

"When I had to repair prints so torn that they exhibited only scraps pasted upon other paper, I was afraid of losing these fragments in the liquid, because the paste became dissolved. In such cases I enclosed the prints in a cylindrical glass vessel, which I inverted on the water in which I had put the mixture proper for extracting the oxygenated muriatic acid gas. This vapour, by filling the whole inside of the jar, acted upon the print, extracted the grease as well as ink spots, and the fragments remained pasted to the paper."

A solution of peroxide of hydrogen (H_2O_2) has been used with great success in the restoration of valuable prints, as well as for cleaning and reviving oil painting darkened by the action of sulphurous vapours.

BLEACHING OF WOOL

The bleaching of wool and animal fibres generally is a much simpler and less important operation than is the whitening of vegetable fibres. Wool is covered with a peculiar varnish or greasy matter which impairs its qualities, and which it is the object of the bleacher to remove. To this varnish the name of "yolk" or "suint" is given. It is a fatty unctuous matter, chiefly derived from the cutaneous perspiration, but, no doubt, also secreted by the pores of the wool itself; and it imparts that peculiar heavy odour to sheep with which all must be familiar. From the researches of Vanquelin it would appear that this unctuous varnish consists chiefly of a kind of soap, together with a small quantity of waxy matter, a peculiar odorous animal substance, a mixture of potash salts, and a little lime. This varnish, in consequence of its soapy nature, is soluble in water, so that washing in pure water would remove the greater portion of it; but it is found more advantageous to remove it by the process termed "scouring."

Scouring is performed by means of an ammoniacal lye, prepared of river or other soft water mixed with stale purified urine, which is found to contain a large quantity of ammonia, upon which its action probably depends. The mixture is heated by steam to a temperature at which the hand of the workman can be easily held in it for a considerable time. In this bath the wool is left for from half an hour to two hours, according to the quantity of greasy matter it contains. It is then to be taken out and drained into a basket, so that the drainings may drop into the vessel in which it was steeped, that nothing may be lost. It must now be completely rinsed by exposing it in baskets to a continuous stream of clear water, while a workman is perpetually employed in stirring it with a pole, till the water passes off perfectly clear. As a substitute for urine pig's dung is sometimes used, and various other substances have been proposed and introduced, such as ammoniacal salts, soda-ash, phosphate of soda, and soluble glass. Recently a machine, Petrie's wool-washer, has been introduced for scouring wools. It consists of a range of three or four long tanks, clean water entering at one end of the series and flowing through the whole. The wool is introduced at the end of the range where the water escapes, and where it is consequently most highly charged with the impurities of the washing process, and it is carried forward from one tank to another till it is lifted out at the point where the pure water enters.

It is known that the wool is properly scoured by its filaments being smooth, long, slender, white, and perfectly free from foreign substances, and not having lost their natural tenacity. If this scouring be properly done there is no need of further washings in soaps, or otherwise, till the wool is subjected to the process called "sulphuring;" and in point of fact it is very rarely passed through any other process. Some, however, recommend for the finer wools, where a very delicate white is wished, that they should be passed through one, two, or more baths of soft soap. No caustic

alkaline lyes can be employed, as they destroy the wool altogether, dissolving it, and forming with it a kind of soap.

The process of sulphuring is applied to yarns and woven goods only when they are intended to be finished white or light bright colours. Formerly, the method of sulphuring woollen goods was to expose them in a close apartment to the vapour of burning sulphur. The goods were hung on poles, and when the chamber was filled, a quantity of sulphur placed in very flat and broad dishes was allowed to burn away gradually in the chamber, while every aperture by which the vapour could escape was carefully closed. After exposure to the sulphurous acid vapours from six to twenty-four hours the bleaching process was complete, and the goods withdrawn from the chamber. The same process is now much more expeditiously performed by Thom's sulphuring process. The goods are passed on a long chain up and down over a series of rollers in a small chamber filled with sulphurous acid vapours, and a few minutes suffice for the operation. Sulphite of soda acidified with hydrochloric acid is also used in France for the bleaching of woollen fabrics.

Cloth which is to be finished white after the sulphuring process is run through a bath containing some indigo carmine, which increases the brilliancy of the white. When it is to be dyed it is treated with dilute sulphuric acid, thoroughly washed, and dried.

BLEACHING OF SILK

Raw silk is covered with a kind of varnish, the nature of which was first thoroughly investigated by M. Roard. He showed that this varnish, instead of being a gum, as was usually believed, resembled a mixture of bees' wax and oil, with a resinous colouring matter, and in raw silk constituted 23 or 24 per cent. of the weight. The varnish is soluble in water, and affords a solution which forms a lather like soap. The yellow varnish is of a resinous nature, and is insoluble in water, but is soluble in alcohol. The waxy substance exists in all silks, but the whiter the silk the less wax does it contain.

The comparative composition of yellow and white raw silk is shown by M. Mulder's analysis:—

	Yellow.	White.
Fibroine.....	53.37	54.04
Gelatine.....	20.66	19.08
Albumen.....	24.43	25.47
Wax.....	1.39	1.11
Colouring matter.....	0.05	...
Fatty and resinous matter.....	0.10	0.30

This varnish, or "gum," as it is technically called, gives the silk a stiffness and elasticity which, for many of the purposes to which silk is applied, it is desirable to remove. This is called "ungumming" by the bleachers of silk. Though many different processes have been suggested for this purpose, none seems to answer so well as the old process of scouring in a weak solution of soap. If, however, the silk be kept in the soap too long after the varnish is removed, it begins to lose body, and has its qualities impaired, becoming dull, stiff, and discoloured, in consequence of being partly dissolved. White or yellow silks may be completely scoured in one hour in the soap bath, using about 15 lb of water for each pound of silk, and a suitable quantity of the finest soap. The soap and silk should be put into the water half an hour before it is brought to the boiling point, and then be boiled one hour. They are then removed, wrung out, washed in pure water, and either exposed to the vapour of sulphur or passed through a solution of sulphurous acid gas in water.

The following is the process usually followed by the scourer of silks. A quantity of water is put into a boiler over a fire, and for every 100 lb of silk to be scoured, 30 lb

of very fine soap are dissolved. The solution is generally boiled; but before the silk is put into it, the heat must be lowered to about 90° Fahr., and at this temperature it must be kept during the process. The silks are to be hung in the liquor on rods or frames, and left till the gum is sufficiently destroyed,—care being taken to alter their position now and then, so that every part may be exposed to the action of the bath. When perfectly un gummed, they are flexible and of a dull whiteness; in this state they are to be wrung out to clear them of the soapy water, then well shaken, and put into coarse linen bags, in parcels of from 20 to 30 lb each.

These bags are now to be steeped in a fresh bath, or, as the workmen say, are to be baked. The bath is prepared in a manner and proportion much as before, except that the quantity of soap may be somewhat diminished as the heat is to be increased; for the silk is now to be boiled for an hour and a half, taking care to keep the bags from sticking to the bottom of the boiler, by frequently stirring them with a stick. For silk that is intended to be dyed, the former steeping in the lukewarm soap-bath is unnecessary, and the boiling only is employed, using a greater quantity of soap in proportion to the fineness of the colour. After boiling the silk is wrung as before, and then washed, and if it is found to be not sufficiently or not uniformly scoured, it must be submitted to a fresh bath.

The white silk usually sold has a bluish shade given it by a bath impregnated with litmus or indigo. This is prepared by dissolving a pound and a half of fine soap in about 90 gallons of water, in which a small quantity of litmus or indigo has been diffused. This process gives to the silk the tints known by the names of "silver white," "azure white," and "thread white," according to the depth of shade which has been imparted. The "China white" tint is given by adding arnotto to the bath instead of indigo.

From these processes the silk acquires a tolerably clear white, but the highest degree is given to it by the action of sulphurous acid, the silk being either, as is usually the case, subjected to the acid in the state of vapour, or immersed in a solution. At Lyons no soap is used in the tinting process; but, after being boiled, the silk is washed, wrung dry, sulphured, and then passed through water properly bleued.

BLEACHING OF BEES'-WAX, &c.

Bees'-wax in its raw condition, as it is first melted up from the comb, is a yellowish coloured substance somewhat greasy to the touch, and having a faint honey-like odour. It often contains mechanical impurities, besides traces of honey, and to remove these and discharge the colour the following process is adopted:—The wax is broken up into small pieces and melted in a copper boiler, with water sufficient to keep it from burning. When melted it is run into a tub containing hot water, and while in the hot fluid condition the mechanical impurities it may have contained subside to the bottom. From this tub the melted wax flows

BLEEK, FRIEDRICH, one of the greatest Biblical scholars that Germany has produced in modern times, was born on the 4th July 1793, at Ahrensböck, in Holstein, a village near Lübeck. While attending the elementary school there, he gave evidence of such ability that his father sent him, after he had acquired some knowledge of Latin and Greek, in his sixteenth year, to the gymnasium at Lübeck, where he spent three years, and there imbibed so great a love for the languages of antiquity, that he abandoned the idea of a legal career, which he had once entertained, and resolved

into a vessel, the bottom of which is perforated with small holes. Through these thin streams of wax are received on a cylinder kept revolving in water below; and thus fine threads of solid wax are produced. These are exposed on moistened sheets to the air and light for some days, during which they are occasionally turned and watered. By this exposure the wax loses much of its colour. It is then melted up into solid blocks and left for some time, after which the operations of melting, forming into threads, and bleaching in the light are repeated till it has attained a pure white translucent lustre, is of very firm consistency, and is free from all odour. Yellow wax is also decolorized by treatment with nitric acid, but chlorine, although it bleaches most expeditiously, is not available, as it leaves traces incorporated with the wax, which on burning evolves irritating fumes of hydrochloric acid. Palm oil, used in the manufacture of soap and candles, is bleached by the action of bichromate of potash and acid.

For bleaching generally, but especially for the bleaching of animal fibres and substances, the use of a considerable variety of processes, and of chemicals other than chlorine and sulphur compounds, have from time to time been proposed and to some extent put into operation. To some of these proposals incidental allusion has already been made, and generally their success has not been such as to warrant special notice. Among other substances which have been recommended for scouring wools and silk are feeble solutions of sulphides of sodium and of potassium, or aluminates of these alkalies, the cyanide of potassium, and a mixture of common salt and oxalic acid. The alkaline permanganates have also been frequently regarded as hopeful bleaching chemicals; and a few years ago the permanganate of potash was introduced and used by MM. Tessié du Motay and Maréchal, who, in connection with the permanganate, used a solution of the peroxide of hydrogen. To this latter substance a peculiar bleaching application has recently been given. Under the name of *golden hair water*, or *auricome*, a liquid is sold by hair-dressers which is found to hold in solution a large percentage of peroxide of hydrogen. The use of this solution gives to the hair the brilliant golden yellow tinge which has come to be regarded as a highly fashionable colour. Other applications of this powerful oxidizing and reducing agent have been suggested by its toilet use, and it has been employed for the bleaching of ornamental feathers, hair, &c. Doubtless, if it could be prepared in stable solution at moderate price it would be found extensively useful in bleaching and other industrial applications. It has also long been hoped that a means of applying ozone as a direct bleaching agent might be devised, but hitherto little success has been attained in this direction. In Germany ivory is bleached by steeping it a week in light naphtha or other volatile oil, and exposing it thereafter to the air and sunlight, by which the atmospheric oxygen becomes ozonized in contact with the ivory and thus whitens it. (J. P.A.)

to devote himself to the study of theology. After spending some time at the University of Kiel, he repaired to Berlin, and there, from 1814 to 1817, enjoyed the instructions of De Wette, Neander, and Schleiermacher. The teaching of these distinguished men, especially of the last named, exercised a decisive influence upon the whole of his after life. So highly were his merits appreciated by his professors—Schleiermacher was accustomed to say of Bleek that he possessed a special *charisma* for the science of "Introduction"—that in 1818, after he had passed the

necessary examinations for entering the church, he was recalled to Berlin to occupy the position of *Repetent* or tutor in theology, a temporary post which the theological faculty had obtained for him, with a view of retaining his services in connection with that department of the university. In this position, besides discharging his duties in the theological seminary, he published, in Schleiermacher's and Lücke's *Journal* (1819, 1820, 1822), two dissertations, one on the "Origin and Composition of the Sibylline Oracles," and another on the "Authorship and Design of the Book of Daniel." These articles attracted much attention, and were distinguished by those qualities of solid learning thorough investigation, and candour of judgment, which characterized all the productions of his pen. Bleek's merits as a rising scholar were recognized by the minister of public instruction, who continued his stipend as *Repetent* for a third year, and promised further advancement in due time. But the attitude of the political authority underwent a change. The excitement caused in academic circles by the dismissal of De Wette from his professorship in 1819, in consequence of certain injudicious expressions in the letter of sympathy which he had written to the mother of Sands, the murderer of Kotzebue, had not died out, and the odium and punishment which fell upon De Wette were shared in a greater or less degree by his friends. Bleek, who had been a favourite pupil of the banished professor, incurred the suspicion of the Government as one who was believed to hold extreme democratic opinions. Not only was his stipend as *Repetent* discontinued, but his nomination to the office of extraordinary professor, which had already been signed by the minister Altenstein, was withheld for two years. The mystery at last was cleared up. Bleek had been confounded with another individual of a similar name, one Baueleven Blech. Tardy justice was at length done, and in 1823 Bleek received the appointment to which his merits so well entitled him.

During the six years that Bleek remained at Berlin he twice declined a call to the office of ordinary professor of theology, once to Greifswald and once to Königsberg. In 1829, however, he was induced, on the death of Lücke, to accept his chair in the recently-founded university of Bonn, and entered upon his duties there in the summer of the same year. For the space of thirty years he laboured with ever increasing success, attracting students to his lectures, not by any attractions of manner nor by the enunciation of novel or bizarre opinions on theological subjects, but by the soundness and thoroughness of his investigations, the remarkable impartiality of his critical judgments, and the exceeding-clearness of his method of presentation. In 1843 he was raised to the office of consistorial councillor, and was selected by the university to hold the office of rector, a distinction which has not since been conferred upon any theologian of the Reformed Church. After a long and honoured academic life he died suddenly of apoplexy on the 27th February 1859, having been able to lecture to his students as usual on the previous day.

Bleek's works belong entirely to the departments of Biblical criticism and exegesis. His great merits as a critic and exegete consist, as has been already observed, in the thoroughness of his investigations, and especially in the candour of his judgment. The latter quality, indeed, he possessed in so remarkable a degree, that, as a recent writer has remarked, it has become "proverbial." His views, indeed, on questions of *Old Testament* criticism would be regarded in this country as those of the "advanced" school; for on all the disputed points concerning the unity and authorship of the books of the *Old Covenant* he was led to form conclusions opposed to received opinions. But with respect to the *New Testament*, his position was highly conservative. His defence of the genuineness and

authenticity of the gospel of St John is still regarded as the ablest that has yet appeared; and although, on some minor points, his views did not altogether coincide with those of the traditional school, his critical labours on the *New Testament* must nevertheless be regarded as among the most important contributions to the maintenance of orthodox opinions that the present century has produced. Bleek's works were published partly during his lifetime, and partly after his death. His greatest work, his commentary on the epistle to the Hebrews (*Brief an die Hebräer erläutert durch Einleitung, Uebersetzung, und fortlaufenden Commentar*) appeared in three parts, in 1828, 1836, and 1840 respectively. Of it De Wette said that "It was so distinguished for comprehensive learning and thorough untiring industry, for so pure and transparent a love of truth and so profound a theological feeling, that it was entitled to one of the foremost, if not the very foremost, places among the exegetical works of our time;" and Delitzsch adds that "every one acquainted with the subject will endorse the judgment." This work was abridged by Bleek for his college lectures, and was published in that condensed form after his death by Pfarrer Windrath in 1868. In 1846 he published his contributions to the criticism of the gospels (*Beiträge zur Evangelien Kritik*, pt. I.), which contained his defence of St John's gospel, and which arose out of a review of Ebrard's *Wissenschaftliche Kritik der Evangelischen Geschichte*.

After his death were published—(1), his *Introduction to the Old Testament* (*Einleitung in das Alte Testament*), 3d edition, by his pupil Prof. Kamphausen, 1869, English translation, by Venables (from 2d edition), 1869; (2), his *Introduction to the New Testament*, 3d edition, Mangold, 1875, English translation, by Urwick, 1869, 1870; (3), his *Exposition of the first three Gospels*, by Holtzmann, 1862; (4), his *Lectures on the Apocalypse*, English translation, 1875. Besides these there has also appeared a small volume containing *Lectures on Colossians, Philemon, and Ephesians*, Berlin, 1865. Bleek also contributed many articles to the *Studien und Kritiken*. For further information as to Bleek's life and writings the reader is referred to Kamphausen's article in the *Darmstadt Allgemeine Kirchen-zeitung*, 1859, No. 20; to the same writer's article in Herzog's *Real-Encyclopædie*, vol. xix.; and to Lichtenstein's *Histoire des Idées Religieuses en Allemagne*, vol. iii.; and to Diestel's *Geschichte des Alten Testaments*, 1869. (F. C.)

BLEEK, WILHELM HEINRICH IMMANUEL, son of the preceding, distinguished by his researches in African philology, was born in 1827 at Berlin. He studied first at Bonn and afterwards at Berlin, where his attention was directed towards the philological peculiarities of the South African languages. In his doctor's dissertation (Bonn, 1851), *De nominum generibus linguarum Africæ Australis*, he endeavoured to show that the Hottentot language was of North African descent. In 1854 his health prevented him accompanying Baikie in the expedition to the Niger; but in the following year he accompanied Bishop Colenso to Natal, and was enabled to prosecute his researches into the language and customs of the Kaffres. Towards the close of 1856 he settled at Cape Town, and in 1857 was appointed interpreter by Sir George Grey. In 1859 he was compelled by ill-health to visit Europe, and on his return in the following year he was made librarian of the valuable collection of books presented to the colony by Sir George Grey. In 1869 he visited England, where the value of his services was recognized by a pension from the Civil List. He died at Cape Town on the 17th August 1875. His works, which are of the first importance for African and Australian philology, consist of the *Vocabulary of the Mozambique Language*, Lond., 1856; *Handbook of African, Australian, and Polynesian Philology*, Cape Town and Lond., 3 vols., 1858-63; *Comparative Grammar of the South African Languages*, vol. I., Lond., 1869; *Reynard the Fox in South Africa, or Hottentot Fables and Tales*, Lond., 1864; *Origin of Language*, Lond., 1869.

BLENHHEIM (German, BLINDHEIM), a small village of Germany, in the kingdom of Bavaria, and circle of Swabia, situated on the left bank of the Danube, a few miles below Hochstädt. It is only remarkable as the scene of the defeat of the French and Bavarians, on the 13th of August 1704, by the English and the Austrians under the duke of Marlborough and Prince Eugene. Population, 751.

BLENHHEIM HOUSE, a princely mansion erected by Parliament for the duke of Marlborough at Woodstock, near Oxford, and, with the manor of Woodstock, settled on the duke and his heirs, in consideration of his military services, and especially his decisive victory at Blenheim. The large sum of £500,000 was voted for the purchase of the manor and the erection of the building, which, notwithstanding the strictures of Swift and the criticisms of Evans and Walpole, is a magnificent pile, built by Sir John Vanbrugh, in a massive Italo-Corinthian style. The front from wing to wing extends to 348 feet; and the great hall is a lofty and noble apartment in good proportions. There are a considerable number of fine pictures in the Blenheim collection, the most noted being "The Young St Augustine and Pope Gregory," by Titian; "Europa," "Esther," and "The Massacre of the Innocents," by P. Veronese; "St Jerome," by Tintoretto; "Magdalen," by C. Dolce; many historical subjects, by Rubens; portraits by him and Vandyck; and "The Woman taken in Adultery," and "Isaac blessing Jacob," by Rembrandt.

BLESSINGTON, MARGARET POWER, COUNTESS OF, novelist and miscellaneous writer, was born near Clonmel, Tipperary, Ireland, September 1, 1790. Her childhood was made unhappy by the bad temper, improvidence, and loose living of her father, and by the reduced circumstances of the family. Her early womanhood was made unhappier still by her compulsory marriage at fifteen to one Captain Farmer, whose drunkenness involved him in debt, and whose debts brought him to the King's Bench prison, where he was killed by a fall in one of his drunken fits, in October 1817. His wife had some time before left his house, and in February 1818 she was married a second time to the earl of Blessington. Celebrated for her wit, her literary accomplishments, her generosity, and her social attractions, she was no less distinguished by her passion for pleasure and her craving for show and a high style of living. In the gratification of these tastes debts were accumulated, and the estates of the earl soon became burdened with "incumbrances." In the autumn of 1822 they set out on a Continental tour, and remained abroad till the death of the earl, which took place at Paris in May 1829. Some years earlier they had become acquainted with Count Alfred d'Orsay, a man of fashion and seeker of pleasure, who was then serving in the army, but quitted it for the sake of joining them. In 1827 he had connected himself with the family by his marriage with the only daughter of the earl by a former wife. After Lord Blessington's death Count d'Orsay, who had separated from his wife, came to England with the countess, and they lived together in London till her death. The home of the beautiful and brilliant countess (first Seamore Place, and afterwards Gore House, Kensington) became a centre of attraction for whatever was distinguished in literature, learning, art, science, and fashion. Ambitious of the distinction of authorship, Lady Blessington had published in 1822 her first work entitled *Sketches*, in two volumes. Ten years later she made herself favourably known by a *Journal of Conversations with Lord Byron*, which appeared first in successive numbers of the *New Monthly Magazine*, and soon afterwards as a separate work. This was followed by a long series of works, most of them novels of high life, several of which obtained considerable popularity. Her *Idler in Italy* and *Idler in*

France were rendered temporarily attractive by personal gossip and anecdote, descriptions of nature, and sentiment. Lady Blessington was for some years editor of Heath's *Book of Beauty* and the *Keepsake*, the popular annuals of the day, and also contributed largely to magazines and newspapers. Early in 1849, in consequence of failing resources, the splendours of Gore House were extinguished; its furniture and decorations were sold to pay debts, and its presiding genius withdrew to Paris, whither her friend Count d'Orsay had previously gone. She died there, June 4, 1849. Her *Literary Life and Correspondence*, 3 vols., edited by R. R. Madden, appeared in 1855.

BLICHER, STEEN STEENSEN, Danish lyrical poet and novelist, was born at Vium in Viborg, Jutland, on the 11th October 1782. He was extremely delicate in constitution, and after having passed a year or two at the university, which he joined in 1799, was compelled to give up his studies on account of a consumptive complaint. He accepted a situation as tutor in a family at Falster, and by vigorous physical exercise and flute-playing succeeded in restoring himself to health. He afterwards returned to the university, and completed his course in 1809. Several years were then spent at his father's parsonage, preparing for the ministry and managing the farm. In 1819 he was called to the church of Thorning, and in 1825 to a more remunerative charge at Spentrup. Here he died in 1848. Blicher was first known by his translations of Ossian, but his early poems did not attract much attention. He then contributed to a literary journal, the *Nordlyset*, in which appeared the first of his Jutland tales (*Jydske Romanzer*). The popularity of these romances was surpassed by that of the *National Noveller*, which give an admirable picture of country life in Jutland. His collected poems, some of which had appeared as early as 1814, were published in 2 vols., 1835-36; the novels appeared in 5 vols., 1833-36. A short sketch of his own life and character was prefixed by him to the complete collection,—*Old and New Novels (Gamle og nye Noveller)* 7 vols., 1846-47. Blicher also translated Goldsmith's *Vicar of Wakefield*.

BLIDAH, the chief town of an arrondissement in the province of Algiers in Algeria, about 30 miles inland from the capital, on the railway from that city to Oran. It lies at the base of the Algerian Atlas, in the midst of the fertile plain of Metija, and is beautifully surrounded with orchards and gardens, which afford a pleasant contrast to its ramparts and towers. It has well-built modern streets with frequent arcades, and pumbers among its buildings several mosques and churches, a Franco-Arabic and a Protestant school, extensive barracks, and a military hospital. Water is abundantly supplied by an aqueduct fed by the Oued-el-Kebir. As the centre of a flourishing district and a post on one of the main routes in the country it enjoys an extensive traffic, and the inhabitants maintain a thriving trade in oranges, raisins, grain, cotton, and tobacco. The products of the neighbouring copper-mines and of the cork-tree and cedar-groves are also of importance. In the vicinity are the two villages of Joinville and Montpensier, which owe their origin to the military camps established by Marshal Valée in 1838; and on the road to Medeah are the tombs of the Marabut Mohammed-el-Kebir and his two sons. Blidah was a town of some importance under the Turks, but in 1825 it was nearly destroyed by an earthquake. It was not till 1838 that it was finally held by the French, though they had been in possession for a short time eight years before. In 1867 it suffered from another earthquake which also nearly ruined the village of Chiffa. Population in 1872, 8113.

BLIGH, WILLIAM, admiral, was born of a good family in the south of England in 1754. He accompanied Captain

Cook in his second expedition as sailing-master of the "Resolution," and in 1787 was despatched to the Pacific in command of H.M.S. "Bounty," for the purpose of introducing into the West Indies the bread-fruit tree from the South Sea Islands. Bligh sailed, in 1787, from Otaheite, where he had remained about six months; but, when near the Friendly Islands, a mutiny broke out on board the "Bounty," headed by Fletcher Christian, the master's mate, and Bligh, with eighteen others, was set adrift in the launch. This mutiny, which forms the subject of Byron's *Island*, did not arise so much from tyranny on the part of Bligh as from attachments contracted between the seamen and the women of Otaheite. After suffering severely from hunger, thirst, and storms, Bligh and his companions landed at Timor in the East Indies, having performed a voyage of about 4000 miles in an open boat. Bligh returned to England in 1790, and he was soon afterwards appointed to the "Providence," in which he effected the purpose of his former appointment by introducing the bread-fruit tree into the West India Islands. He showed great courage at the mutiny of the Nore in 1797, and in the same year took part in the battle of Camperdown, where Admiral Duncan defeated the Dutch under De Winter. In 1801 he commanded the "Glatton" at the battle of Copenhagen, and received the personal commendations of Nelson. He was subsequently made governor of New South Wales, and vice-admiral of the blue. He died at London in 1817. He was an active, persevering, and courageous officer, although, perhaps, somewhat exacting in his manner.

BLIND. The blind, as a class, are limited to such narrow spheres of action that those unacquainted with the subject fail to realize how large a number of the human race are deprived of sight. In the temperate regions of the globe about 1 in every 1000 of the population is blind, but in less favourable climates the percentage is much greater. When we consider what medical skill has already accomplished in Europe and America, not only for the relief but the positive prevention of blindness, we may readily conclude that in warmer and less civilized countries the class is more numerous and their condition more deplorable.

We rejoice that much can still be done by proper care and treatment to prevent blindness; for instance, ophthalmia of infants is a very common cause, and ought not to terminate in loss of sight, which in most cases results from neglect and dirt. Glaucoma is also a fruitful source of blindness, invariably causing loss of sight if left to itself; but, thanks to Professor Gräfe's brilliant discovery, these cases are generally curable if operated on early. Another very common cause of blindness is serious injury to one eye, which is thus lost, and if the injured organ be not at once removed, sympathetic inflammation and destruction of the other is very apt to follow, resulting in total blindness; whereas, if the injured eye be at once removed the other is generally preserved.

Loss of sight from small-pox is now comparatively rare, owing to the general practice of vaccination, but much undoubtedly may still be done towards diminishing the frequency of blindness by further advances in the art of treating eye-disease, and especially by spreading among all classes a knowledge of what has already been done in this direction.

It often occurs that children become blind through the most trivial causes by parents consulting unskilful practitioners. The improvement and increase in the number of well-regulated hospitals now makes it possible for every parent, however poor, to have the best medical advice and attendance.

In all ages of the world the blind have been the objects of pity and commiseration, yet it has only been within the

past century that Christian civilization in its grand onward march has taken them in its embrace, and shed the influence of its light upon their midnight darkness. During recent years leading philanthropists have given much earnest thought to the best methods of ameliorating and improving the condition of the blind. Nearly all the European Governments and the States of the American Union have made liberal provision for their education and special training. In Great Britain the work has been left thus far to charitable enterprise. Much, however, has been done,—almost every large town having its asylum, workshop, or home teaching society.

The following summary, from *A Guide to Institutions and Charities for the Blind*, prepared by M. Turner and W. Harris in 1871, will show the state of these institutions at a recent date:—

"In the year 1800 there were only four institutions for the blind in the United Kingdom; during the next thirty years six others were added to the list; in the succeeding thirty years seventeen more were opened; while within the last ten years twenty new ones have been established, making a total now of fifty-three, without including societies for visiting the blind at their homes, and other charities.

Scotland with five institutions sold, in the last year of which we have any report, goods of the value of £21,930, while England with forty institutions only sold in the same period goods of the value of £33,598; and Ireland, only £454.

Scotland provides for, on an average, 78 blind in each institution; while England only provides for 43, and Ireland for 60.

The donations and subscriptions in Scotland for the same year amount to more than £20 per head of the number benefited; while in England they amount to about £21, and in Ireland to about £16.

So far as returns have reached us, it appears that Mr Moon's system of reading for the blind is adopted by 38 institutions and home-teaching societies, while only 22 use the books of other systems—Lucas's, 7; Roman, 4; Alston's, 4; Frere's, 3; Braille, 4. [Since 1871 the use of Braille has been introduced into many other institutions.]

Of the 30,000 blind in the United Kingdom, there are only about 2250 being instructed or assisted to work. The total amount received per annum for the benefit of the blind, according to the answers received, is about £66,000; besides, there are twelve societies from which no return has been made. Of institutions for the blind generally, we may remark that in each institution nearly the same difficulties appear to exist, the principal one being the difficulty of selling the goods manufactured at such prices as will secure a ready sale and cover the cost of production, and consequently in most instances there is a large surplus stock. In cases where the stock is wholly disposed of, our observations lead us to think that sales have been secured by selling at a loss.

The principal trades practised by the blind in the United Kingdom are the making of baskets, brushes, brooms, mattresses, rugs, mats, caning of chairs, with knitting and sewing for women."

Within a few years a great impetus has been given in England to the higher education of the blind, by the formation of the British and Foreign Blind Association, the establishment of the College for the Blind Sons of Gentlemen at Worcester, and the Royal Normal College and Academy of Music for the Blind, Upper Norwood.

The first-mentioned association "has been formed for the purpose of promoting the education and employment of the blind, by ascertaining what has been done in these respects in this and other countries, by endeavouring to supply deficiencies where these are found to exist, and by attempting to bring about greater harmony of action between the different existing schools and institutions.

"The founders of the association took as an axiom that in all questions which relate to obtaining impressions by touch the blind are the best judges; the council of the association therefore consists entirely of gentlemen who are either blind, or so nearly so that they have to use the finger instead of the eye for the purpose of reading.

"One main difficulty in the way of educating the young blind is the great cost of most of the appliances; this the council have endeavoured to meet by the manufacture of cheaper and better apparatus than any hitherto in use.

No one who has not made the attempt can have any idea of the extreme difficulty of combining great accuracy and durability with cheapness. This has been in a great measure accomplished as regards the Braille writing frames, which are now within the reach of every blind person who wishes to avail himself of the advantages of writing. The fact that a large number of these frames has been already sold speaks for itself, and, as the great majority of the purchasers are poor, the quick sale is evidence not only of the cheapness of the frames, but also of the widespread desire for self-education existing among the blind.

"Another obstacle to the diffusion of the knowledge of the Braille system has been the absence of printed books in English. With the view of meeting this want one of the council has perfected the process of stereotyping used in France, by which the cost of production of stereotype plates is greatly reduced; and as the blind can themselves produce these plates, a new and remunerative means of employment has been discovered. Some school books have already been issued by the association, and will shortly be followed by others. The work on the *Education and Employment of the Blind*, by the honorary secretary, has been published under the sanction and at the expense of the association."

The following extract from an address delivered by the honorary secretary before the Society of Arts on the various types for the blind, shows how thoroughly they are investigating the subject:—

"The happy idea of printing on paper letters recognizable by the touch is due to M. Haüy of Paris, who printed his first book in 1784, and founded the Institut des Jeunes Aveugles, Paris. The type he adopted was the script, or Italic form of the Roman letter. This was introduced into England by the present Sir C. Lowther, who printed the gospel of St Matthew in 1832 with type obtained from Paris, and followed it with other portions of the Bible. In 1834, Gall, of Edinburgh, printed the gospel of St John in Roman capitals, in which, however, all curves were replaced by angular lines, and the lines themselves were serrated, which changes, he believed, gave greater distinctness to the letter.

Alston, of Glasgow, adopted Fry's plan of using ordinary Roman capitals. Dr Howe, of Boston, U.S., makes use of the small Roman letters, giving them angularity according to Gall's idea.

The Philadelphia type does not differ much from Alston's. The combination of capitals with small letters has also been tried, and a society has recently been formed at Worcester with the intention of printing on a large scale in this type. In Germany various modifications of the Roman letter exist, the principal of which, the so-called Stachelschrift of Stuttgart, consists of Roman capitals formed by finely dotted lines. All these modifications are suggestive of the strong tendency among those who have attempted to benefit the blind to retain for them the form of letter to which the seeing are accustomed, while the constant change of form indicates a fact with which most blind persons are familiar from personal experience, viz., that none of these modifications are satisfactory as to the primary condition of being easily felt. A better form than any which has obtained currency was suggested twenty years ago by Mr Welch, a blind man, who has been the pioneer of education amongst the blind of London, and this is almost identical with one independently worked out by Mr Littledale of Cheltenham.

The second great class is made up of alphabets deviating more or less widely from the Roman letter, and consists of a stenographic shorthand invented by Mr Lucas, a phonetic shorthand due to Mr Frere, and a full written system introduced by Mr Moon, in which the Roman letter is retained in a more or less modified form whenever he considered this could be done compatibly with easy recognition, the simple line-signs employed by Mr Frere being used to replace the more complicated of the Roman letters. It will be necessary to examine these systems in detail, and it will facilitate this examination if we compare them with each other in the following particulars:—(a.) As respects the shape of the letter; (b.) As respects the advantage of conformity with the Roman letter; (c.) As regards the reading from right to left and from left to right alternately; (d.) Advantage of a shorthand as contrasted with a full written system.

(a.) *As respects the shape of the letter.*—Mr Lucas and Mr Frere brought out their systems about the year 1838, Lucas preceding Frere by a few months. They employed at first almost identically the same characters, but unfortunately could not agree to represent the same sound by the same symbol. Mr Frere had the advantage

or having his plan carried out by a very ingenious and sensible blind man, who soon discovered that the letters formed by lines and curves upon which dots were placed were too similar to those formed by the corresponding lines and curves without dots; he, therefore, changed all his dotted characters, replacing the dotted curves by angles of 45°, and the dotted lines by lines in which a short line is substituted for the dot.

The result of this change is, that Frere's character is now far superior to Lucas's in the quality of easy recognition. Mr Moon's character, in the large size which is used by him, is quite as easily distinguishable as Frere's, but in the form in which he now prints his characters, his right-angles are not true right-angles, but are rounded. In the size which he uses, this defect is of very little importance, but it effectually prevents any considerable diminution, because, if this is attempted, the rounded right-angles cannot be distinguished from the hooked lines.

The importance of using a character as small as is compatible with easy recognition may be readily understood from the following statement:—The largest type used by Mr Frere is that employed in the gospel of St John. The character is 44-sixteenths of an inch long, and is about the same size as Moon's character. The pages occupied by the gospel of St John in Frere are 96. In his medium type, in which the length of the letter is 4-sixteenths of an inch, the same matter would go into 67 pages; and in his smallest type, in which the length of the letter is 34-sixteenths, it would occupy 46 and a third pages. It has been found, by an experience extending over 27 years, and embracing many hundreds of individuals of all ages and conditions, that all those who can read the largest type can read the medium, and almost all can read the smallest.

The medium type is very generally preferred, as being more pleasant to the finger, and many with delicate touch prefer the smallest for the same reason. Thus it will be seen that, by selecting a well-devised character, not only can a very considerable saving be made in the size, and therefore in the cost of books, but by a diminution of size, within certain limits, the character is rendered absolutely more legible. The gospel of St John, in Moon's type, occupies 140 pages.

(b.) *As respects the advantage of conformity with the Roman letter.*—Much has been said and written on this subject. A favourite argument with the advocate of the Roman letter is, that by its use a blind man can be assisted in his reading by those around him who are possessed of sight. This, no doubt, would be valid if no simpler character for the blind had been invented, but when we have to choose between a character in the reading of which the blind can be assisted by the seeing, and one which is so simple that no assistance is required, there can hardly be a doubt as to which ought to be used.

Another plea for the use of the Roman letter is, that by its means the blind can write in a character understood by everybody. This writing is, as we shall presently see, a very imperfect process; but this argument is undoubtedly of some weight. These remarks apply simply to the existing systems in which the Roman letter is employed. It is probable that a much more legible alphabet might be constructed, but, after our 96 years of experience and experiments with the Roman letter, another failure may well be feared. The small angularized Roman letter of Dr Howe, of Boston, which is used in most of the schools of the United States, is probably as good a form as any, and if printed in a larger size would not be difficult to feel; in its present size, however, it is far too small, and has signally failed in America. The American schools are all State institutions, and have to furnish accounts to their respective State Legislatures of the work done by them.

Out of 664 pupils in seven schools, where the Roman character of Dr Howe is used, one-third learn to read fluently, one-third by spelling, while none fail; and it must be borne in mind that those who learn to read by this system also acquire an admirable method of writing. Moon's system retains those Roman letters which can be easily distinguished, and thus makes a transition between the systems in which the Roman character is used and those which employ purely arbitrary signs. For this reason, and from its great simplicity of construction, it is more easily learned than any other, and therefore is well suited to the great mass of the poor, who from want of intelligence or of application cannot learn one of the shorthand systems. Its great bulk, however, involving costliness of production and comparative slowness of reading, is a serious obstacle to its general use.

(c.) *Reading from left to right, and from right to left, alternately.*—In Frere's system the lines are read from left to right, and from right to left, alternately, an arc of a circle taking the finger from the end of the upper to the beginning of the lower line. The plan may be illustrated by imagining the letters to be fixed on the upper edge of a long string. Let it be supposed that this string is doubled backwards and forwards upon itself in such a way that the letters always occupy its upper edge. This will give a good idea of Frere's method of reversing the line; not only is the line reversed, but every letter in it is also reversed, so that the finger, when