THE

EDUCATION OF THE BLIND.

AN

ACCOUNT

OF THE

RECENT DISCOVERIES

WHICH HAVE BEEN MADE

FOR

FACILITATING THE EDUCATION

OF

THE BLIND,

WITH

SPECIMENS OF THE BOOKS, MAPS, PICTURES, &c.
FOR THEIR USE.

PRINTED IN BEHALF OF THE

EDINBURGH SCHOOL FOR THE BLIND.

EDINBURGH:

PUBLISHED BY JAMES GALL,

MDCCCXXXVII.

PREFACE.

THE Blind are now able to read nearly as fluently as those who see. Books are now printed for their use. They are also able to write letters to each other by post, and to read what is thus written. They can cast up accounts with no other apparatus than common pins; and draw for themselves diagrams, with the same materials, for the study of geometry. Not only are books printed for their use, but also maps and music, which add greatly to their means of improvement; and besides the invention for writing what they themselves can read, a very simple instrument has been invented, by which they are able to write the common written character, in a style as small, and even more elegant than is generally found among those who see.

As almost the whole of those discoveries have been made within a short time, and as they are so simple and available, that any blind person may avail himself of the whole of them for very little expense, it

is important that they should be known, and their simplicity understood.

On account of the many applications which have been made for a description of these discoveries, along with directions for their use, the Author has been induced to draw out the following little Work for this purpose,—as he can describe them, by it, more minutely than he could always do in writing.

If this attempt should be the means of facilitating the mental culture of the Blind, of alleviating the unpleasantness of their unfortunate situation, or of even adding to the number of their accomplishments, he will not consider his labour misspent.

The profits arising from the sale of this Work will be given to the Edinburgh School for the Blind.

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EDUCATION OF THE BLIND.

Of what use is education to the Blind?—No one surely would ask the question unless it were to answer by saying, that education is of greater importance to the Blind than to those who see. But alas! the very reason why they need it most, is the reason why they have been hitherto deprived of it.

Blindness *is* a difficulty in the way of education; but it is not an insurmountable one; and it is the intention of this little book to point out, not only effectual, but convenient and easy means, by which that difficulty may be overcome. It is now considered an established maxim in the economy of public charity, that it is better to bestow upon an individual the power of providing for himself, than to grant a continual supply of his wants, and retain him in a state of dependence; and upon the same

principle, it must be acknowledged, that it is better to raise the Blind by education, to that state of intellectual and moral cultivation, by which they would be able to occupy useful and trustful situations in society, than to afford to them, by the cold hand of charity, the necessaries and comforts of life which they might be enabled to earn for themselves.

Of all the losses which the want of sight entails upon the Blind, the inability to read must rank among the greatest. The man who cannot read is generally an ignorant man. Blindness, therefore, shuts out knowledge by its chief inlet. In solitude, reading performs two offices: It not only occupies and exercises the mind when it would otherwise be idle, but it also gives knowledge at the same time. The Blind, however, are deprived of this blessing. The Bible itself is shut up from them, and the evil effects are apparent in that morbid self-opinionativeness and metaphysical distortion of mind, which would be corrected by the enlightening influence of reading, as well as the contemplation of the simplicity and beauty of nature.

Reading is not dependent on the sight alone, because forms can be felt as well as seen; and

it is only because we can *see* better than we can *feel*, that we do not read with our fingers, and print and write in relief. If a printer were to press the large types very hard, we might feel their shapes on the other side; and it is upon this principle that the printing for the Blind is founded, which we are now about to describe.

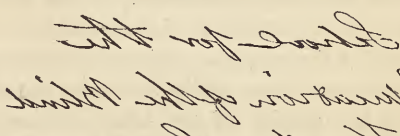
PRINTED BOOKS FOR THE BLIND.

Although Mr Gall, in the present century, has revived the printing for the Blind, he was not the first who thought of it. It was attempted in Paris during the last century, and failed, not from any impossibility in the thing itself, but on account of the alphabet which was employed for the purpose. Mr Gall perceiving that angles were more easily felt than rounds, and that the outside of the letter was more easily felt than the inside, modified the alphabet into its most simple form, throwing the characteristics of each letter to the outside, and using angles instead of rounds. After a long continued, laborious, and expensive series of experiments, by means of blind persons, he has produced the present Alphabet, which may now be considered the most simple, the most

tangible, and therefore the most perfect Alphabet which can be constructed for the Blind.*

It is a curious fact, which has now been well ascertained, that the *finger*, even in an untutored state, can feel very small indentations upon surfaces; and the reason why a person with his eyes shut does not easily know the shape by the feeling, is, that he is not in the habit of *receiving information* by such means. But after knowing what the letter is, he is able to perceive all the parts very distinctly by means of his finger.

As an illustration of the truth of this remark, we shall take the following diagram :—



This, by being written backwards, is not in itself less plain, but has every turn as perfect as if it were written the other way; yet to the *unaccustomed* eye, it requires careful attention and reasoning to perceive what the letters are.

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* See Appendix, No. I.

If it be supposed, that when presented in the usual way it would not be easily read, one glance at it, by means of a mirror, would dissipate every doubt upon the subject.

This is the reason why we at first take a long time to feel the letters before we can read them; and yet the Blind are able to skim over the letters with great rapidity in reading, in the same way as we are able to read a written letter with great ease, although, if it were presented to us in a mirror, we would scarcely be able to read it at all.

So great is the facility with which the Blind are able to feel the letters, that already they can read books printed with the common English size of type. This is the same as is used in pulpit Bibles, and papers printed for the Courts of law. And although this surpasses all that was formerly hoped for, even this is not to be considered the smallest size which the Blind will be able to read.

Mr Gall has also added another improvement to the art, by using fretted types instead of smooth ones. This gives the lines of the letters better support, and makes a more decided impression on the finger.

The Gospel by St John was the first part of

the Bible which was printed in Great Britain for the Blind. At first it was feared, that although the Blind might be able to feel the letters, they would be so long in reading one verse, that all the pleasure they would get from it would not be worth the trouble. Shortly after it was published, a number of individuals began to teach the Blind to read, rather from a feeling of curiosity than from any hope of its being useful; but they were surprised to find, that the Blind learned to read as fast, and in some cases faster, than children who see. Belfast seems to have been the first place where it excited any great degree of wonder. It had been adopted there in a Sunday school; and the children improved so rapidly, that the school was generally filled with visitors; and public interest was so much excited, that an Institution has been since built in that town for their education, along with the Deaf and Dumb. The Blind children in that Institution, are decidedly the best readers at present in the kingdom.

The reading is now adopted with complete success in various asylums, but more especially by private individuals in different parts of the country. A school has also been opened in

Edinburgh, the first which has ever been established exclusively for the education of the Blind.

TEACHING THE BLIND TO READ.

We have never heard of any of the Blind, (except young children,) who, when they began to learn, ever expected to be able to read; and we have never heard of any who attempted to learn who were not successful.

The first object is to teach the alphabet; and for this purpose, the first book which is put into their hand, is provided with a large alphabet, which enables them to feel all the parts of the letters. It is better to teach only one or two letters at a time, and to make them search for similar letters in the succeeding pages. When the alphabet has been learned, the short words which follow, enable the pupil to go forward without much difficulty, and to exercise his recollection of the letters and his spelling at the same time.

In reading, the pupil must use his right hand. The first, or the first and second fingers of which are made to feel the letters in their order; while the forefinger of the left hand is allowed to rest at the beginning of the line

which is being read; and is brought down to the one below when it is finished. This plan enables the pupil to find the beginning of the next line without difficulty.

In a short time, the pupils are able to read by merely passing their fingers over the words; and so very plain do the letters appear to them, that they can read with a stout glove upon the hand, or a piece of linen laid upon the book.

WRITING BY STAMPS.

The writing by stamps, as we have already mentioned, enables the Blind to write, and to read what is written. The principle is very simple. If we prick a piece of paper with a pin, so as to form a letter, we feel the shape of the letter on the other side. Stamps with the letters set with pins, are used by the Blind to press through the paper; and in this way they are able to write a long letter upon a sheet of paper, to write the address by the same means, and when they have finished, they can read with their finger all that they have written.

At first, when the Blind addressed their own letters, it was feared that the postmen would not be able to read the address; but in this they were very agreeably disappointed; for the let-

ters went from one end of the kingdom to the other, with as much accuracy as if they had been addressed in the common way. There has been no instance yet known of their having miscarried.

It is exceedingly delightful to the Blind, to be thus enabled to correspond with their friends, and to receive letters which they can read without assistance. They are also in the habit of writing poetry and private memoranda, in which they take great pleasure. The frame upon which the writing is performed, is very simple, and costs about 5s. The wooden stamps cost about 6s. 6d., and the box for holding them arranged for writing, costs 3s. 6d. so that the expense of the whole apparatus is about 15s. This is the most expensive part of the apparatus for the Blind; but when once furnished, it is a source of much pleasure and convenience, as it enables the Blind to print their own books, and even to print music, as we shall afterwards shew. The Blind can write three or four copies of the same thing at once, by pricking through as many sheets of paper.

It is also to be remarked, that they may write on both sides of the paper, without pro-

ducing confusion, even although the letters were to cross each other. That which is written on one side is not felt on the other side; so that although to the eye the letters are mixed, and appear in confusion, the finger feels only one series at a time.

TEACHING TO WRITE.

The Blind who can spell, may learn to write by the stamps in one lesson. The frame and stamps being laid before the pupil, he must first be taught to lay the paper on the frame evenly. In this he must be guided, by feeling whether the sides of the paper coincide with the sides of the frame.

The paper used is common writing paper, not very thin. The frame is adapted to foolscap; but any kind of *writing* paper will do. Common printing paper is thick enough; but not being *sized,* the points do not continue raised. When the paper is evenly laid on, the upper part of the frame must be laid over it for guiding the hand in using the stamps. It must be observed, that the paper must be written on the upper, and read on the under side; consequently it must be written either by beginning at the bottom of

the page, and writing forwards line by line upwards; or, beginning at the top, to write backwards line by line downwards; the former of these methods is the more convenient, and is that which is now practised by all.

When writing in a book, or indeed in writing on any paper which has more than one leaf, it will be found a convenient rule always to keep the other leaf or leaves which are not being used, towards the *left* hand, and the top of the sheet or book *downwards*. When this is attended to, all the writing lies on the right side of the book, whatever page is turned up.

There are no capitals in the blind alphabet. The writing therefore must be all uniform. First, one letter is taken from the box, and brought to the lowest line, and towards the left hand. The letter itself on the stamp is turned upside down; but the index on the end of the stamp is not so. When properly placed, the person writing presses it down, or gives it a smart stroke with his wrist, so as to make it pierce the paper. Before putting back the stamp which has been thus used, the next letter is placed close by its side towards the right hand, when it also is struck down in the same manner. When this second has been struck, the first may then

be removed, and a third struck down beside the second, and so on. When a word is finished, any of the stamps may be turned upside down, to keep the first letter of the next word separate from the word before it. This turned stamp should not be struck nor pressed. But even though it should be struck, having the pins turned upwards, it would not perforate the paper.

When one letter has to be used doubly, one of two plans may be followed. The first is when similar letters may be used. Instead of b d e m n p q u w 3 4 6 7 9, we may use q p 3 w u d b n m e 7 9 4 7, turned upside down. The second method is after using the stamp once; it is taken out, and another of the same thickness put in its place, with the pins upwards. The stamp is then used again at its side.

WRITING BY THE TYPHLOGRAPH.

The typhlograph is an invention by which the Blind can write a common current hand, as small and as elegant in its forms as that used by those who see. It consists of a board, a slide-rest, and a guide:—The board for holding the paper; the slide-rest for enabling the

writer to keep the line, and the guide to enable him to form the letters.

The *board* is a piece of common wood, a little larger than a leaf of common letter paper, and a quarter of an inch thick. A series of notches are cut down each side, at a distance from each other, corresponding with the proposed distance of the lines of the writing. Two pins are inserted near the top, to keep the paper from being moved, while the guide is used.

The *slide-rest* is made of two parallel pieces of wood, notched at regular intervals, and kept at a certain distance from each other. At each extremity, a wedge-shaped projection is placed so as to fit into the notches of the board. Two saw cuts are made across the under side of the slide-rest, to let it pass the pins of the board. The slide-rest is laid across the paper on the board, while the guide moves between the parallels.

The *guide* is a slip of brass which runs between the parallels from a cross piece of wood to which it is attached, and which lies across the slide-rest. The slip of brass is made narrower than the space between the parallels, so that it may either slide against the upper or the under one.

At one end of the brass slip, a long hole is cut, into which the pencil or point is placed, and along the sides of which it is made to move. By this hole, all the letters of the alphabet and the figures may be formed in the most beautiful manner, without the pencil having to leave the sides of the hole, except in a few instances, and even in these it is so slight, that it can be performed with great ease and precision.

The elegance of the writing by the Typhlograph depends almost wholly on the shape of the hole; which, although exceedingly simple, requires great nicety of workmanship. The hole has an upper and under half, which are separated from each other on the right side by a small projection, which stops the pencil from going up or down from the one to the other on that side. When the *upper* half is used, the guide must rest against the *under* parallel; and when the under half is used, it must rest against the upper one. In this way the line is kept straight.

The first lesson in writing by the Typhlograph, is to make lines of this kind,  by means of the upper part of the guide, while it slides against the under parallel. The

upper half of the guide is of this shape.  When the pencil is put into the hole, it is slidden forward till it touches the pencil. The pencil is then moved upwards against the side of the hole round the top, and downwards on the right till it is stopped by the projection at the bottom of the line. While the pencil rests upon the paper at that point, the guide is again brought forward till it touches the pencil with its left side; the pencil is again taken round to the projection, and so on.

The second lesson is to make these,  by the under part of the guide, while it slides against the upper parallel. The under half of the guide is of this shape,  and the pencil is made to move downward along the left side, and upwards along the right, till stopped by the projection. The guide is moved forward till it touches the pencil, and then it performs the same journey as before.

The third lesson is to make lines of this kind,  by using part of both halves. He first uses the upper half, but does not bring the pencil further than the middle of the line thus  He then brings the guide up against the upper parallel, and makes its left side

touch the pencil, which is still at the middle of the line. The pencil is then brought down and up half way, to the middle again, thus:  The guide is then brought down again, and the pencil takes the upper curve again, and so on; so that the top half of the upper part, and the lower half of the under part of the guide, are used alternately.

The fourth Lesson is the O, thus:  This is made by first using the top of the upper half as before, only he brings the pencil back again to the left side, where he began (in the middle of the line.) Then he uses the bottom of the under half in the same manner as before, reaching up to the middle of the line again. In this way the O is formed; but in order to make the next letter a little distant, he moves forward the guide, till the left side touches the pencil, and then he draws the pencil across to the right side. The guide must be moved upward and forward again, to use the top of the upper part as before.

If the under half be parallel with the line when the guide is up, the upper half will be above the line; and if the upper half be parallel with the line when the guide is down, the under half will be beneath the line. In this

way the top parts of the b d i j h k l p t, and the capitals, may be drawn above the line when in the upper part, when the guide is up; and the under parts of the f g j p q y and z may be drawn below the line when the guide is down.

From the preceding lessons, the pupil will have learned the use of the guide in making the most common forms used in writing. He may now to proceed to learn to write the letters of the alphabet; in which the teacher will scarcely require any help. But in any case of difficulty, he will find in the Appendix (No. II.) a description of the motions of the guide in writing each of the letters. There are represented the various parts of the guide which may be used at once; and, by the marks attached to them, each letter is described by the parts of which it is composed.

A great variety in the style of writing, may be obtained by a different formation of the Typhlograph. It may either be sloped or horizontal, thin or broad. Even the thickness of the pencil will affect the style of writing. When the point is small, the writing is large and broad; when it is thick, the writing is smaller and very narrow.

We may either write with a black lead pen-

cil, or with a steel point over black paper. When we use a black lead pencil, it is best to use a hard, but not a brittle one.

The steel point is the same as that used by copper engravers in etching, only it should be a little rounded at the point to keep it from cutting the paper.

The black paper is sold in shops, under the name of copying paper; but as it is rather thin, and too much loaded with the blacking, it may be better to prepare *strong* paper in the same way. I am not certain which is the *best* way to prepare the paper: I have found paper rolled by the printer's ink roller, and then held to the fire for a short time, succeed very well. I might suggest also the snuffings of candles, or a thick salve of fine lamp-black mixed with butter, or some other unctuous substance rubbed thinly on the paper. If it be desirable to lay it on with a brush, it may be diluted with turpentine, without destroying the relative proportions of the other ingredients.

Having procured the black paper, the letter to be written is placed upon the board of the Typhlograph, and the black paper above it. The slide-rest is then laid over the paper, and made to rest in two notches of the board;

the guide is then placed within the slide-rest, and used as above directed. The point moving along the black paper, gives off the black to the paper below, and an indelible writing is thus produced, without the inconvenience of using a fluid ink, which must be supplied at intervals, of which a blind man has no means of reckoning. The black paper may be used a long time without being exhausted; even when it is nearly exhausted, the change is indicated by faintness of the lines, not by the failure of the writing; so that a blind man need never be afraid of labouring in vain. He produces legible manuscript long after the black paper has become unfit for proper writing. The price of the Typhlograph is 5s.

THE ARITHMETIC CUSHION.

Professor Sanderson, who was blind, and who was Professor of Mathematics in the University of Cambridge, invented a table for himself, by which he could cast up accounts. It consisted of a surface cut into squares, with grooves between, which crossed each other. Each square had nine holes, and according to the hole in which the pin was put, so was the figure distinguished. The squares being ar-

ranged in lines upwards, and also sideways, and each representing one figure, he was able to perform all the rules of arithmetic by its means.

An improvement upon this was a cast-iron board, with a great number of square holes. Each hole represented one figure, and that figure was indicated by one of two kinds of types which was thrust into it. One type had on one end a projection in the side, and on the other end a projection in the corner; and as the type might be turned four ways, and might be used with either end turned upwards, this type could represent eight different figures. The other type had a projection in the centre at one end; the other end had no projection at all, so that it indicated the ninth figure and the cipher.

In the Glasgow Asylum, a further improvement was made, by which only one type was necessary. The holes however were made of a pentagonal form; and as the type had on one end a projection on one of the sides, and on the other end a projection on one of the corners, each end could represent five different figures; and thus ten ciphers might be represented by a single type.

The great disadvantage of all those methods lay in the inconvenience of the apparatus. Without taking into account the great labour and expense of the materials, the Blind, after these were procured, could not cast accounts, or make any calculation, without being where they were; and to have carried such an unwieldy apparatus about with them, would have been impossible.

The whole of this apparatus has been rendered unnecessary, by the method which we are now about to describe, and which requires no special apparatus at all. The figures are represented by pins stuck into a cushion or any soft substance, such as a chair, a bed, or a carpet. If the pin be stuck in obliquely, it may represent one of four figures, according as it may be turned to the right or to the left, to the top or to the bottom; other four figures are represented in the same way, by two pins stuck close together, instead of one, assuming the same positions. If instead of being stuck in obliquely, they are thrust in perpendicularly, either singly or doubly, other two figures are obtained. The arrangements of the figures under this notation, will be found in the Appendix, No. III.

The advantages of this notation must be ap-

parent to those who can distinguish between that which is for *shew*, and that which is for *use*. An arithmetical notation, which may be used in all places and at all times, without difficulty, without expense, and without any peculiar apparatus, is of a thousand times more value to the Blind, than any other which can only be used in the school-room, and by such an apparatus as the types and boards which we have already described.

Pins are in every house. They are cheaper than almost any other manufactured article which we know. They are very light, and are far from being bulky. They may therefore be carried about by the Blind in considerable quantities without inconvenience, and at very little expense.

Cushions are easily procured, and even when they are not at hand, their place may be supplied by a chair, or a bed, or a carpet, or indeed any thing into which pins can be thrust. Their very clothes may be used for calculating any little matter which might occur, when nothing more convenient presented itself.

When the Blind have been taught to cast accounts by means of the pin notation, they ought always to carry about with them a pin-

cushion or a small box filled with pins, both for this purpose, and also for other purposes which shall afterwards be mentioned.

In business transactions the pin notation will be found to be most valuable to the Blind. It occupies the place of a scroll journal. Every customer has a small cushion appropriated to his accounts. These cushions have a loop of tape or ribband sewed to the corner by which it is to hang. This loop fixes the position of the cushion, and is always supposed to be at the top, on the right hand. The person's name being written with the stamps on paper, is pinned to the centre of the top; and when an article is to be charged against him, the name of the articles may either be written in the same way, or indicated by peculiar combinations of pins—a number of which are given in the Appendix. The quantities and prices are indicated in the same line by the pin notation.

The Blind ought always to be taught book-keeping. This is done first by making them cast the accounts on the cushion, and then *copy* them into the cash-book or ledger with the stamps.

GEOMETRY.

The pin-cushion is the universal album of the Blind. Not only are the arithmetical figures represented by its means, but any kind of diagram may be represented to the touch. In forming diagrams, the pins are thrust into the cushion to the very head, in lines corresponding with the shape intended to be felt. The heads of the pins therefore are the only parts which are felt—each head represents a point, and a succession of them represents a line.

It is necessary to have a pair of wooden compasses for the forming of geometrical diagrams. Instead of the limbs terminating in points, as in other compasses, there is a small nick at each extremity, into which the pin is placed before thrusting it down. The sides of the limbs are straight,—one of them having slight grooves cut at regular distances, for making straight lines by rows of pins; the other having the grooves cut at distances of half an inch—every alternate groove being distinguished by a larger indentation at the top.

The pin-cushion should never be awanting from the school, or the study of the Blind. I have shewn how necessary it is to the study of

arithmetic and geometry. I shall now shew how it may greatly assist in the acquisition of the other branches of a blind man's education, and how it may become the interpreter between the Blind and the Seeing, and even between the Blind and the Deaf.

In teaching the Blind the *alphabet*, we may use the cushion with great advantage. By arranging the pins into larger letters, they are able to feel them with great ease; and the differences between the letters may more easily be explained by the cushion than by any other means.

When the Blind are beginning to read, we may make up sentences and short words upon the cushion with great ease and considerable advantage. For although the same object may be gained by using the printed spelling book, or by writing the same words with the writing stamps; yet, in the absence of all these, we may, without using a particle of paper, teach a blind person to read.

In teaching the Blind to *write*, we cannot in a more convenient way give the pupil an idea of the various letters, than by representing them on a cushion by the arrangement of pins.

In short, when a teacher is desirous of con-

veying to his blind pupil an idea of any form, the pin-cushion presents an easy and convenient method of doing so; and although he may be able quickly, and sometimes effectually, to convey the idea by drawing with his finger upon the palm of his pupil's hand, yet when this fails, as it very frequently does, either from the complicated character of the form itself, or the misapprehension of the pupil, the pin-cushion is a certain and an easy resource in all such difficulties. With it at his command, he need not be afraid to attempt to teach any branch of knowledge, however much its intelligibility may depend upon pictorial illustrations, diagrams illustrative of optics, machinery, and other scientific subjects, drawings of buildings, furniture, implements, and other objects. Even profiles of distinguished individuals may all be distinctly delineated, in a tangible form, by the same means.

In teaching history and geography, *maps* of a temporary kind may be hastily got up on the pin-cushion; and the addition of a piece of twine greatly diminishes the labour. Every turn in the coast is indicated by a pin, and the twine is either made to turn round it, or the pin is stuck through the twine. A dozen pins

in this way, may make a very respectable map of the coast of a country. Cities and towns may be represented by three, or four, or five pins stuck close together; villages, by one or two, according to their relative sizes. Rivers may be indicated by rows of pins, if such should be required; and mountains, by masses of pins stuck so close that all the heads are not able to go down.

It may appear to some that this is too tedious a process, considering the temporary character of such a map; but it must be kept in mind, that as all knowledge ought to be communicated gradually, this pin-map may be the very best way in which geography can be taught, even to those who see. At first, the teacher may give, by a piece of twine and a few pins, a general idea of the *outlines* of the country. This being a simple form, and unencumbered by minute details, which are apt to distract the attention, becomes deeply impressed upon the mind of the pupil, and forms the basement upon which farther knowledge is to be reared. The teacher gradually adds to the map; first, the capital, which he represents by three pins at first, and then leads up the river upon which it stands, or forms the bay in

which it is situated. The next most important city or town is then added with the same accompaniments; and thus while the teacher is gradually building the map, he is at the same time securing every step of the pupil's progress, by carefully abstaining from confusing his mind, by presenting to it objects which he perhaps is never called on to remember.

I might suggest to those who would wish to teach geography in this manner, that they might use a common map, laying it on a piece of paper the same size, and with a pin prick it at those points where he would wish to insert the pins. He may then lay it on the cushion, and be guided by those marks; or he may have the cushion crossed with the lines of longitude and latitude either with ink or with threads. Two or three cushions may be made for the purpose, having the lines differing in number and inclination, so as to suit maps of any extent of spherical surface, and of any part of the world.

The pin-cushion is also useful in writing and teaching *music*. This may be done in two ways. Five cords are sewed upon the musical cushion, to represent the lines, and pins are thrust either into the cords or spaces, and varied, either

in their combination or position, so as to represent the variation of the time of the notes. Further variety may be obtained by melting a globule of sealing-wax upon the head of the pin, and this globule may be sharp, or round, or square, according to the caprice of the person who adopts the signs. The pin may be bent, or even decapitated, for the sake of further variety; but we are bound to remark, that decapitation is not altogether safe or advisable, as the only sure method of preventing the pins from being buried in the cushion, is to allow them to wear their heads.

There is at all times a very great convenience arising from simplicity of instruments and methods; the multiplication of signs, therefore, ought as much as possible to be avoided; and as common pins, without being altered or added to, and therefore not requiring to be kept in separate boxes, are quite capable of supplying all the signs requisite in the notation of music. I would recommend the second method as that which ought to be adopted, in preference to the first.

The second method consists in adopting the numerical notation of music, (which we shall afterwards describe.) In it we employ nearly

the same signs which we use in arithmetical notation, with the addition of a few others, which are necessary to represent other signs peculiar to music. I need not here enter into the particulars of this branch of the subject, as it will more naturally occur after I have described the numerical notation itself.

MUSIC.

Printed music, for the use of the Blind, is of considerable importance; but to have printed it in its ordinary character would have been impossible. The Blind could not distinguish such complicated characters, more especially if they were surrounded by five parallel lines. A new notation has been invented so simple, that any one could understand how to sing from it with only one lesson. The notes are represented by the numbers 1 2 3 4 5 6 7. The "rest" is represented by a 0. To give an idea of time, points are used after the figures; one point doubles the time of the simple figure; two points multiplies it by four; and three points multiplies it by eight.

If more than this be required, a line after the figure indicates four of the points, and one, or two points may follow it, so as to multiply

the time of the simple figure by sixth-four. For example,

Demisemiquavers	1	2	3	4
Semiquavers	1 .	2 .	3 .	4 .
Quavers	1 ..	2 ..	3 ..	4 ..
Crotchets	1 ...	2 ...	3 ...	4 ...
Minums	1—	2—	3—	4—
Semibreves	1— .	2— .	3— .	4— .

It scarcely ever happens that six different kinds of notes occur in one piece of music; frequently there are only two, the minum and the semibreve. In such cases the minum would be the simple figure, and the semibreve the figure with one point after it.

In the Appendix, (No. IV.) will be found an exposition of the principles upon which this musical notation is founded, along with the details of its arrangements. I shall here only give a few specimens of sacred music printed on this plan.

YORK. *c.m.* *g major.* *C* (.)

1. 3 5 4 6 3 5 2.
O do thou keep my soul, O God;

2. 3 5 5 7 5.
Do thou de - liv - er me.

1. 3 5 4 6 3 5 2.
Let me not be a - shamed, for I

3. 4 3 2 2 1.
Do put my trust in thee.

MANCHESTER. *c.m.* *f major.* $\frac{3}{2}$ (.)

1. 3..2. 1..87 6.5.4. 4.3.
I to the hills will lift mine eyes,

8. 5.4.3. 6.7.83 3.2.
From whence doth come mine aid;

23 4..3. 6..5. 5.4.3. 3.2.
My safe - ty com - eth from the Lord,

7. 8.4.3. 54 3.2. 1..
Who heaven and earth hath made,

ANGELS' HYMN. *l.m. a major.* $\frac{3}{2}$ (.)

1 3 . 1 2 . 3 4 3 2 1 .
All peo - ple that on earth do dwell,

1 3 . z 5 . 2 5 . z 5 .
Sing to the Lord with cheerful voice.

3 4 . 5 6 . 5 4 . 3 2 .
Him serve with mirth, his praise forth tell,

5 4 . 3 2 . 1 4 3 2 1 .
Come ye be - fore him and re - joice.

ST LAWRENCE. *c.m. f major.* C (..)

0 . 1 . 3 . 34 5 : 6 3 . 2 . 1 .
Oh thou my soul bless God the Lord,

5 . 6 . 8 . 5 4 43 3 . 2 .
And not for - get - ful be

0 . 5 . 1 . 2 . 3 4 5 . 6 5 4 3 6 .
Of all his gracious be - ne - fits

8 . 5 : 6 3 . 2 . 1 ..
He hath be - stowed on thee.

The advantage of translating music into figures consists not only in the ease with which we are able to read music at first sight by its means, but also in the small space which is required for its notation. For example, a whole tune, consisting of four common metre lines, in all its parts, treble, tenor, counter, and bass, may all be distinctly printed in a space not more than two inches long, and half an inch broad.

FRENCH. *c.m.* *f major.* (·)

·1 34 51 23 4· 03 2 11 7,1· 05 87 65 5Ƹ 5· 03 21 17 1·
·1 11 11 71 1· 01 7,16,5,5. 01 32 17, 32 2· 01 7,1 6,5, 5.
·3 56 33 55 6· 05 4 34 23· 03 55 Ƹ5 66 7· 05 43 42 3.
·8 84 86 58 4. 08 5 64 58. 08 85 67 82· 5. 08 56 45 1.

This, when printed in large types for the Blind, is no larger than the common notation of the same tune for those who see.

Another great advantage consists in the facility with which music may be expressed, either vocally, or by signs. It may be printed with the types used in the books for the Blind. It may be written with the *stamps*, or the *Typhlograph*. It may be represented by *pins* on the pin-cushion, or with *knots* on a string.

Although no music books were ever to be *printed* for the blind, they may be *written* with the stamps with great ease, three or four copies being written at the same time. All the signs

required in this notation are to be found among the stamps used for common writing. It is intended, however, to have music books printed for the blind immediately.

Even were no writing stamps to be had, tunes could be written on the cushion with pins, using the same signs as in the arithmetical notation.

Greater distinctness may be gained in writing music by pins on the cushion, if we stretch a cord along the place upon which we wish to write. When the figures 1 2 3 4 5 6 7 are written beneath this cord, they form the lower octave; when they are written above it, they form the higher octave.

The 8th figure is used to represent the *rest*. The 9th figure represents the point for marking time, and the 0, which is a single point stuck perpendicularly, represents the dotted note, or when stuck close to another note, indicates the semitone above it; in other words, it is a sharp. Flats do not require to be marked, as the sharp of the note below indicates the same tone.

The other signs usually written above music, such as the *bind*, the *pause*, &c. may all be indicated by pins *stuck into the cord*.

The writing of music on the cushion, ought always to be adopted before writing it with stamps. The tune having been written on the cushion, and carefully examined that it be correct, may then be commenced on paper with the stamps. When one note is written on the paper, the pin representing it should be lifted out of the cushion, and in this way repetition or omission is prevented.

To the Blind who compose music, the pin notation must be most valuable, on account of the rapidity with which it may be written, the ease with which it may be revised, and even altered, without wasting paper or destroying materials.

The numerical notation of music enables us also to write upon string.

A large knot represents 1.

A double knot represents 2.

A twisted knot represents 3.

A plait represents 4.

A loop represents 5.

A loop with a knot in the middle, 6.

A side knot, 7.

A loop with the string drawn through it, 0.

A small knot the point for marking time.

Two sets of knots are used; one small, the

other large, for a higher and a lower octave. Both are formed in the same way.

When *one* small knot is placed close *before* a note, it sharpens it. If *two* be found in the same situation, the note is to be flattened.

When the notes are placed close together, they have only half the time of the same notes placed a little separate. If a small knot be placed a little in advance of the note, it doubles its time; if another be placed a little in advance of that, the time is twice doubled. If a third be placed a little in advance of that, the time is doubled three times, and so on.

When one small knot is placed close *after* a note, or if any of the knots which increase the time be double, then the note before it is to be considered a dotted note.

GEOGRAPHY.

Geography is of importance to the Blind for various reasons. In the *first* place, it adds to the general stock of knowledge possessed by the Blind;—it corrects false ideas, both in reference to places and events; and it cultivates the mind, by expanding its ideas, and illustrating its other studies. In the *second* place, it affords an additional variety in the exercises of

the school: this is of much greater importance than is generally supposed. In the *third* place, the examination of proper maps cultivates the sense of touch. This has been most strangely overlooked in the education of the Blind. When we consider what delicacy of touch has been acquired by those who did cultivate it, and how much they must be dependent upon that sense for receiving all their ideas of form, it is evidently a great neglect.

The maps, globes, and other apparatus which have been used in the education of the Blind, are by far too gross and rough to be of any use in the cultivation of their sense of touch. The great object seems to have been to meet the obtuseness of the feeling by a magnitude of the parts, so that they might be perceived even by the most unpractised fingers. The consequence has been, that amidst all the acquirements which result from the education of the Blind, the cultivation of the sense of touch is neglected.

We have already remarked, in an early part of this little work, that the cultivation of the sense of touch does not consist so much in a greater sensibility in the nerves, as in acquiring the habit of receiving information by its means.

The Indian, who can track his way through the pathless forest, has no better eyes than the bewildered European; but he has learned to make a much better use of them. The position of a leaf, the growth of the trees, and many other circumstances which habit at first suggested, but which habit at length conceals even from his own reflection, enable him, as if by instinct, to preserve an undeviating course through the woody wilderness. So it is with the Blind. When their sense of touch is cultivated by habit, or by education, which is the same thing, that, which to others is perceived by the eye, is almost equally perceptible to their touch; partly by the superior sensibility which is gradually attained, but more particularly by that powerful intercourse which has been established between the mind and the nerves of the fingers.

The examination of maps is well adapted to the cultivation of the sense of touch; much more so than reading by the fingers. When the map is first presented to their feeling, there are *great general features* which are at once recognized, long before the more delicate indications are perceived. The mind, however, feels no dissatisfaction from this inability, and will,

for some time, rest satisfied with that measure of knowledge of the form of the country which it has already obtained.

But when the finger has become familiar with the great outlines, it will soon begin to make further discoveries of the more minute forms and lines which were at first unnoticed; and this process of discovery goes forward, without effort and without end, until the finger has acquired such a degree of sensitiveness as to enable it to feel even the most delicate indications of form and position. In reading by the fingers, the case is altogether different, because until the finger has been able to arrive at a certain degree of aptitude in distinguishing each letter, the mind is altogether uninformed, and feels a painful anxiety until it has ascertained what the letter is. When that is done, no further effort is required.

The maps published in Edinburgh are engraved in a very simple manner.* Upon a plate of type-metal the map is drawn reversely. The land is scooped out, and the water is al-

* The Society of Arts awarded their honorary silver medal to Mr Gall, junior, for this invention.—Another prize of five sovereigns was also awarded to him, for the Typhlograph, and the Arithmetical Pin Notation.

lowed to remain. The rivers being raised, have their margins shelving downwards, and the mountains are cut still deeper in the already lowered land.

Impressions are taken from this plate at the common printing press; and by adding patches of thick paper behind, the map is embossed in a manner the reverse of the plate. The sea is low and the land high, while the rivers run in valleys; and the hills rise above the land in rugged imitations of their originals. In short, the map is, in some degree, a very natural imitation of the countries which it represents.

The representation of towns, and boundaries of provinces, may either be produced by the press, or by the hand after they are printed. They have been executed in both ways; but those in which they have been added by the hand, are best and most distinct. The towns are produced by pressing a blunt bodkin at the back, so as to elevate the paper without piercing it. The boundaries are made by a series of punctures also on the other side in lines corresponding with those which we wish to elevate.

Very good maps may be made by the pin alone; and although they cost a great deal of

trouble, and can never be so plain and beautiful as those which are embossed,—yet when circumstances prevent the pupil from procuring them,—or when a map is wanted which has not been embossed, the punctured maps must be very useful. The method of making these will be described afterwards.

Those maps which are already published, are as follow:—Eastern Hemisphere, 1s. Western Hemisphere, 1s. Europe, 2s. North America, 2s. Edinburgh, 2s.

PICTURES FOR THE BLIND.

The Blind can feel the shape of any image which they can handle; but not having any idea of perspective, it is only an outline which can be understood. They readily perceive the resemblance between the outline of Italy and a boot, and they can also perceive the resemblance of any other outline which is full and well defined. We are, therefore, able to give the Blind many illustrations of different objects by means of the printing press, or the pin-cushion, or another method which is now about to be described.

The reader's attention has already been directed to the method of writing by pin-stamps,

In it, the lines of the letters are produced by the puncturing of the paper with pins. But not only may letters be produced in this way, —any figure or diagram may be represented with great ease. On the other side of the paper which is to receive the representation, an outline is drawn with a pencil; and we have only to puncture these lines with a pin or a needle, in order to make them quite perceptible to the finger. Two or three copies may be punctured at once.

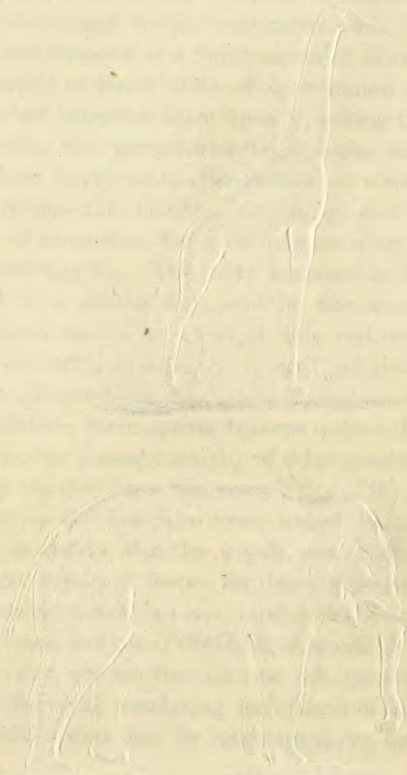
We have seen copies of a little book on Geometry, in which the words were written with the stamps, and the diagrams punctured with a needle. Books of natural history, philosophy, geography, &c. may be made by the same means.

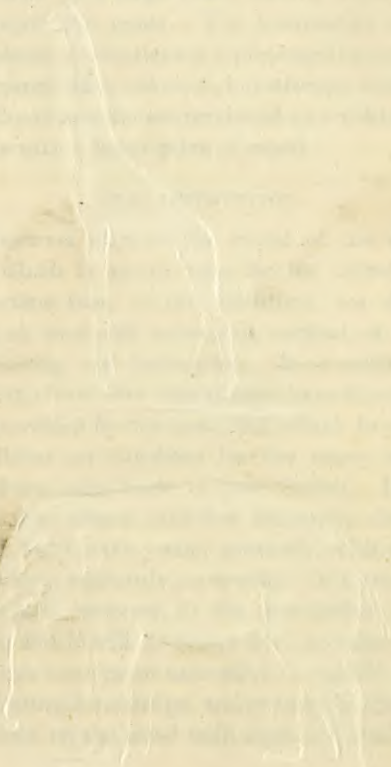
Maps especially may be executed in this manner, as we have already mentioned. The outlines are drawn reversed, on a piece of smooth and thick letter-paper. The coast is first punctured with a needle, and the sea is punctured in lines round the coast, gradually diminishing in strength, until it fades away, somewhat resembling the lines on the coast represented in maps. The rivers are punctured with the same instrument very finely, in two or three lines at the ocean, but gradually decreasing in breadth

and strength, until they fade away at the source. The representation of the cities and towns are produced by a large blunt bodkin, which does not pierce the paper. The boundaries of the kingdoms or counties are represented by straight punctured lines, not close, but strongly marked; and the mountains are produced by crushing the paper with a blunt piece of wood.

ORAL INSTRUCTION.

Whatever may be the extent of the literature which is yet in store for the Blind, it is important, that, in the meantime, we should have an easy and successful method of communicating oral instruction. It is rather remarkable that this also should have been long ago provided by the same individual to whom the Blind are indebted for the many efforts which are now made in their behalf. It is a plan, not indeed intended originally for the Blind, but for the young generally, with whom it has been eminently successful. It is peculiarly adapted, however, to the instruction of the Blind, and it will be found that no other method can ever be so successful in rapidly communicating knowledge, and rendering the impressions on the mind both clear and lasting.





The system of oral instruction recommended by Mr Gall, consists in condensing the knowledge which we wish to communicate into short and simple sentences. We then state one sentence at a time; and after allowing the pupils to direct their whole attention to it alone, we catechise them upon it, asking them regarding the person who did it,—the action which he performed,—the person on whom it was done,—the manner, the time, and the place of the action, &c. according to what the sentence may be. The next sentence is then stated in a similar way, and in like manner catechised on.—The effect of this method of communicating knowledge is most surprising. When the questions are rapidly brought before the children, their spirits become quite exhilirated by the pleasant activity of mind produced during the exercise. They never tire of it; the teacher is the first who tires, unless he catechises so slowly, that the pupils, not getting a sufficient supply of matter for thought, begin to meditate on something else; and thus the exercise is destroyed; and the children would much rather that the teacher did not ask questions at all, that the wandering excursions of their own minds may not be interrupted by ques-

tions which *distract* without *occupying* the attention.

The effect of this exercise, in conveying clear and permanent impressions to the mind, is still more advantageous. When the mind, in a *passive* state, wanders in half-attention over a long unbroken statement, its powers are diffused so widely, that the impressions thereby conveyed are of a dim and shadowy character. There is not point enough to make a deep impression, and in a short time it is nearly obliterated. But when the mind, in an *active* state, is called on to examine a short and simple statement at one time, without being distracted by the consideration of other matters, the whole energies of the children are concentrated upon that statement as into a focus; and when they are further called on to analyze even that sentence, by *stating* the several ideas of which that sentence is composed, the very exercise of *expressing* the ideas, as well as thinking of them, gives a power and a precision to every corner of the sentence; and so distinct and deep is the impression thereby made, that it remains uneffaced for months or for years afterwards.—It may be necessary to give an illustration of this method of communicating knowledge.

We shall suppose that the teacher wishes to communicate to the Blind the following passage from the History of England:—

"Henry VII. repressed many rebellions, and made the common people more civilized. He was a great and a wise king, and died at the age of fifty-two."

He ought to break it up into small pieces, and catechise upon each after announcing it. Thus,—

"*Henry VII. repressed many rebellions.*"
Who repressed many rebellions?
Which of the Henries was this?
What were numerous during Henry's reign?
What did Henry do to these rebellions?
"*He made the common people more civilized.*"
What did Henry VII. do to the common people?
Who civilized the common people?
What class of the people did Henry civilize?
"*He was a great and a wise king.*"
What was Henry's general character?
Who was great and wise?
What was he besides being a great king?
"*He died at the age of fifty-two.*"
How old was Henry when he died?
Who died at the age of fifty-two?

This exercise appears long, but in reality it is very short; the question and answer occupy very little time, and it requires no study to fix the ideas on the mind—that object is accomplished at once, and the impression is lasting.

TEACHING LANGUAGES.

This method may also be applied with the greatest success in teaching languages to the Blind without books. In this instance we must be guided by nature, as she also teaches language without books. And as a child acquires language, by being led to express his thoughts before learning its grammatical rules, so must we endeavour to give a knowledge of whatever language we teach the Blind, by making them express their thoughts in it, and teach the grammar afterwards.

This is very easily accomplished by catechising on a sentence, and making the pupil answer in the words of the language. He is thus made, as it were, to *think* in the language, and this must be the most powerful way of communicating it.

To illustrate this method, I shall take an example from the Latin Testament:—

Mark iii. 1.—Et introivit (Jesus) iterum in

synagogam: et erat ibi homo, habens manum aridam.

2. Et obsersabant eum, si sabbatis curaret ut accusarent eum.

3. Et ait homini habenti manum aridam: Surge in medium, &c.

The teacher reads the first sentence, translating each word thus:—*Et,* and,—*introivit,* went, —*iterum,* again,—*in synagogam,* into the synagogue.

He then reads the Latin words, calling on his pupils to give the English. Thus, the teacher says, *Et,*—the pupil answers, *And.* The teacher says, *Introivit,*—the pupil answers, *Entered.* The teacher says, *Iterum,*—the pupil answers, *Again.* The teacher says, *Synagogam,* —the pupil answers, *Synagogue.*

The teacher next pronounes the English word, and the pupil answers the Latin.—Thus:

Teacher, And.	*Scholar,* Et.
Teacher, Entered.	*Scholar,* Introivit.
Teacher, Again.	*Scholar,* Iterum.
Teacher, Synagogue,	*Scholar,* Synagogam.

If to know a word once, were sufficient to remember it, there would be no need of any

thing further; but we are all too well aware that the remembrance of mere words is very difficult, and soon fades, unless the impression be deepened. The following plan, however, serves to deepen the impression without fatigue, and make the recollection permanent. The teacher next catechises in English, and makes the pupil answer in Latin. In doing this the pupil feels no difficulty, because the words are still fresh upon his memory. But if the catechising were delayed even for half an hour, the pupils would scarcely be able to answer. So firmly however does the catechising deepen the impression, that the fruits of five minutes' catechising will last for as many *weeks* as it would have otherwise done for *minutes*. Take the following as an example of the catechising:

T. Who entered into the synagogue?
S. *Jesus.*
T. What did Jesus do?
S. *Introivit in synagogam.*
T. When did he enter the synagogue?
S. *Iterum.*
T. What did he enter into?
S. *In synagogam.*

T. Who was there?

S. *Homo.*

T. Where was this man?

S. *Ibi—in synagogam.*

T. What is said of this man?

S. *Habens manum aridam.*

T. Who had the withered hand?

S. *Homo.*

T. What had he?

S. *Manum aridam.*

T. What had he withered?

S. *Manum.*

T. What kind of a hand had he?

S. *Aridam.*

T. What did the people do to Jesus?

S. *Observabant eum.*

T. Whom did they observe?

S. *Eum.*

T. What did they wish to observe about Jesus?

S. *Si sabbatis curaret.*

T. What did they think Jesus would do to the man?

S. *Curaret.*

T. When did they think Jesus would cure him?

S. *Sabbatis.*

T. For what purpose did they watch him?
S. *Ut accusarent illum.*
T. What did they wish to do to him?
S. *Accusarent.*
T. Whom did they wish to accuse?
S. *Illum.*
T. What did Jesus do when he saw them watching him?
S. *Ait, &c.*
T. To whom did he speak?
S. *Homini habenti manum aridam.*
T. What did he say to him?
S. *Surge in medium.*
T. What was he to do?
S. *Surge.*
T. Where was he to rise?
S. *In medium.*

The above specimen exhibits the method of asking and answering the questions; but in teaching it will often be necessary to repeat questions again and again, the answers to which are not sufficiently familiar to the mind; for it must be remembered, that no passage should be left until it be completely taught.

The reader will also observe, that many answers must be given which are not grammatical.

At first this is of no importance, the chief business being to give a knowledge of the words. When the pupil finds different forms of the same word, his mind is enabled to perceive the *root* which is common to both; and when the mind is sufficiently at leisure, it will naturally revert to the difference. When, by the occurrence of these, a regular analogy is presented to the mind, it begins to anticipate the principle, and to perceive the character of these inflections. This is the best preparation which the pupil can have for entering on the study of the grammar of the language; and to the blind pupil it is a valuable assistance, because instead of receiving difficult, dry, and to him unmeaning sounds to remember, he delights to find that the grammatical rules and inflections are by no means new, but are rather the welcome explanation of former difficulties; while, instead of being a tax upon the memory, it is rather its assistant, by giving an orderly arrangement of what was previously in confusion.

By means of this method of teaching the Blind, the difficulties are so equally blended, that at no point do they ever become repulsive. At the first, when the mind is unoccupied by previous information, although all the words

are new and unknown, they are easily remembered. In one lesson, eight or ten verses may be taught without fatigue. And afterwards, when the mind has to retain former words, as well as to acquire new ones, the difficulty is diminished by finding, that a great number of the words have already been learned during former lessons. The excitement produced by the lively exercise of catechising, more than reconciles the mind to what would otherwise be pure drudgery.

When the pupil has obtained some better knowledge of the language, which in a short time he will be able to do, the teacher will expect that all the questions *shall be answered grammatically*; and when the pupil fails to do so, the teacher has a most favourable opportunity of shewing and explaining what is right and what is wrong.

In a short time, the teacher may *ask* the questions also in Latin, and thus the whole exercises are carried on in the same language. The progress of the pupil will thenceforward be doubled, for he not only improves by what he answers, but by what he hears.

Practical lessons in Latin may then be required from the pupil, drawn from the passage

which he has been reading; and after that, the scheme may be completed by making him give an amplified paraphrase, or abridged abstract of the passage, in words and phrases, differing as much as possible from the original.

From the success which has attended this method of teaching languages among those who see, and from its peculiar adaptation to the Blind, who in this way may both teach and learn languages without books; it is hoped, that another means is thereby obtained for the acquisition of knowledge by the Blind; and another facility added for the useful employment of the same interesting class of individuals, by their becoming the teachers of others, and therefore useful members of society.

APPENDIX.

No. I.

An ALPHABET for the BLIND.

THE importance of a proper choice in the selection of an Alphabet for the Blind, is evident from the fact, that the failure of the previous efforts on the Continent are almost altogether to be attributed to the character which they adopted.

The first point to be decided is, whether we shall adopt a known alphabet, or an arbitrary one. The advantage (and it is the only advantage which it was ever supposed to possess) of an arbitrary character is, that its forms may be adapted to the sense of touch, so as to make even small letters easily distinguished from each other. Even this advantage may be given to the common alphabet; but supposing that it could not, it would have been decidedly better

to have adopted a common known alphabet, than to have encountered the more serious disadvantage which would to a certainty ruin any attempt to introduce a literature for the Blind, founded on an arbitrary alphabet.

1. In the *first* place, we must keep in view the perpetual sentence of banishment from the understandings and sympathies of the public generally, which, practically speaking, would be pronounced against it from its very birth. No man can ever be expected to feel so much interest in a thing which he must learn before he can understand, as in that which is plain to his eyes and his understanding. If the Blind, therefore, must depend upon the interest which the public takes in the accomplishment of this object, it is well that, in making the arrangements, we give some weight to the probable operation of their feelings. In single instances one misfortune may be encountered without danger; but when there is one, even a small disadvantage of a general and perpetual character, it gathers itself into a misfortune of the deadliest kind, sufficient to blast an otherwise hopeful cause.

2. No one but professed teachers of the Blind would, in all probability, ever undertake to learn

it. This would be a most serious disadvantage to a literature which is intended, not merely for Blind Asylums, but for every parlour and cottage where there is a person blind. To attempt a literature only for the Blind who are lodged in Asylums, would be to exert ourselves in behalf of only a fractional part of the number of the Blind. Parents and friends will feel no difficulty in teaching an alphabet which they themselves know, while an arbitrary character which they do not know, (suppose Chinese, Persian, or any which the reader has never learned,) will be exceedingly repulsive, more especially at the commencement; and it is there that the failure of benevolent intentions generally takes place.

3. There is an awful insecurity attending any books which might be printed in an arbitrary character, and as great an insecurity attending the learning to read them. It will be impossible to get all to agree in their opinions regarding any arbitrary character which may be proposed. Those who learn to read one arbitrary character, will not be able to read books printed on another; and any improvement which may be made on any one of them must destroy all the books which have been previ-

ously printed in that character. There is, in short, no standard of approximation by which the framers can be guided. The "a" of one may be like the "z" of another; and we would fall into a complete Babel of confusion by assenting to the idea of adopting an arbitrary character, in preference to one which is known.

4. The adoption of an arbitrary character, would ruin all the prospects of the system of epistolary correspondence between the Blind and their friends. At present, the Blind write letters which any one can read. They themselves can read them with their fingers, and the postmen can also read the adresses written in the same manner. The Blind therefore, if an arbitrary character were used, could not send any letters unless to persons who not only had learned that particular alphabet, but who had either acquired sufficient expertness to enable them to read it, or had sufficient perseverance to induce them to translate the letters one by one, until they had got the substance of the communication. It is easy to imagine, how few correspondents the Blind would have, and how impossible either to address their letter in the same character, or to send it to indivi-

duals who did not know the alphabet, with any prospect of its being received or read.*

Throwing aside the idea of an arbitrary character, we have still a choice between the capitals letters, such as A B C D and the small letters, such as a b c d or *a b c d*.

In order to come to a proper decision upon this point, it is necessary to understand the principles upon which the tangibility of an alphabet is regulated.

When the finger is put down upon an embossed letter, the feeling is produced by part of the finger yielding to the elevation, and conveying to the nerve a feeling of resistance. This feeling may exist even when the object *does not really touch the finger*. Lay a small bead, or even the head of a pin upon the table, and press the finger upon it for a few seconds, until the skin has received an indentation by the pressure. Throw away the bead, and lay the finger upon the smooth table, the feeling will still remain; and unless sight disprove it, the person would be apt to suppose that the bead was still under his finger. This sensa-

* See Gall's Origin and Progress of a Literature for the Blind, p. 34.

tion would continue so long as the indentation remained.

This is the reason why an *open* line is much more easily felt than one surrounded by others; because the flesh of the finger cannot get round about it to make an impression. This is also the reason why *sharp points* are easily felt, and why rounded and blunt lines are very indistinctly perceived.

1. *Sharp and prominent* CORNERS are therefore important requisites in the formation of a character for the Blind; and any alphabet which possesses blunt and rounded lines must be unfit for their use.

2. *Diversity of* OUTWARD *form* is absolutely necessary for a blind alphabet; for if the characteristics of a letter be in the *centre*, the finger cannot discover them.

Upon these principles, we see at once that the capital letters are very far from being fitted for the use of the Blind. When we reduce the alphabet to a small size, we can distinguish the letters from each other only *by the position of their* CORNERS. Now, it unfortunately happens that no fewer than six capital letters have their CORNERS, (by which alone they can be distinguished,) *exactly* the same. These are EH

KNXZ. Each of these six letters appears to the fingers merely as an oblong square; and the M can only be distinguished from them by the slight difference of its breadth. The BDRU cannot be distinguished from them, or from each other, except by the *bluntness* of some of the corners, for the *position* of the corners is not different. The AIJLW alone have their *corners* in different positions from all the others. OCGQS are merely rounded knobs without *corners*, and therefore are incapable of being distinguished by the finger, except by their want of form. The S, in the same manner, will almost appear an O, or a D, or a U, or an R. The F and P will appear almost the same. T will scarcely be distinguished from the V and Y, because the CORNERS of all the three are the same. Instead therefore of twenty-six different and easily distinguished forms, we have only nine which are different. They may be represented by the following letters: AHIJL OPTW; and under one or other of these *all the others* are sheltered from observation.

A second great disadvantage in the capital letters consists in their perpendicular sides. This disadvantage will easily be perceived by comparing those letters which have perpendi-

cular sides and those which have not. Take the OVCA. Although these letters were placed close to each other, the finger perceives the individuality of each, and is in no danger of supposing that part of one letter belongs to the one next it, because the finger gets in between the letters at the top or the bottom, although the letters themselves are quite close. There is economy of space here ; but take any of the letters which have perpendicular sides, they must be kept separate in order to be felt. Thus, M H N I. If these were placed close to each other, the finger could not feel any letter at all :—MHNI.

A third disadvantage consists in the breadth of the tops and bottoms. Letters for the use of the Blind should have the tops or bottoms of the letters, in as many instances as possible, terminating in only one CORNER. This would give an *individuality* to each, because the finger would feel the top and bottom, and would know that there was a complete letter between. When there are two CORNERS at the top or the bottom, the finger does not easily perceive which of the corners belong to one letter, and which belongs to the one next it. For example, when we have such letters as these

coming together, HINEMKXZ, the finger can scarcely feel any thing more than a succession of points, all equally distant from each other; and he is unable to say which of the corners belongs to one letter. It is as if it had been printed thus : : : : : : : : : : : : : : : : which no person could read, nor could any one even tell how many letters it was composed of.

These reasons are scientific, and founded upon experience; but there are two popular arguments which, to the general reader, must be more convincing. Let us consider whether we like to read the capital or the small letters ourselves; which is the most legible, and which would take up least space when it is printed? What would we think of a printer, who, in his anxiety to print a copy of the Bible in its very smallest size, would print it all in capitals? And if we, in our anxiety to diminish the bulk of a Bible for the Blind, choose the capital alphabet instead of the small one, it is most evident that we would be still less successful. There is considerable difficulty in reading sentences printed in capitals; and if we would but examine the reasons, we would find that they are almost the same with those which have been already specified.

When is it that words or sentences are always printed in capitals, and never in small letters? In title pages—and why? Because of the *uniformity* of the alphabet. Words printed in capitals have so few great distinguishing features, and are so monotonous in their character, that they are always preferred to the common alphabet in titles. If we were to print a title with types of the common alphabet, the words would have no resemblance to each other, and the symmetry would be totally destroyed. The reason why the capitals are best for titles, is the very reason why they are totally unfit for the Blind.

I have been thus particular in my remarks upon the fitness of the capital letters, on account of the preference which has been given to them by two individuals, whose experience in regard to the Blind is great, and whose anxiety for their welfare is unbounded. Actuated by the most correct views of the mischief which the adoption of an arbitrary character would necessarily entail upon the literature of the Blind, they have fallen into the opposite error of supposing that it was neccessary, not merely that all should be able to read the books, but that the alphabet should be *exactly the same* as

the common alphabet. If this had been necessary, the small letters, without any modification, would have been much better than the capitals; but as a *modification* of the *small* letters would possess all the simplicity and superior legibility of an arbitrary character, without having any one of its disadvantages, it must be much better adapted to the use of the Blind than the capital alphabet.

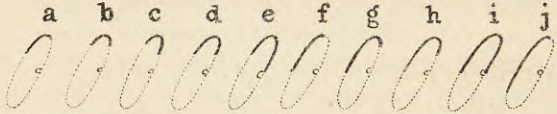
The modification of the small alphabet, as prepared by Mr Gall, possesses the two great characters required—simplicity and tangibility. The triangle is the simplest form which can be produced. Mr Gall has therefore adopted the triangular modification. For the (a) or rather (*a*,) he uses ◁, for (*b*) he uses ▷, for (*c*) he uses ⋖, for (*d*) he uses ◿, and so on. It will be observed, however, that the b and d have got a peculiar top, like a swallow's tail. This is not exactly in character with the principle of the alphabet; but in the large alphabets it is necessary for the economy of space: for if the top were given in its full length, there would be too much space between the lines. This part of the letter is therefore aggravated by means of the broad top, so that it may be felt without being very long. In small alpha-

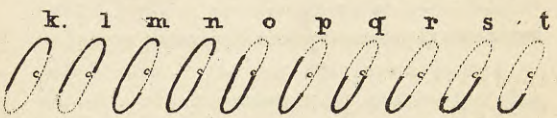
bets this is not necessary, because the space required between the lines gives sufficient room for the extension of these top lines.

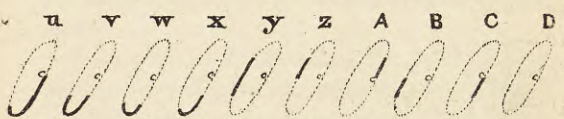
It is thus evident that every letter is stripped of every part which is not essential to its character, while every characteristic is so magnified as to distinguish its possessor from every other letter. *Corners* are given instead of *rounds*, and these corners are so arranged that no letter has them under the same arrangement.

It is pleasant to find that the same principle has been adopted in America; and although the letters are not nearly so simple, (and consequently can never be reduced to so small a size, and yet retain their legibility,) yet so great is the similarity, that those who have learned to read Mr Gall's books are also able to read those from America. If the capital alphabet had been adopted here, this advantage would have been lost.

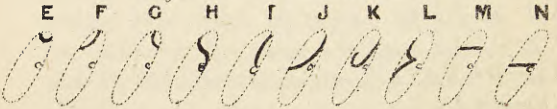
Index to the Movements in Writing by the Typhlograph.



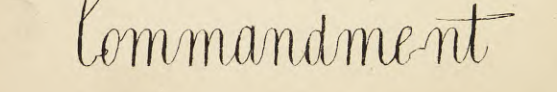




Unguided Movements.



Facsimile of writing with the Typhlograph by a Blind Girl.



No. II.

TABLE for shewing the Method of Forming the Letters of the Alphabet by Means of the Typhlograph.

MOVEMENTS IN MAKING THE SINGLE LETTERS.

(a)—d *d* s r*
(b)—*y* o Q
(c)—a *a* v
(d)—d *d* s z p
(e)—F *a* v
(f)—k *k* y *y c* G S
(g)—d *d* s B y *v*
(h)—*y* y A h v
(i)—D *C* r
(j)—D *C* B y *t*
(k)—*y* y A g U x
(l)—j m
(m)—e i h v
(n)—e h v
(o)—d *d* v
(p)—*y* y y k v
(q)—d *d* s B p
(r)—e f G
(s)—T *u*
(t)—*y* y p N
(u)—*C* q r
(v)—d s Q
(w)—*C* q q Q S
(x)—c *t* t a *a* v
(y)—d s B y *v*
(z)—O *a x* N

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* In the above references to the figures represented in the accompanying plate, it is supposed that when the line referred to has one extremity nearer the left hand than the other, (not calculating the slope,) then the left extremity is the beginning of that line. When none of the extremities are nearer than the other, it

MOVEMENTS IN MAKING THE CAPITAL LETTERS.

(A)—u i r
(B)—e B A z k *J* R *t*
(C)—J m
(D)—y *t* X u *e*
(E)—*d* L v
(F)—g E *j t* N
(G)—J m A B *v*
(H)—I A *u* T O z r
(I)—I A *s*
(K)—I A *u* u O* d *d J* R v
(L)—*k t* X t
(M)—{ i B A *A* l B A *A* l r / s i B A *A* l r
(N)—s i B A *A* k
(O)—n
(P)—e B A z k K
(Q)—n X w
(R)—e B A z k *J* R v
(S)—s h *J*
(T)—d M y *s*
(U)—e q z p
(V)—e q h
(W)—*I* A q *z* o h
(X)—e *s* s h *h* r
(Y)—e q *z* z y *v*
(Z)—*I* A B i s

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is supposed that the top is the beginning. When this supposition is reversed, the letter referring to that line is printed in *Italic*,—That is to say, when the letters of reference are printed in the *Roman* character, the line begins at the left hand, or at the upper extremity. But when the letters of reference are printed in the *Italic* character, the line begins either at the right hand, or at the lower extremity.

* This move (O) is not to be marked; the pencil is merely to remove from the one extremity to the other, to begin the next move at its proper place.

MOVEMENTS IN MAKING THE FIGURES.

(1)—C A
(2)—c *J* N
(3)—*b* U *w*
(4)—*T* N
(5)—x *c C* o
(6)—d *v y*
(7)—O *T*
(8)—*b* H *w* W
(9)—*d* v A B
(0)—d *d* v

These directions for making the letters, particularly the capitals and figures, are only to be considered as suggestions to the teacher. Many of them might be much better delineated in other ways by the same instrument.

The small letters are those which are most elegantly formed; and although, for convenience sake, it is better to use the same instrument to form the capitals, yet when elegance is required in both small and capital letters, cards may be cut for each of the capitals, and their places in relation to the other writing indicated by the notches in the slide-rest.

In making the crossings of the t and A, there is a part of the typhlograph which supplies the line for guiding the pencil in forming them. In this also the notches of the slide-rest are necessary to shew where the crossings are required. They may also be made by leaning

the pencil above the projection of the guide, and moving both pencil and guide so as to cross the letters which require it.

In writing by the Typhlograph, the pencil ought to be kept perpendicular; but sometimes the elegance of the letters may be increased by changing that position, and running the point under the guide; thus, in making the c, the under part of the letter should be made in this way, so that it may be made broader than the top.

Between some of the letters it may be necessary to make a line, the breadth of the hole in the guide, that the letters may not be too close. For example, when two *o*'s come together, they must be separated in this way.

In the specimen of writing given in the preceding page, the *e* is connected with the *n* in this manner. This does not appear so handsome as when the writer is able to enlarge the *curve*. The girl who wrote the specimen, it may be remarked, has had only a few lessons, and scarcely any practice.

When the Blind are taught to write with the typhlograph, their experience in forming the letters is evident from the force with which they press the pencil against the sides of the

guide;—this gradually diminishes as they proceed in their practice. In a little while they are able to anticipate the line which the guide would direct them to make; and at length their hand will be so completely schooled into the forms of the letters, that they will be able to write without the guide at all.

Those who have learned to write before they became blind, ought occasionally to practise writing with the typhlograph. Those who see are corrected in their writing by the eye; but when they become blind, their writing is always apt to grow worse, for want of this discipline. The occasional use of the typhlograph will supply its place.

The Blind may write very small letters with great ease and precision. Indeed there is scarcely any limit to the reduction of the size. When the hand *tries* to form the letters large, the guide confines the movement to the size for which it is constructed; the letters, therefore, are quite perfect, however minutely they may be formed. It would not be difficult for the Blind to write the Lord's Prayer upon a piece of paper not larger than a square inch; and there is no doubt but that the Blind may yet exhibit specimens of penmanship which

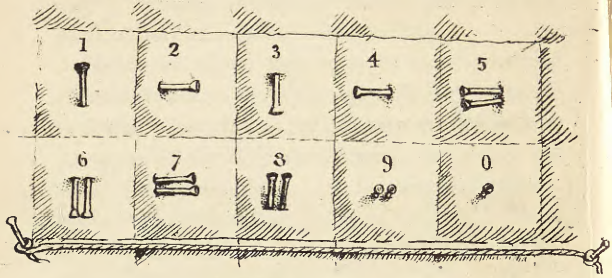
might be fairly entitled to comparison with the productions of accomplished writers.

Neither is there any limit to the variety of character which the Typhlograph may be made to form. Any blind person may use a particular style of writing for himself, by using always the same guide. It is very difficult to make two guides alike in every respect. There is therefore almost a certainty that each is different from every other.

German writing may be made with even *greater* ease than the ordinary Italic form; while the ease with which the guide may be made for such writing is an additional recommendation. An elongated hexagon, with a small projection in the middle of the right side, will make an excellent German-text guide.

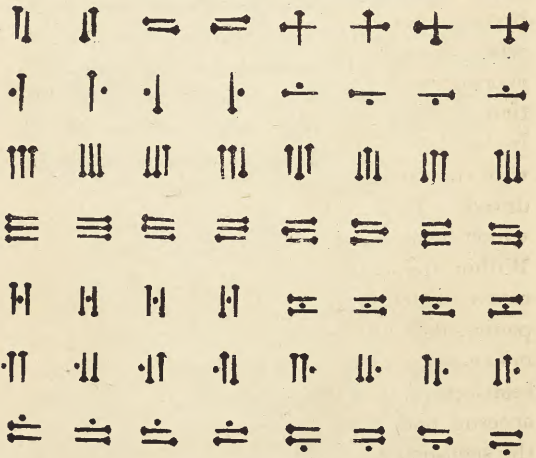
No. III.

Arithmetical Pin Notation.



OTHER SIGNS

Formed by two or three Pins



In Teaching Arithmetic the Pupil may be assisted in keeping the lines of figures straight by having a Cushion quilted in Squares. This however ought to be used only for a short time.

No. IV.

The NUMERICAL MUSICAL NOTATION for the BLIND.

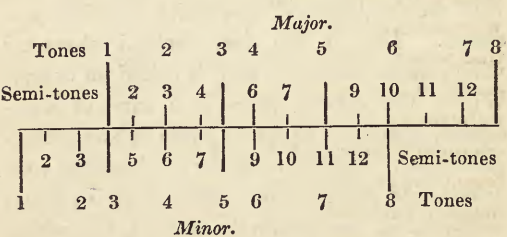
It will be necessary first to explain the principles upon which the numerical notation is founded, before describing the notation itself.

The octave in music possesses a definite and unchangeable character. When a cord by vibrating, produces a distinct musical tone, and when we make the vibrations become rapid by shortening it, the tone rises in the same proportion, until the rapidity of the vibrations is exactly doubled. Then there is a complete accord with the fundamental tone which was first produced. This is the first decided character which music assumes, and is called an octave. Within the octave, there is a kind of semi-octave, which is very perceptible in bass accompaniments. And between the fundamental tone or key-note, and the semi-octave, there is a minor semi-octave, less distinctly marked, but which accords both with the fundamental tone and the semi-octave. So that when these three are sounded at the same time, there is produced a

perfect simple harmony, to which nothing can be added.

A more minute division of the octave gives us seven distinct notes, in which we recognise the fundamental tone as the first, the semi-octave as the fifth, and the minor semi-octave as the third. These tones, however, are by no means regular; and it is only when we institute a mechanical rather than a musical division of the octave, that we find a regular and natural division into twelve tones or rather semi-tones.

In this secondary scale, we recognise the notes of the septenary scale, and we are better able to perceive their relative distances from each other, as well as the relation of the three choral notes to each other.—Thus:



It is worthy of notice here, and may be useful in some cases, in arranging the notation,

that although the minor key rises in a different succession of semi-tones, the abstract relation of the tones remains the same. For example, in the major key, the third full tone falls on the fifth semi-tone, but in the minor key it falls on the fourth, But if we consider the first of the minor key to be the sixth of the major key, all the notes are the same in both.

On account of the irregularity of the ascent of the septenary notes, musical instruments must be furnished with twelve tones instead of seven; so that whatever of them may be selected for the fundamental or key-note, the other notes may be found on the semi-tones on which they ought to fall. This renders it necessary, in the common notation, to mark a clef with a certain number of flats and sharps. If no clefs were marked, no one could play the tune; for that which with one clef would indicate an interval of two semi-tones, would, with another, indicate an interval of only one—and the most common tune might be played in twelve different ways—different in the relation of the notes to each other. In using the common line notation, therefore, we are forced to the difficult study of the clef in all its twelve different modifications; and before being able to read a

simple piece of music, we must examine and reason on the character of the clef, and the semi-tones which it brings into service.

Upon the same principle we find, that one tune may be written in twelve different ways, and yet, by making a corresponding alteration in the clef, no change would take place in the music itself, except in the elevation of the voice in singing it.

As the relative proportion of the notes must always remain the same, in whatever pitch the tune may be raised, it is evident, that for the Blind it is as well to represent the tune *itself* with 7 notes as to represent its *performance* upon 12.

For this purpose, we must make the key-note of the music the key-note of the notation also, calling it 1. The six notes above, are 2 3 4 5 6 and 7.

In teaching the intervals, the pupil is greatly assisted by the choral notes, which are represented by 1 3 5 8, which the ear very readily remembers; and when these are firmly impressed on the memory, any of the others may easily be lighted on by their means.

This then being the foundation upon which the notation for the Blind is to be reared, it

is only necessary to give them the figures representative of music, along with a system of time, and a few other symbols. The Blind may then learn in less than half the time, and with half the labour usually sacrificed by those who see.

1. The seven notes of music are represented by the first seven figures 1 2 3 4 5 6 7, and a rest is represented by a cipher 0.

2. The change from one octave to another is represented by raising or sinking such notes above or below the line, or by attaching marks indicative of such a change. When only the 1 and 2 are used in the octave above, 8 and 9 may be used instead. When this is not sufficient, a comma turned upwards after such notes as are of the higher octave may indicate the same thing; a comma turned downwards may indicate a transition to the lower octave.

3. In order to shew the elevation of the key-note, there must be placed at the beginning of the tune a letter indicating the note of the instrument upon which we are to modulate the key-note of the tune. We may alter the elevation of the tune by altering the letter.

4. To mark the time, it is only necessary to indicate the relative proportions which one

note bears to the others, provided we indicate, at the commencement, the mark which is correspondent with the semi-breve.

5. The simple figure is considered the basis; a dot added doubles the time; two dots multiply it by 4; and three dots multiply it by 8. If a larger range of time be required, instead of four dots we may use a score, and after it may be placed another dot, or even two, to multiply the basis by 32 or 64. The largest note therefore would be represented by the figure itself, a score, and two dots; although I can scarcely suppose that any tune would have in it two notes, the one sixty-four times the length of the other. In many tunes there are only two different kinds of notes, and in many more, only three; in such cases there would be the greatest economy of space; but even in those whose time varies, there would be an immense saving when compared with the common notation.

6. In describing the method of marking an octave higher or lower, the use of commas is mentioned; but this is only necessary when the figure is simple, and has no point for marking time. When the points follow the figure, to mark an increase of time, they may be turned

up to mark the higher octave, or turned down to mark the lower. In all such cases, however, there must be prefixed to each line a point turned either up or down, to shew in what direction the figures in the line are supposed to be turned. Thus, if at the beginning of the line the point be turned upwards, and 7 occur in that line with a point turned downwards, this would indicate that the 7 of the octave below was to be used. Again, if the point be turned downwards at the beginning, and in the line there occur a 1 with the point turned upwards, this would indicate that the key-note of the octave above was to be used.

7. When dotted notes are required, a colon is used instead of a point; but where there is no point attached to the figure a semicolon is used—the comma of the semicolon indicating as usual the position. It would thus, when in its natural position, represent the lower octave, and when turned up, the higher octave.

8. Flats and sharps may be represented with common types by a parenthesis prefixed. The flat by the parenthesis turned *from* the figure—the sharp turned *towards* it.

9. Flats and sharps which occur in music, not in the clef, but accidentally, are generally

caused by a change in the key-note; and the most frequent occurrence is upon the fourth of the major key, although the present form of notation prevents us from perceiving such analogies. When therefore this does occur upon the fourth of the major scale, the cause is, the changing of the key from the grand octave to the semi-octave; and as the note below the grand octave is 7, which is a semi-tone, when the 5 takes the place of 8 or 1, the 4 takes the place of 7, and must be semi-tone also. It becomes, if I may use the expression, half a 7 and half a 4, and may therefore be made a Z, which partakes of the shape of both.

10. The bars are indicated by spaces between the figures where they occur.

The numerical notation of music enables us to make out indices of tunes, not merely by the alphabetical arrangement of their names, but by the numbers composing their first lines; so that on hearing any tune, we could find out its name by such an index.

No. V.

FRETTED TYPES.

Printing with fretted types is one of the most valuable inventions for which the Blind are indebted to Mr Gall, as it has placed this interesting art upon a more stable and sure foundation than ever it was before. Although many advantages were expected from it, not only have they all been realized, but many more have been obtained which were never even thought of.

The fretted types are similar in every respect to the old ones; only, instead of having the lines smooth, they are composed of a succession of points, which, when the paper is pressed upon them, almost perforate it. The impression thus made is more *legible,* and more *durable,* while it takes only about one-half of the labour to produce it.

The books are much *cheaper* than those which are produced in the old way. They are printed with *greater* ease and quickness than even common printing, because the types do not require to be inked.

Formerly it was impossible to print upon both sides of the paper, Now, however, by

means of the fretted types, the paper may be printed on both sides. About one-fourth of the paper may thus be saved; and the lines being kept more asunder are made more legible, and, to the finger, less confused. A specimen will be found at the end of the book.

Formerly the lines were apt to fall in the middle when hard pressed by the finger. Now, the lines are supported by a series of arches, so that no pressure of the finger can make them fall.

Formerly the lines were smooth and blunt, so that a considerable pressure by the finger was necessary to produce a distinct indentation. Now they are rough and sharp, so that the finger is more distinctly indented, while a much slighter pressure is required to produce the effect.

No. VI.

Size of the TYPES for the BLIND.

In the specimens of printing at the end of the book, the reader will perceive an alphabet for the Blind on the *English* size of type. This is a size which the Blind are already able

to read, and there is no doubt but that books will yet be printed upon types much smaller than even this.

Indeed, there can be no limit assigned to the reduction of the size of type, so long as we keep to the present alphabet, whose characteristics (as has been already mentioned,) are altogether *external.*

But it is a dangerous error to suppose, that the books should be printed upon the smallest type which the Blind can be taught to read. They should *at first* be printed very large, for although the bulk of the books may be an important matter for after consideration, it ought not to be allowed to affect that which is of still more importance at present. There must be Bibles for the Blind printed on various sizes of types; but it would be best to print the large size first, and let the smaller sizes follow, for the following very important reasons:

1. We must provide in the meantime Bibles which *all the Blind* will be able to read. If it were only for children that we had to provide Bibles, there might be some doubt which size to adopt first. Children are able to read print which the adult Blind cannot feel; but any print which the adult can read the children

can read also. This is one reason therefore why the books should be printed on a large type first. The fretted type upon which the specimen at the end of the book is printed, can be read by any blind person, with more or less difficulty, *even at the very first.* A type much smaller could not be felt at first by many of the Blind, whose fingers are hardened by manual labour. It were cruel therefore, as well as impolitic, to exclude from the first opening of God's Scriptures to them, so large and so interesting a class of individuals as the *adult* Blind. Mr Gall's efforts were not undertaken to give an additional interest to the platform of an Asylum examination. His eye rested on the dark chamber of the solitary Blind.

2. The great question now is not, How small print can the Blind be taught to read? but the question is, *What size of print would the Blind* LIKE *to read?* A very little consideration is sufficient to shew us, that unless the Blind can be made to take pleasure in reading, the books will remain unread. And although benevolent individuals may take great pains, and lay out great expense in procuring for them Bibles, unless this simple fact be considered and acted on, they will find, that, as in

France, their labour and their money bought only a shadow. In endeavouring to save room, they will lose their books altogether—In endeavouring to save money, they will throw away all that they do expend.

The first object is to make readers, and to create a thirst for reading. For this purpose we must encourage them to read ; not by shewing them how small the books are which they cannot feel, but how easily they can feel the books that are provided for them. Even after they have learned to read, they must still be thus encouraged, if we wish them to derive any benefit from their learning. A blind man may be *able* to read, and yet it may require so great an effort, that he will feel no *pleasure* in doing so. It is only when the ability to read is attended with almost no effort, that the *pleasure* of reading commences ; large and easily felt print is therefore the only way in which we can accomplish this object, and avoid the cause which ruined the Parisian books. *They* could be read, and they are read to this day ; but they have always been confined to the inmates of the asylum and a few others, who had opportunities of cultivating their sense of touch, and patience and perseverance to enable them to overcome

the difficulty. They are nevertheless a failure, *because they are not* FOR THE BLIND *as a whole.*

The Blind ought to be dealt with as we would deal with aged people, whose eyes are dim, or even as we would wish to be treated ourselves. We would not like to be provided with books printed upon a microscopic great primer, which brought the letters to become visible, but nothing more. We do not print novels or scientific works upon diamond types; and even the Bible would never be printed upon small types, until an edition had been provided upon a more comfortable size of letter, which could be read not merely by children, but by *all.*

No. VII.

The Price of BOOKS and PRINTING for the BLIND.

Books printed upon the same size of type with that of the specimen at the end of this book, and also a size smaller, may be printed with editions of 500 copies at the rate of one penny per sheet of small post; or in other

words, one farthing for every leaf of common letter paper. When printed upon the small English type, such as that in the specimen, the expense would be about three-half-pence per sheet.

The whole New Testament, printed on the large type, would cost about 30s. or 33s. if printed only on one side. If printed on both sides, it would cost about 26s. Upon a smaller type, which will probably be the *medium* type for the Blind, the New Testament would cost about 25s. Upon the English type, it would cost about 12s. 6d. or 15s. Testaments may yet be printed on the triangular character, capable of being read by the Blind, for 5s. and bound into a single volume.

Upon these terms, benevolent individuals may benefit the Blind by printing parts of the Bible for their use. To print 500 copies of four pages, would cost rather less than L.2, 2s. and this sum might be greatly reduced by the sale of the copies, both to the Blind and to those who see.

No. VIII.

Mr ST CLAIR'S WRITING APPARATUS for the BLIND.

A very ingenious and simple apparatus has been invented by Mr St Clair, (who is himself blind,) by which he is enabled to correspond with his seeing friends.* It consists of a slip of tin plate, in which is cut a range of square holes.

Within these he is able to form the capital letters with considerable precision.

The great peculiarities of the capital letters point them out as well adapted to this plan of writing. Nearly the whole of them are squares, varied only in their internal structure, or in the obtuseness of some of their corners. The square hole therefore is in a great measure a guide for them all. The following is a fac simile of the writing which Mr St Clair produces by its means :

JOHN ST. CLAIR

* The Society of Arts adjudged to Mr St Clair a prize of three sovereigns for this contrivance.

The ease with which the instrument may be made, and the facility with which the writing by its means may be learned, render it an important auxiliary in the education of the Blind.

No. IX.

SCHOOLS for the BLIND.

So great are the facilities now afforded to the education of the Blind, that

Religious knowledge	Algebra
Reading	Geometry
Writing	Geography
Grammar	History
Arithmetic	Languages
Book-keeping	Music

and almost every other department of science may be taught with great ease. Schools may be instituted in every town throughout the country; or in places where there are few blind persons, a class may be attached to the parochial schools, in which all or any of the above branches may be taught. Even private individuals, who are interested in any blind persons, may become their teachers. The whole art is so simple, that any one may accomplish it.

Libraries may also be formed for the Blind, either in their own school, or in the clergyman's house. From them the Blind may procure books to read and to return, as in other libraries.

The establishment of such schools would greatly benefit the Asylums for the Blind; as it would procure for them educated individuals as inmates, from all parts of the country, who would be therefore more useful members of the institution, and would require less care in being taught their trade.

Many of those trained in such schools would not require to be removed to any Blind Asylum. Their minds being cultivated, would soon strike out some useful occupation in their own locality. They would not only become independent of charity, but might even be able to occupy elevated situations in society. Many have already done so without having so great opportunities.

We have already instances of the Blind becoming Scripture readers to their neighbours; and most useful readers they are, because they find a deeper interest, and a more affectionate welcome attend their visits, than would fall to the share of any other on a similar errand.

To the Blind themselves the ability to read

the Bible is of great value. Even the comparative slowness with which at first the verses are read is not without its advantages. It gives the mind food for thought, and time for attention and reflection. The Blind are necessarily solitary, and any occupation, however trifling, is valuable. How important then to give them the Bible! Never was there a better opportunity of presenting God's word as a message to man.

If there are advantages possessed by those who see over the Blind in reading, it must be confessed at the same time, that the Blind possess other advantages, which those who read with their eyes cannot have. They need no candle. They can read by night as well as by day. Even in bed, when sickness would prevent him from sitting up, the blind person can take his Bible to bed with him, and read with his book beneath the bed-clothes.

The Blind may become deaf, and the Deaf may become blind. In either case the books for the Blind, and the writing apparatus, must be of great advantage. One instance of the latter kind has already occurred, and already has the remedy been applied. One young woman, who was an inmate of the Glasgow Deaf

and Dumb Asylum, became blind, and was thus shut out from all intercourse with society, except through the medium of the sense of touch. That young woman has been taught to read Mr Gall's books with her fingers; and thus, though nearly shut out from intercourse with man, she enjoys continual access to the word of God.

No. X.

THE following address, *written and signed with the writing stamps,* was presented to Mr Gall, by the pupils of the Belfast School for the Blind, accompanied with a handsome copy of the Bible.

RESPECTED SIR,

Permit us to convey to you our deep sense of the unspeakable benefits you have conferred upon us. We can now read and write. Our solitary hours, which were formerly employed in brooding over our deprivations, are now spent in drawing holy comforts from the Word of Life; so that to us who sat in darkness light is sprung up. For these blessings, sir, we are, under God, indebted to your exertions.

We cannot express what we feel;—we cannot

repay what we have received. But we beg you to accept the accompanying small Bible, being the valueless representative of that which is above all value.

We have requested Mr Collier, our teacher, to present it to you in our name.

We daily pray to God that he may bless you, and spare you to see many happy results of your benevolent labours.

Signed on behalf, and at the request of the pupils of the Belfast School for the Blind,

SAMUEL THELLAR.

August 1, 1835.

The following is Mr Gall's answer:

Myrtle Bank, Trinity, Edinburgh.
13*th August*, 1835.

MY DEAR YOUNG FRIENDS,

I have most unexpectedly received, by the hands of your respected teacher, Mr Thomas Collier, a very estimable token of your gratitude to me, as the humble instrument of providing the means by which you are now enabled to read and write.

This mark of your affection to myself, and of your estimation of the blessings of Literature, has afforded me great satisfaction. It is the first indication I have received of the kind,

the " sheaf of the first fruits" of my labours for the Blind; which, with humility and gratitude, I desire to " wave as a wave-offering before the Lord;" while I request you to join me in acknowledging Him as the author of the blessing, and alone entitled to the glory.

The closing intimation of your letter is peculiarly pleasing. I have long experienced the value of the prayers of the pious young; and your spontaneous daily supplications on my behalf, I esteem above all price. They are the most valuable, and most appropriate return that gratitude could dictate. Allow me earnestly to solicit their continuance; and that He who has put it into your hearts to do so, may hear and answer our prayers for each other, is the earnest desire of,

Your affectionate Friend and Wellwisher,

JAMES GALL.

To the Pupils of the Belfast School for the Blind.

THE END.

a b c d e f g h i j k l m n
o p q r s t u v w x y z

JOHN I.

IN THE BEGINNING WAS THE WORD, AND THE WORD WAS WITH GOD, AND THE WORD WAS GOD. THE SAME WAS IN THE BEGINNING WITH GOD. ALL THINGS WERE MADE BY HIM;