

# Corpus Editions of Runic Inscriptions in Supranational Databases

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## Abstract

While there are a number of scholarly databases which contain information about runic inscriptions, none of them can be considered to represent a corpus edition in the true sense of the word. Such databases are, however, important sources of a limited amount of core information concerning the corpus or corpora they include, and as a rule they build on and at times even supplement or correct information in the printed corpus editions. There exist three scholarly, supranational databases important to runology and publicly available at the present time. These are: (a) the Scandinavian Runic Text Database (*Samnordisk runtextdatabas*), (b) the Kiel Runendatei (database of the Kiel Rune Project), and (c) the RuneS database (of the research project Runic Writing in the Germanic Languages). The origin, development and future prospects of each are reviewed here, along with their strengths and advantages as well as their weaknesses and limitations.

*Keywords:* Runic inscriptions, supranational databases, corpus editions, Scandinavian Runic Text Database, search platform Runor, Runendatei (Kiel Rune Project), RuneS database (Runic Writing in the Germanic Languages)

## Scandinavian Runic Text Database

By Henrik Williams and Marco Bianchi

*Early years of the database*

The Scandinavian Runic Text Database (Swedish *Samnordisk runtextdatabas*) is one of the oldest publicly available digital resources in

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the humanities and has now—with its predecessor—been in continual use since 1987. Already in the 1970s there were plans for a runic database which, however, never came to fruition (Gustavson and Jörsäter 1981). The Scandinavian Runic Text Database is based on a database whose compilation began in autumn 1986 at the Department of Scandinavian Languages at Uppsala University (Lagman and Williams 1989). This database contained the Viking Age rune-stone inscriptions from medieval Swedish areas. Its purpose was to enable the production of research material for a project on the chronology of the Swedish Viking Age runic inscriptions (Elmevik and Peterson 1989) and resulted in two doctoral dissertations (Williams 1990; Lagman 1990) and a dictionary (Peterson, latest ed. 2006). This database, or more particularly its successor the Scandinavian Runic Text Database, has since been the basis for further dissertations as well as much other research.

The Uppsala database had no official name. It was initiated and made possible by Svante Janson, a professor of mathematics at Uppsala University who himself developed all the search programs, first in Basic and then in Pascal. The main search program in its final form was called Kombi (the last version was 5.3). Like the data files themselves, the program was MS-DOS-based, as was its successor Rundata, which however was menu-driven to some extent. The Uppsala database was distributed via floppy disk and freely available after 1990 to anyone who wanted to access it but because of a somewhat demanding user interface there were few outside the project group who utilised it to any great extent. The character set was also somewhat restricted due to contemporary technical limitations but in the hands of those who learnt to use it, the database was an extremely useful tool for its purposes, primarily phonological and lexical investigations of runic inscriptions. It was also very fast, allowing even large searches to be completed within seconds.

At a meeting of runologists on the island of Bornholm in June 1989, the head of the ‘Runic unit’ (*Runverket*) at the Swedish National Heritage Board (*Riksantikvarieämbetet*), Helmer Gustavson, suggested that a common Scandinavian database with all the Viking Age runic inscriptions should be established. In June 1990, a symposium in Uppsala was arranged on the topic of ‘Transliteration and normalisation of the Scandinavian Viking Age runic inscriptions for a future pan-Scandinavian runic text database’ (Peterson 1991). It was not until November 1992, however, that funding was obtained from Axel och Margaret Ax:son Johnsons stiftelse för allmännyttiga ändamål (a foundation for ‘charitable public causes’).

By then the plans had been broadened to encompass the creation of a database of all runic inscriptions from the Scandinavian area as well as those made by Scandinavians outside Scandinavia, with normalisations into Old West Norse. Ancient Norse, Viking Age and medieval inscriptions were thus to be included in the database. Normalisations into runic Danish and runic Swedish were provided for the East Scandinavian inscriptions. A translation into English (see below), primarily made by Mindy MacLeod and Julie White, has always been part of the Scandinavian Runic Text Database. Danish inscriptions were made available for inclusion by Marie Stoklund and Michael Lerche Nielsen, and Norwegian ones by James Knirk. Datings of artistic style, later supplemented, were taken from the database *Mälsten* ('Lake Mälaren stones'), created by Anne-Sofie Gräslund and Frands Herschend. Coordinates for the placement of most Upplandic rune-stones in the national network were transferred from a database at the 'Runic unit'; the rest were introduced by Jan Owe. Information from scholarly publications and various internet resources has continually been added.

#### *Scandinavian Runic Text Database and Rundata*

Work on the Scandinavian Runic Text Database began in January 1993 but at a reduced pace. This was due to the fact that less funding was obtained than had been applied for. The project was funded until the end of June 1997 and much of the work was carried out by Svante Lagman with the rest completed by co-workers (Elmevik and Peterson 1997, 33). Table 1 shows the increase in the number of inscriptions in the database over the years. When the Scandinavian Runic Text Database was ready, it was made accessible on the Internet, an early initiative for a humanities discipline. The promise of a user manual (Peterson 1994, 308) was unfortunately never realised but instructions on its use were incorporated into a help file in the search program itself.

The project had no funding between 1997 and 2017 and work has therefore continued mainly on a volunteer basis. Fortunately, Jan Owe was able to take over Svante Janson's role when time constraints did not allow the latter to continue. Owe has managed not only all the programming work with the search application Rundata but also all the updating of the database itself since 2000. (He has in addition been deeply involved with the preparation of the database *Svensk runbibliografi*.)

With the Millennium Edition, which was released in the autumn of 2000, and subsequent Windows versions, Rundata became problematic to use in

Table 1. Number of runic inscriptions in various versions of the Scandinavian Runic Text Database and its predecessor. Included in Medieval Sweden are Gotland, Härjedalen, Jämtland and Finland but not Bohuslän, which was part of Norway at the time.

Area	1987	1991	1996	1997	1998	2001	2004	2008	2014	2020
Medieval Sweden	2455	2421	3249	3311	3311	3415	3588	3622	3715	3766
Medieval Denmark	0	0	835	842	841	844	921	962	1030	1033
Norway	0	0	1549	1565	1560	1566	1597	1664	1665	1665
Other areas	0	0	235	239	239	255	324	330	339	346
Post-medieval inscriptions	0	0	0	0	0	0	0	0	0	356
Total	2455	2421	5868	5957	5951	6081	6430	6578	6749	7166

this operating system. Jan Owe took over the source code and rewrote it for modern Windows. Rundata for Windows version 1.0 appeared in December 2001, with the database containing no new inscriptions but a number of corrections. Newer versions of Rundata as well as the database itself appeared in 2004, 2008 and 2014.

### *Everlasting Runes*

Until its 2014 version, the database consisted of a spreadsheet with meta-data along with text files for transliteration, normalisation and translation of the inscriptions. It was distributed with and closely tied to the search application Rundata, which was available for Windows computers only. During the 2010s, the drawbacks of this technical concept became increasingly evident and plans were made for a complete technical overhaul of the database. Together with the Swedish National Heritage Board, Uppsala University received funding for the project Everlasting Runes (Swedish *Evighetsrunor*) from the Royal Swedish Academy of Letters, History and Antiquities (*Vitterhetsakademien*) and the Bank of Sweden Tercentenary Foundation (*Riksbankens jubileumsfond*) for the period 2017–20. As far as the database was concerned, Everlasting Runes had two major aims: (1) to convert the database to a relational data model and (2) to make it available on the Semantic Web. A further aim of the project was to enrich the data provided about each inscription in the database with other digital resources, in particular relevant parts of the corpus edition *Sveriges runinskrifter* and the extensive collection of runic photographs stored at the Swedish National Heritage Board.

The chief principle of a relational data model is that different types of information are kept in different tables with each piece of information stored only once in the database. Whenever possible, metadata is set according to standardised taxonomies and information is kept in separate tables. Each entry in the database has a unique identifier, a so-called primary key, which can be used to link entries together across the tables. This not only makes the database easier to maintain but also allows for queries to be answered in a faster and more reliable manner.

The conversion of the text files to a relational data model was executed with a script developed by Marcus Smith at the Swedish National Heritage Board. The script interpreted the metadata of each inscription, e.g. geographical information, runic period, dating, cross form, carver, material, type of object, ornamentation etc. and structured it according to a standardised vocabulary. During the process, the renderings of the transliterations and normalisations were also modernised. First, the text encoding was converted from CP1252 (standard Windows encoding) to UTF-8 (8-bit Unicode Transformation Format), and all ad hoc renderings of special characters introduced during the early years of the database were replaced with Unicode characters: <R> was converted to <Ṛ>, <ð> to <ḡ>, <ñ> to <ṅ>, <A> to <Ǻ> etc. In future versions of the database, it will also be possible to mark vowel length in Runic Swedish normalisations, e.g. in expressions like *Ragnvaldr lēt rīsta rūnar* (now *Ragnvaldr let rīsta runar*) 'Ragnvaldr had the runes carved' in U 112 on a stone from Kyrkstigen, Uppland. Second, the inscriptions were annotated with TEI-XML (Text Encoding Initiative, Extensible Markup Language) in accordance with the Menota and EpiDoc standards (Medieval Nordic Text Archive and Epigraphic Documents respectively). These xml-renderings are not yet publicly available but they play a crucial role in plans for further development of the database. The xml-texts will make it possible to annotate the material morphologically, syntactically and lemmatically. Furthermore, they make the presentation of the inscriptions more versatile in applications that display information from the database, allowing them, for instance, to render transliterations according to different standards.

A consequence of the relational data model is that the database makes a strict distinction between an archaeological artefact (the object) and its runic inscription. This distinction is, however, not due solely to the data model chosen but also reflects the different responsibilities of the authorities involved. A typical Swedish runic object is stored as an entry in the Cultural Environment Register (Swedish *Kulturmiljöregistret*) which is maintained by the Swedish National Heritage Board and made available

through the search interface *Fornsök*. The runological reading and linguistic interpretation of the inscription on each runic object, meanwhile, is provided by Uppsala University and made available through the Scandinavian Runic Text Database. Furthermore, there is not necessarily a one-to-one relationship between artefacts and their inscriptions. An archaeological object (e.g. a church wall) may contain several inscriptions and similarly, one and the same runic inscription could, at least in theory, be inscribed on different artefacts. There is currently a strict one-to-one relationship between objects and inscriptions in the database but in future versions it will be technically possible to treat cases like G 330, a wall with a number of graffiti carvings in the church of Bunge in Gotland, as several different runic inscriptions placed on a single runic object.

The runic text database is hosted on a web server at Uppsala University and can be accessed through a technical interface, a so-called API (Application Programming Interface) that allows computer applications to send queries to the database and display the results. The university does not provide a dedicated user interface for queries. Instead, the “official” website to access the database, the platform Runor, has been developed by the Swedish National Heritage Board in close collaboration with Uppsala University. However, it is important to note that the API adheres to open standards and is accessible for everyone who wishes to make use of the Scandinavian Runic Text Database.

Runor’s homepage contains a search interface and a map which together offer various paths into the Scandinavian Runic Text Database. Individual inscriptions may be accessed by typing a signum or a place or by locating them on the map. Advanced, combined and nested queries, including text searches, are built and executed with Runor’s text searching interface. Each query generates a request made to the database’s API at Uppsala University which, in turn, replies with a data string containing the search result. Runor then processes the reply and displays it on a page of results. But Runor also displays information, notably images and documentation, from sources other than the Scandinavian Runic Text Database. These are fetched through a request to the Swedish National Heritage Board’s Swedish Open Cultural Heritage API (Swedish *K-samsök*) that aggregates cultural heritage data from a number of Swedish institutions, e.g. the Swedish National Heritage Board itself, Swedish national museums, Nordiska museet, and of course Uppsala University with its Scandinavian Runic Text Database.

Swedish Open Cultural Heritage is a national infrastructure for cultural heritage data built upon a concept called “Linked Open Data” outlined

by Tim Berners-Lee in 2006 (Berners-Lee 2006; see also Smith 2021, 65–67). Linked data basically comprise a web of data rather than a web of documents. The data are uniquely identified and linked by semantically significant and machine readable relationships. In essence, this means that Runor is able to display data on runic inscriptions, e.g. pictures, that are not stored in the Scandinavian Runic Text Database or a dedicated local database with the only prerequisite being that they are indexed in Swedish Open Cultural Heritage and identified as belonging to a certain inscription or its object.

The new web-based database and the search platform Runor were released in late 2020. The database was revised and updated in several respects, the most important of which was the addition of 356 post-medieval Dalecarlian runic inscriptions. Rundata and the old text file-based database are no longer maintained but are still available for download.

#### *Usage and further development*

The database was originally created for use by linguists, as is still evident in some of the functions in Runor. If one for example wishes to search for a particular word, one must at present know its Old West Norse form to be assured of having all matches returned. Thus if one does not know how a word or name is declined, there is a great risk of different forms being overlooked. For names it is therefore advisable to search for attestations in the English translation, where they always occur in the nominative. Knowledge of the Old Scandinavian languages is thus an advantage, although of course not a necessity, for use of the database. With the introduction of xml-markup in transliterations and normalisations, the prerequisites for lemmatic annotations and, as a consequence, more straightforward searches for all occurrences of a certain word or name are in place but have not yet been implemented.

The database has become a source in itself. There is some danger in this (cf. Källström 2005, 306 f.) because it is primarily an index of the existing Scandinavian runic inscriptions. It is not in itself a publication of these inscriptions but rather a useful means of locating at least one source publication. This means that one should not quote directly from the database (which does contain errors, although progressively fewer) but from the referenced publications themselves. Furthermore, the format of the database differs from that of printed publications, making it inaccurate to quote the database version as that of the original source (although sometimes there is an independent discrepancy that is worth noting and

the database may then be referenced). This warning applies in particular to the normalisations that are often revised in the database and thus deviate from the quoted source.

The database relies on one publication rather than fully accounting for all proposals, but this should not be taken as a guarantee that the chosen publication presents the only possible or even the best reading and transcription or normalisation of the inscription. The identifying signatures, i.e. abbreviated indications of sources, are usually those of reputable publications, often the latest national corpus edition. The incorporation of important, recent changes to reading or interpretation was marked by the inclusion of a \$ sign in the signature in Rundata (references to these revisions are found under “Inscription information” in Rundata and under “References” in Runor, which however does not mark changes with a \$ sign). If a recent publication contains valuable information but no new reading or interpretation, or at least none that is particularly convincing, a reference is included under “Inscription information” (in Rundata) or “References” (in Runor). If no reliable publication exists, non-scholarly or unpublished documentation is employed; some readings are even based directly on photographs or drawings. The intention is to record every inscription.

The database includes the earliest inscriptions, i.e. those from the 100s to the 700s. These are often extraordinarily difficult to interpret and even read. The format of the database is ill-suited to the presentation of this material, which is managed in a more satisfactory manner by the Kiel Runendatei (see Christiane Zimmermann’s presentation below). Often there is no generally accepted interpretation but preference is given to those offered by the national corpus editions, by Krause 1966, or for bracteates by the *Ikonomographischer Katalog*. In many cases, however, a speculative reading or interpretation is presented if no others exist. This should not be taken as an endorsement.

The translations into English offer no scholarly guarantee. Many are produced by non-native English speakers. More importantly, however, the translations are not meant to constitute good English but rather a literal rendering of the Old West Norse normalisations. The ambition has been to translate each Old West Norse word by a single equivalent in English (even when the semantic implications differ), making it easier to search (under “Selection”) for a particular lexical item by way of the English translations.

## Kiel Runendatei: database of the Kiel Rune Project

By Christiane Zimmermann

The Kiel Runendatei (<http://www.runenprojekt.uni-kiel.de>) is an online database of runic inscriptions in the older futhark encompassing both Scandinavian and South Germanic texts. The database has been freely accessible on the Internet since August 2000. It is the result of a long-term project financed by the German Research Foundation (Deutsche Forschungsgemeinschaft) under the leadership of Edith Marold, and later also Christiane Zimmermann, at the Nordic Institute of Kiel University (cf. Marold et al. 1994; Marold et al. 1998). The central aim of the database is to record in a standardised and systematic format the often greatly divergent readings and interpretations of the inscriptions in the older futhark, to catalogue and classify their linguistic constituents, and to make them accessible online for further runological and linguistic research.

The project was motivated by three factors that in the early 1990s made sound research in this area increasingly difficult. The first of these was the large number of runic objects that had been discovered in the years since publication of the last comprehensive corpus of inscriptions (Krause 1966) which had altered general understanding of the character of early runic literacy as well as of the oldest stages of the Germanic languages. Second, new insights in the neighbouring disciplines, particularly archaeology, meant the dating of various inscribed objects required revision, as did the established chronology of linguistic and runological development. The final contributing factor was the increasing number of publications, often with new readings and interpretations, which made it difficult to determine the current state of research on individual inscriptions and groups of inscriptions.

In the course of extensive preliminary work in 1991 and 1992, several database programs were tested and an initial database structure for the organisation of the research data using dBase Mac was developed. Project work began in the winter of 1993–94 after funding from the German Research Foundation was approved. The successful completion of the first version of the database in 1999–2000 laid the foundation for an extension and expansion of the project as well as an increase in funding for work on the database from 2001 to 2012.

### *First version of the online database: project stage 1993–99*

In order to represent the complex state of past and present research, the database was designed as a relational system with four separate tables to

record various types of information, i.e. (1) “find” (providing data on the object bearing the inscription, its findplace, the character and authenticity of the inscription and a transliteration which identified questionable or controversial sections of the reading), (2) “interpretations” (with readings and interpretations of the inscription, a syntactic analysis of the text and a German and English translation), (3) “words” (with a grammatical analysis of the word forms as well as information on their linguistic classification), and (4) “bibliography”; for further details on the individual datasets and description standards see the relevant pages at [http://www.runenprojekt.uni-kiel.de/beschreibung/1/default\\_eng.htm](http://www.runenprojekt.uni-kiel.de/beschreibung/1/default_eng.htm).

This arrangement of data enabled the linking of multiple datasets with different readings and interpretations of an inscription to a single runic object. Identical word forms that occur in different inscriptions (e.g. *ek*, *erilaz*) could then be recorded under a single dataset to which different inscriptions and interpretations could be assigned. Finally, academic literature covering multiple inscriptions and interpretations could be linked to the relevant objects, interpretations and words.

The first version of the database recorded and evaluated readings and interpretations from scholarly literature from 1960–98 (approximately 800 titles). Numerous new finds increased the number of datasets in the “find” table to around 380 (including bracteate inscriptions), linked to a total of more than 800 different interpretations.

Developments in the database management systems necessitated a number of software changes within this stage of the project: after the discontinuation of dBase Mac, the database was converted to FoxPro 2.6 for Macintosh and then in 1995 to Visual FoxPro 3.0 for Macintosh. With this data format, it was possible to release the first online version of the desktop database in summer 2000 for various SQL-searches (Structured Query Language; see <http://www.runenprojekt.uni-kiel.de>).

The first web version of Runendatei offered the following responses to standard queries: (1) compilation of up-to-date bibliographies on the individual inscriptions (from the time period 1960–98); (2) lists of readings and interpretations of the individual inscriptions (as well as references to the literature); (3) categorisation of inscriptions according to place of discovery and country; and (4) overviews of the words found in the inscriptions, arranged according to word class.

#### *Second version of the online database: project stage 2001–12*

In assessing the results of the first online version of Runendatei, some deficiencies in the original concept became apparent. Firstly, the suggested

readings and interpretations in the evaluated literature sometimes repeated older interpretations, in several cases causing a lack of clarity as to the originator of the interpretation. This could be addressed only by the inclusion of literature predating 1960. Secondly, although the database fulfilled its planned role as a digital resource for research, its additive character revealed one major disadvantage: the plausibility of individual interpretations could be assessed only by experts in the field as readings and interpretations of very different scholarly validity were treated equally in responses to online queries. Thirdly, the information required for a proper assessment of the inscription's archaeological context and dating was only rarely available in full in the runological publications.

On the basis of these findings, work on a second, revised version of the database (2001–12) focused on incorporating pre-1960 literature, supplementing context information and assessing the merits of different interpretations. In addition, the first steps were taken for preparation of a new edition of the inscriptions in the older futhark based on the information collected in the database (cf. Zimmermann 2022, 70–73).

The database of the Kiel Rune Project that is accessible today displays the state of the work at the end of the project in spring 2012: with 440 inscriptions, the “find” file comprises all the inscriptions in the older futhark published by 2012. The table “bibliography” encompasses 2470 titles from 1821–2009 and evaluates the results of the research contained therein in the form of approximately 1800 interpretations and more than 2240 word forms. In addition to the German web interface of the first version, an English language user interface has been made available and the online query for interpretations of an inscription has been linked with the datasets of the Scandinavian Runic Text Database (see above).

Following the final revision of the search options in 2012, there are at present nineteen standard queries available to the user (in the German version). In addition to the search options available in the first version of the database, archaeological information on the find history and context, the object, the layout and condition of the inscription, the distribution and dating of comparable objects and the cultural-historical and socio-historical interpretation has been made available in a standardised format together with a picture of the object whenever rights to the image were available (cf. the query for essential data on an inscription, [http://www.runenprojekt.uni-kiel.de/abfragen/default\\_eng.htm](http://www.runenprojekt.uni-kiel.de/abfragen/default_eng.htm)). Further new search options include filtering by type of object, chronology, authenticity, and character of the inscription. An assessment of the probability of the readings and interpretations presented has also been added where possible.

When the financial support of the German Research Foundation ended in 2012, updates to Runendatei could no longer be made. New finds or re-evaluations of older ones, such as for example the confirmation of N KJ49B Fuglset as a forgery (cf. Knirk 2021), are consequently no longer recorded. It is however planned to transfer the data from Runendatei to the new database of the RuneS project (discussed below), in particular the data from the files “interpretations” and “bibliography”.

### *Eichstätt Old English Runes project*

Modelled on the concept of the Kiel Runendatei, a partner endeavour, the Old English Runes project was launched by Alfred Bammesberger and Gaby Waxenberger at the Catholic University of Eichstätt in 1995. This was also financed by a research grant from the German Research Foundation (funding period 1995–2000).

The approach of the Eichstätt team was similar to the one in Kiel, recording readings and interpretations of Anglo-Saxon and Frisian runic inscriptions in a database. The organisation of the data and the structure of the individual tables corresponded to those of the Kiel database. In this way the foundations for the merger of the two databases were laid (cf. Bammesberger and Waxenberger 1996; 1998).

From the beginning of the project, it had also been a stated aim of the Eichstätt group to compile a comprehensive critical edition of the Old English runic inscriptions as such a corpus edition was completely lacking. At the cessation of funding, the university in Eichstätt took over further financial support for the edition. The database was continued only for internal use thereafter so its publication and the planned merger of data inventories with Runendatei never took place. Both parts of the project have been taken up since 2010 as part of the RuneS project (on the planned edition, cf. Findell 2022, 84–87).

## RuneS: database of the project Runic Writing in the Germanic Languages

By Christiane Zimmermann

As part of the Göttingen Academy of Sciences and Humanities (*Akademie der Wissenschaften zu Göttingen*) project Runic Writing in the Germanic Languages (German *Runische Schriftlichkeit in den germanischen Sprachen*, abbreviated RuneS), a new online database, available since 2017 and

containing core information on the different corpora of inscriptions, will present the results of the planned project research (on the concept of the project, cf. Zimmermann 2011; <http://runes.adw-goe.de>).

The database is hosted on the server of the Göttingen State and University Library; the input and correction of data are carried out at the research units in Kiel, Eichstätt-Munich and Göttingen, via a VPN (Virtual Private Network) interface and a specifically developed, Java-based data editor (cf. Bahr 2021). To date this data editor features four levels of operation: (1) it processes the basic data on the objects and inscriptions, (2) the attached image editor archives, describes and links the images to the basic entries, (3) the graphemics editor supports and archives the graph-typological description of the runic graphs and (4) the graph-type editor classifies the runic graphs.

The (English) version of the database currently available at <https://runesdb.eu> is called RuneS 1.0. Anticipated expansions of this version to RuneS 2.0 and RuneS 3.0 will incorporate project results focused on runic graphemics, text grammar and pragmatics. The final phase of development plans to link the texts of the new editions (cf. Zimmermann 2022, 70–73) with the corresponding data records.

### *RuneS 1.0*

Central to the relational data model of RuneS 1.0 are tables of key data on the runic inscriptions. These include information like that of the table “find” of *Runendatei* (see above), although in some areas such as the geographical registration of the findplace or description of the object, the structure of the data is more detailed and presented in a more consistent manner.

Due to the essentially bilingual recording of all the data on the object and inscription, the online database is available in a German and an English version (on the bilingual concept, cf. Zimmermann, Kazzazi and Bahr 2018, esp. 31 f.). The database differs in this respect from the older *Runendatei* which, although equipped with an English-language user interface, essentially presented the data in German. The bilingual nature of the RuneS database does have limits, however: its origins in a number of different data sources (see below) means that not all types of data are yet available on the website in both languages. The translation of runic texts, for example, is largely either to English or to German.

In accordance with the comprehensive concept of the project, inscriptions and entries from all the runic corpora are included, i.e. (1) inscriptions

in the older futhark, (2) Old English and Old Frisian inscriptions, (3) Scandinavian inscriptions in the younger futhark/futhork and (4) Scandinavian, English and Continental *runica manuscripta* ‘manuscript runes’. The database currently contains 8313 entries.

Alongside the data compiled specifically for the database are included data from a number of older databases, such as the Kiel Runendatei for inscriptions in the older futhark (see above), the database Danske Runeindskrifter for the inscriptions from Denmark (cf. Lerche Nielsen forthcoming) and the Scandinavian Runic Text Database (Version 2008) for the remaining Scandinavian inscriptions from the Viking and Middle Ages (see above). Information from various publications has also been transferred to the database as well as from new editions being prepared under the auspices of the project, such as e.g. the new edition of South Germanic inscriptions (cf. Zimmermann 2022, 70–73), the *Edition of Old English Runic Inscriptions* (Waxenberger and Kazzazi forthcoming) and *Die nordischen Runica Manuscripta* (Bauer and Heizmann forthcoming). The underlying sources can be found on the website under “project: data sources”.

The most common signa and names are recorded for each runic object as well as information on the findplace and type of object along with a dating, a transliteration and an English or German translation. Supplementary data and a typology of the object and inscription as well as information about the current repository and—as far as possible—one or more illustrations of the object and inscription complete the information (cf. the entries on the Eikeland relief fibula, N KJ17a <https://runesdb.eu/en/find-list/d/fa/q///6/f/11>; Caistor-by-Norwich astragalus, PreOE-GB-13 <https://runesdb.eu/en/find-list/d/fa/q///6/f/613>; Aalen necklace, SG-1 <https://runesdb.eu/en/find-list/d/fa/q///6/f/190>; Aug.perg. CLXIII, 165v <https://runesdb.eu/find-list/d/fa/q///6/f/9596>).

The heterogeneity of the underlying sources of information means that the classifications of object and material as well as supplementary information on the inscription and object had to be revised, complemented and adapted to the newly developed recording and typological schemes. This process has not yet been completed for the Viking Age and medieval Scandinavian inscriptions and accounts for how the information is still structured in these areas. For the same reason, information in the field “transliteration”, which employs the various transliteration systems used by the sources, is as yet not entirely consistent.

The first ever digital compilation of the *runica manuscripta* employs a recording system developed specifically for the database in which the

runic entries are registered in accordance with the descriptive scheme of the epigraphic objects. The basis of a database entry for the *runica manuscripta* is the unit “text” (i.e. text in or with runes), which includes texts and manuscripts composed entirely in runes (such as the *Marienkloge*, Holm 120 8vo) as well as hybrid texts (cf. BSB Clm 6250, *Etymologiae*). Multiple runic texts on a single page of a manuscript are registered as separate entries (cf. AM 45 fol leaf 77v [1] and [2]). The shelfmark of the manuscript and the library in which it is kept are used as the findplace of the runic entry. As expected, the field “provenance”, which is still under construction, contains information on the original provenance of the manuscript as far as this is known. Manuscript runes are identified on various types of objects, such as “whole manuscript”, “leaf”, “board” as well as “wrapper”.

The data in the “find” file have been available since 2017 on a newly developed website which allows four different ways of accessing the data: (1) different groups of objects can be accessed via the “find list” menu through the filters “object class”, “country”, “findspot” or “rune row” (the latter under construction); an individual search field can also be chosen as a filter. Such a query leads—like the choice of one of the tiles under “find list”—to a “fact sheet” about a runic object which provides an overview of the basic data on the object, inscription, place of storage and any images. (2) The “find map” makes it possible to chart the spatial distribution of a group of objects which can be individually determined with the use of different filters. (3) The “advanced queries” function in a similar way: here the results appear in the form of a table which can be downloaded. Users can switch between the form of output, i.e. map or table. (4) The so-called “default queries” offer a preselection of simple queries to facilitate access. Specifications of the relevant registration and description standards pertaining to the collection and display of data are accessible under the menu item “project”, which also contains a list of the signa. A weekly update ensures that there is little delay in making any modifications available to users.

More recent expansions of the database, implemented in 2020 and 2021, include the linking of data records with the database Danske Runeindskrifter and the Swedish search platform Runor (see above). This permits users to switch between a record in the RuneS database and the corresponding entry in the neighbouring databases. A further link was established with the Portable Antiquities Scheme database of the British Museum and Amgueddfa Cymru – Museum Wales (<https://finds.org.uk/>).

*RuneS 2.0 and RuneS 3.0*

In line with studies on runic graphemics, graph-typological and graphemic data are presently being recorded for (1) the inscriptions in the older futhark, (2) the Old English and Old Frisian inscriptions, (3) individual groups of Scandinavian inscriptions in the younger futhark/futhork and (4) the medieval Scandinavian *runica manuscripta* (cf. Zimmermann and Zimmermann 2022; Zimmermann and Kazzazi 2022).

Three levels of data are encompassed: (1) the realisation of the runic graph in the form of a snippet, (2) the graph-type variant, an abstraction from a group of graphs which correspond in terms of more subtle, recurring formal features, and (3) the graph type, a superordinate abstraction with types identified on the basis of basic formal features.

The linking of these units with the objects and their inscriptions, dating, findplaces and so on (on data structure, see Zimmermann, Kazzazi and Bahr 2018, 30 fig. 2.2) means that the new database RuneS 2.0 makes a datapool available that can be combined in many ways, enabling a number of queries on individual rune types, specific formal features of the runic graphs, and the distribution of graph types and their variants. The expansion of the website to encompass the new data will be completed in 2023. The current forms of presentation will be expanded in the new version to include graph-typological data, implementing specific overviews and search mechanisms for graphemics: a new section of the “fact sheet” for example will reproduce the inscription in the form of a transrunicification using the graph types and will also allow the possibility of supplementation by graphic snippets or graph-type variants. The graph types will in turn act as interactive buttons leading to the “fact sheet” of the individual types which will contain a formal description, distribution map and other basic information. The existing “advanced queries” will also be supplemented with filter options to graphemics.

In subsequent stages of expansion, data from the grammatical and pragmatic investigations of texts of the selected corpora (see above) will be made available on the website of RuneS 3.0. Whether and to what extent the RuneS database will continue to be updated and expanded once work on the project concludes is still undetermined.

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