These new production centers appear to have been most dense in the Low Countries in the region bordered by the Rhine and the Seine, supplying both military and civilian needs. They seemed largely unaffected by the demise of the empire and continued to export to a new barbarian market, whose tastes in form and decoration differed vastly from the more sophisticated vessels of the old classical world. Scandinavia became an eager importer of prestige wares, typically tall beakers and small jars and flasks in light blue, green, or brown glass, often decorated with applied or marvered trailing. Unique designs, common throughout many regions in contact with established trading routes, included glass drinking horns, claw beakers (showing applied glass trails in the form of claws), and funnel beakers (so named because of their distinctive shape).

The ability to produce glass at this time appears to have languished somewhat, and there is only slight evidence to show manufacturing houses outside the former Roman centers. Similar typological sequences occur in all regions throughout the Continent, and common sources of manufacture must therefore be assumed. In this respect, Scandinavia is particularly important because the pagan burial, the single most useful archaeological context for the recovery of glass vessels, persisted in Scandinavia for several centuries after most of the rest of Europe had been converted to Christianity. After the beginning of the 7th century, therefore, Scandinavia is the only region where the output of the Rhinelander glasshouses can be found in anything approaching complete form. The sherded show a marked deterioration in variety of types; generally, the drinking vessels become wider at the rim, lose the standing area, and ultimately emerge as the developed funnel beaker of the 10th century.

Throughout the first millennium, the materials of production seem to have remained largely unchanged. Like most glass found elsewhere in northwestern Europe, composition was of the high soda-lime-silica type produced by using a pure sand component and an alkali derived from natron, a saline evaporate, the closest source of which is located in Egypt. Although it seems improbable that natron continued to be shipped across Europe throughout the millennium, analysis of glasses has not identified a substitute, and no other solution has been found. A more important change, however, took place in Europe between the 9th and 11th centuries; new materials were introduced as alkali sources, namely forest products, typically wood ash or the ashes of bracken, hence the term "forest" glass. The difference between the two types of glass is largely one of durability; the earlier glass tends to survive well in most buried contexts, whereas the latter "forest" glass has a tendency to surface weathering, which causes opacity and eventual decomposition. The majority of glass of the medieval period proper is of this latter type, and its survival is often a matter of chance, giving rise to the poor record of glass-vessel remains known from Scandinavia during this period. Window glass, introduced at this time with the development of church building, suffers a similar fate and rarely survives in anything approaching its original condition. Both window and vessel fragments are frequently weathered to the extent that only a central core of opaque vitrification survives; in many cases, total disintegration must be assumed.

The use of these new alkali materials did, however, enable glass production to be decentralized and to occur in a much wider spectrum of locations where both sand and woodland supplies were plentiful. It effectively localized production, particularly in the forests of Germany and southern Sweden, and provided a semi-nomadic occupation for glass workers who might move from place to place according to the supplies of available woodland. Greater output of glass subsequently created new markets for window and vessel glass alike.

The manufacture of glass entails a chemical reaction between the two raw materials, sand and alkali, under specific redox conditions and according to strict timing. It was not an activity that could be carried out easily, and the processes were recorded in a number of manuals, notably by the monk Theophilius writing in the 12th century. In his De diversis artibus, he describes not only the materials to use, their amounts and coloring effects, but also the different methods necessary to produce vessel and window glass, respectively. The furnace, which contained separate compartments for fritting (the solid-state reaction between the two raw materials), melting, and cooling the finished products, seems to conform to a type found throughout northern Europe. The furnaces are poor archaeological survivors and, in the later period at least, were mostly temporary.

Furnace remains tend to be characterized by waste material from the production process, usually melted or twisted blobs of glass, and by the presence of cullet, fragments of vessels that were added to the glass melt to assist in the melting. These were sometimes imported specially for the purpose, and there are records of such trade. Many sites, particularly those occupied toward the end of the first millennium, undertook glassworking activity by melting down cullet and recycling it into beads, mounts, and other glass objects. This procedure could be carried out at a relatively low temperature, required considerably less skill than glassmaking proper, and was not dependent on specific locations for supplies of natural materials.


John Hunter

[Glossography denotes a scribal practice, widespread in antiquity and in the Middle Ages, consisting in providing particularly difficult or important texts with glosses, i.e., words written between the lines of the text (interlinear glosses) or in the margins (marginal glosses) in order to explain words or passages. Sometimes, lists of glosses, not necessarily referred to any definite text, were written down on full pages or in the blank spaces of MSS;
collections of this kind are called glossaries. The explanations of words could be made either by means of synonyms and paraphrases in the same language as the main text or by translation into another language. As far as the Christian West in the Middle Ages is concerned, most of the texts subject to glossing were written in Latin, the "language of culture" par excellence, while glosses were frequently written in the vernacular languages.

Compared with the rest of the Germanic-speaking areas, Scandinavia has not left us much evidence of glossographic activity from the medieval period.

The earliest relevant records come down to us from Iceland, where three MSS containing Latin-Islamic glosses from about 1200 have been preserved. One MS is the renowned Icelandic Hómtildabók ("Book of Homilies"; cod. Stock Perg. 4to no. 15), showing on fol. 68rv interlinear and marginal glosses to the Latin Credo. The other two MSS, each containing a collection of glosses, are GKS 1812 4to (formerly in the Copenhagen Royal Library, now at the Árni Magnússon Institute of Iceland, Reykjavík) and the fragment AM 2491 fol. (also in Reykjavík). Careful examination of the writing and composition of these two MSS has shown that the sections containing glosses were written by the same hand, and that they originally belonged to a single MS. This identification also applies to the glossaries themselves, which are only slightly later than the main text and may originally have been parts of a single glossary. A total of about 260 Latin words, for the most part nouns, with their respective Icelandic equivalents are included in the two MSS. In the former, they appear in two different places (foils 24r and 34v) and are arranged in parallel columns, while in the latter they are inserted in the blank spaces of a calendar (fol. 4rv), also in columns. The content is miscellaneous, drawn mostly from domestic life and the world of artisans and peasants. Words are grouped, here as in other glossaries of this kind, according to different criteria (semantic affinity, metonymical relationship, rhyme, alliteration, etc.), which makes it impossible to trace them to a continuous Latin text. Rather, they are likely to be jottings made by some student or scholar for personal use. In other words, the glosses may reflect vocabulary exercises.

Bilingual glosses are also attested sporadically in later Icelandic MSS. For example, in the 14th-century AM 671 4to, interspersed among Latin marginal annotations in a section devoted to theological matters, appear several Icelandic glosses translating terms denoting "God's benefits" (fol. 5r). A series of Latin-Icelandic glosses are also found at p. 120 of AM 242 fol., currently known as the Codex Wormianus of Snorri's Edda (second half of the 14th century). The glosses, added to the MS by a mid-15th-century scribe, consist of three verbal forms and three adjectives. As far as Norway is concerned, mention may be made of a small collection of Latin-Norwegian glosses written, presumably by a mid-14th-century hand, on wax tablets, known as Hoppestadavlemne. Beside terms belonging to domestic and rural life, we find here names of animals, especially birds.

Comparatively richer and more varied is the evidence of gloss writing from East Scandinavia. In Denmark, two MSS deserve mention: AM 202 8vo and AM 11 8vo. The former, compiled in the course of the 14th century, comprises a miscellany of notes on Latin grammar and vocabulary. The glosses, mostly translating Latin words taken as examples to illustrate morphological and lexical features, are extremely varied in content. Some of them, however, especially those in the margins, do not bear any reference whatsoever to the main text, but exhibit a close link with foreign glossographic work, in particular with Old High German glosses to Priscian's grammatical writings. AM 11 8vo, also dated to the 14th century, consists for the most part of a Latin translation of the Jutish Law (Jyske lov). A number of marginal annotations, including Latin and Danish glosses, were added in the 15th century.

The earliest evidence of glossing in Sweden is provided by the oldest extant Swedish MS, Stockholm codex B 59, a well-known MS of the so-called Older West-Gotland Law (Äldre Västgötslagen), written in the late 13th century. Latin-Swedish glosses, dating from the first half of the 14th century, are found in two different places in the MS (foils 67v and 77v). Particularly interesting is the glossary on fol. 77v, divided into two sections, each of which has close correspondences with two analogous collections of glosses found in the Danish codex AM 202 8vo. The glosses in the first section (a list of verbs) also occur, with only slight variations, in a Swedish glossary from the second half of the 15th century (AM 792 4to, fol. 142v; the same glossary also includes many names of aromatic and medicinal plants). Finally, mention must be made of a Latin-Swedish glossary preserved in the early 15th-century codex C 22 of the Uppsala University Library (foils 69r-77v). Its special importance lies in the fact that it represents the earliest extant collection of glosses of wider range from the Scandinavian Middle Ages, including some 800 words of miscellaneous content, almost a dictionary on a small scale.