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Basic Guide for the Preservation of Laboratory Archives

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Guia Básico para Preservação de Arquivos de Laboratório

Basic Guide for the Preservation of Laboratory Archives

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Presentation

In its 25th year of existence, the Documentation and Archives Coordination of the Museum of Astronomy and Science (MAST) is pleased to provide yet another working tool for the preservation of documents produced by science and technology.

This guide is the result of a survey performed by the History of Science Archives aiming at understanding the reality of documents production at scientific and technological laboratories. This process ensured that recommendations are based on the surveyed laboratories practices and their respective needs. However, although based on this specific context, recommendations may provide subsidies to other scientific and technological institutions in the planning of their actions directed towards the preservation of their documental property.

Thus, MAST remains committed to promoting strategic actions towards preserving the Brazilian scientific and technological heritage. Since its establishment, MAST is dedicated to the preservation of archivistic, museological, bibliographic or architectonic collections and, to that end, organizes various initiatives such as, for example, courses, lectures, publications and events that disseminate knowledge produced throughout its existence.

We wish to thank directors and researchers from institutions that kindly collaborated in this work, as well as MASTôs team that contributed towards all stages of the survey, thus making this document possible.

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Introduction

The emerging need to preserve holdings and scientific instruments, taking into account their acknowledged value for the history of science, was one of the leading reasons for the creation of the Museum of Astronomy and Releated Sciences. Materials that are of no use to scientific research can become important sources of information not just for historical studies, but also for the implementation of educational actions.

The experience of MASTôs History of Science Archive in the organization of personal papers of scientists and promotion and surveillance institutions in various scientific disciplines led to many questions regarding which records to preserve. The issue arises when we look at records that have been preserved by researchers at home as their own personal collection and those that remain at the institutions. There are gaps and misconceptions. On one hand, records that should be found in the personal papers are not located because they were not preserved by either the researchers or their relatives, whereas on the other hand, it is common to find typically institutional records, such as processes and memoranda, in personal papers.

Moreover, other issues challenge the work of archivists, such as record identification, access to and use of information, among other things. However, one issue is fundamental here: the interaction between archivists and researchers towards a better mutual understanding of both activities and the fruitful collaboration resulting thereof.

The scientific practice performed in the context of science and technology laboratories is an additional challenge for archivists mainly in two ways:

1) Lack of a specific knowledge of the scientific field ï the courses in archival studies are technical and broad in order to enable the professional to deal with records originating from any knowledge area without the need of additional courses. The archivist trainned in archival studies, as this is a multidisciplinary working field; he works in collaboration with specialists in the area where he will perform. Therefore, the archivist will hardly have any specific knowledge about the scientific area of the laboratory; he will have to work in partnership with the researchers for a

better understanding of the whole research process. The archivist must understand the research development process and not its contents.

2) Record types ï Contents are challenging, but so is the type: scientific practice produces paper-supported administrative records that are traditional for archivists, as well as electronic sheets, databases, computer programs, prototypes, various collections (plants, minerals, animals, etc.), graphics, machines, tools, instruments and many others, just to mention a few. An archivist, traditionally educated in archival science, will struggle to deal with this material, especially with the identification and classification of what can be considered as archival document, as well as with the types of record and which records evidence the most important activities.

However, the most important thing is to understand that the context of material production is crucial to archivists, especially those who organize archives originating from scientific and technological practice.

The History of Science Archivesô experience allows to note the complexity of issues involving the custody of and access to records produced by Sci-Tech, especially the organization of scientistsô personal papers, a complexity which is related to the identification of the main activities and records, records readability, personal and institutional respective boundaries, access to records, among others that are also important.

Such challenges paved the way for the elaboration of a research project with the objective of going to the working place and talking to scientists and researchers in order to obtain their opinion regarding records produced in the laboratories. This knowledge is fundamental to MASTôs role before the great challenge it faces, which is to assist the other Ministry of Science and Technology (MCT) institutes in the preservation of their scientific memory. MAST undertook this task. The preparation of documents that outline guidelines and regulations aimed at the preservation of collections was among the various initiatives taken.

This guide is the result of a study and was based on a research carried out during the period 2004-2008 in several scientific and technological laboratories of the Brazilian Ministry of Science and Technology ï MCT with a view to finding out the preservation procedure of records produced at the laboratories. The projectôs objective was to interview researchers in order to obtain information about routine laboratory activities and their opinion regarding the records produced under their

responsibility, the idea being that of collecting supporting material which would enable the elaboration of guidelines for a record preservation program of MCTôs research institutes.

The administrative routine and practices of the institution as a whole, as well as the dissemination of the produced knowledge, are common to institutes, and their management of records is part of the archivistôs traditional and routine activities and as such do not represent a methodological challenge. The archivist is prepared to act jointly with administrators and historians, but the scientistôs figure is still a novel experience. For a preservation program to be effective, one must focus on the task of scrutinizing a laboratory with regard to its activities, its production of records and the relationship the laboratory professionals maintain with such records.

Records produced by the scientific and technological laboratories are important to the history of science since they reflect the environment where research was developed and help the historian understand the scientific, political and social influences in the scientific and technological activities.

The methodology used in this research was the performance of an interview and the application of a questionnaire. Researchers and technical staff from 102 scientific and technological laboratories of seven institutes of the Ministry of Science and Technology in the city of Rio de Janeiro were interviewed[1].

The researchôs response was very good and the feedback was gratifying. Many interviewees requested to receive the researchôs results, with the understanding that they could be helpful to their routine practice and the preservation of the memory of their work. Moreover, interviews allowed an interaction among these professionals, thus promoting a mutual understanding of the activities and interests of both and changing the concept of the archivist as an "intruder" in the laboratory. The great receptivity of researchers to tips and prospects for custody, organization and preservation of records is what motivated and encouraged the development of this document.

The aim of this guide is to provide scientists, technical staff and researchers with objective recommendations and basic orientation regarding the preservation of records. The target audience of this document is, besides scientific institutions

[1] They are: The Nuclear Engineering Institute (IEN/CNEN); The National Institute of Technology (INT); The Brazilian Center for Physics Research (CBPF); The National Institute of Pure and Applied Mathematics (IMPA); The National Observatory (ON); The Centre for Mineral Technology (CETEM) and The Institute of Radioprotection and Dosimetry (IRD/CNEN).

leaders in general, the scientists and researchers and the teams that perform laboratory work themselves, with a view to raising their awareness about some basic measures for the control and preservation of records. It could, however, be useful to archivists and historians that act in the science and technology field.

This guide was written targeting a scenario with no archivists or professionals that are trained and qualified for archival work, as well as no institutional archives (which storage records from all institutional sectors). The structure of topics is based on data collection. However, the recommendations presented here are more comprehensive than data collected in the research.

Thus, MAST makes this guide available for the purpose of providing scientific institutions with supporting elements to enable them to plan actions to preserve the archival institutional patrimony, thus allowing the memory of scientific and technological fields of researched institutions to be valued and available. The preliminary recommendations presented herein are a basis for the study of complementation and implementation of guidelines and action policies. This guide is not exhaustive or intended to encompass all the issues involved in the preservation of science and technology collections, but rather serves as an early work.

PART I - Recommendations for Researchers and laboratory teams

The recommendations proposed here are directed to institutions that do not have an institutional archive set out and addressed to teams and those that are responsible for the laboratories of science and technology, that is, the direct producers of records. By Institutional Archives we mean the repository for records for long-term preservation and which storage records from all the sectors of the institution. Recommendations are presented in a simple and objective form and easy to understand since they should not represent an additional burden in the routine activities of laboratories. The objective here is not to overload the laboratory team with activities that should be performed by archivists and documentalists, but rather to provide a guide that can be consulted at any moment in order to clarify doubts as to how to proceed. Also, recommendations mainly aim at being a tool for raising awareness towards the importance of records preservation.

1 ï Internal Rules

One of the fundamental points to deal with the issue of record preservation is the elaboration of rules and guidelines with a view to regulating both the production and custody procedures and the final destination. The existence of normatives, if it does not eliminate, at least minimizes the cases of abandonment, neglect and disposal of records. Institutional rules with the objective of designing record criteria and destination must be created and stipulated in accordance to institutionôs purposes and abiding by the current national and international legislation.

The implementation of internal rules to regulate laboratory routine is crucial to the control of activities and products, as well as for records. Normatives back decisions, provide transparency to research management and organize actions and procedures, as well as professionalizing decisions. To this end, recommendations are:

1.1 From the highest to the lowest hierarchy, establish institutional rules that are simple, clear and objective and easily assimilated so that all units comply with them.

It is much more effective when rules are recognized and stipulated by the institutionôs management, since it professionalizes and strengthens the institutional character of decisions, thus minimizing individual will and vanity. The more objective and easy to understand they are, the greater the chances to be assimilated and complied with. Lengthy and complicated normatives have a high rejection rate and tend to fail. In the absence of institutional normatives, the person responsible for the laboratory ï or the one who is in the highest hierarchy ï will have to establish internal rules for the preservation of records and products. Rules must foresee a custody system routine, both in the short and long-term, as well as the custody condition itself.

1.2 Raise the laboratory teamôs awareness about the importance of preserving records generated in the development of research activities and processes.

In order to be effective, awareness about the importance of preservation must be raised throughout the team. The responsible for the laboratory or research must embody such awareness and transmit it to the team, or else the absence of demands results in a relaxation of procedures and, consequently, in the abandonment of preservation practices.

1.3 Create a record preservation system for laboratories that do not have a Quality System.

The advantage of a Quality System is the standardization of procedures and the creation of work routine that favour both the good performance of activities and the preservation of the produced records. The implementation of routines assumes the identification of more significant records, that is, those that document all the essential stages of the whole research process. Such records must be classified as long-term records and must bear the definition of mechanisms for their storage and safety. Even if the implementation of a Quality System is not aimed at, the laboratory can and must elaborate routines and normatives that will consequently bring trust, seriousness, transparency and professionalism to research and the team.

1.4 Create procedure normatives for the custody of confidential records to protect information and establish confidentiality and retention terms.

The responsible for the laboratories and research will have to define the secrecy degree of records and the restricted access terms. Records may be transfered to Institutional Archives, with the access restrictions duly defined and forwarded to Archives who will respect them accordingly.

1.5 Inform the laboratory team about rules and procedures for the preservation of records. Demand the team to follow them.

Itôs important the communication of normatives by the responsible for the laboratory to the team and the demand of compliance with them. When rules are systematically demanded, the team ends up assimilating procedures and incorporating them into their routine. Training and qualification may prove to be efficient for raising team awareness provided that they are led by the responsible.

2 ï Preservation practices

The elaboration of routine laboratory practices facilitates the work of the research team, since records are quickly located and retrieved, as well as that of the Institutional Archives team who will have more complete information for the gathering and organization of records in custody.

In general, researchers adopt different practices for the storage and preservation of records, ranging from the elaboration of more sophisticated custody systems to the complete absence of any of them. The preservation of laboratory records must be continuous and permanent and cannot be sporadic. Routines that facilitate preservation must be in place.

2.1 Plan and implement custody practices for records produced by the laboratory.

The following steps may be adopted in the implementation:

a) Define and provide a specific location for custody;

b) Establish an annual schedule for the custody of records at the previously defined location;

c) Place identification on records with basic information, such as: name of project, responsible, financial sources, dates, contents and date of custody. Regarding research data: name of project which generated the data; data type (raw or analyzed, observed or experimental, numerical or descriptive); equipment or method used to generate data; physical form: computer tapes, computer printouts, paper sheets, CDs, etc; data quantity; data arrangement. (A standard worksheet containing information on the identification of each project may be planned and placed as the first record of the group (see ANNEX 1);

d) Number the groups of records held under custody by preparing a list with their location;

e) Whenever possible, identify custody terms and confidentiality degree and create objective criteria for control and access;

f) Do not dispose of records without prior consultation with professionals bearing a potential interest: scientists, others researchers, administrators, archivists, librarians and museologists;

g) Define the form of storage for digital records;

h) Define which records should remain at the laboratory for a longer period and which may be forwarded to Institutional Archives or Library;

These practices may encompass only procedures or also include furniture, physical infrastructure, location, materials and equipment. Thus, some basic recommendations that will help the laboratory team on the preservation of records may be highlighted:

Furniture

2.2 Choose the most adequate furniture for the type of material to be preserved.

Many types of furniture may be used for the storage of the most varied records. Furniture also contributes towards a better preservation of records. It is important to prioritize the safest ones, those which can be locked and cause no harm to records. Some measures must be taken:

a) Acquire adequate furniture for the storage of records according to its physical support, so that it is well packed, thus ensuring a longer life.

b) Used closed furniture which can be locked and protect records from direct contact with light and dust and which is easily accessible by hands.

c) Control access to such furniture by recording in writing which people can use their keys.

d) Keep furniture in areas that are neither of people circulation nor easy access of non-authorized people or who do not belong to the laboratory staff.

Storage location

2.3 Plan the storage location of furniture and records in order to better preserve them.

The storage location of records must also be planned so that it provides safety and preservation of records. An option would be the creation of separate physical areas for the storage of technical records and of raw data that would operate as the laboratory or Division/Coordination ñTechnical Archivesò. Some guidelines must be observed:

a) Avoid placement of furniture in vulnerable areas or near the following locations:

- Kitchens
- Storage of consumables or inflammable materials
- Location that is subject to flooding, rainwater infiltration or with high humidity
- Without ventilation

b) Keep confidential records in a safe location and create clear criteria for their control and access. They must be stored in Technical Archives.

c) Give special attention to laboratory notebook by filing them in a safe place when they are not being used. Information contained in the notebook is always considered important from a scientific and historical point of view.

Responsibilities

The responsible for research or laboratory plays an important role in the preservation of records. His attitude and leadership may be decisive to the preservation or disposal of research records.

2.4 Define responsibilities of the research or laboratory leader and the team regarding the preservation of records.

The responsible for the laboratory should be the appropriate person to take over the task of defining the storage methodology ï or delegating to who will do it ï , with the following guidance:

a) Register the methodology of research records storage and preservation in order to enable its retrieval. All the team must be made aware of the methodology and follow it in order to achieve success.

b) Demand that the laboratory team consider the importance of records preservation as a duty to future generations and that this becomes a constant concern.

3 ï Type and support of records

Knowledge of type and support of records is crucial to the mastering of record production, what is possible to know about which stage of the research it is produced and its role in the whole process. This facilitates the work of appraisal and selection of records that must be preserved. Moreover, this mastering enables the understanding of the genesis and role of records in their creation context. The identification of records that are produced by the stages of a scientific research and their role allows a greater clarity on their importance and enables the archivist to better plan production, appraisal, classification and description of records.

Some suggestions may be indicated in order to know the typology of laboratory records.

3.1 Preserve records that register the different types of the raw data collected: observational or experimental, numerical or descriptive.

Raw data must be preserved as research evidence and source for new studies, for scientific, historical or other purposes. Information about the context of data must be

identified in order to ensure fast and reliable access, such as: name of project; responsible for the creation of data; data type; equipment and methods used for the creation/collection of data; physical form (computer tapes, computer printed reports, paper strips, worksheets etc.); quantity; arrangement, among other that is deemed relevant.

3.2 Define retention period for each record and systematize them in a schedule.

One of the main advantages of knowing typology is the early and easy identification of produced records. A list containing record types must be elaborated in the form of a table. The utilization schedule in the context of the laboratory and its long-term preservation or future disposal must be defined alongside each record. Once the schedule is produced, it will serve as a guide for the entire laboratory and research carried out and will only have to be updated when deemed necessary. This will be a one-time effort.

This Schedule will serve as an embryo for the preparation of a Records Retention Schedule, which is one of the management tools Institutional Archives will work with. Schedule may be elaborated based on model shown in ANNEX 2.

3.3Make a safe packaging for the record conservation.

All records must be kept in safe packages that do not interfere with their physical integrity and do not put information at risk. Digital records ï in their various supports, such as HD, CD, DVD or even magnetic means ï must be packed in special casings. Adequate, properly keyed furniture must be reserved for this custody. The responsible for the laboratory will have to build an access control system for this furniture. Size and format must be observed. Institutional Archives will provide support and subsidies for the preservation.

4 - Correspondence

Mailing plays a significant role in the performance of the laboratory, the institution and the scientific memory, thus contributing towards the understanding of many professional relationships, research results and scientific exchange. The long letters, which described events, personal impressions and experiences, gave way to very short electronic mail messages. As a result, the creation of rules for their preservation is more than urgent. The availability of personal and professional messages from researchers via e-mail becomes an important material for the history of science, as well as to archivists and historians.

The growing use of electronic mail against traditional mail creates some concern in historians who utilize this source in order to understand facts and professional trajectories. E-mail is practical, fast and easy, but is also unstable, volatile and temporary. The fragility of support makes the loss probability higher than that of the traditional paper. With the rapid advancement of technology, electronic messages, which were before of informal nature, are increasingly assuming the institutional formalization needs, exactly because of their fast, practical and low cost character. The trend towards the disappearance causes the emerging need to create mechanisms for preservation the electronic mail correspondence, the so-called e-mails.

In general, formal correspondence is traditionally filed and controlled by archives. Electronic mail is the target of many questions since it is not largely addressed by archives and is neglected by institutions. Formal correspondence is filed as received and dispatched and suffers little careful appraisal for disposal. On the other hand, e-mails are not seen as records. The responsible for laboratories will have to elaborate appraisal, selection, disposal and mail filing criteria.

Traditional Mail

The ideal solution for its preservation would be to open topic-related files in the currents records of the laboratory. Should such archives not be available, provide a cabinet for the custody of hanging files. Project, topic, partnerships or other subject, depending on the needs of control or use, may identify files. Files must be transferred to Institutional Archives as soon when they are no longer of use.

4.1 Define criteria for the selection of mail according to its contents, that is:

- Creation and implementation by the laboratory
- First projects and research of the laboratory
- Teams training
- Financial resources and materials for the laboratory
- Laboratory actions and activities
- Active or finalized projects and research
- Partnerships, technical cooperation agreements and covenants
- Other subjects deemed important

Electronic mail

It is as important as the traditional one. It is the most widely used form by researchers in information exchange in the context of research. Its preservation for scientific and historical purposes is crucial. Hence, some criteria should be observed:

4.2 Train team and users in the application of electronic mail in order to make better use of its available possibilities and resources, with a view to avoiding waste and mistakes.

It is very important that researcher know the resources that are offered by electronic mail tools in order to facilitate the organization of messages. The responsible for the laboratory must request the information systems sector to provide training. If need be, a laboratory team member may be appointed responsible for the management and filing of messages so that control is always updated and part of the teamôs routine.

4.3 Make a mail server available dedicated to the receipt and custody of e-mails.

If the laboratory doesnôt have a structure to make a mail server available, a computer with a good storage capacity must be provided. In addition, specific message management programs (applications) that offer a simple filing system should be

developed, thus allowing the recording in a system other than the original that maintains, for example, its original characteristics such as format, style, layout and annexes.

4.4 Create and manage incoming mail storage criteria for longterm preservation, especially those that are related to the core areas of the laboratory.

Use the same criteria of traditional mail, accordin to item 4.1; in addition to these, there is a need to preserve messages which:

a) Serve as evidence of an action or activity
b) Contain technical information
c) Exchange information on the research
d) Send a text that is of interest
e) Change the course of a research
f) Modify responsibilities
g) Inform about a decision making

4.5 *Implement a correspondence filing policy as a component of a record management program, with its own traditional filing policy and procedures and with the determination of which correspondence and annexes should be saved, for how long and when to erase them.*

This policy should:

a) Reference and strengthen institutional policies, such as: Information Technology (IT) policy, with regard to acceptable and reliable use; and Human Resources policy, with reference to: code of conduct and policies and legal procedures related to the custody process. Casual or occasional personal correspondence for non-official/institutional purposes, such as, for example, financial transactions and personal contacts shall be considered as acceptable use.

b) Create a filing policy that defines the roles and responsibilities of users, managers, the IT team, the record management team and management with respect to the legal aspects in order to strengthen the policy.

c) Foresee guidelines for the definition of data that is considered private for the management and retention of messages, as well as penalties for non-compliance with policies and normatives.

d) Determine how and when electronic mail correspondence will be managed, protected and retained according to the institutionôs custody policy and the timetable for updating copies. Options may include electronic mail automatic filing systems, manual procedures or a hybrid method ï manual and electronic procedures.

e) Coordinate the traditional paper correspondence filing methods with the current electronic correspondence management information systems in an integrated and complementary manner. Digital records may receive the same filing system of paper correspondence (by chronological or alphabetical order or by subject). Electronic mail messages (e-mails) may also be printed and filed in the traditional paper system.

Preservation of invitations

Much of the invitations actually come via e-mail. Virtual invitations visualized on the computer screen are generally not kept. They are read and discarded. At most, those in the paper form arriving via traditional mail are preserved. In the majority of cases, information is passed on to other records and invitations are eliminated. Some guidelines may be observed:

4.6 Establish appraisal criteria for the preservation of invitations.

The laboratory staff must define which invitations will be preserved by appraising staff, laboratory, and research participation. Those that highlight the importance of the work performed must be prioritized. Information of discarded invitations will be registered in the laboratoryôs annual reports.

4.7 Register invitations in the researchersô curricula.

This way, the institution possesses all the information for the evaluation of performance. Moreover, information in the researcherôs curriculum must be kept updated. Ideally, a copy may be left at the institution for verification purposes.

5 ï Informatics

The use of hardware and specific programs is essential for activities performed in all the areas of knowledge. Many laboratories require specialized programs for the development of works, whereas others develop their own programs. Data processing may be linked to core activities or be simply used as a means.

Two issues are important to the History of Science: preservation of research data and the preservation of information regarding the functioning of hardware and computer programs. The latter is avaluated through the preservation of manuals and instructions for use.

These records describe the use of equipment and programs and are important to the operation knowledge of machines and research. Their long-term preservation will enable the historical reconstruction of scientific research both for science itself and for the history of science.

The producers of such records must observe the use of hardware and their utilization form in research, as well as research data migration to new technologies. Some criteria must be adopted in order to preserve the utilization form of both research data and instruction for use.

5.1 Select hardware, software and file formats that better ensure the permanent easy access to digital materials over time.

Research data must remain accessible for a long-term so that future staffs that are performing new research may use them. It is difficult to evaluate damages caused by the loss of research raw data. It would mean having to remake a whole knowledge or

course and this is not always possible. Besides, the loss of sources causes financial harm.

5.2 Adopt a computer program compatible with previous versions and future versions, so that programs may communicate with other softwares and systems[2].

It is important that new adopted programs communicate with the old ones. If this is not the case, there is a risk of losing important research data; thus loss of fundamental information of a research or project should be avoided. It is essential that the program used be generally compatible with systems and prone to be updated. When acquiring or planning a system, due diligence must be observed in order to ensure that it may be updated with new versions.

5.3 Keep the specifications of the software used.

All softwares built or used by a research, as well as the construction of a system as a whole in order to ensure its accessibility should be properly recorded. Information about used and/or produced programs must be kept with research records while they are useful to research. Then, forward to Institutional Archives.

5.4 Ensure that digital records are stable and fixed both in their contents and formats.

Contents and formats must be stable and information must be fixed on a support in order to be considered a record. Information that is still being handled and subject to suffer modifications cannot yet be considered a record – this will only occur when it is stabled and fixed on a support. Once it becomes record, it should be considered under the custody practices.

5.5 Ensure that digital records are promptly identified.

[2] See records produced by the Interpares Project: "International Research on Permanent Authentic Records in Electronic Systems (InterPARES)", whose objective is the development of essential knowledge for the long-term preservation of authentic records that are created or held in digital format. Information is available at: <http://www.interpares.org>.

Among the main information, the following stand out: authorôs name; origin and address; title or subject; diplomatic document (report, letter and contract); projectôs name, objective and sponsors; format; creation and transmission date, among others. Information about digital records that identify them and enable their recovery is called metadata, which must be preserved or else a loss of recordsôcontents and context may occur.

5.6 Ensure that the digital record contains information that will be assist in checking its integrity.

The record should remain intact and uncorrupted and that the message, which means to communicate in order to reach the purpose, must remain unaltered. If the records refer to research projects, all the information that identifies the referred project must be listed.

5.7 Provide duplicate safety copies, thus protecting digital materials from accidental loss or preventing from being corrupted.

A number of vailable means may be used. All these measures are valid in order to prevent loss of scientific research data. CDs, DVDs, hard disk or other available and compatible means may be used. The best way to avoid such losses is to make regular and frequent copies. Copies must be stored in another location, preferably outside the institution, thus offering an additional protection against fire and theft of equipment. Many copy techniques (backup), software packages and services are available, including some that automatically create copies and transmit them to a safe location outside the institution. Moreover, access to equipment must also be thoroughly controlled.

5.8 Keep antivirus always updated on the institutional network.

Antivirus plays an important role in the network data management and storage system and investment for its acquisition and maintenance should be guaranteed.

5.9 Keep copies updated with predefined frequency.

The frequency for the production of copies must be defined based on criteria to be elaborated by the laboratory team. For example, make copies in the following cases:

a) Technological innovation
b) Project or data update.

5.10 Establish an institutional system for the production of copies from all network and non-network computers.

The laboratory must follow all the institutional normatives for network copies and, if there not be normatives, establish one for the laboratory. As an extra precaution, a safety copy could and should be made outside the institutional network.

5.11 Create a custody system for the storage of hardware manuals.

Manuals must be preserved in a safe place and with a controlled access. Preferably, they may be forwarded to Institutional Archives following the conclusion of their current use. In case there are no Institutional Archives available, one should provide a specific and safe location for their custody. Adopt a Log Book to control the loan or exit of manuals and instructions for use from the laboratory.

5.12 Migrate support and format records whenever necessary.

Records update is always a good preservation option in todayôs world where supports and means suffer constant support and format changes. The most fragile supports do not last long and are prone to technological obsolescence and, consequently, data loss. Migrate to a safer support with a longer life span is the option chosen in order to ensure access to information for a long time.

6 ï Scientific instruments

There is a conceptual discussion in the museological area regarding to the term ñscientific instrumentò, since many objects with different roles are being used in laboratory research. Other terms may be adopted, such as: device, tools and apparatus, among others. Such terms are still being discussed and are not consensual, since it is not always easy or possible to determine their limits. MAST has adopted the term ñscience and technology objectsò, defined as those that are the result or originate from scientific and technological research or which have been used along the proess.

Scientific instruments are of important significance for a science and technology museum. Being a museum that is also dedicated to the preservation of scientific instruments, MAST has a special interest in treating objects that represent the progress in scientific and technological processes. The preservation of instruments and equipment, as well as their operation and instruction for use manuals, are important sources for the history of science. Some attitudes may be adopted so that this information and these objects are not lost.

Scientific instruments and equipment

6.1 Create a system for the custody of memory related to the instrument/equipment.

The system refers to the acquisition, maintenance, use, concession, alienation, operational qualifications required etc. Also preserve records that register tools, such as: drawings, sketches, photos and operations manual, as well as correspondence with suppliers and other researchers.

6.2 Study the destination to be given to scientific instruments following obsolescence.

Destination must be appraised with the following considerations:

- If it remains in the institution, provide a special custody location with good access and preservation conditions;
- In case of alienation, search an institution where the scientific instrument may still be used for scientific, historical or educational research.
- Avoid cannibalization to use parts of it in other equipments. Should this not be possible, record the scientific instruments with photos, plants, drawings and others, and transfer to Institutional Archives for long term preservation.

Manuals or instructions for use

6.3 Establish, as a criterion, the custody of manuals or instructions for use original copies at Institutional Archives.

In general, manuals are of long-term preservation nature and, therefore, their ultimate custody should be at Institutional Archives. The ideal is to provide a copy for laboratory use, thus preserving the original from constant handling and keeping it in a safe location.

6.4 Create rules and normatives at the laboratories like wising the Quality System.

The organization of records required by the Quality System is a good control example to be followed even for laboratories without such system in place. Some steps may be used, and they are:

a) Adopt a worksheet, notebook or logbook for the recording of all the maintenance performed on equipment and the use conditions of equipment.
b) Open a file for each instrument with the objective of filing all related records, such as: invoice, manuals, maintenance records, certificate of guarantee and script for use, among others.
c) Keep a record of how to use the instrument.

7 ï Personal papers at laboratories

Researchersô practices in laboratories produce records during their activities and under their responsibility. In many cases, these records are seen as personal to the researcher and not as a registration of institutional activities. The existence of personal papers at the laboratories is relatively common in both active and already disabled laboratories, especially in those that were created decades ago. It refers to researchers that are no longer active, due to retirement or death, but who have left their records at the laboratories were they performed. These records often remain at the laboratory itself not in an integrated manner, however, without any interference from the institution or the current laboratory team. They may remain forgotten, kept in an inaccessible location or left aside. This is a controversial issue and needs to be better explored and understood by the institution. The institution has to position itself regarding its records production in order to remedy this issue and to legitimize its property. Some of the basic recommendations are:

7.1 Forward to Institutional Archives records considered personal and belonging to researchers no longer active at the institution.

The laboratory should not keep former researchers records under its responsibility, unless these contain raw data and information that are still useful to scientific and technological research. Records that are transferred to Institutional Archives will remain under its custody and conservation and available for access. If there is any case of restricted access, this information should be provided to Institutional Archives who will be responsible for the control of access. The great advantage for the laboratory is that it will not bear the burden of preservation, thus allowing researchers to focus on their research.

7.2 Determine that the institution prioritizes the acquisition of personal papers of its researchers, with the understanding that this material is closely linked to records produced by the institution.

Although considered personal, records were produced in the context of the laboratory and are closely related to the performed research. When researchers or their relatives decide to discard these records, priority should be given to the institution where the records have been generated.

7.3 File permanently all records related to the creation and implementation of the laboratory or unit.

All records regarding the creation of the laboratory must be files, such as: installation projects, administrative rules, internal rules, minutes of meetings and first research. These records must be permanently preserved at Institutional Archives. This measure ensures their survival and rids the laboratory of the burden of dealing with the preservation of records. The main advantage is that it will be possible to recover the registers in order to rebuild the history of the laboratory, the knowledge area and the role of research at the institution. It is also important to file significant records related to laboratories that have been disabled, reformulated or incorporated into other laboratories.

8 ï Personal and institutional records

From a researcherôs point of view, it is important to verify the quantity of personal and institutional records produced by the laboratories. The experience of MASTôs History of Science Archives in the preservation of personal papers of scientists from different areas shows that, in general, records come to the archives which archivists consider they should stay at the scientistôs institution of origin and not be held under their custody as a personal papers. It is necessary to understand why it happens and the researchersô reasons for establish limits. Personal papers may be confused with the professional ones that are produced by researchers in other institutions or scientific associations and may be kept by the researcher at the institution where he performs. It is relatively usual finding records typically institutional at the researchersôresidence.

The importance of the relationship between personal and institutional in the records produced by the laboratories lies with the possibility of obtaining a better

clarity over the records appraisal process and the establishment of records organization, preservation and disposal systems.

The boundary between personal and institutional in the context of laboratories is a topic that has no consensus of opinions. In many cases, the establishment of boundaries is left at the discretion of the researcher and is a decision that is more personal than institutional. This represents fragility for the preservation of institutional registers in its core area. Some actions must be taken in order to minimize misunderstandings.

8.1 Establish criteria in order to determine which records will be considered personal in the context of the laboratory and which will be considered institutional and be transferred for long term preservation at Institutional Archives.

The laboratory team must decide over the institutionality of records and especially raw data. Those which will be reused in another research, even by other teams, and also those which have been obtained through budgetary resources and originating from public funds must be considered institutional. Records that are defined as personal may remain under the responsibility of researchers. Whatever the criteria used, they will have to be registered in writing and communicated to Institutional Archives.

8.2 Perform the work of raising internal awareness among the laboratory team with a view to encouraging researchers to create record appraisal criteria that will be considered personal and institutional.

Raising awareness may be more effective than just a normative. The understanding of the importance favours the initiative of the responsible for the laboratory to train his team and create criteria for record appraisal. Criteria must take into consideration the importance of research with regard to originality and the impacts of results, the team involved, the relevance for the research area, the institutional strategic objectives, among others. And, most of all, an appraisal should be made regarding what can in fact be considered personal in the context of the laboratory.

8.3 Define rules that will dictate the boundaries between records that may be considered personal and institutional.

Personal papers are those which researchers may use, whereas institutional records are those that will be part of the holdings as property of the institution and should, therefore, be preserved. The laboratory must have clarity regarding its own institutional mission and the role it plays at the institution in order to define boundaries. However, it is equally necessary that the institution understand that laboratory production is an institutional production. Therefore, one must have a real notion about the laboratory products as being the property of the institution. Once the institution is fully aware of its property, it will be much easier to raise awareness among its researchers regarding records preservation.

8.4 On the establishment of these boundaries, the researcher and his team will have to be heard regarding the meaning of records and their value for the institution, the researcher, other teams and the history of science.

No one better than the researcher himself knows the value of records produced both for scientific use and other uses in the future. In these cases, a consultation may be made with science historians, educators, journalists and other professionals who will be able to use information for the history of science, scientific dissemination, and science education, among other possibilities.

8.5 Implement a consistent preservation program, elaborated with criteria based on an institutional reflection and with the participation of researchers, administrators, archivists, directors and historians.

A wide preservation program, with the training of qualified professionals and with the effective participation of all the institutional sectors is more likely to be successful. Some guidelines may be recommended here:

a) Establish terms for records storage and retention at the laboratories and terms for their long preservation at Institutional Archives or disposal. As soon as the research is concluded and records are no more of current use, they may be transferres to Institutional Archives for long-term preservation. Records that can be discarded will have to be given to the archivist who will duly proceed with the legal steps for public records disposal.

b) Make records transferred to Institutional Archives available for consultation, indicating who will still have a restricted access for little longer, provided that it is properly justified and with a stipulated term for disclosure. Some records may even require a restricted character for consultation, something that does invalidate their custody at Institutional Archives who has the necessary structure for the control of access. As for the remaining records, access may already be released to other teams or external interests.

c) Establish criteria to define the personal and institutional characteristics of some more controversial records, such as:

I. Theses ï they possess both characteristics. Foresee that the thesis is forwarded to the library because it is an intellectual production with a public vocation. Forward a copy to archives. Send to Institutional Archives the intermediate records which originated the thesis. If the thesis project contains unpublished data that can be reused in other research, such data should be kept at the laboratories as long as they are useful and then, later on, transferred to Institutional Archives. In the case of drafts which did not produce any results, these records may be considered personal and remain with the author. It is important that the institution establishes criteria that are based on the needs of research and recognizes the value of record as a register/evidence of the institutional course.

II. Articles ï a situation similar to the earlier one. Should records which originated the article contain unpublished data, such as observed or produced measures, then original data is institutional and the researcher will also be able to keep a copy of data if these support his work or are used in other research.

III. Electronic data ï assign authorship/responsibilities to data. When in a network, the institution should establish ways of identifying authorship and responsibilities regarding handling, use and update in order not to create doubts. It should also define the boundaries between personal and institutional based on:

- the possibility of printing on paper or other means for a long-term preservation.
- the possibility to provide a copy of data that is considered institutional to researchers because it is easily transportable.
- the provision of infrastructure for the preservation of electronic data that is no longer of current use to scientific research, and which remains under the responsibility of Institutional Archives or the data processing area of the institution.

IV. Patents ï For confidentiality reasons, reserve to the researcher or responsible team the records generated by a research or aiming at a patent. However, once the research is done and patent achieved, the institution will have to assess the necessary term for records disclosure for consultation at Institutional Archives. Records that originated the patent will be considered institutional.

V. Correspondence ï Establish criteria for the appraisal of mail which will be preserved (both traditional or via electronic mail) and determine the preservation of all and any correspondence which:

- refers to the ongoing process of research.
- registers or modifies a commitment.
- registers the participation of the team and the project.
- forwards results or observations that are relevant to the research.
- modifies the course or ongoing process of research.
- forwards relevant records as attached, such as, for example, minutes of meetings, research data, follow-up reports, among others.

8.6 Consider the institutional interest in records deemed personal for a future acquisition priority.

These are records that are sent to the researcherôs residence, as they are considered personal. When the researcher or his family wish to discard records, the institution where the researcher performed must be given priority in the acquisition. Both institutional and personal records are of interest to the history of science (see also item 7).

9 ï Public and private records

The boundary between public and private is an issue that is always present in various areas of knowledge, mainly in the case of records. Records produced by the intermediate stages[3] of a laboratory research tend to be, for various reasons, a challenge for archivists: they have a high technical datas, they are of difficult access, or under the custody of researchers, and are many times considered by them as personal. From a research viewpoint, reflection on these records is fundamental for the understanding of procedures adopted by laboratories, as well as methodologies, routines, infrastructure, team participation, among many others.

In general, it can be observed that records produced by intermediate stages of a scientific investigation process are considered private by the researcher. Since there is controversy over the understanding that these records are part of the context of research that, in turn, is part of the context of institutional production as an organic whole, some recommendations may be considered.

9.1 Establish that intermediate records produced by scientific and technological research are institutional property and, therefore, a patrimony to be protected.

As already seen, the institution must consider data and records produced during the whole research process as institutional property. They are the ones that prove and register the scientific production of the institution and not just articles and final

[3] These are the records produced by all the stages of a process, the step-by-step of research before the production of final records. .

reports. Intermediate stages records enable the comprehension of the ongoing process of the research, the decisions made, the course of research, the laboratoryôs environment, teamsôparticipation and infrastructure, among many others.

9.2 Establish criteria for the preservation of these records so as the decision over its destination does not lie entirely under the responsibility of the researcher.

Decisions must be the result of internal maturation of the team and the institution. It must not be an individual decision based on personal desires. The more the decisions are taken according to criteria studied and stipulated by the institution, the lesser will be the risks of unilateral decisions that privilege desires, vanities, personal interests etc.

9.3 Establish guidelines and normatives for the preservation of these records.

To that end, the following must be defined:

a) Records which will be considered private and public, by purpose and with due justifications. Tables 1 and 2 shown below present some proposals to guide decisions:

Table 1 ï Proposal of criteria for the appraisal of intermediate records by type of project or activity				
Records	**Public**	**Private**	**Access**	**Note**
Services rendered	**X**		Authorization required	
Service rendered with information on process		**X**	After the period of secrecy	Secrecy period to be stipulated with the firm
Patent	**X**		After obtaining the certificate	
Collection for thesis		**X**	At the researcherôs discretion	Thesis is public
Improvement or optimization of research process	**X**			
Technological innovation	**X**		Authorization required	
Handling of information		**X**	At the researcherôs discretion	
Project with public financing	**X**		After the conclusion	
Project with private financing	**X**		After the conclusion	
Academic research	**X**			
Ongoing process reports	**X**		Restricted to the team until conclusion	

Table 2 ï Criteria for the appraisal of intermediate records by type of record				
Records	**Public**	**Private**	**Access**	**Note**
Technical Report	**X**		Authorization required	Both options are valid and depend on the institutional appraisal
			After the conclusion	
Record with handling of information		**X**	At the researcherôs / firm discretion	Access is restricted to the firm and the staff in the case of research ordered by a firm
Not analyzed raw data (data collected, observed or produced)	**X**		Authorization required up to the conclusion	Data may lead to misinterpretation or wrong conclusions
Intermediate calculation or under discussion		**X**	At the researcherôs discretion	
Handwritten draft		**X**	At the researcherôs discretion	
Database	**X**		Authorization required	
Calculation log	**X**		After the conclusion	
Administrative process	**X**			Includes administrative and technical records
Laboratory logbook	**X**		Authorization required	In the case of a single journal for the laboratory, that is, all team members make notes in the same journal
				In the case of an individual journal, but data is of interest to the institution
		X	At the researcherôs discretion	In the case of individual use
Electronic spreadsheet	**X**		Authorization required	
Virtual prototype		**X**	At the researcherôs discretion	May be discarded
Construction of virtual models		**X**	At the researcherôs discretion	

b) Retention period for each item, both at the production location (laboratories) and at the permanent custody location (Institutional Archives).

c) Access retention period of both teams and the public in general.
d) The team that will be responsible for the custody, control and preservation of records.
e) Financial resources and materials for the preservation.

9.4 Researchers must be encouraged to reflect on the various criteria in order to appraise records.

Here are some suggestions:

a) Use of records for other teams or future teams with a view to analyzing whether data is relevant to other approaches.

b) Information readability, clarity and consistency, in order not to preserve incomprehensible and useless data.

c) Whether records register procedures, techniques, observations that may reveal approaches by and behaviour of researchers and teams.

d) Records misuse by other teams or the lay. The researcher will have to stipulate records custody time period at the laboratory, taking into consideration that not yet mature or not well-based information may cause problems to the institution.

e) The use of intermediate records for purposes other than the scientific research (e.g. by science historians).

9.5 In partnership with managers, archivists and historians, define which records will be worthy of preservation and of becoming public and thus available to other professionals.

Other professionals may be consulted (see item 8.4). Should the institution not have archivists or historians in its staff, seek external consultants or international partnerships for a more based aappraisal.

9.6 Consolidate decisions in documents, which may be a preservation plan or program, or something similar.

Criteria that will guide the appraisal of records produced in the laboratories will have to be contained in the preservation program or plan, with a view to defining institutional and personal boundaries. Since these boundaries are not always easy to determine, the purpose of criteria is to minimize arbitrariness or inconsistencies so that decisions are informed, thus avoiding personal desires or vanities. The importance of recording decisions is to systemize procedures and turn them into routine, thus giving institutional visibility for laboratory activities. Moreover, it facilitates records preservation work since the team will already have a tool on which to be based. After consolidating the document, approve it at the institution.

9.7 Orientate researchers over the importance of records originating from research intermediate activities for the history of science.

The promotion of lectures and visits by science historians to the laboratories can be fruitful. Interactions among professionals aim at raising researchersô awareness regarding the importance of records to scientific memory, the subject area of knowledge and, most of all, to Brazilian science. Furthermore, interactions with archivists will enable the identification of records and the elaboration of its retention.

9.8 Orientate researchers to treat the set of records produced by research as an organic whole.

Archivists play a fundamental role in this process, orientating over archivistic procedures and conveying the notion of organic relationship among records. It is fundamental to understand that intermediate stages records, as well as those from the initial stages, planning stages and dissemination of results form an organic whole that promotes research context. Dismembering this context or eliminating records which will form gaps will be prejudicial to comprehension and, consequently, to historical research.

9.9 Under the orientation of an archivist, promote training of researchers through lectures, technical visits, short-term courses or other means with a view to understand the archival notions such as organic relationship between records, integrity, authenticity, provenance, context of creation and, mainly, the value of an activity proof and the value of evidence.

The researcher will obviously not need to deeply comprehend these concepts (see Glossary). What matters is the perception that many issues must be considered before the decision of discarding or keeping records. Besides contextualizing research and results, records are the testimonies of activities which generated them, they are evidence of results. The value of evidence must be one of the main considered criteria.

9.10 Enable researchers to appraise a record and assign a custody value that is established in a more consistent and conscious manner. Reflection on records production will be a qualitative gain for the researcher and the archivistôs work.

Raising awareness will enable the researcher to understand the dimension of the importance of records after the conclusion of the research. Thus, decisions will certainly be based on reflection and institutionally backed. Besides favouring the researcherôs work, it will also facilitate the work of the archivist who will have no difficulty in the comprehension and definition of records that are to be preserved.

9.11 Map the activities by listing all those performed during the research in the context of the laboratory. Each activity involves, or not, the creation of records which must also be mapped. The researcher will have to inform, for each record, the preservation time period and who has access to it. Such information will be extremely useful for the elaboration of a retention schedule for laboratory records.

Mapping (see model in ANNEX 1) can be done with a survey table, with activities, records produced, custody location and terms, access form and authorization. The activities to be listed are all laboratory or research routines and, consequently,

records that register the step-by-step of research. Once records are listed, indicate the use or preservation term for each item and then the type of access to these records. The composition of mapping will provide the researcher with an overview of records produced under his responsibility, besides allowing the control and definition of custody. For the archivist, this mapping represents the clear and objective comprehension of the research stages and avoids an additional effort in data collection. Moreover, mapping will be the basis for the elaboration of the Records Retention Schedule ï which is institutional.

9.12 Appraise the activities that represent relevant stages of a research process as activities whose evidence will be preserved.

Once the activities to be preserved are defined, their records will be considered public and their terms of access will be defined by the researcher and formalized by the institution. Those that will not be considered public can be defined as private and will remain at the researcherôs discretion. The decisions made will have to be registered in records, disseminated among the team and known to Management and Institutional Archives.

9.13 Establish criteria to enable the researcherôs appraisal.

The researcher himself must have the conditions to appraise records that are of interest to the institution, e.g. some criteria may be suggested, such as the preservation of records which:

a) Indicate the relevance of research to the knowledge area
b) Register the participation of the team
c) Represent the relevant stages of the research process
d) Register changes in the course of research
e) Are considered raw data
f) Register data processing
g) Register the methodology

9.14 Define records that will be considered public and private by determining appraisal restrictions (to team or public) and the due retention time period.

Access following authorization means that it is restricted to the team and that authorization is required in order to access records. Information contained therein must not be permitted to the lay since they cannot be understood and can give way to misinterpretation. This does not mean that information will always be restricted. The researcher must establish retention time period and allow access after the end of the term. This information must be registered in records and known to Management and Institutional Archives.

9.15 Forward to Institutional Archives records that are considered public. Should there not be archives that encompass all the institution, records will have to be kept at a permanent custody location where they will be preserved.

Should the permanent custody location not be Institutional Archives, it will have to be a reserved location, with good climatization and must be very clean. Access to the location must be controlled and records arranged in a way that enables easy identification. In case records are stored with their relevant identification information, future forwarding to Institutional Archives or for the attention of the archivist will be made easier, thus saving time, efforts and resources.

9.16 Establish that records produced by laboratories are archive records because they are generated during the course of activities performed in the execution of a research and are a proof of each stage of the research and scientific and technological process.

Records must be treated as part of an institutional whole since other sectors also produce records, which will be part of Institutional Archives. They are the testimony and evidence of all the activities performed by the institution and not merely those dedicated to research. The laboratory team and the institution must acknowledge these records as their property.

10 ï Importance of records

The importance of records produced by laboratories is an emerging question for archivists who are accustomed to dealing with historians, but with a rare interaction with scientists and laboratory researchers. Researchers, i.e. records producers, must have clarity over the importance of records for use other than scientific purpose such as, for example, historical research.

The importance of records produced by laboratories after the conclusion of a research is not always recognized. The acknowledgement of the importance of laboratories by researchers is not sufficient and an initiative must be taken regarding the preservation of records. Recognizing the importance of records is the first step and is the one that will trigger measures aiming at their preservation. Therefore, the responsible for laboratories must be sensitive to this issue. Some guidelines are indicated for the appraisal of the importance of records:

10.1 Raise researchersô and engineersô awareness about the understanding of the importance of their records to historical research and not merely to their life and work but to the history of the institution where their research is being carried out.

One option would be the organization of a series of lectures to be held at the institutes by science historians and addressed to researchers regarding the sources used in the History of Science. Knowing the potential of use of laboratory records as a historical source will be a considerable gain for a preservation policy. Moreover, records use in the scientific research itself can also be considered. There is no doubt that records can be useful to the life and curriculum of the researcher, something which gives rise to the trend of taking records home. However, utility for other teams and researchers and mainly the institutional origin and the infrastructure that generated the records must be taken into account. Records cannot be reduced to a ñtrophyò and simply ñbe taken homeò. Besides, many records may also be used in science education activities, thus encouraging the comprehension of scientific and technological processes and arousing the interest of children and youth to science.

10.2 Assess the importance of records according to their value for a long-term preservation.

Records with a legal, fiscal, evidence or historical value are considered for long-term preservation. Law foresees the custody of some transaction evidence records. However, the preservation of records produced by laboratories is not contemplated by legislation, but is defined by the institution and in many cases by the standardized procedures of Quality Systems in various knowledge areas. Thus, permanent custody criteria must consider the value of records to the laboratory, historical and scientific research ï of the team itself and other and future teams ï , the history of the institution, the area of knowledge and the national scientific memory. As such, the possible records values must be taken into account in the appraisal of records, and they are:

a) Scientific value ï which represent raw, collected or produced data; which refer to earlier works; which serve as a learning platform for new researchers and which enable team training.
b) Historical value ï which register the history of the laboratory, the institution and the knowledge area.
c) Administrative value ï which register the management of research:
    i. Attesting the acquisition of dcientific instruments;
    ii. Ensuring a commitment;
    iii. Enabling the auditing of the institution;
    iv. Providing a re-appraisal of the system;
    v. Evidencing research / institution infrastructure;
    vi. Attesting a project financially and through results;
d) Archival value ï which can assign authenticity, provenance, readability, organic relationship and evidence value and characteristics of records.
e) Educational value ï which illustrate the operation of a research, showing how principles and techniques work and arousing the interest of youth to science and technology, thus demonstrating progress in scientific areas.

11 ï Suggestions for raising awareness

Raising researchersô awareness about the importance of records produced at the laboratories to the history of science is a fundamental measure for the preservation of such records. No action whatsoever can be effective without this conscience and also necessary efforts by researchers regarding preservation could not be made. As such, some recommendations are highlighted:

11.1 Create a single space for the custody of laboratory records, which can be Technical Archives.

A specific space for the custody of technical records would provide a greater incentive to researchers for their forwarding of records for their preservation. A single location is easier to be managed since it saves efforts and resources regarding its maintenance. Besides, it will enable the implementation of an adequate facility. Technical Archives must be used as current and intermediate archives. Following the conclusion of research and the discontinuance of use of records, these should be transferred to Institutional Archives.

11.2 Invest in scientific dissemination works

Researchers must divulge research data so as to make the population in general understand the work of scientists. Researchers must transmit the importance of their work to the public in order to obtain due recognition accordingly. Laboratories should think about actions that would favour the dissemination of research to the public at large. Language-friendly texts, publications, pedagogical materials for elementary school and high school levels teachers are some actions that could be implemented. Another action would be to open the doors of laboratories to enable students guided visits to the institution through direct contact with schools, or even to open a physical space in the institution for the receipt of previously scheduled groups, with exhibitions about the importance of research performed at the institution and how these products of such research arrive at the day-to-day life of people.

11.3 Invest in raising human resources awareness through seminars, courses and thematic campaigns.

All staff, and not just researchers, must know the importance of preserve institutional records. In the absence of internal staff that is qualified in the area of collections preservation, the institution may enter into a partnership with other institutions that have such professionals for assistance and promotion of courses. Another option would be to hire specialized firms for the elaboration and implementation of a record preservation project. Courses and campaigns may be thematic and sporadic and would not interfere with the laboratory work routine, nor would it be stressful to the researcher. Moreover, an investment in the assistance of science historians could be made in order to promote lectures and partnership works aiming at recording the history of the laboratory, the subject knowledge area and the institution.

11.4 Create basic normatives and procedures for the preservation of laboratory collections.

Besides appropriate physical space, dissemination and raising awareness, the creation of basic regulations and rules for the preservation of records is also important. Each normative should come along with an understanding of its need; otherwise, it will not be effective. Once rules and procedures to be adopted are established, these should be the objects of training in order to become routine practice. Preservation will thus be effective this way.

PART II - Guidelines for institutional managers

The present proposed guidelines are directed to institutional managers since they refer to a global vision of all the areas and activities and not just to research performed at the laboratories. The first issue to be observed is that the institution should perceive records production as an organic whole that must not be divided into parts in a watertight manner. The institution must understand that it executes a number of activities in order to carry out its mission and achieve its objectives. Each activity necessarily produces records that prove it and which are its evidence. Archive is a set of records produced by all the institutional activities that testify and evidence such activities. Therefore, it has to be seen as a whole and cannot be dismembered into unconnected and independent parts.

The creation of Institutional Archives that gather all the records for long term preservation, from all the sectors and not just those related to administrative activities, is fundamental to records preservation. The implementation of these archives should be an institutional goal. The Institutional Archives team can and must control the record management. While the institution does not have the conditions to implement it, a managing group must be designated by the director with the objective of studying and implementing a record management system.

The most important thing is to centralize records management and that its control is effective in such a way so as to enable the managing group ï or the responsible professional ï to answer for all the records classified as permanent value at the institution. This group must have knowledge about records production and be able to control the proceedings and the final destination of records.

The institution must also elaborate criteria for the preservation of such records and, more importantly, create the means for their preservation. A single physical space with a single and non-sectorial structure would require lesser resources and provide easier access and custody. It would be a space that would gather all the records that are not of current use, with pre-established custody terms, independent of records being of administrative, technical or scientific nature. This is the single space that centralizes records control and custody that will ensure records preservation for the memory and history of the institute.

The institution must also try and find out a way to preserve personal records of scientists and researchers that are composed of records which are being considered personal, at least during the development of research and which are in general left aside following its conclusion. The institution has to think about establishing criteria in order to consider whether such records are personal or institutional, and not leave this decision at the discretion of the researcher. Following the establishment of such boundaries, the institution must provide the appraisal of and custody infrastructure for these records, including electronic or virtual support. Such custody may be shared with Institutional Archives by respecting each of the sectorial provenances separately and without mixing them up. It is a solution that is absolutely accepted and adopted in various institutions since it centralizes and facilitates record management.

Another important issue for reflection is the preservation of softwares and equipments produced by the institution. Rules or criteria for these records are generally limited to their use term. They cannot be simply abandoned or left aside when they become obsolete or unused, since this practice can cause losses. This material is valuable for historical research. The institution must come up with guidelines for this material with regard to custody space. The preservation of manuals or instructions for use of equipment and *softwares* is also important since it enables the comprehension of their structure, operation and use.

A relatively common issue is the confusion that many people make regarding the role of libraries and archives. The role of a library is to disseminate all the knowledge of products generated by scientific and technological research and not that of hosting records that evidence institutional activities. Archivesôrole involves the custody of records with public access terms that is restricted for a while, depending on the case, and the library aims at wide dissemination. The fact that the final report goes to the library and becomes available for consultation is an institutional attempt to preserve scientific memory and which has had an effect with exclusive regard to the final product of research or activity. Researchers may consider that the report would be the only record worth preserving and there would not be a concern or need to register all the others, that is, those which evidence and prove the performance of each stage of an activity. A suggestion being made is that intermediate records of administrative and core areas be considered worthy of a judicious appraisal and preservation in Institutional Archives as records, independent of the research final product going to the library. The appraisal for the determination of records that will be

considered of institutional value, thus becoming part of the institutionôs property, must be performed jointly with researchers, engineers, staff and the team in general.

Archives are a property that must be more valued by scientific institution managers. It is worth reminding that Art.1 of the Brazilian Law 8159 dated January 8, 1991 establishes that ñrecords management and the special protection of records as supporting tools to administration, to culture, to scientific development and as evidence and information elements is a duty of the Public Authorityò (see ANNEX 3).

The Brazilian National Council of Archives, linked to National Archives/Civil House of the President of the Republic, is responsible for the elaboration and publication of Resolutions that regulate the preservation of records originating from federal institutions of the Executive Autority. Among these resolutions, nº 14/2001[4] implements a Retention Schedule for administrative records, with examples of validity and retention terms for records of the administrative area, namely, resources, materials, financial/budgetary and general services. With this document, institutions can elaborate their own schedules and provide a study in order to extend to records of the core area of the institution, that is, records produced by laboratories and research groups, besides the remaining activities of finalistic character. This is not an easy task, but many institutions have successfully managed to regulate their schedules. National Archives provide support and approve schedules of federal institutions of the Executive Authority through the analysis and publication in the Federal Official Gazette (*Federal Register*).

It is worth reminding that the Federal Government established the Archival System of Record Management (SIGA) in the federal public administration through Decree nº 4915 dated December 12, 2003, with the objective of organizing the record management activities in the context of bodies and entities of the federal public administration. SIGA will be fundamental to the monitoring of record management activities at the institutes and to the creation of guidelines and normatives regarding the preservation of archival records.

4 Available at: <http://www.arquivonacional.gov.br>.

With these tools, the institution will create guidelines for the regulation and preservation of intermediate records resulting from scientific work, as well as of final products.

Some actions may be studied by the managers towards the preservation of scientific and institutional memory.

12 ï Institutional archives

The implementation of Institutional Archives represents the value the institution assigns to the preservation of the registers of its history, thus professionalizing activities. The purpose is to transfer records of permanent character produced by all the sectors of the institution. Records are handled by preserving their provenance ï without mixing them up ï and their secrecy time period stipulated by their producers and current legislation.

12.1 Implement the creation of central or general Institutional Archives within the institution that operate as a single and centralized physical space that preserves records that are no longer in current use.

The advantage of having a single storage or coordination is the centralization of efforts across the board: materials, personnel, physical and environmental structure. Moreover, any team member will know where to look for necessary information, that is, who to ask and the custody conditions. All records of permanent character will be forwarded to the same location, thus facilitating steps and control. Institutional Archives will be responsible for the transfer deadline schedules and will manage the entire records appraisal and selection processes, thus relieving researchers of this responsibility.

12.2 Establish records custody time period.

The establishment of records custody terms must be done jointly researchers, archivists, historians and administrators and coordinated by Institutional Archives. In

the absence of these professionals, the institution should request the collaboration and partnership of other institutions that are staffed by qualified professionals who are experienced in this task that is neither trivial nor easy. It should therefore be the result of an internal reflection and a professional maturation by all the involved. Some actions may be performed in order to assist in the process, such as:

a) Identify all the records produced independent of support or physical means with which the record has been produced.
b) Elaborate a list of these records.
c) Establish custody terms for each record, defining how long they will stay at the laboratories and the deadline for their forwarding to the definitive filing space of records at the institution.
d) Transfer to Institutional Archives the list of records along with the custody terms.

12.3 Facilitate access to records produced by laboratories.

Access to records is fundamental; without it, all other actions are meaningless. Access does not only mean the act of being able to see the record, but also to know where it is located and manage to get to it. Some actions may be undertaken:

- Create a list or schedule with the following information: description of record, project/activity to which it refers, responsible sector, responsible researcher, custody location and information deemed relevant to identification of the record (see ANNEX 2).
- Keep the list in a safe location that is easily accessible.
- Communicate to team members the existence and the location of the subject list.

These measures that researchers may take regarding production of records seem very simple and basic, even obvious, but they are not. Identification is not always performed in the act of production since researchers still remember the information during the current phase; the biggest risk is when records cease to be of current use and research nears its conclusion, that is, close to the permanent phase. After the conclusion and at the onset of a new research, researchers will not remember

anymore what has not been recorded. Records identification must occur precisely during the current phase.

13. Appraisal of records for conservation

Appraisal of records and other registers that must be preserved is a matter of study and internal discussion at the institution. However, some contributions may be made for analysis:

13.1 Perform a mapping of records produced by laboratories, of course, with the participation of their researchers, engineers, technical staff, team and responsible with a view to knowing and assigning values to records.

The assignment of value must be assessed by taking into account some points:

a) Not only reports and articles ï final products of research ï are important and must be preserved, since they are not sufficient for the broad understanding of the functioning and structure of laboratories. Also important are records that contain information about laboratory infrastructure and teams, their actions and performance, as well as records about the history, changes and restructuring they may have undergone, their priorities and lines of research.

b) Correspondence of research or scientific and technological activities which bring some relevant result, such as a change of course or procedure or a decision made, must be preserved.

c) Raw data or drafts must be preserved if they have the following characteristics: readability, authenticity, rareness, assignment of provenance or origin, custody or storage capacity (infrastructure, costs, physical space and maintenance), possibility of re-use and evidence value.

13.2 Establish appraisal criteria that assist the institution in the identification of significant research and development (R&D) records for their long-term preservation as well as for their more prominent researchers.

The institution must foresee criteria to identify and appraise projects that are more relevant to the institution and classify them as, for example, ñsignificantò, ñimportantò or other name that the institution or laboratory prefers. All the experiments or projects identified as ñsignificantò must have their records permanently preserved at Institutional Archives. Appraisal must consider that:

a) Researchers may contribute towards guidelines for the identification of projects to be considered as significant and alert archivists and responsible for research. They are the fundamental responsible for the preservation of records.
b) Academic coordinations or science and technology laboratories must establish an *ad hoc* history committee for the identification of significant projects and research in their own area of performance, thus bringing information to the responsible and the archivist.
c) The institution must foresee a custody location in order to ensure the preservation of significant projects. Records must be kept in specific furniture and locations during the research, before even being transferred to Institutional Archives.

14 ï Implementation of a Record Management Program

A management program that encompasses all the records produced by the institution is fundamental to control and access, besides organizing records and ensuring their preservation. The following is necessary for its implementation:

14.1 Recognize the needs and benefits of the institution adequately supporting the implementation of a Record Management Program.

The first step is the institution understanding the functioning and advantages of a Record Management Program. Benefits brought are the best way to convince

managers over the importance and implementation of a broad program that will carry implications for all sectors of the institution. Some of the advantages of the implementation of a Management Program are:

- Appraisal of records performed with criteria
- Agility and optimization of activities
- Resources savings
- Unnecessary disposal of records and space gain
- Custody physical space savings
- Professionalization of procedures
- Quick and easy retrieval of records
- Increase of institutional efficiency and positive visibility.

14.2 Study, plan and implement a Record Management Program that covers the administrative and core areas of the institution.

This program must encompass and regulate all measures and suggestions that have already been pointed out in this report. A management program produces normatives and action and monitoring tools, such as:

a) Record Classification Schedule ï it assigns a numerical classification to the activities with the objective of control and filing. Records receive the number corresponding to the activities that produced them when it is created. This classification may be used with SIGTEC[5], since this system also requires a record classification.
b) Retention Schedule ï list of the activities of the institution and its correlate records produced, indicating custody time period in the sectors and final destination, disposal or transfer to Institutional Archives for long term preservation.

5 Results monitoring system implemented by the Brazilian Ministry of Science and Technology and its institutes, with the objective of improving the performance of the institution and increase the probability of achieving good quality results with minimum of re-working. SIGTEC was conceived as a way of integrating and organizing the flow of information resulting from the operation of the Institution Technological System. A Technological System is a set of units of competency, infrastructure and personnel involved in the operation of the institution.

c) Procedures manual ï list of actions, rules, routines, models and forms adopted for the control and management of records aiming at the appraisal or disposal.

14.3 Establish that a Record Management Program must have as a statute that records produced by laboratories are testimony to scientific and technological action of the institution.

The acknowledgement that records produced in the context of the institution are institutional is a fundamental starting point for the elaboration of a Record Management Program. In principle, records produced by the laboratories are the result of infrastructure maintained by the institution for the performance of research and activities in general. The researcher would not be able to carry out his work within the institutional lines and guidelines without the conditions provided by the institution. The scientific and technological action of the institution will be evidenced through the records produced, thus reconstructing an entire trajectory of activities.

A Record Management Program foresees a survey about the record production of the entire institution ï support and core areas ï aiming at the elaboration of a Classification Schedule and a Retention Schedule that will guide and control records production. Therefore, the Schedule will have to encompass both institutional records and those that will be considered personal by indicating their final destination: long term preservation at Institutional Archives or disposal. Records that are deemed personal will have to appear as õdisposalò, which means õnon-entryò at Institutional Archives, with an observation stating that they may be handed over to the responsible for their production.

14.4 Establish a team responsible for the preservation, with professionals who advocate record management and recognize its current, intermediate and long-term preservation phases.

It is fundamental to set up a specific team for this task with professionals that are qualified for its execution. The archivist would be the indicated professional for such a task. Should there not be one, then the designated professional must be trained to

manage this program. The institution must endeavour to hire archivists via public tender. Should this not be possible, it should establish partnerships with institutions that can play an advisory role in the organization of records and in the elaboration of projects for the implementation of an institutional management program. Moreover, it is fundamental to provide the training and qualification of employees who may assume this responsibility through courses, technical visits or internships at other institutions. This professional will train other employees in management and assign responsibilities.

14.5 Invest in activities that raise internal awareness at the institution in order to emphasize the importance and the benefits of record management and the criteria to save science and technology records (also see item 11.3).

ñRaising awarenessò is the key sentence to try and preserve records produced by science and technology. Many initiatives may be taken to that effect, such as lectures about the history of science with researchers, establishment of programs with resources directed to the preservation of institutional memory, of the knowledge area and of the more relevant laboratories and research. Moreover, the elaboration of primers with basic information about ñwhat to preserve, how to preserve and why preserveò, may work well to arouse interest and motivate action.

14.6 Plan the Record Management Program in accordance with practices and routine of its laboratories and research centres individually.

The way laboratories and research carried out perform must be considered in the management program so that it reflects their structure, activities, procedures and ways of performance. The same applies to research centres, both those that are internal to the institution and that operate interinstitutionally.

14.7 Identify and appraise researchersô records for long-term preervation.

Record Management Program must consider records produced by researchers during research performed at the institution and in the context of other activities related to other works and personal life. These records are of interest to the institution. Thus, the institution must apparaise that researchers, research and records are of great relevance to long-term preservation as property at Institutional Archives.

15 ï Scientific and technological research

Much of the records produced by research are essential to the history of the institution and the areas of knowledge involved. Selecting which ones to preserve is a difficult task that must be carefully done. Some suggestions may be analyzed among the criteria to be considered.

15.1 Permanently preserve proposals, starting projects and other records regarding the main research facility and its centres and/or laboratories or other facility that is relevant to research, as well as significant records with respect to their maintenance.

Records regarding research facilities, such as accelerators, plants, telescopes, reactors, etc. are fundamental to the comprehension of research progress or failure, as well as ï obviously ï to the history of science. Many records register the main stages of processes and activities, thus allowing their tracking and the understanding of results. Records on the maintenance of certain instrument and equipment may be fundamental to the good performance and reliability of research, besides eventually attesting to manufacturing problems and/or misuse. Inadequate products that are used in maintenance may interfere with data results and reliability. The institution must analyze very thoroughly tools and equipment maintenance records and select carefully those that will be preerved at Institutional Archives.

15.2 Preserve records that register laboratory facilities.

Records that register the facilities and infrastructure for research, such as implementation projects, plants, drawings, drafts, budgets, among others, must be preserved at Institutional Archives. The institution must establish criteria for the preservation of these records:

a) By preserving records related to the establishment of laboratories, disciplines and performance areas at the institution, as well as those that register research priorities.
b) By preserving records about successful, unsuccessful or controversial research. Stories of failure are also significant to the comprehension of the institution and even public policies for institutions and scientific and technological research areas.

15.3 On elaborating research projects, foresee a budget for the organization of records that are produced during the whole process.

Budget must foresee material resources, such as specific furniture and equipment, as well as preservation-oriented consumables and the hiring of specialized staff for the handling of archives, whenever possible. Such an conduta will facilitate the preservation of records, relieving the researcher of this task and delegating it to a qualified professional at no cost to the institution.

15.4 Preserve records that are related to projects accountability, especially those with extra-budgetary resources.

Records of public notice research, contracts and partnerships must be preserved, namely, budgets, financial records, equipment purchase receipts, acquired and/or

elaborated manuals, among others. The institution must be able to keep organized all projects from all the years.

15.5 On the elaboration of research projects, appoint a team member who will be responsible for the organization and preservation of records generated by the research.

Delegate a laboratory team representative and train him to sort and file research records that may either be administrative or technical. This would be a very important gain for the institution. The delegated representative will be responsible for the forwarding of records to Institutional Archives once the project is concluded, so as to keep a historical record of the research.

15.6 Consolidate records custody procedures across the institution with a view to adopting a single conduct for all the laboratories, thus facilitating the appraisal and transfer of long term preservation records to Institutional Archives.

Standardized procedures facilitate the identification and knowledge of the universe to be handled, thus enabling a greater administrative control over the laboratories. The definition of records that will be held under long-term preservation is crucial to the preservation and will make transfer to Institutional Archives easier. The great advantage for researchers is that records are organized, accessible and available for consultation whenever requested. The researcher will not need to deal with the preservation of records after the conclusion of research since this task will be delegated to Institutional Archives and the responsible archivist.

15.7 Select and preserve in a long-term basis at Institutional Archives records of scientists, researchers, technical and engineers staff.

The selection of these records must consider the importance of research, researcher and area of knowledge, as well as the participation of the team and leaderships.

Records regarding authorships and the role played by team in all the stages strengthen professional recognition and the relationship of researchers with the institution, besides being fundamental to researchers and the institution. The transfer of these records legitimizes the importance the institution gives to its researchers, thus professionalizing procedures and relationships.

15.8 Ensure the long-term preservation of records of the responsible for the research, when these are not regular staff but admitted under contract, regarding contacts established in the context of research (correspondence, contract forms, reports and minutes of meetings).

Research whose leaders don't belong to the regular staff of the institution must also be preserved. The institution must consider that it is responsible for all research performed which uses its physical and administrative infrastructure. Thus, research is considered as institutional activity and, therefore, of interest to preservation. Consequently, records produced under the leadership of temporary researchers must be included in the institutional interests.

15.9 Provide the joint work of archivists and researchers with the objective of mutual understanding of both tasks, thus enabling a broad notion of the research and development (R&D) activity.

The intention is to have researchers understand the archivist's work and stop considering him an intruder at the laboratory. The role of the archivist is to assume the onus of preserving records that are considered fundamental and relevant to scientific research, thus relieving the scientist of this concern. After all, the task of researchers is to produce knowledge in the scientific and technological area, whereas that of the archivist is to ensure its preservation and access. Therefore, a dialogue and a mutual understanding are necessary to complement activities. The good relationship between researchers and archivists will bring about good results to institutional memory.

16 ï Information technology

16.1 Implement an institutional policy in the area of information technology, including guidelines for the proper use of computer equipment, network resources, applications, intranet systems and electronic mail.

In general, science and technology institutions are already equipped with a good data processing infrastructure. The Information Technology team must be responsible for the custody of information and the periodicity of elaborating safety backup copies of information that is necessary to each research or activity. Moreover, it is important to train researchers in the use of available data processing tools in order to facilitate, expedite and ensure the best possible utilization aiming at preserving data and information.

16.2 Establish a schedule and a system for the performance of backup copies of electronic records, besides an infrastructure for the preservation of these records.

The Information Technology sector must be responsible for the safety backup copies and perform a survey about record and raw data custody needs for each laboratory. It should, along with researchers, analyze and establish copies and procedures routines for storage purposes. Researchers must be trained in the use of *softwares* and other necessary tools in order to better preserve information about research and projects.

16.3 Study the implementation of an Electronic Record Management system.

This system will make possible that records created and kept in an electronic format be subject to a careful appraisal that includes identification, description, destination and their preservation. Furthermore, laboratories that essentially produce electronic data must think about the development of a digital record preservation policy, which contains rules, standards, models, environments, teams, responsibilities and

procedures for each area. All the laboratory team must be involved with the policy and must know how to follow it.

17 ï Personal and Institutional Archives

Boundaries between records that should be considered institutional and those that may be personal to researchers must be described as the result of internal reflection and analysis, not just by laboratory teams but the whole institution. Some guidelines are indicated in order to facilitate and direct activities accordingly.

17.1 Assume the institutionality of records and define those that will be considered property of the institution.

Records classified as institutional will have to be considered as property of the institution and, as such, receive a treatment that is given to a patrimony to be preserved. The institution will have to create custody and storage conditions, as well as budgetary resources for the necessary infrastructure, namely, appropriate physical space, adequate furniture, climatization, trained and qualified technical team.

17.2 Perform the work of raising laboratoryôs awareness with a view to encouraging researchers to establish criteria to be used for the evaluation of records that will be considered personal and institutional.

The realization of lectures and training courses will assist in raising researchersô awareness. Institutional partnerships for the performance of lectures and workshops will also be helpful. Moreover, visits to laboratories by archivists and conservators for their interaction with researchers will help breaking down barriers and establishing the onset of dialogue among professionals, which may end up giving good results for both sides. The presentation of Retention Schedules that are elaborated by institution in the area of science and technology could serve as an example for researchers

who will have the opportunity to visualize the archivistôs work and understand its purposes. Schedules highlight the choices made by institutions regarding their records property.

18 ï Technical archives

The creation of Technical Archives is an option of some institutions for the preservation of records originating from scientific and technological research. In general, the institutions that has Technical Archives means that do not have Institutional Archives who should keep records for long-term preservation. The institutional choice of creating Technical Archives must be made under the guidance of Institutional Archives who will work in a partnership in the custody, maintenance, use and access guidelines.

18.1 Consider Technical Archives as the ones that keep records of the current and intermediate stages of research. Forward records to Institutional Archives at the end of their cycle of use.

Institutional Archives should monitor all Technical Archives since the latter will hold records that will subsequently be transferred upon reaching the phase of long-term preservation. Such monitoring will enable the handling of records in their current and intermediate phases and keep them prepared for transfer to Institutional Archives, thus facilitating the work of both. Moreover, it will allow records that are produced by research to remain as long as necessary with laboratories and researchers and without harming scientific and/or technological research.

Conclusions

The preservation of scientific memory is a recurring subject that lacks many studies on its potential. The present recommendations, although being the result of an exploratory study, provide sufficient subsidies for reflection and elements that might contribute towards the preservation of Brazilian scientific memory. The research project accomplished by MAST provided a broad knowledge about issues that involve the preservation of records produced by scientific laboratories. The team experience on this issue was based on the practice of organizing the personal records of scientists, especially with regard to records handed over to History of Science Archives by researchers, such as their personal papers.

Knowledge acquired and which resulted in the present guide must be made available to other professionals who are interested in the preservation of scientific and technological memory. This study is not intended to be exhaustive since it was carried out based on a defined universe. However, it can serve as reference for other works. It can also contribute towards raising researchersôand archivistsôawareness about the importance of the custody of records many times neglected by the researchers themselves and even by archivists and documentalists.

The research that originated this guide enabled the onset of reflection about the subject among researchers, however, without any leaderships or concrete examples to be followed as yet. Notwithstanding, one can see that the path is open and the ground is fertile for heated discussions and debates. Although receptive to reflection about subject of records preservation, researchers also proved to be orphans of information and expert advice on the subject in the context of many laboratories. The need to have an archivist at the laboratory that can orientate researchers emerged during interviews. Some mentioned MASTôs work with other scientific institutions dedicated to the preservation of their historical collections, both archival and museological, as a valid initiative.

This document suggest that the preservation should be studied and promoted by the Brazilian Ministry of Science and Technology - MCT who would act jointly with the supporting agencies in order to include research records handling costs in their

public tender notices as ñallowed costsò. Moreover, MCT could resume the study aiming at the implementation of the ñNational Science and Technology Memory Policy: report of the special commission established by Administrative Rule 116/2003 of the CNPq[6] president, on July 4, 2003ò. Following the acknowledgement of its responsibility regarding the preservation of collections produced by Schi-Tech, MCT must take the initiative of implementing preservation policies and guidelines.

To this end, MAST has implemented a *Lato Sensu* post-graduation Course in the Preservation of Science and Technology Collection with the objective of training professionals in preservation with practical and theoretical classes. This initiative meets MASTôs institutional objectives and comes with commitments assumed with the MCT aiming at disseminating the importance of elaborating preservation programs.

A preservation program cannot act on past losses but can create mechanisms that avoid future losses. It must be elaborated by combining institutional interests with that of researchers. It should start from a diagnosis of the situation, with a characterization of institutions and their functioning, thus showing the complexity of issue it encompasses.

Finally, it is hoped that this guide presents information that may be useful to laboratories in various scientific and technological areas.

[6] Conselho Nacional de Desenvolvimento Científico e Tecnológico (National Council of Scientific and Technological Development).

Glossary

Current records ï set of records that are being used and processed and meet the objectives for which they were created. They are conserved in the institutional sectors that created them.

Institutional archive ï Place of institutional records of long-term preservation. It is equivalent to permanent archives, whose main task is to collect, preserve and enable access to records produced by the institutional activities and which must be kept for their fiscal, legal, evidence, historical, cultural or educational value.

Technical archives ï Place of custody of technical records produced by the core activities of the institution, such as illustrations, blueprints, photographs, graphics etc.

Authenticity ï This is a feature of the archival records. A record is authentic when it is created and maintained in accordance with the rules and regulations of the producer. They are authentic in relation to their creator; archive records are created and maintained in accordance with rules and regulations of the producer, keeping in mind the need to work through them, so that the procedures of creation can be proven.

Intermediate records ï Refers to records produced in the intermediate steps and activities of a research that record the step-by-step process before the production of the final or partial results.

Records ï Records that are produced and/or received by a public or private person or entity in the exercise of their activities and constitute evidence or information.

Diplomatic document ï It is the configuration of a record which is established according to the arrangement and nature of information contained in it, e.g. memorandum, letter, process, report, guide, request.

Scientific instrument ï Term used to indicate all and any object, be it instrument, equipment, apparatus, tool, etc., that is produced through scientific and technological activities.

Integrity ï One of the features of archival records, according to which a record must be preserved without dispersion, mutilation, alienation, non-authorized destruction or undue addition.

Organic relationship between records (Arrangement) ï One of the characteristics of archival record. It refers to the organic relationship that records keep among themselves and where a complete understanding is only achieved through the analysis of the whole. An archival record acquires significance only when it is related to the environment that produced it, thus leading to the idea of origin.

R&D ï Research and Development. It refers to research itself and its dynamic improvement process that implies a change, an evolution, growth and progress and its elaboration.

Researcher ï Term adopted to indicate not only the researchers classified as such, independent of academic or technical educational background, but also to replace terms like "scientist," "engineers," "technical staff" or otherwise.

Preservation ï Term that encompasses all actions that make possible the guarantee of integrity of information and meanings of a record through its management and protection. It includes organization, physical conservation and access.

Record Management Program ï Program that includes a set of procedures and technical operations related to its production, processing, use, appraisal and archiving in the current and intermediary phase aiming at its disposal or collection for long-term preservation.

Provenance ï Institution or person that is legitimately responsible for the production, accumulation or custody of records. The identification of provenance attests to the authenticity of a record.

Records Classification Table ï Scheme through which the record classification of a record is processed into classes.

Simplified Script ï A synthesized translation of the equipment and working instrument manuals containing the main commands in order to simplify the handling and preservation of the original copy. They are usually kept next to their respective equipment/instruments.

Software ï Computer program.

Records Retention Schedule ï Archival tool for the records appraisal, approved by the competent authority that establishes deadlines for the transfer, collection, disposal and reproduction of records.

Record Typology ï The configuration acquired by diplomatic document according to the activity that generated it, e.g. progress report, trip report, analysis bulletin and collection form.

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Annex

Annex 1

RECORD MAPPING CARD MODEL

Routine Activities	Produced record	Is it preserved?	Where?	For how long?	How is the access?

Annex 2

PROJECT AND RESEARCH IDENTIFICATION SHEET MODEL

PROJECT/RESEARCH GENERAL INFORMATION	
Name of project/research	
Name of responsible	
Name of laboratory/sector	
Financial backing	
Start and end date	
RESEARCH DATA	
Data type	**Raw ( ) observed ( ) analyzed ( ) experimental ( ) numerical ( ) descriptive ( ) field ( ) bibliographic ( )**
Equipment	
Method	
Physical Form	
Quantity	
Data arrangement	
Custody deadlines suggested	
Team	
Observation	

Annex 3

Presidency of the Republic
Civil House
Legal Affairs Subcommittee

LAW Nº 8.159 DATED JANUARY 8, 1991

Regulation

Provides for the national public and private archives policy and makes other provisions.

Decree nº 2.942, dated 18.01.99, Regulates Arts. 7, 11 and 16 (revoked)
Decree nº 4.553, dated 27.12.02

THE PRESIDENT OF THE REPUBLIC, I inform that National Congress decrees and I sanction the following law:

CHAPTER I

General Provisions

Art. 1. The record management and the special protection of archival records, as a supporting tool for administration, culture and scientific development and as elements of evidence and information is the duty of the Public Authority.

Art. 2. For the purposes of this law, records are considered as the set of records produced and received by public bodies, public institutions and private entities, resulting from the exercise of specific activities, as well as from physical person, regardless of information support or nature of records.

Art. 3. Record management is considered as the set of procedures and technical operations for their production, processing, use, appraisal and filing in the current and intermediate phases, aiming at their disposal or transfer for permanent custody.

Art. 4. All are entitled to receive from public bodies information of their particular interest or collective or general interest that is contained in records and which shall be provided according to the terms of the law, subject to liability, excepting that whose secrecy is vital to the security of society and the State, as well as to the sanctity of intimacy, privacy, honour and peopleôs image.

Art. 5. Public Administration will open consultation to public records in the form of this law.

Art. 6. The right to compensation for material or moral damage resulting from the breach of confidentiality is safeguarded without prejudice to criminal, civil and administrative lawsuits.

CHAPTER II

About Public Records

Art. 7. Public records are holdings of records produced and received by public bodies at federal, state, Federal District and municipal levels in the course of their administrative activities as a result of their administrative, legislative and Judiciary duties.

§ 1. Sets of records produced and received by institutions of public character, by private entities entrusted with the management of public services in the pursuit of their activities are also public.

§ 2. The cessation of activities of public institutions and institutions of public character implies the transfer of their records to the public archival institution or its transfer to the successor institution.

Art. 8. Public records are identified as current, intermediate and permanent.

§ 1. Current records are those that are ongoing or, even lacking a certain movement, are being consulted frequently.

§ 2. Intermediate records are those that, while not being of current use at the producing bodies, due to administrative interest reasons await their disposal or transfer to permanent custody.

§ 3. Permanent records are the collection of records with historical, probative and informative value that must be permanently preserved.

Art. 9. The disposal of records produced by public institutions and institutions of public character will be performed through the authorization of the public archival institution in its own sphere of competence.

Art. 10. Records with permanent value are inalienable and imprescriptible.

CHAPTER III

About Private Records

Art. 11. Private records are the set of records produced or received by persons or entities in the pursuit of their activities.

Art. 12. Private records may be identified by Public Power as being of public and social interest, provided they are considered as a collection of sources that are relevant to history and national scientific development.

Art. 13. Private records identified as being of public and social interest cannot be alienated with the dispersion or loss of the record unit or transferred abroad.

Sole paragraph. On alienation of these records, Public Power will exercise choice in the acquisition.

Art. 14. Access to private records identified as being of public and social interest will be opened through the authorization of its owner or holder.

Art. 15. Private records identified as being of public and social interest may be deposited under revocable terms or donated to public archivistic institutions.

Art. 16. Civil registration records of religious entities produced prior to the enactment of the Civil Code are identified as of public and social interest.

CHAPTER IV

About the Organization and Management of Public Archival Institutions

Art. 17. Public or public character record management is the responsibility of federal, state, Federal District and municipal archival institutions.

§ 1. National Archives of the Executive Power, records of the Legislative Power and the Judiciary Power are Federal Records. Records of the Ministry of Marine, the Ministry of Foreign Affairs, the Ministry of Army and the Ministry of Aeronautics are Executive Power Records.

§ 2. Records of the Executive Power, the Legislative Power and the Judiciary Power are State Records.

§ 3. Records of the Executive Power, the Legislative Power and the Judiciary Power are Federal District Records.

§ 4. Records of the Executive Power and the Legislative Power are Municipal Records.

§ 5. Public records of the Territories are organized according to their political-legal structure.

Art. 18. National Archives are responsible for the holdings produced and received by the Federal Executive Power, as well as for the preservation and provision of access to records under their custody and monitoring and implementing the national archives policy.

Sole Paragraph. National Archives may create regional units for the full exercise of their duties.

Art. 19. Federal Legislative Power Archives are responsible for the management and collection of records produced and received by the Federal Legislative Power in

the exercise of its duties, as well as for the preservation and provision of access to records under their custody.

Art. 20. Federal Judiciary Power Archives are responsible for the management and collection of records produced and received by the Federal Judiciary Power in the exercise of its duties, handled in court and originating from registries and secretariats, as well as for the preservation and provision of access to records under their custody.

Art. 21. The state, Federal District and municipal legislation will define the criteria of organization and links of state and municipal records, as well as the management and access to records, with observance of the provisions of the Federal Constitution and this law.

CHAPTER V

About Access to and Secrecy of Public Records

Art. 22. The right of full access to public records is guaranteed.

Art. 23. A decree will determine the categories of secrecy that will have to be observed by public bodies in the classification of records they produce.

§ 1. Records whose dissemination will put society and the State at risk, as well as those required for safeguarding the sanctity of intimacy, privacy, honour and peopleôs image are originally classified.

§ 2. Access to classified records regarding the safety of society and the State will be restricted for a maximum period of 30 (thirty) years as from its production date, and this term may be extended only once and for the same period.

§ 3. Access to classified records regarding honour and peopleôs image will be restricted for a maximum period of 100 (one hundred) years as from its production date.

Art. 24. In any case, the Judiciary Power may determine the restricted view of any classified record provided that it is indispensable to defend oneôs own right or to clarify the personal circumstances of a party.

Sole Paragraph. No administrative organizational rule shall be interpreted so as to restrict in any way the provisions of this article.

Final Provisions

Art. 25. Those that disfigure or destroy records of permanent value or considered to be of public and social interest shall be subject to criminal, civil and administrative accountability, in the form of legislation.

Art. 26. The National Archives Council (Conarq) is hereby created and linked to National Archives. It will define the national archives policy as a central body to the National Archives System (Sinar).

§ 1. The National Archives Council will be presided by the Director-General of National Archives and composed of representatives from archival, academic, public and private institutions.

§ 2. The structure and functioning of the council created in this article will be established by regulation.

Art. 27. This Law goes into effect on the date of its publication.

Art. 28. Contrary provisions are hereby revoked.

Brasília, January 8th, 1991; 170th year of Independence and 103rd year of the Republic.

FERNANDO COLLOR
Jarbas Passarinho

This text does not substitute the text published in the Federal Official Gazette of 09.01.1991.