent cruiser on any part of the high seas, unless clear evidence is forthcoming from the captured vessel that the intention has been abandoned, or that its execution was contingent on the blockade being raised. After a port has been placed under blockade, egress is prohibited to all neutral vessels, except to such as have entered the port before the blockade was established, if they come out either in ballast or with cargoes taken on board before the commencement of the blockade. No warning is required to affect such vessel with a knowledge of the blockade, and if any such vessel should succeed in passing through the blockading squadron it becomes liable to capture as good prize by a belligerent cruiser on any part of the high seas, until it has reached its port of destination, when the offence is considered to be purged. Under the ancient practice both ship and cargo were confiscable for the breach of a blockade, and even the captain and crew were liable to be treated as enemies. A milder practice is now generally observed as regards the captain and crew, and a certain equity is administered in the British and American prize courts towards the owners of cargo, where the ship and the cargo do not belong to the same parties, and the owners of the cargo have not any knowledge of the blockade, or have been unable to countermand the shipment of the cargo since the blockade has become known to them. In such cases the cargo is released, although the ship may be rightfully condemned to the captors. (T. T.)

BLOIS, the chief town of the department of Loir-et-Cher in France, is situated in the form of an amphitheatre on the steep slope of a hill on the right bank of the Loire, 35 miles S.W. of Orleans, in 47° 35′ N. lat. and 1° 29′ E. long. It is united by a bridge of the 17th century with the suburb of Vienne on the other side of the river. The houses of the older part of the town are frequently of antiquarian interest, and the streets, which are in many cases rather stairways than streets, have often a picturesque appearance. The castle is an immense structure built at different periods, part as early as the 13th century. It was the birth-place of Louis XII., and is noted as the scene of the assassination of the duke of Guise and his brother the cardinal by command of Henry III. Among the other remarkable buildings in the town are the Hôtel de Ville, the episcopal palace, now occupied by the prefecture, the cathedral of St Louis (a modern structure), and the churches of St Vincent and St Nicholas. An ancient aqueduct, cut in the solid rock by the Romans, conveys the water of several springs to a reservoir, whence it is distributed to different parts of the town. Blois is the seat of a bishopric founded by Louis XIV., and has a communal college, a normal school, and two diocesan seminaries; an exchange, a hospital, a theatre, a botanical garden, a public library, and an agricultural society. It manufactures gloves, hosiery, hardware, and pottery, and has a considerable trade in wine, brandy, and timber. Population in 1872, 17,475. Though possibly existing under the Roman empire, Blois is first distinctly mentioned by Gregory of Tours in the 6th century, and does not become of much importance till the 9th or 10th, when it forms the chief town of a countship. From that date it appears very frequently in French history In 1577 and 1588 the States-General were held in the city.

BLOMFIELD, Charles James, bishop of London, was born on the 29th May 1786, at Bury-St-Edmund's. He received his first education at his father's school in that town, and was then transferred to the grammar school, where, under the able instruction of the Rev. M. T. Becher, he laid the foundations of an unusually sound and thorough classical scholarship. His career at Trinity College, Cambridge, which he entered in 1804, was brilliant. He gained the Browne medals for Latin and Greek odes, and carried off the Craven scholarship. In 1808 he graduated as third wrangler and first medallist, and in the following year was elected to a fellowship at Trinity College. The first-fruits of his scholarship was an edition of the *Prometheus* of Æschylus, in 1810; this was followed by editions of the *Septem contra Thebas*, *Persæ*, *Choephoræ*, and *Agamemnon*, of Callimachus, and of the fragments of Sappho, Sophron, and Alcæus. Blomfield, however, soon ceased to devote himself to mere scholarship. He had been ordained in 1810, and held for a short time the curacy of Chesterford. He was then presented to the rectory of Quarrington, and shortly afterwards to that of Dunton, in Buckinghamshire, where he remained for about five years. In 1817 he was moved to the benefices of Great and Little Chesterford and Tuddenham, and he was in the same year appointed private chaplain to Howley, bishop of London. In 1819 he was nominated by Lord Liverpool to the rich living of St Botolph's, Bishopsgate, and in 1822 he became archdeacon of Colchester. Two years later he was raised to the bishopric of Chester, and in that position began his career of incessant labour for the advancement of the church. Many reforms were needed in the diocese, and the new bishop's energy and ardour succeeded in effecting much, though not without stirring up enemies. In 1828 he was transferred to a wider sphere of activity, being raised to the bishopric of London. This important office he held for eight-and-twenty years, labouring incessantly in a field where unremitting exertion was absolutely necessary. He gave his whole heart to the endeavour to extend the influence and efficiency of the church, and his strenuous activity was not without result. In all political or social movements which concerned the church the bishop took a prominent part. He was noted as being one of the best debaters on the episcopal bench in the House of Lords; he took a leading position in the action for church reform, which culminated in the Ecclesiastical Commission; and he did much for the extension of the colonial episcopate. His health gave way under his unceasing labours, and in 1856 he was permitted to resign his bishopric, retaining Fulham palace as his residence, along with a pension of £6000 per annum. He died at Fulham on the 5th August 1857. In private life Blomfield was warm-hearted, genial, and kindly; he was fond of travelling and of intellectual society, in which he was well qualified to shine. His published works, exclusive of those above mentioned, consist of charges, sermons, lectures, and pamphlets, and of a *Manual of Private and Family Prayers.* He was a frequent contributor to the quarterly reviews, chiefly on classical subjects. An admirable memoir has been published by the bishop's son, *Memoirs of Charles James Blomfield, D.D., Bishop of London, with Selections from his Correspondence,* edited by his son, Alfred Blomfield, M.A., &c., 1863. See also Biber, *Bishop Blomfield and his Times,* 1857.

BLONDEL, DAVID, a Protestant clergyman, distinguished by his proficiency in ecclesiastical and civil history, was born at Chalons-sur-Marne in 1591, and died in 1665. In 1650 he succeeded G. J. Vossius in the professorship of history at Amsterdam. His works were very numerous, and were remarkable even at that period for obscurity of style. The most celebrated of them was the dissertation on Pope Joan, in which he came to the conclusion that the whole story was a mere myth. Considerable Protestant indignation was excited against him on account of this book.

BLOOD. See ANATOMY and PHYSIOLOGY

BLOOD, THOMAS, generally known by the appellation of *Colonel Blood,* was a disbanded officer of the Parliamentary army. Bearing a grudge against the duke of Ormond, who had defeated a conspiracy he engaged in to surprise the castle of Dublin, Blood seized the duke one night in his coach in St James's Street, and carried him off a considerable distance, resolving to hang him at Tyburn; but Ormond struggled for his liberty and was rescued by his servants. Soon after, in 1671, Blood formed the design of carrying off the crown and regalia from the Tower,—an attempt which very nearly proved successful. He had bound and wounded Edwards, the keeper of the jewel-office, and had escaped out of the Tower with his prey; but he was overtaken and seized, together with some of his associates. One of these was known to have been concerned in the attempt upon Ormond, and Blood was immediately concluded to be the ringleader. When questioned, he frankly avowed the enterprise, but refused to discover his accomplices. All these extraordinary circumstances induced Charles II. to seek an interview with him, which not only led to his pardon, but to the king's granting him an estate of £500 a year in Ireland, encouraging his attendance about his person, and showing him great favour. He died August 24, 1680.

BLOOMFIELD, ROBERT, was born of very humble parents at the village of Honington in Suffolk, in 1766. Losing his father at the age of eleven, he was apprenticed to a farmer, and could only cultivate his literary tastes by perusing such books as he could borrow. Thomson seems to have been his favourite author, and *The Seasons* inspired him with the ambition of being a poet. He came to London, and composed *The Farmer's Boy* in a garret in Bell Alley. The manuscript fell into the hands of Capel Lofft, who encouraged him to print it, and it succeeded so well, that above 26,000 copies of it were sold. His reputation was increased by the appearance of his *Rural Tales, Songs and Ballads, News from the Farm, Wild Flowers,* and *The Banks of the Wye.* These are of unequal merit; but all breathe a spirit of purity and enthusiasm for the beauties of nature, that place the name of Bloomfield among the most natural and amiable of our pastoral poets. The extensive sale of *The Farmer's Boy* and *Wild Flowers* seems to have done little for the benefit of the poet, who died in poverty at Shefford in Bedfordshire in 1823. His *Remains in Poetry and Verse,* 2 vols., appeared in 1824, and another edition of his poems in 1866. A selection from his correspondence, edited by Hart, appeared in 1871.

BLOUNT, CHARLES, younger son of Sir Henry Blount, was born at Upper Holloway, April 27, 1654, and died 1693. He gained considerable reputation as a politician and man of letters, but his abilities were not great, and his strength lay in scoffing infidelity. His *Anima Mundi, or an Historical Narration of the Opinions of the Ancients concerning Man's Soul after this Life, according to Unenlightened Nature,* gave great offence; and his translation of Philostratus's *Life of Apollonius Tyanæus* was suppressed for the flippancy and impertinence of its attacks on revealed religion. A similar work of his, called *Great is Diana of the Ephesians,* under colour of exposing superstition, struck at revelation. In 1684 he printed a kind of introduction to polite literature, under the title of *Janua Scientiarum.* His *Just Vindication of Learning and of the Liberty of the Press* (1693) is a shameless plagiarism from the *Areopagitica.* The pamphlet which he sent anonymously to Bohun, the censor, entitled *King William and Queen Mary Conquerors,* set all London in a flame, and completely attained its object, the ruin of Bohun. Indirectly it had a good result in directing attention to the folly of the censorship. After the death of his wife, he proposed to marry her sister, and wrote a letter on that subject with great learning and address; but the archbishop of Canterbury and other divines decided against him, and the lady having therefore refused him, he is said to have shot himself, or, according to Pope's account, to have given himself a mortal wound in the arm. A collected edition of his works was published in 1695 by Gildon, with a life by the editor. See Macaulay, *History,* iv. 352, *sqq.*; Lechler, *Ges. d. Englisch. Deismus,* 114–127.

BLOW, JOHN, an English musical composer, was born in 1648 at North Collingham in Nottinghamshire. He was educated at the chapel royal, and distinguished himself by his proficiency in music, having composed several anthems at an unusually early age. In 1673 he was made a gentleman of the chapel royal, and in 1685 was named one of the private musicians of James II. In 1687 he became master of the choir of St Paul's Church; in 1695 he was elected organist of St Margaret's, Westminster, and in 1699 composer to the chapel royal. In 1700 he published his *Amphion Anglicus,* a collection of pieces of music for one, two, three, and four voices, with a figured-bass accompaniment. Doctor Burney says that in the *Amphion Anglicus* "the union of Scottish melody with the English is first conspicuous." Blow died in 1708, and was buried in the north aisle of Westminster Abbey. None of his compositions, most of which are anthems, attain the highest order of merit.

BLOWPIPE, a tube for directing a jet of air into a fire or into the flame of a lamp or gas jet, for the purpose of producing a high temperature by complete and rapid combustion. The blowpipe has been in common use from the earliest times for soldering metals and working glass; and since 1733, when Anton Swab first applied it to analysis of mineral substances, it has become a valuable auxiliary to the mineralogist and chemist, in the chemical examination and analysis of minerals. Its application has been variously improved at the hands of Cronstedt, Bergmann, Gahn, Berzelius, Plattner, and others, but more especially by the two last-named chemists.

The simplest and oldest form of blowpipe (still used by gasfitters, jewellers, &c.), is a conical brass tube, about 7 inches in length, curved at the small end into a right angle, and terminating in a small round orifice, which is applied to the flame, while the larger end is applied to the mouth. Where the blast has to be kept up for only a few seconds, this instrument is quite serviceable; but in longer chemical operations inconvenience arises from the condensation of moisture exhaled by the lungs in the tube. Hence many blowpipes are made with a cavity for retaining the moisture. Cronstedt placed a bulb in the centre of his blowpipe. Dr Black's convenient instrument consists of a conical tube of tin plate, with a small brass tube, supporting the nozzle, inserted near the wider end, and a mouthpiece at the narrow end. One of the most suitable forms of blowpipe is that shown in fig. 1. It is Gahn's instrument as improved by Plattner.

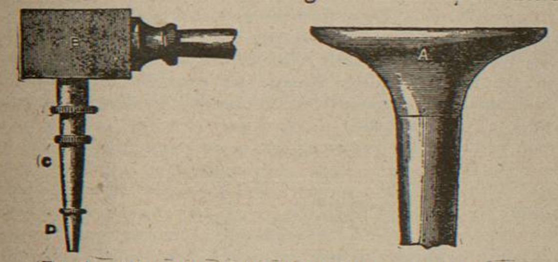

FIG. 1.—Extremities of Gahn's Blowpipe,—ordinary size.

The tube A is ground to fit accurately into a socket at the top of the water-trap B, as is also the jet-pipe C. The nozzle D, of platinum, is fitted in the same manner, so that it can be easily removed and replaced while hot; *e.g.* when it is desired to remove the crust of soot which deposits upon the point when an oil lamp or candle is used. The sizes of orifice recommended by Plattner are 0·4 and 0·5 millim. The trumpet mouthpiece, from the support it gives to the cheeks when inflated, conduces to a more steady and long-continued blast being kept up without fatigue than when the mouthpiece is inserted between the lips. Mr David Forbes has suggested the use of a double jet-pipe in connection with this instrument, so that a large or small orifice may be obtained without stopping the point; but it is doubtful whether the advantage gained is counterbalanced by the extra cost and complication. For the majority of blowpipe workers, there is probably no better instrument than Dr Black's, if provided with a properly-shaped nozzle, if possible of platinum; but where it is much used, the large-sized trumpet-mouthed instrument of Plattner is to be preferred. The instrument should be held with the first and fourth fingers passed round it, and the thumb laid along the side of the tube, the hold being steadied by resting the elbow on the table. The mode of blowing is peculiar, and requires some practice; an uninterrupted blast is kept up by the muscular action of the cheeks, while the ordinary respiration goes on through the nostrils.

If the flame of a candle or lamp be closely examined, it will be seen to consist of four parts—(*a*) a deep blue ring at the base, (*b*) a dark cone in the centre, (*c*) a luminous portion round this, and (*d*) an exterior pale blue envelope. The blue ring is formed chiefly by combustion of carbonic oxide. In the central cone the combustible vapours from the wick, though heated, are not burned, atmospheric oxygen not reaching it. In the luminous portion the supply of oxygen is not sufficient for complete combustion; the hydrogen takes up all or most of it, and carbon is precipitated in solid particles and ignited. In the exterior envelope, lastly, the temperature is highest, and combustion most complete,—sufficient oxygen being supplied to convert the carbon and hydrogen into water and carbonic acid.

In blowpipe work only two of these four parts are made use of, viz., the pale envelope, for *oxidation,* and the luminous portion, for *reduction.* To obtain a good *oxidizing flame,* the blowpipe is held with its nozzle inserted in the edge of the flame close over the level of the wick, and blown into gently and evenly. A conical jet is thus produced, consisting of an inner cone, with an outer one commencing near its apex:—the former, corresponding to (*a*) in the free flame, blue and well defined; the latter, corresponding to (*d*), pale blue and vague. The heat is greatest just beyond the point of the inner cone, combustion being there most complete. Oxidation is better effected (if a very high temperature be not required) the farther the substance is from the apex of the inner cone, so far as the heat proves sufficient, for the air has thus freer access.

To obtain a good *reducing flame* (in which the combustible matter, very hot, but not yet burned, is disposed to take oxygen from any compound containing it), the nozzle, with smaller orifice, should just touch the flame at a point higher above the wick, and a somewhat weaker current of air should be blown. The flame then appears as a long, narrow, luminous cone,—the end being enveloped by a dimly visible portion of flame corresponding to that which surrounds the free flame, while there is also a dark nucleus about the wick. The substance to be reduced is brought into the luminous portion, where the reducing power is strongest.

The flame of an oil-lamp is the best for blowpipe operations where gas is wanting; candle flame may be used when great heat is not required. The blowpipe lamp of Berzelius, supplied with colza oil, is probably the most suitable. The wick, when in use, should be carefully trimmed and clean, so as to avoid a smoking flame. The general introduction of gas has quite driven out the use of oil-lamps for blowpipe purposes in laboratories.

Various materials are used as supports for substances in the blowpipe flame; the principal are charcoal, platinum, and glass. *Charcoal* is valuable for its infusibility and low conductivity for heat (allowing substances to be strongly heated upon it), and for its powerful reducing agency by the production of carbonic oxide when ignited; so that it is chiefly employed in trying the fusibility of minerals, and in reduction. The best kind of charcoal is that of close-grained pine or alder; it is cut in short prisms, having a flat smooth surface at right angles to the rings of growth. In this a shallow hole is made with a knife or borer, for receiving the substance to be held in the flame. *Platinum* is employed in oxidizing processes, and in fusion of substances with fluxes with a view to try their solubility in them, and note the phenomena of the bead; also in observing the colouring effect of substances on the blowpipe flame (which effect is apt to be somewhat mashed