Mainz,” an expression which could hardly be anything but a figura­tive allusion to the casting of the types.

Granting that all the earlier works of typography pre­served to us are impressions of cast-metal types, there are still differences of opinion, especially among practical printers, as to the probable methods employed to cast them. It is considered unlikely that the inventor of printing passed all at once to the perfect typography of the punch, the matrix, and the mould. Bernard @@1 considered that the types of the *Speculum* were cast in sand, as that art was certainly known to the silversmiths and trinket-makers of the 15th century ; and he accounts for the varieties observ­able in the shapes of various letters on the ground that several models would probably be made of each letter, and that the types, when cast by this imperfect mode, would require some touching up or finishing by hand. He ex­hibits a specimen of a word cast for him by this process which not only proves the possibility of casting types in this manner but also shows the same kind of irregularities as those observable in the types of the *Speculum.*

But here again it is argued that in types cast by this or any other primitive method there would be an absence of uniformity in what founders term “ height to paper.” Some types would stand higher than others, and the low ones, unless raised, would miss the ink and not appear in the impression. The comparative rarity of faults of this kind in the *Speculum* leads one to suppose that, if a process of sand-casting had been adopted, the difficulty of uneven heights had been surmounted either by locking up the forme face downwards, or by perforating the types either at the time of casting or after­wards, and holding them in their places by means of a thread or wire. To this cause Ottley attributed the numerous misprints in the *Speculum,* to correct which would have involved the unthread­ing of every line in which an error occurred. And, as a still more striking proof that the lines were put into the forme one by one, in a piece, he shows a curious printer’s blunder at the end of one page, where the whole of the last reference-line is put in upside down, thus :—

JQoe ijuaø beøpot ølapenbe ettoe niεt ijιtεtετttιe.

\*pjldE3 il 0103U3®

A “ turn ” of this magnitude could hardly have occurred if the letters had been set in the forme type by type.

Another suggested mode is that of casting in clay moulds, by a method very similar to that used in the sand process, and resulting in similar peculiarities and variations in the types.

Ottley, who was the chief exponent of this theory, suggested that the types were made by pouring melted lead or other soft metal into moulds of earth or plaster, after the ordinary manner used from time immemorial in casting statues of bronze and other articles of metal. But the mould thus formed could hardly avail for a second casting, as it would be scarcely possible to extract the type after casting without breaking the clay, and, even if that could be done, the shrinking of the metal in cooling would be apt to warp the mould beyond the possibility of further use. Ottley there­fore suggests that the constant renewal of the moulds could be effected by using old types cast out of them, after being touched up by the graver, as models,—a process which he thinks will account for the varieties observable in the different letters, but which would really cause such a gradual deterioration and attenua­tion in the type, as the work of casting progressed, that in the end it would leave the face of the letter unrecognizable as that with which it began. It would therefore be more reasonable to suppose that one set of models would be used for the preparation of all the moulds necessary for the casting of a sufficient number of types to compose a page, and for the periodical renewal of the moulds all through the work, and that the variations in the types would be due, not to the gradual paring of the faces of the models, but to the different skill and exactness with which the successive moulds would be taken. It is evident that the sand and clay methods of casting types above described must be slow. The time occupied after the first engraving of the models in forming, drying, and clear­ing the moulds, in casting, extracting, touching up, and possibly perforating the types required for one page, would exceed the time required by a practised xylographer for the cutting of a page of text upon a block. But he that has gone through the trouble of casting separate movable types has a clear gain over the wood­block printer in having a fount of movable types, which, even if the metal in which they were cast were only soft lead or pewter, might be used again and again in the production of any other page of text, while the wood-block can only produce the one page which

it contains. Moreover, only one hand could labour on the xylo­graphic block ; but many hands could be employed in the mould­ing and casting of types, however rude they might be. Bernard states that the artist who produced for him the few sand-cast types shown in his work assured him that a workman could easily pro­duce a thousand such letters a day. He also states that, though each letter required squaring after casting, there was no need to touch up the faces.

There remains yet another suggestion as to the method in which the types of the rude school may have been produced. This may be described as a system of what the founders of sixty years ago called polytype, which is a cast or facsimile copy of an engraved block, matter in type, &c.

Lambinet,@@2 who is responsible for the suggestion, based upon a new translation of Trithemius’s narrative, explains that this process really means an early adoption of stereotype. He thinks that the first printers may have discovered a way of moulding a page of some work—an *Abecedarium—*in cooling metal, so as to get a matrix­plate impression of the whole page. Upon this matrix they would pour a liquid metal, and by the aid of a roller or cylinder press the fused matter evenly, so as to make it penetrate into all the hollows and corners of the letters. This tablet of tin or lead, being easily lifted and detached from the matrix, would then appear as a surface of metal in which the letters of the alphabet stood out reversed and in relief. These letters could easily be detached and rendered mobile by a knife or other sharp instrument, and the operation could be repeated a hundred times a day. The metal faces so produced would be fixed on wooden shanks, type high, and the fount would then be complete. Lambinet's hypothesis was endorsed by Firmin- Didot, the renowned type-founder and printer of Lambinet’s day. But it is impossible to suppose that the Mainz psalter of 1457, which these writers point to as a specimen of this mode of execution, is the impression, not of type at all, but of a collection of “casts” mounted on wood.

Whatever value there may be in the above theories with regard to the movable types of the first printer, certain it is that the shape and manufacture of the types used as early as *c.* 1470 do not seem to have differed materially from those of the present types.

This is evident (1) from the shape of the old types which were discovered in 1878 in the bed of the river Saône, near Lyons, opposite the site of one of the 15th-century printing houses of that city, and which there is reason to believe belonged once to one of those presses, and were used by the early printers of Lyons ; (2) from a page in Joh. Nider’s *Lepra Moralis,* printed by Conrad Homburch at Cologne in 1476, which shows the accidental impres­sion of a type, pulled up from its place in the course of printing by the ink-ball, and laid at length upon the face of the forme, thus leaving its exact profile indented upon the page ; (3) from an entirely similar page (fol. 4b) in *Liber de Laudibus ac Festis Gloriosæ Virginis,* Cologne, c. 1468. From the small circle appearing in the two last-mentioned types, it is presumed that the letters were pierced laterally by a circular hole, which did not penetrate the whole thickness of the letter, and served, like the nick of modern types, to enable the compositor to tell by touch which way to set the letter in his stick. The fact that in these two cases the letter was pulled up from the forme seems to show that the line could not have been threaded.

Vinc. Fineschi, *Notizie Storiche sopra la Stamperia di Ripoli* (Florence, 1781, p. 49), gives an extract from the cost-book of the Ripoli press, about 1480, by which it appears that steel, brass, copper, tin, lead, and iron wire were all used in the manufacture of types at that period.@@3

The history and nomenclature of the earliest types are practically a continuation of the history and nomenclature of the characters figured in the earliest block-books, wood­engravings, and MSS. For instance, Gothic type was first seen about the year 1445 ; but it should not be forgotten that the Gothic writing, of which that type was an imita­tion, was already known and used about the second half of the 12th century. Again, the pure Roman type, which appeared about 1464, is nothing but an imitation of what in palæography is called the Caroline minuscule, a hand­writing which was already fully developed towards the end of the 8th century. Consequently, details as to the history and development of the various types properly belong to the study of Palæography *(q.v.).*

*@@@1 Origine de l'Imprimerie,* i. 40.

*@@@2 Origine de l'Imprimerie,* Paris, 1810, 2 vols. 8vo, i. 97.

@@@3 On the above theories and types consult T. B. Reed, *old English Letter Foundries,* pp. 3-26.