APPLIED SCIENCE LABORATORY FOR ARCHAEOLOGY AND FINE ARTS (ASLAFA)

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MISSION

(i) To provide scientific support services in the form of materials identification, dating and sourcing for Southeast Asian institutions and individuals specializing in archaeology, museology, art history and allied disciplines.

(ii) To conduct research in the field of conservation of cultural heritage.

(iii) To train persons from SPAFA member countries as well as other developing countries in Southeast Asia, such as Cambodia, Laos and Vietnam, etc, in application of science to archaeology, fine arts and conservation.

JUSTIFICATION

Modern studies of ancient culture and traditional art are increasingly dependent on scientific data of the kind that can only be obtained through technical laboratory work. In Southeast Asia, the need for scientific laboratory data is experienced by specialists in all of the fields covered by

SPAFA: by archaeologists and art historians seeking dates and sources for excavated objects, by economic historians and material scientists seeking data on ancient technological processes; by museum conservators seeking to identify early and traditional material in order to preserve and restore museum objects; by ethnomusicologists and artists seeking to understand the performance characteristics of materials and media; and by engineers, architects and others involved in the restoration of historical monuments.

The cultural heritage of Southeast Asia is very rich, with a large number of monuments, wall paintings, art objects, archaeological and ethnographical artifacts, etc. The construction materials of these objects are very much different from those available in other regions of the world. Climate, so very significant in the process of deterioration and consequently in conservation, is hot and humid. There are therefore many problems of conservation to which solutions are not known. ASLAFA would conduct research to find out new techniques of conservation of various types of materials.

The need for laboratory services of these kinds is therefore widely felt. At present, the need is largely unfulfilled. Museums and universities in all SPAFA member countries have attempted to develop some laboratory capacities in the fields of archaeology and fine arts. The laboratories in question, however, are limited in scope and capability. Those in museums are focused largely on the specific needs of conservation; they lack the funds and equipment and expertise to conduct more basic research. Archaeology laboratories in universities are more research oriented but tend to be lacking in space, equipment, and qualified laboratory technicians. Although university-based archaeologists and art historians do sometimes persuade specialists in medical and engineering faculties to perform scientific analyses for them, this is an unsatisfactory solution in the long run. Laboratories in other faculties have their own work to do and cannot give much time or attention to supporting humanistic research.

Thus, most Southeast Asian specialists in archaeology and fine arts-related fields have little or no access to laboratory services. The proposed scientific and research laboratory of SPAFA will provide those services and will function as

an independent neutral laboratory for SPAFA members.

The main functions of the Laboratory will be :

i. Technological studies of materials.

ii. Research in conservation techniques.

iii. Training in application of science to conservation, archaeology and fine arts. All countries including SPAFA members and others like Laos, Vietnam, etc. can benefit.

EQUIPMENT AND STAFFING

SPAFA has enough laboratory space along with such basic facilities as water, electrical and gas connections, cabinets, counters, exhaust fans, fume hoods, etc. It will also provide the salaries for a Laboratory Director, two research scientists and two assistants. The Laboratory Director and research scientists will have a MS or higher degree in a relevant scientific discipline, experience in laboratory analytic techniques, and a demonstrated interest in archaeology and fine arts subjects. The assistants will be at the BS level and will also have scientific backgrounds.

ASLAFA expects to be able to carry out research and training in the areas of art, archaeology and conservation. Eventually it will have equipment and facilities of the following kinds:

i. Thin-section (petrographic) analysis of ceramic and stone artifacts.

ii. Metallographic analysis of artifacts made from bronze, iron, silver, gold and other metals.

iii. X-ray diffraction (XRD) analysis of minerals in stone used for monuments, statues, etc.

iv. X-ray fluorescence (XRF) analysis of ceramics, metals, glasses, etc. A non-destructive technique for studying surface compositions.

v. Atomic absorption (AA) analysis of ceramics, metals, glasses, etc. A minimal destructive technique which is complementary to XRF, for studying overall compositions.

vi. Thermoluminescence (TL) analysis. For dating ceramics and baked clay cores of metal statues, etc.

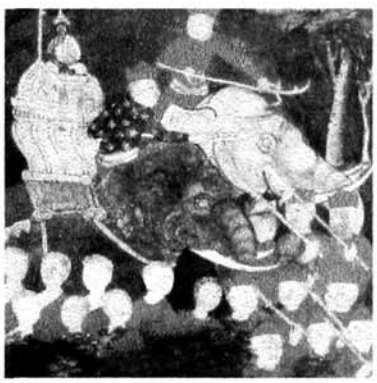
vii. Radiocarbon (C-14) analysis. For dating organic materials.

viii. Conventional microscopic analysis for identification of pigments in paintings, fibres, etc.

ix. Energy-dispersive x-ray (EDAX) or other electron microprobe analysis of metals, ceramics, etc. for studying variations in surface composition.

x. Biodeterioration studies

At present, it seems most practical to perform petrographic, metallographic, atomic absorption and conventional microscopic analyses in-house and to farm out the other types of analyses to cooperating specialists in other institutions. C-14 dating, one of the most urgently needed services, can be provided by the Office of Atomic Energy for Peace (OAEP) in Bangkok, but that institution will require a substantial upgrade in equipment. EDAX and similar analytic systems must be performed in conjunction with a scanning electron microscope (SEM). While it may eventually prove necessary to purchase SEM equipment for ASLAFA, several institutions in Bangkok have such equipment and can make it available for limited use. Studies will be undertaken to improve the presently known conservation techniques for metals, stone, paper objects, textiles, etc. Biodeterioration studies will also be taken up.



Initial special equipment needed will therefore include several types of microscopes (metallurgical, petrological, low-and-high powered transmitted light); modern atomic absorption spectrophotometric equipment; metallographic and petrographic thin-section preparation apparatus; a comprehensive micro- and macro-photographic setup; several microcomputers; and such other equipment as is needed in the judgement of the steering committee and the director of ASLAFA.

For the laboratory to succeed, it is essential that it receives close and frequent cooperation from scientists at other institutions within Thailand and in other countries. Thus, funds will be regularly budgeted to pay annual consultants' fees to selected cooperating scientists. Further, ASLAFA will in some cases take responsibility for finding money to provide special equipment for the laboratory of cooperating scientists. ASLAFA will also make sure that cooperating scientists receive ample credit for their work by placing their names on publications and publicizing the contributions of their institutions.

PROJECTS

The Laboratory will address ifself to conduct research to find solutions to problems found in SPAFA member countries. The strategy is to establish at least one Scientific

Research Laboratory for Southeast Asia. Examples of some projects that ASLAFA would undertake for research and training are:

i. Analysis of ancient metal objects for understanding their fabrication techniques.

ii. Studies on Biodeterioration of cultural property.

iii. Effect of environment on cultural heritage.

iv. Improvement of techniques of conservation of paintings.

v. Analysis of ceramics—chemically and petrologically.

It will be ensured that the activity conducted by the proposed laboratory will benefit the whole region of Southeast Asia. The research will be of an applied nature and not fundamental. Fundamental research should be the responsibility of the universities or other scientific institutions. ASLAFA will try to induce these universities and scientific departments to take up fundamental research which might be related to the probllems of archaeology and fine arts. The laboratory itself will act as a modal agency.

Further, each country laboratory will participate in the process of research by undertaking a part of the project. ASLAFA will act as the institution for this purpose also. The equipment which will be available at the Laboratory will be at the disposal of all countries in Southeast Asia. Thus the laboratory will play the role of a catalyst in the region.

REQUIREMENT

The basic requirements for any laboratory are:

i. Staff

ii. Space

iii. Equipment and chemicals

iv. Technical library

STAFF

ASLAFA will aim to have a Laboratory Director, two research scientists and two assistants. In the beginning one research scientist and one asisstant will be appointed. As the work progresses, other staff will be taken.

CONSULTANTS.

In view of the advanced nature of the work, it is necessary for the initial formative years that a high level international expert who should be experiened in setting up conservation research laboratories and who should have intimate knowledge of the problems of the countries of

Southeast Asia be availalble for short periods. This consultant will be invited two times for one week each during the period 1992 to 1995. Job requirements of the Senior Consultant will be:

i. Identification of research training projects
ii. Formulation of detailed research training projects
iii. Standardization of equipment
iv. Guide research training
v. Training of scientists.
vi. Set up the research laboratory.

There are certain jobs for which the experts from abroad may have to be invited. These will be according to the needs of particular projects which are taken up from time to time.

SPACE

The Laboratory space is already foreseen in the new SPAFA building, which would be functional from 1992. Now the need will be to have specially designed furniture for the laboratory. An amount of $3,000 in the first year and $2,000 per annum thereafter can be considered.

EQUIPMENT AND CHEMICALS

Equipment will be of two types—one which can be called the 'core equipment' and the other 'project-based equipment.' Core equipment is that without which a laboratory cannot function, like the glassware, chemicals and small tools. A provision of a budget for the first year may be for $5,000 and for the coming years about $3,000 per annum. A list be drawn once the Laboratory gets going.

Project-based equipment is that which is required for a particular project, for example archaeometallurgical studies or research in conservation of wall paintings. The equipment may be more advanced. Some foundations may have to sponsor such projects. Scientists and consultants required may also be included in the budgets of those projects.

LIBRARY

The Library of SPAFA will also have books on conservation and application of science to archaeology and fine arts. Such books will be gradually purchased through projects and donations. An amount of $1,000 per annum may be assigned for journals.