

COLLECTIONS OF HUMANITIES AND NATURAL SCIENCES
State programme including the developmental objectives for the years 2004–
2008

1. Problem analysis

1.1. Essence, significance and present situation

Universities, scientific institutions and museums of Estonia house rich, largely unique collections of humanities and natural sciences of high scientific and cultural value. The collections of humanities document the cultural heritage of Estonia through corresponding source materials, those of natural sciences document, through different items, the diversity and development of nature of Estonia and other areas. Both types of collections serve as the evidential material of earlier investigations, as well as a basis for the further studies by applying the newest methods. A significant part of the collections has also a global value, especially the materials collected from poorly studied regions of Eurasia, taxonomic types (the specimens used for the erection of new species), archaeological heritage and manuscripts, the maintenance of which is governed by international regulations. These collections have been and will be constantly used in numerous scientific studies and everyday cultural-educational work and for conservation purposes.

The collections of humanities and natural sciences are part of our national wealth and cultural heritage. According to the Paris convention for the protection of the World cultural and natural heritage of 16 November 1972 and the Memory of the World programme launched by the UNESCO in 1998, each country must commit to the establishment, protection, conservation, investigation and transmission to future generations of the cultural and natural heritage in their country as part of the World memory. The legislation of the Republic of Estonia ensures the protection of museum, cultural and archival objects (see 1.2). Due to the lack of the state-level strategy for the conservation of the cultural heritage (which should cover all culturally valued collections, notwithstanding their administrative affiliation), the scientific collections housed at research and development institutions have been left without legislative protection and continuous financing; the maintenance of the collections depends only on the possibilities of the respective institutions. At the same time, the use of

scientific collections has increased abruptly in the last years. Increase in the use of the collections of humanities is caused by the growing importance of the identity and memory problems in society in the Information Era. The collections of natural sciences have received more attention because of the application of new molecular biological methods in the study of the earlier collected materials, but also due to the global trends towards the protection of biological diversity and promotion of sustainable development, which have found expression in Estonian legislation as well (see 1.2). The objectives of the strategy of Estonian research and development activities “Knowledge-based Estonia” include the renewal of the basis of knowledge and increase in the education level, also the improvement of the life quality and social welfare. These aims will be achieved largely through the cultural, natural and social sphere studies that ensure preservation of national identity but are based on possibly complete and well maintained collections of humanities and natural sciences accessible for investigation.

The collections housed at scientific institutions and museums differ greatly in type, size, history and specifics. Collections of humanities (folklore, national culture, dialects, older literary language, cultural history, numismatics, archaeology, osteology, etc.) reflect the discursive development of the spiritual and mental world of people and, together with collections of natural sciences (botanical, zoological, mycological, microbiological, medical, geological, etc.), characterize society and nature on their particular development levels. The requirements for the maintenance of collections vary in strictness and specifics depending on the nature and scientific-cultural value of the materials. Data on more valuable collections are given in Appendix 3 of the programme.

The materials of humanities and natural sciences collected over decades are extensively used in research and developmental activities. On their basis fundamental studies have been compiled on the evolution of flora and fauna, older history, folklore and written cultural history of Estonia and neighbouring regions. The collections serve as a basis for monographs compiled in Estonia as well as abroad, valuing the history of Estonia as a cultured European country. Although in recent years the maintenance and use of collections have improved, largely thanks to the financial support of the state programme “Estonian language and national culture” of the Estonian Ministry of Education and Science (will end in 2003), Estonian Science Foundation and Soros Foundation, the situation as a whole is still unsatisfactory.

Additional measures should be taken to ensure the preservation and development of valuable collections, and their use in scientific investigations. Compilation of electronic databases of the collections is especially neglected. However, this would provide a real inventory of the materials and enable their effective use in research work and integration into the international scientific system.

Although the collections are very different, priorities of the programme could still be defined, considering the scientific-cultural and economic value of the materials, their significance in the preservation and study of the Estonian cultural heritage and natural diversity, and the conditions of the maintenance of collections. Of particular importance is the fact that collections are needed in scientific research (which is financed from other sources) and education, first of all in degree studies. The value of intensively used collections increases with use. This, as well as participation in international joint projects, helps to improve the state of the collections.

1.2. Main legal acts serving as a basis of the programme

- Heritage conservation act (Riigi Teataja (RT, in English = State Bulletin) 1994, 24, 391);
- Convention of biological diversity (RT II 1994, 13, 41) and the act of its ratification (RT II, 1994, 13, 41)
- Sustainable development act (RT I 1995, 31, 384; 1997, 48, 722; 1999, 29, 398; 2000, 54, 348);
- The Hague convention for the protection of cultural property of 14 May 1954. Ratified by the Parliament of Estonia (Riigikogu) on 22.02.1995 (RT II 1995, 7, 32);
- Paris convention for the protection of the world cultural and natural heritage of 16 November 1972. Ratified by the Riigikogu on 05.04.1995 (RT II 1995, 10, 53);
- Museum act (RT I 1996, 83, 1487);
- European cultural convention, accepted in Paris on 19 December 1954. Signed by the Republic of Estonia on 06.05.1992 (RT II 1996, 11/12, 35);
- Resolution of the Riigikogu of 12 March 1997 “Approval of the environmental strategy of Estonia” (RT I 1997, 26, 390);

- Organization of research and development act (RT I 1997, 30, 471; 1998, 111, 1832; 1999, 10, 157; 2001, 34, 187; 43, 237);
- Archives act (RT I 1998, 36/37, 552);
- Regulation of the Minister of Finance of Estonia No. 7 of 29 January 1998 (RT Supplement 1998, 58/59, 1916);
- Resolution of the Riigikogu of 6 December 2001 "Knowledge-based Estonia. Strategy of Estonian scientific and development activities for 2002–2006", approval and text (RT I 2001, 97, 606).

1.3. Main terminology

The terminology presented below is based mainly on *Definitions of Cultural Property. Comparisons of Definitions in Different International Treaties and Recommendations, 1874–1995*; Patrick Boylan's *Arts, Museums and Heritage Organisation Policy Statements Series*. London: City University, 1996 and the UNESCO convention for the protection of the world cultural and natural heritage.

Archaeological heritage – unmovable or movable cultural heritage. Artefacts or antiquities are material objects from remote past, made by man or related to human activity. Unmovable heritage is inseparable from its initial surroundings (ancient settlement site, hillfort, campsite, battle field, field, road remains, cemetery, cult site and rock drawing together with the overlying buildings and cultural layer). Movable heritage is a single object or its part or fragment (tool, utensil, vehicle, weapon, decoration, pottery, coin, also bone, fragment of raw material, residue of manufacture found on unmovable heritage, etc.).

Documentary heritage – manuscripts, printed documents, other media and collections having long-term value because of the information they contain, their provenance, format or some other distinctive physical or intellectual characters. Because of their unique and special value, they should be preserved for future use.

Collection of humanities – movable heritage artefacts (documentary heritage, heritage of national culture, archaeological heritage, etc.) of scientific, cultural, national, etc. value. These will be preserved permanently and are used in present and future scientific research, in an appropriate depository or through limited international

loan and exchange. As a rule, the collection is as complete as possible, systematized and documented.

Cultural heritage – objects and events of historical, scientific, artistic, social, technological etc. value, which will be preserved for further generations. Results and witnesses of different traditions and mental achievements of the past.

Cultural property – items and their collections, but also mental heritage related to important historical processes, events or persons, or having a historical, archaeological, ethnographical, artistic, scientific or some other cultural value; considered as national wealth.

Curator – a person in charge of the collection, preferably holding the doctoral degree; plans and oversees all activities relevant to the maintenance and development of collections. As a rule, curators participate in these activities and research work based on the collections.

Natural heritage – natural features consisting of physical and biological entities or groups of such entities, which are of outstanding universal value from the aesthetic or scientific point of view; geological and physiographical objects and precisely delineated areas which constitute the habitat of threatened species of animals and plants of outstanding universal value from the point of view of science and conservation; natural sites or precisely delineated natural areas of outstanding universal value from the point of view of science, conservation or natural beauty.

Collection of natural sciences – materials collected from nature or naturally formed living or lifeless objects (individuals of species, their fossils, minerals, soil profiles, etc.), permanently preserved for present and future scientific research performed at the repository and through limited international loan and exchange. The items are as a rule documented (provided with data on finding place, habitat, time of collection, collector; individuals are preferably identified).

Remark. Objects of scientific collections are as a rule not used for educational purposes (except for those necessary for degree, especially doctoral studies) or demonstration to a wider public as this may endanger their long-term preservation. At the same time, it is the honorable duty of each collection to promote public activity and provide new materials for the development of economy, either as duplicates or specially collected items. Thus, the institutions housing collections should have also so-called examination and exchange collections, which together form an organic unity.

Items of scientific collections are not for sale or some other business activity. An exception is the multiplication of objects or donating duplicates to non-profit organizations and enterprises, which does not lower the value of the collections. The profit raised will be used first of all for promoting the main activities and scientific research related to the collection.

Heritage of national culture – any source of knowledge that has appeared in Estonia, in the Estonian language or concerns Estonia, independent of the place of publishing. The heritage of national culture includes books, periodicals, notes, maps, graphics items (posters, postcards), audio-visual items and pamphlets.

Movable cultural heritage – here belong artefacts/objects, which are not connected with a particular building or site (documents, books, CDs, videotapes, photos, textiles, clothes, furniture, artwork, items from nature, etc.).

2. Objectives of the programme and expected results

The **main objective** is to ensure preservation, maintenance and development of Estonian collections of humanities and natural sciences, their modernization according to international standards to ease the use of the collected materials in regional as well as global scientific research and education, adult cultural and nature education and economic activities.

The programme has the following **sub-objectives**:

2.1. Improvement of storage conditions: to create adequate material conditions for the storage of collections, including rooms, special equipment for repositories, climate equipment, etc., to provide institutions with qualified permanent staff (curators) for maintaining and developing collections, and ensure necessary training.

Expected result: material and human resources have been secured for stable and proper preservation of collections and possibilities have been created for constant and systematic improvement of the use of the collected materials.

2.2. Ensuring preservation: to organize proper, up-to-date registration, maintenance and conservation of collections, make reserve and working copies of threatened items and create an adequate system for the usage of collections.

Expected result: inventory of the most important collections has been completed, a modern system of curation ensuring preservation of unique and valuable objects without restrictions on their use has been implemented.

2.3. Modernization of usage: to create databases (infobanks) or develop the existing ones to international level in order to open the contents of collections and enable their use. The databases of Estonian collections of the same type should be of unified structure and linked to international databases via the internet. Proper equipment (computers, programs) should be procured and posts of curators established. Paper (as much as needed) and electronic versions of databases should be made accessible to users home and abroad.

Expected result: the information contained in collections has been included into one general database covering the entire Estonia. The database is accessible to users home and abroad.

2.4. Implementation of the programme and application of results: to create structures necessary for fulfilling the programme and draw up the corresponding statutes. The knowledge obtained through the curation of collections and creation of information banks, also through links to international databases, should be generalized in order to use it in further maintenance, development and utilization of internationally valuable materials of humanities and natural sciences.

Expected result: a network of national collections has been built; two leading centres (for collections of humanities and natural sciences) together with necessary infrastructure have been created, the corresponding statutes and improved instructions for the curation of collections have been compiled and are used in organizing the work and training the staff; further tasks and perspectives for the development of collections have been elaborated.

3. Plan of activities

3.1. Leading the programme

The programme is planned and general objectives are set for five years.
Responsible ministry: Estonian Ministry of Education and Science.

3.1.1. Steering committee

The programme will be led and coordinated by the steering committee formed by the Ministry of Education and Science.

The tasks of the committee will be

- to organize in every calendar year open competition for projects-applications lasting for one or several years, connected with the fulfilment of the programme;
- considering the main objective of the project and the course of its fulfilment, to evaluate the projects submitted for the competition, which formulate concrete tasks for the next year;
- to resolve financial problems within the scope of the programme budget and detail the expenses foreseen in the budget if necessary;
- to compile the account for the past year based on the accounts by the programme team members;
- to assess the programme results;
- to detail long-term and urgent tasks of the programme and expedient use of resources.

3.1.2. Participation in the programme

As a rule, any research and development institution, included into the registry at the Ministry of Education and Science, and collecting and maintaining materials on humanities and natural sciences that are constantly and regularly used in scientific work, can participate in the programme and apply for the corresponding project (grant). The steering committee has a right to make motivated exceptions to this rule.

3.2. Schedule of tasks for the programme

The programme period comprises two tentative stages. The priorities in the first three years (2004–2006) will be amelioration of the conditions for the maintenance and storage of collections, especially creation and improvement of the infrastructure, inventory of objects, providing institutions with the qualified staff and training of the staff (incl. skilled curators). Reserve and working copies have to be made of the unique cultural materials presently available only on paper, in order to prevent their complete destruction. At the same time, foundation of national collections and corresponding centres will start. In the years 2007–2008 usage of collections will be modernized, databases will be compiled/improved and, when possible, linked to thematically related international data networks. In the last year,

beside current work, conclusions will be drawn and all related documentation compiled.

3.3. Foundation of the centres of national collections, Estonian collections of humanities and natural sciences

Within the framework of the programme, sets of similar collections will be defined by different subjects, which will be treated as virtual national collections of Estonia. The statutes and instructions for the national collections will be compiled, and means necessary for carrying out activities will be allocated. The objective is to unite the collections of a certain subject into one whole national system, whose parts act following the same principles.

To ensure effectiveness of the collections, virtual centres of Estonian natural sciences collections and Estonian humanities collections will be established, aimed at coordinating the activities of special collections housed at (and financed by) different institutions; providing methodology and methods for updating the maintenance and replenishment of collections, development and use of databases; making proposals for funding collections according to their value, size and results achieved. The centres will also generalize and distribute working experience, following the objectives set in point 2.4 of the programme. Through virtual centres, the scientific collections will be included into the cultural heritage preservation strategy, currently being prepared by the Ministry of Culture of Estonia, and into the digitized archives of cultural heritage.

National collections (which can subdivide into subcollections) will be formed for the following fields of **humanities**:

- archaeology (antiquities, anthropological and archaeozoological bone findings);
- Estonian language (older and modern literary language, dialects of the Estonian and kindred languages);
- cultural history (manuscripts, photos, audio and video materials);
- numismatics (coins, precious metal objects);
- folklore (manuscripts, audio and video materials, photos);
- national imprint (Estonian books, Baltica, periodicals, special collections),

and for the following fields of **natural sciences**:

- botany (vascular plants and mosses, algae);

- geology and pedology (rocks, fossils, minerals, soils, etc.);
- human and veterinary medicine (preparations, bones, etc.);
- microbiology (fungi and fungal culture (in part), lichens);
- zoology (animals, incl. insects).

3.4. Main tasks by major collections

3.4.1. Archaeological collections

Inventory of collections and estimation of their state, systematization of the osteological collection. Improvement of maintenance and storage conditions, promoting security measures and use of collections, renovation of repositories of osteological material. Excavation findings require rapid conservation as they start to decay with the change of the environment. Constant eye should be kept on conserved finds, which, depending on the degree of preservation, may need additional conservation. For this purpose, conservation laboratories have to be founded as soon as possible to ensure long-term preservation of collections. Conservation and reorganisation of threatened collections. Making working copies of unique archival materials. Digitization of archival and map materials. Compilation of databases of archaeological and osteological findings and localities/antiquities. Elaboration of regulations for sampling and preservation of auxiliary scientific material (soil, wood, charcoal, etc.) collected during archaeological excavations; development of the corresponding repositories and storage conditions; digital archiving of analyses. Establishing requirements for excavation, preservation and storage of human and animal bones. Regulation of the sampling of rare osteological finds. Development of a permanent display based on archaeological collections.

3.4.2. Estonian language collections

To create the material basis for long-term preservation of collections of the Estonian language. Inventory of collections in order to determine the actual state of the stored items. Proceeding from the actual state of items and necessity, to create facilities for making reserve copies. At the same time, to start composition of electronic databases and digitization of collections. To initiate digitization of fading recordings and saving them to compact discs. To elaborate and implement principles for digitization of the card catalogue.

Inventory, copying and cataloguing of dialect archives. To procure equipment for saving tape-recordings to compact discs. To revise the personal catalogue of dialect collectors and start its digitization. Based on sound recordings and written texts, to initiate compilation of the internet-accessed electronic database of Estonian dialects and those of kindred languages (containing authentic materials from the core area of each dialect). To elaborate the so-called dialect landscape map (based on the map of dialect landscape by A. Saareste of 1932).

3.4.3. Cultural history collections

To carry out inventory of manuscripts and estimate their state by kinds of collections following the international standards. To elaborate and implement principles for the maintenance of collections, which could serve as a basis for further processing of stored materials (selective conservation and restoration of items, making reserve copies and digital working copies). Reserve and working copies should primarily be made of the most threatened whole collections of great cultural value (e.g. reports of the Academic History Society grant holders, manuscript collection of the Learned Estonian Society). To ensure proper storage of the analogue objects of the art, photo and sound recordings collection, represented by single items (to make copies of photos to facilitate the use and preservation of original photos, use special pockets for photos, etc.), digitize and index the collections and create necessary internet-based metadatabases. To elaborate and apply the methodology for archiving, preservation and maintenance of digital documents and ensure access to them. To initiate the linking of the existing databases and digitized source materials to international cultural heritage databases.

3.4.4. Collections of numismatic and precious metal items

Ensuring adequate preservation and security conditions. Study of collections for precise dating of coins and creating scientific catalogues. Compilation of digitized databases.

3.4.5. Folklore collections

To carry out immediate inventory of older and intensively used (and thus threatened) collections (Hurt, Eisen, Estonian Students' Society, etc.) and to assess their present state. To improve the conditions for preservation of unique original

materials (procure cabinets with wooden doors, temperature stabilizers, etc.). Following international standards, to disinfect (fumigation, deep freezing, wet processing, etc.) and conserve (to file, band, etc.) the endangered original materials. To create material conditions (procure hard- and software) and develop complex methods for making working (digitized) and reserve copies (microfilms) of endangered originals before conservation. To elaborate the types of metadata necessary for interactive usage of the working copies and indispensable for marking the reserve copies. To begin frontal scanning of the unique photo collection and digitization of analogue sound recordings. To arrange the video collection and start its digitization for making working copies in MiniDV and DVD formats. The objective is to integrate the greatest folklore collection of the Baltic region into international scientific use.

3.4.6. National imprint collections

The collections of four Estonian scientific libraries were checked under the auspices of the UNESCO in 1998–2000, with the aim of determining the most damaged items. The results show that highly acidic paper (which turns very fragile and falls apart) has been used for 75% of Estonian printed materials (published in 1850–1990) and thus the fastenings of leaves and bindings are severely damaged. For this reason, it is necessary to improve conditions for the maintenance (accept maintenance standards) and storage (temperature of depositories 10 °C, relative humidity $\pm 35\%$) of items in order to ensure their preservation. About 21% of the items need immediate restoration and conservation. First of all, microfilms have to be made of the collection of periodicals, and the already existing and new microfilms digitized. Only one full set of several 19th-century newspapers (Sakala, Olevik, Postimees, etc.) is available, and because reserve and working copies are missing, very soon the periodicals collection becomes unusable. For including the heritage of national culture into the UNESCO World Memory programme, the elaboration of the National Red Book (i.e. the registry of the most threatened printed materials) conception and its application are of primary importance. The arrangement and systematic digitization of the geographic map collection has to be continued. Pamphlets of national cultural value should be determined and measures taken for making them accessible to researchers. A unified environment should be developed for the description and archiving of digitized sources, and access to them guaranteed.

Digitized sources need to be linked to bibliographic databases, to ensure maximally extensive and versatile use of the information in scientific research.

3.4.7. Botanical collections

The existing repositories of botanical collections need repair and new ones have to be established, as many valuable collections are stored in inadequate conditions. The collections should be placed into special cabinets and the required microclimate should be created in the repositories. As a result of the state programme under discussion, the maintenance conditions have been raised to an international level. All collections need to be included into a database in order to make the information they contain internationally accessible. The compilation of the database requires previous identification, systematization and revision of the stored items by the corresponding plant specialists. Preferably the work should be curated by a specialist working on the respective plant group. In case of most botanical collections curators and additional staff (preparators) are needed for organizing the herbarium and inserting data into databases. Training of curators is of great importance. Digitization of the most valuable part of the botanical collections (type specimens) and making them internet-accessed in the whole world are the first steps towards the creation of virtual herbariums. The devices necessary for working with collections (computers, scanners, photocopiers, microscopes, laboratory equipment, etc.) and refrigerators for the destruction of pests and prevention of ravages need to be renewed to the level enabling the curators to fulfil all the main tasks and create adequate working facilities for the users of the collections. Botanical collections should be evaluated and registered as material values. Herbariums should be insured against accidents and put under guard. Means should be raised for organizing expeditions related to the exchange of herbarium specimens and preservation of collections. It is necessary to have herbariums usable for study, collections of iconographs and permanent preparations, and provide up-to-date representation of scientific information (monographs, flora, offprints).

3.4.8. Geological and soil science collections

It is essential to improve considerably the conditions of the storage of all geological and pedological collections (expansion of the depositories, procurement of climatic equipment and special furniture) of all corresponding scientific institutions.

Strict security methods should be applied, as a large part of the collections (e.g. precious stones, meteorites, fossils) is of great material value.

Training of curators and other staff, engaged in the collection, preparation, conservation and cataloguing of geological and pedological materials and making them accessible to researchers, is highly needed, especially their attendance in practical courses organized by major European museums. To ensure the continuity of work, younger specialists should be involved in taking care of the collections and scientific research.

For electronic cataloguing of collections an essentially unified processing model should be elaborated, enabling exchange and control of data and linking them to other infobanks in Estonia (e.g. of the Ministry of Environment) and abroad (e.g. European BioCASE project). Digitization of the data presently available in card catalogues, and other related information should continue. Anyone interested in the subject should have access to major collections, including internet-based access to palaeontological type materials (both text and illustrations) for scientific and educative purposes. All this needs the training of the staff, but also modernization of soft- and hardware.

For successful curation of collections and study of materials by Estonian and foreign scientists various up-to-date equipment (microscopes, photographic devices, lamps) is needed.

3.4.9. Human and veterinary medical collections

Human and veterinary medical collections of Tartu are housed in the Biomedical Centre, Old Anatomical Theatre and buildings of the Estonian Agricultural University. Finances are needed to maintain, exhibit and catalogue all of them. Maintenance of wet preparations is particularly costly and labour-consuming, since fixation solution in glass jars has to be renewed regularly. Electronic internet-based catalogues of collections should be created, but first of all adequate computers and photocopying equipment have to be procured. At least one curator with special training is needed, as well as literature relevant in the museum work. Old Anatomical Theatre, which is famous for its architecture and medical history, could become the centre coordinating maintenance of medical collections. Most of the collections of great historical and present-day medical value are already housed there, but the building is in need of repair. Renovation of the Old Anatomical Theatre should be

performed together with other projects like, for example, foundation of the Medical Information Centre, which will be financed from other sources (European Union, UNESCO).

3.4.10. Microbiological collections

Microbiological collections include those of bacterial, protist, fungal, animal and human cell cultures. To ensure safe preservation of such live cultures, the infrastructure of the existing collections should be improved considerably. Main collections should be provided with adequate seeding chambers (laminar boxes), storing rooms, microscopes and other necessary devices. Handling of live microorganism collections should correspond to regulations approved by the World Federation for Culture Collections (WFCC) and other internationally accepted rules. It will be necessary to implement and exactly follow internationally approved rules concerning the exchange of live microorganisms. As a result of the proposed state programme, all major microorganism collections of Estonia have to become (part of them already are) members of WFCC.

In the course of the programme special attention will be paid to the preservation of type cultures deposited in Estonian collections. The type culture is the live culture of a microorganism, which has served as a basis for the description of a new species. An internet-based database of microorganisms has to be created, which is an essential prerequisite for the use of live cultures in international scientific research.

3.4.11. Mycological collections

The main problems that need to be resolved are bad storage conditions (unstable humidity level and low temperature), shortage or lack of curators and shortage of space. To resolve the first problem, major collections have to be provided with proper climatic equipment. Space shortage could be overcome, in addition to finding extra space, by the introduction of the compactor cabinet system for major collections. For normal maintenance of lichenological collections the existing rooms have to be repaired and new ones found. Working facilities (workroom, microscopes) should be created for guest scientists, as foreign scientists frequently come to examine materials on the spot (because of high postal expenses).

Problems arise with the creation of curator posts and finding young specialists with a doctoral degree for these posts. It is necessary to create favourable working conditions and ensure specialists with the salary corresponding to their qualification. New microscopes are highly necessary. At present old Soviet apparatus is very often used, which harms eyesight and does not permit up-to-date study of the mycological collections. To protect collections from pests, in some places deep freezers are needed.

Mycological collections contain numerous type specimens, continuously being added to Estonian collections (about 10 type specimens per year). Information on these as well as other specimens has to be accessible via the internet-linked databases. For the creation of the database of the collections, up-to-date software and computers are needed.

3.4.12. Zoological collections

Main problems with zoological and entomological collections are caused by unsatisfactory conditions in depositories, the need for appropriate climatic equipment, procurement of large deep freezers for pest destruction and special furniture (cabinets) for storing collections. There is also a need for well-trained curators, computers and other specific devices. The security system (incl. fire protection) has to be developed, particularly for the part of the collection containing taxonomic originals.

An important task is compilation and unification of databases of all zoological collections and linking them to corresponding international databases, arrangement of the taxonomic standard materials (holo- and paratypes).

4. Programme budget for the year 2004

The estimated budget for the year 2004 is 13 million Estonian kroons (EEK). This amount was obtained through critical estimation and summation of the data presented by the owners of the collections in the course of the compilation of the present programme. However, funds needed for the fulfilment of the programme (see also Appendixes 1 and 2) are not connected with particular collections, since the projects will be financed through the competition of applications (see ch. 3.1.1.). In order to assess the adequacy of the sum, the following calculation was made proceeding from the international experience. It states that one US is needed every year to maintain one collection object. The present programme covers 16–17 million

very different items (see Appendix 3). Considering the ca 10-fold lower expenditures (on materials, workforce, etc.) in Estonia than in the USA and elsewhere, and the extent of present finances, it is obvious that the planned sum is smaller, yet approaching the funding common in international practice.

5. Duration of the programme: years 2004–2008

6. Possible risks hampering the fulfilment of the programme

1. Time factor, i.e. present inadequate conditions of storage of some collections and constant use of original specimens in everyday scientific research may lead to destruction of several unique and nationally valuable collections.

2. Unreliability of safety and storing equipment and lack of insurance for cases of accidents and thefts.

3. People working with collections are underpaid, which causes migration of workforce and interruptions in taking care of collections.

4. Course of the development of the database network, its reliability and adequacy.

5. Inconsistency of financing, which poses danger to the storing, maintenance and use of collections, retaining qualified permanent staff and replenishment of collections.

7. Indicators of progress in the fulfilment of the programme

1. Quantitative indicators of conditions for storage, inventory and development of collections and training of the staff. It is possible to estimate the correspondence of storage conditions to international standards and the dynamics of changes in storage conditions.

2. Quantitative indicators of the availability of information about the collection and its use in research work.

3. The amount and level of scientific publications written on the basis of collections and their use in degree studies.

4. Replenishment of collections through international cooperation and expeditions.

5. Being known and recognized by the international system of cultural heritage (covered/indexed by corresponding databases and internet).

6. Applied developmental projects completed or started on the basis of collections, directly related to reproduction of culture through education or promotion of the use and conservation of nature.

Appendix 1

Budget of the state programme “COLLECTIONS OF HUMANITIES AND NATURAL SCIENCES”, for the year 2004 (thousands EEK)

Main activities	2004
1. Improvement of storage conditions: development of the material basis, particularly procurement of rooms and special equipment, creation of curators posts, training the staff	5500
2. Ensuring preservation: inventory, “passportizing”, arrangement, conservation, copying, etc. to minimize risks, updating exhibitions	3900
3. Modernization of usage: compilation and development of unified electronic databases, procurement of IT equipment, use of bioinformatics, publication of major commented catalogues, building websites	3200
4. Implementation of the programme and application of results: foundation of national collections and two leading centres, procurement of the necessary equipment, drawing up necessary documentation, elaboration of a basis for future activities	400
Total	13 000

Appendix 2

Total budget of the state programme “COLLECTIONS OF HUMANITIES AND NATURAL SCIENCES”, for the years 2004–2008 (thousands EEK)

Main activities*	2004	2005	2006	2007	2008	Total
1. Improvement of storage conditions	5500	6000	5500	5400	5400	27800
2. Ensuring preservation	3900	3400	3400	3400	3400	17500
3. Modernization of usage	3200	3200	3700	3800	3800	17700
4. Implementation of the programme and application of results	400	400	400	400	400	2000
Total	13000	13000	13000	13000	13000	65000

*Here given briefly, for more information see Appendix 1 and points 2.3.3 and 3.4 of the text

Appendix 3

Major Estonian collections of humanities and natural sciences, mainly administered to the Ministry of Education and Science responsible for the fulfilment of the programme

1. ARCHAEOLOGICAL COLLECTIONS

The archaeological (incl. arhaeo-osteological) collections of Estonia are housed at the Institute of History and the University of Tartu. The collections were started in the middle of the 19th century, but particularly they have increased during the past 20 years as a result of rescue excavations performed according to the Heritage Conservation Act, and are still growing. At present the collections contain about 1.4 million objects, a yearly increase being up to 15 000 finds. Archaeological collections

are indispensable for the study of Estonian ancient history and are thus intensively used in educational and scientific activities. At the same time, archaeological scientific collections serve as invaluable source material for the Medieval and early Modern periods, poorly covered by written records. Estonian archaeological collections are part of the world's cultural heritage and thus widely used also by foreign scientists.

Osteological collections, containing human as well as animal bones, include over 20 000 boxes, with more than 2 million items. The age of the finds ranges from the Pleistocene (max over 40 000 years old) to recent centuries. Often osteological collections are the only source material archaeologists, palaeo- and archaeozoologists, anthropologists, gene researchers, chemists and other natural scientists can use in the study of numerous aspects of early history.

The archaeological archives, comprising descriptions of antiquities, excavation reports and plans, photo and video materials, form an inseparable part of the collections. In addition, they contain personal archives of Estonian archaeologists (e.g. H. Moora, V. Lõugas, E. Tõnisson, O. Saadre). The total extent of the archives is about 400 running metres of shelves, of which 180 m is occupied by literature relevant to this field. The archaeological collections contain also the so-called auxiliary material, incl. wood, charcoal, soil, building materials, etc. samples, which are studied using natural scientific methods.

In 1992 a permanent exhibition was organized on the basis of the archaeological materials housed at the Institute of History. At present the items shedding light on the Stone Age and ancient ironwork are on display (the display of treasures is being renovated). Every year 1000–1500 people, mostly schoolchildren, visit the exhibition.

2. ESTONIAN LANGUAGE COLLECTIONS

Collections of the Estonian literary language are housed at several institutions. A corpus of old literary language, containing vocabulary of older sources (over 500 000 cards), and an electronic corpus of the Estonian literary language, containing texts from 1890 up to the present, have been created at the Faculty of Philosophy of the University of Tartu. The richest language collections are housed at the Institute of the Estonian Language (the archives contain over 4 million cards on literary language, also card catalogues of language management, terminology and etymology). Sound

recordings contain 55 hours of the Estonian spoken language and 250 hours of the “foreign” Estonian language. Language collections serve as a means for the study of the Estonian language. They are stored not only for recurrent but permanent use, because cards, tapes and other materials are not discarded after the study is completed, new studies, however, are based on previously collected and stored materials. Language collections are constantly used in linguistic research work. These are indispensable also in preparation of any practical linguistic manual (dictionary), etc.

Estonian dialect archives are housed at the Institute of the Estonian Language and the Faculty of Philosophy of the University of Tartu. In the former, also dialect archives compiled by the Estonian Language Society are deposited. Most of the dialect vocabulary has been recorded by well-trained collectors, and therefore adequate material is available. Dialect materials comprise card catalogues (5 240 186 cards), booklet catalogues (137 771 pages) and sound recordings. Besides the Estonian dialects, the collections of the institute and university contain dialect materials of our kindred languages (Votic, Ingrian, Vepsic, Komi, etc.). Dialect archives provide source materials for dialectological research and are used by linguists from the whole world. To provide wider access to dialect archives, it is necessary to accelerate the compilation of the electronic database of dialects based on sound recordings and written texts. The database of local, personal and animal names has to be digitized.

3. CULTURAL HISTORY COLLECTIONS

In 1929 the Estonian Cultural History Archives were founded to collect, preserve and study the manuscripts, photos, etc. connected with Estonian cultural history. The archives house the manuscripts from the entire mental and spiritual world of Estonian society (from Fr. R. Kreutzwald’s manuscripts to those by J. Kross), correspondence (from J. Tõnisson’s correspondence to that of V. Väljas), photos, bio- and autobiographies, sound and video recordings. Cultural history collections are kept also at the Under and Tuglas Literature Centre (Fr. Tuglas’ collection of 38 000 items), Library of the University of Tartu (personal archives of Estonian scientists with 65 000 items, historical graphics collection of 10 000 items). The collection of the cultural history archives contains 154 195 manuscript items (incl. correspondence,

diaries, etc.), 149 866 photographs and negatives, 3711 artwork items, 912 items of audio and video recordings.

Most of the collection items need to be digitized, because at present their use is restricted by both time and space. At the same time, more active purposeful collection and archiving of different phenomena and art materials from the Soviet times should be carried out. Development of the usage possibilities (databases, electronic databases) has been neglected due to the lack of means, the extent of research work based on the collections, however, has increased considerably during the last years.

4. COLLECTIONS OF NUMISMATIC AND PRECIOUS METAL ITEMS

Collections of numismatic and precious metal items form part of the archaeological collections. The most important coin collection of Estonia (incl. the coin collections of the Learned Estonian Society and Estonian Literary Society) is housed at the Institute of History. It consists of about 102 000 objects, most of which are silver coins. The collections of precious metal items contains about 1500 silver and gold objects. Most items of the named collections are 9–18-century treasures found in Estonia over more than two centuries. Several coins and decorations contained in the collections are unique (some are the only specimens known in the world). Because of its content, the collection has to be stored under particularly tight security conditions.

5. FOLKLORE COLLECTIONS

Since 1927 all Estonian folklore collections have been concentrated in the Estonian Folklore Archives. Over 75 years the archives have developed into a database containing documentations of the Estonian national culture from the last 150 years. The scope of the archives covers also the folklore of national minorities living in Estonia, mainly that of the Finno-Ugrians. The archives house collections of manuscripts (since extensive folklore collection by Jakob Hurt in the 1880s), sound, film and video recordings, and photographs. As of 1 January 2003, the archives held 1 382 425 manuscript items, 115 650 items of sound recordings, 20 738 photograph items and 387 items of video recordings.

The collections are accessible to all folklore researchers. Every year about 1100 scientists use the collections; on average 2700 items are studied (i.e. brought out

of the repository). The use of collections has intensified notably during the last five years, because several extensive international projects have been launched, concentrating on problems of oral lore, traditions and memory. The highly increased use of collections has necessitated conservation of original materials and making reserve and working copies.

6. NATIONAL IMPRINT COLLECTIONS

The national imprint collection was founded in 1909. As an archival collection it contains all materials printed in the Estonian language and about Estonians or Estonia. The materials cover the period from the appearance of the first book printed in the Estonian (Low German) language up to date. The national imprint collection consists of four parts: Estonian book, Baltica, periodicals and special collections (pamphlets, maps, personal collections) and the related analytical retrospective bibliography facilitating the use of the materials. The items of national imprint are stored as archival collections at the National Library of Estonia, Library of the University of Tartu, Academic Library of Estonia and the Literary Archives of the Estonian Literary Museum. The last mentioned institution houses in special conditions the most complete collection of the oldest (up to 1917) examples of national culture (more than 860 000 items). The national imprint collection reflects the development of the nation and its persistence as a cultured nation, at the same time serving also as a basis for scientific research.

The research project “THULE: Identifying the most endangered collections in major Estonian libraries”, carried out under the auspices of the UNESCO in 1998–2000, identified the most threatened national imprint collections by different periods (years 1850–1990), using an internationally approved methodology. Provided the necessary means are available, rescue of the endangered collections can be started.

Because of the intensive use of the collection, 21% of the items need rapid conservation and restoration (unique single specimens from the older period). As the paper is of extremely poor quality, the periodicals collection (since 1766) should be microfilmed and digitized, to avoid its complete destruction. All scientists, from economic scientists to those concentrating on some particular problem, need the collection in their work. Users of the collections numbered 12 500 in 2002.

7. BOTANICAL COLLECTIONS

Estonian botanical collections are housed mainly at five institutions. The Institute of Botany and Ecology of the University of Tartu and the Botanical Garden of the University of Tartu house collections of vascular plants, algae together with iconographs, mosses (in total about 300 000 items), and the Institute of Zoology and Botany of the Estonian Agricultural University houses those of vascular plants and mosses, and K. E. v. Baer herbarium (in total about 180 000 items). The collections are intensively used in educational and scientific activities (e.g. several monographs have been compiled, such as *Flora of the Estonian SSR*, *Flora of the Baltic Countries*). Large botanical collections are available at Tallinn Botanical Garden (vascular plants and mosses; in all about 57 000 items) and the Estonian Museum of Natural History (vascular plants, mosses; about 123 000 items). All the mentioned collections are included in the international herbaria database *Index Herbariorum*.

The herbarium of the former International Centre of Environmental Biology of Tallinn Pedagogical University contains diverse materials (incl. 5000 moss specimens and 6000 vascular plant specimens, also pine needles, soil, etc.).

8. GEOLOGICAL AND PEDOLOGICAL COLLECTIONS

The geological structure of Estonia is represented by little metamorphosed rocks containing very well (sometimes even uniquely) preserved fossils of numerous extinct organisms. The availability of rich high-quality palaeontological material has enabled and will enable research work to be performed here, which is impossible on the basis of materials from other regions. This has largely contributed to high scientific reliability of Estonian geological collections. Over the years tens of monographs and hundreds of papers, based on the collections, have been published, documenting the development of biological diversity 550 to 350 million years ago. The geological collections of the University of Tartu were started in the first half of the 19th century, the collection of the present Estonian Museum of Natural History was begun somewhat later. Major geological collections of Estonia, covering also the entire Baltic area, have been concentrated in the Institute of Geology at Tallinn Technical University and the Geological Survey of Estonia during the last 50 years.

The collection of the Estonian Museum of Natural History holds about 25 000 items (fossils, including collections of famous geologists of the 19th century, minerals). The collection of the Institute of Geology at Tallinn Technical University

includes 500 000 items (fossils, incl. taxonomic originals, minerals, rocks, meteorites, microfossil samples, thin sections of rocks), plus numerous drill cores. The collection of the Museum of Geology of the University of Tartu includes about 80 000 items (minerals, rocks, sediments, fossils, incl. taxonomic originals, film-monoliths, meteorites, thin sections and microfossil samples), plus drill cores. The collection of soil varieties (soils, block- and micromonoliths, etc.) contains about 200 items. Among the collections of the Geological Survey of Estonia the most valuable is the rich collection of drill cores; other materials are less valuable.

9. HUMAN AND VETERINARY MEDICAL COLLECTIONS

Large collections of human and animal biological material (some dating from the 19th century) are housed and constantly developed at the Faculty of Medicine of the University of Tartu and the Faculty of Veterinary Medicine of the Estonian Agricultural University. The material is stored as dry preparations (bones, corrosional preparations) and wet preparations (soft tissues and internal organs) in jars filled with fixation solution. It shows peculiarities of partly normal, mostly, however, of pathologically deformed (incl. malformed) organisms in our conditions. Therefore the collections serve as a valuable visual substrate of the general as well as regional medicine. On one hand, the collections demonstrate the effect of diseases not occurring nowadays in an advanced form (syphilis, malleus); on the other hand, they give information about the diseases that have become widespread only quite recently (AIDS, prion diseases). They provide information also about threat of terrorism, e.g. about Siberian plague (anthrax). The organism causing that disease was first described in Tartu. Thanks to long preparation traditions, the University of Tartu has abundant well-preserved natural medical materials, the gathering of which will continue. Only wet preparations can serve as a basis for molecular-pathological research (DNA tests, etc.) of old and modern diseases.

Institutes of the Faculty of Medicine of the University of Tartu (especially Old Anatomical Theatre) house different collections, including Prof. Puusep's collection of brain sections. There are over 1000 wet preparations (additionally 450 items at the Biomedical Centre) and about 500 micropreparations (of these, 100 items at the Biomedical Centre). About 700 anatomical dry and wet preparations are housed at the Institute of Anatomy, part of which originate from the 100-year-old collection of A. Rauber. Part of the collections (anatomical, pathological-anatomical, parasitological,

orthopaedic) stored at the Veterinary Museum and the Faculty of Veterinary Medicine of Estonian Agricultural University are of a very high historical value (memorial collection of J. Tehver dating from the 19th century).

10. MICROBIOLOGICAL COLLECTIONS

The Institute of Molecular and Cell Biology of the University of Tartu houses collections of well characterized strains of soil and water bacteria. The 10 000 items of the collections include strains isolated in Estonia as well as international standard strains. Additionally there exist yeast strain, and human and animal cell collections comprising over 2000 items.

Strains isolated from water (number of items not known) are stored at the Institute of Chemical and Biological Physics. The collection of live fungal cultures housed at the Institute of Zoology and Botany of the Estonian Agricultural University contains about 2300 strains, mostly cultures of wood-decaying fungi and of species parasitizing on other fungi (incl. hyperparasites). The collection of parasitizing species (over 400 strains) is one of the most representative collections in the world and has been registered by the World Federation for Culture Collections (WFCC). Strains of pathogenic microorganisms isolated from Estonia are stored at the Institute of Microbiology of the University of Tartu. Microorganism strains, collected in cooperation with doctors and researchers of pathology, are housed at the Institute of Molecular and Cell Biology of the University of Tartu, but have not yet been precisely registered.

11. MYCOLOGICAL COLLECTIONS

The mycological collection of the Institute of Zoology and Botany of the Estonian Agricultural University contains about 165 000 herbal specimens of fungi, including types of about 330 new species. The material has been collected, apart from Estonia, from the temperate region of Eurasia, also from the USA, Tansania, India, Tai, etc. In addition, the collection contains about 4900 exsiccates, obtained through exchange from other herbariums. The holdings have served as a basis for hundreds of research papers, including more than ten voluminous monographs, tens of diploma, master's and doctoral theses. Recently the collection has been successfully used to determine the nucleotide succession in the DNA for the mycorrhiza studies and systematics.

The mycological collection of the Plant Protection Institute of the Estonian Agricultural University holds about 22 000 items (over 9000 species), more than half being a particularly valuable comparative material obtained from herbariums of other countries. The species parasitizing on Estonian plants are very well represented; the most important collection, however, is that of agriculturally important fungi, incl. the material collected by Prof. E. Lepik up to the year 1944.

The mycological collection of Tallinn Botanical Garden contains mostly 5500 herbal specimens of fungi gathered by H. Karis from the regions from Estonia to the Far East. This collection has been used as a basis for several important monographs and dissertations.

The lichenological collections of Estonia are housed at the Institute of Botany and Ecology of the University of Tartu (over 70 000 engineered specimens), Tallinn Botanical Garden (40 200 herbal specimens) and the former International Centre of the Environmental Biology of Tallinn Pedagogical University (about 15 000 items). The lichen herbarium of the University of Tartu contains specimens from the whole world, incl. type materials and exsiccates (about 3700 items). The most valuable are lichens from Siberia and the Far East, and from Australia (received as a donation from the Canberra herbarium). The herbarium is constantly used in research and educational activities; also the international exchange of materials is going on. The collection of the Estonian Museum of Natural History (about 2000 lichens) is deposited into the lichenological collection of the Institute of Botany and Ecology of the University of Tartu.

The collections of the Institute of Botany and Ecology, Tallinn Botanical Garden, Institute of Zoology and Botany, and Estonian Museum of Natural History are included in the international database *Index Herbariorum*.

12. ZOOLOGICAL COLLECTIONS

Scientifically most valuable zoological collections of Estonia are concentrated at four institutions: Zoological Museum of the University of Tartu, Institute of Zoology and Botany of the Estonian Agricultural University, Plant Protection Institute of the Estonian Agricultural University, and Natural Museum of Estonia.

The collections of the Zoological Museum contain over 600 000 items, collected during almost two centuries. About half of the items are completely systematized. Three-quarters of the specimens are Arthropoda, mostly insects.

Molluscs are represented by over 80 000 specimens, birds, mammals and reptiles by thousands of specimens. The collections contain about 100 holotypes, mainly of insects.

The insect collection of the Institute of Zoology and Botany of the Estonian Agricultural University holds about 400 000 prepared and labelled specimens, including 238 holotypes and about 2000 paratypes. There are ca 1000 specimens of Nematoda, including several type specimens. Molluscs and spiders are less numerous. The collection of Oligochaeta (3000 specimens, incl. 21 holotypes and 111 paratypes) is housed at the Võrtsjärv Limnological Station of the institute, as are the mollusc collection and zoo- and phytoplankton samples (ca 15 000 samples since 1932) taken from Estonian water bodies. The internationally used acronym of the collection is IZBE.

The collection of the Plant Protection Institute of the Estonian Agricultural University comprises over 40 000 items, mostly mounted and labelled insects. The most important items are the collection of tropical beetles and K. Leius's collection of bark beetles and pollinator insects.

The zoological collections of the Natural Museum of Estonia are kept in the storage rooms of the zoology and entomology departments. The objects number 221 000, of which 109 400 have been registered as museum items. Entomological items number ca 200 000, incl. about ten taxonomic type specimens.