

REPORT OF COMMISSION VI—TRAINING (EDUCATION), TERMINOLOGY AND BIBLIOGRAPHY

TO THE

SIXTH INTERNATIONAL PHOTOGRAMMETRY
CONGRESS AND EXHIBITION

TO BE HELD AT

THE HAGUE, NETHERLANDS, 1-10 SEPTEMBER, 1948

FOREWORD

THE subject matter, for which Commission VI is responsible in this report includes, as indicated in the Commission title, Training (Education), Terminology, and Bibliography. To these main subdivisions, the Commission has added the consideration of Standardization, with particular reference to Training, and Terminology. A further addition to the scope of the Commission's report was made by including a study of the desirability of establishing a Historical Record of photogrammetric accomplishments and events.

In conformity with the established procedures of former International Photogrammetric Congresses, George H. Harding, the President of Commission VI, prepared a questionnaire which was mailed in July 1947 to the reporters of the established national photogrammetric organizations throughout the world, who might be interested and in a position to participate.

For use in writing this report, replies have been received from the following:

1. Société française de Photographie, Section LAUSSEDET, Photogrammetrie, France.
2. Société tchecoslovaque de Photogrammetrie, Czechoslovakia.
3. Schweig. Gesellschaft für Photogrammetrie, Switzerland.
4. Finnish Society of Photogrammetry, Finland.
5. Mr. J. M. H. Heines, Rapporteur Commission VI, Holland.
6. Dr. Arnid Odencrants, Reporter Commission VI, Sweden.
7. Norsk fotogrammetrisk Selskap, Norway.
8. American Society of Photogrammetry, compiled by G. C. Tewinkel, Secretary Commission VI.

It is regrettable that many of the countries and national societies who have been, and are, interested in and concerned with the development of photogrammetry, were unable to make available a reply to the Commission's questionnaire prior to the writing of this report. It is hoped that many additional replies will be received in time for the International Congress Meeting in September.

Commission VI plans to prepare a detailed report giving the comments and suggestions of all the national reporters. This report will be completed in advance of the Sixth International Photogrammetric Congress in September and will be made available to Commission members and others at the Congress interested in the activities of this Commission. In view of the time and effort spent by national reporters in preparing these reports and the excellent ideas contained in them, it is believed that such a compilation would prove of real value, not only at the Sixth International Congress Meeting but to National Societies.

This report will be limited, necessarily, to a condensation or summary of the available replies, with references to some of the more complete proposals and suggestions included with these replies. The body of this report is separated into the five subject matter categories listed in the first paragraph; i.e., Training (Education), Terminology, Bibliography, Standardization, and Historical Record.

TRAINING (EDUCATION)

The training of competent personnel for photogrammetric work is a serious problem and one which, in most cases, has never been adequately provided for. The present status of training facilities in photogrammetry all over the world is, therefore, of utmost interest and should be seriously studied in an effort to improve existing facilities.

It is interesting to note that there are only 26 universities and colleges reported as giving some formal instruction and one giving degrees in photogrammetry, and eleven conducting some research in this field. It is also interesting to note that Switzerland has the same number of institutions conducting research in photogrammetry as does the United States, with Holland and then France participating in the order named.

There are six technical schools, four in France and one each in Sweden and Finland, giving formal instruction in photogrammetry, and of these only the one in Finland was reported as conducting research in this field. Two institutes in Sweden are conducting research, but conduct no educational program. There are two commercial organizations in Holland conducting educational courses, and two in Holland and four in Sweden conducting active research in photogrammetry.

Ten governmental agencies have been reported as conducting formal instruction for training employees in the United States, Holland, Finland and France. Thirteen governmental agencies are conducting active research; of this number ten are in the United States.

A list of all educational institutions reported as giving formal instruction in photogrammetry, arranged alphabetically and by countries, will be included in the detailed report.

A considerable difference of opinion existed, as expressed by the national reporters, on the need or desirability of specialized university curricula leading to a degree in Photogrammetry. However, all nations reporting were in complete accord that the equivalent of a three-hour semester course should be established as the *minimum requirement* for all civil engineering students, with proper electives provided for students wishing to specialize in the photogrammetric field. Switzerland was the only nation reporting its instructional facilities as "Excellent," while the others graded "Adequate," "Adequate with qualifications," down to "Very poor." Most of the nations reporting did not indicate any planned improvement in educational and instructional facilities for the next few years.

As a means of improving undergraduate instruction, it has been suggested that additional basic courses in mathematics and optics should be required, that additional engineering schools should provide means for specialization, and the quality of both teaching methods and instruction be improved. In general, it is felt that instruction in photogrammetry should be associated very closely with precision control surveys. As aids to instruction, it is further suggested that models of stereoscopic mapping equipment, as well as laboratory terrain models which may be mapped by simulated aerial methods, be employed. All countries reporting indicated an interest in the development of instructional equipment, although in most cases they are lacking at the present time.

In general, very few studies of electronic measuring devices have been reported, taking into account the replacement of optical instruments presently used in control surveys. Holland, Sweden, France and the United States indicated some activity in this effort.

Considerable interest was evidenced in training films and slides for the purpose of instructional work. Holland and Sweden both have slides available

for exchange. France has a training film, not available for exchange. The United States has training film. Slides are in process of preparation, at present exchangeable only in the United States.

The opinions on what the minimum requirements of a course in photogrammetry should include varied considerably. An average of this requirement was stated previously in this report, as the equivalent of a three-hour semester course, although this falls far below some of the recommendations made. Recommendations for equipment for the minimum course also varied widely. Due to the variations, it is felt that the suggestions should be included later in the detailed report.

It was agreed, generally, that standard minimum requirements for a course should be established. These requirements should include both teaching staff and instructional facilities. Just what might constitute such minimum requirements appeared quite varied, and should prove an interesting topic of discussion at the Congress meeting in Amsterdam.

All national reporters were unanimous in expressing the opinion that Instructors in Photogrammetry should participate in part time photogrammetric research, as an essential requirement for their keeping abreast of the rapidly changing developments in this field. They further agreed, where such research is not being conducted, that the instructors themselves should be required to attend as students, periodically, special courses for teachers of photogrammetry, in order to keep them up to date.

Few educational institutions reported practical work in Photogrammetry being undertaken by graduate students or staff on a commercial basis, although this was the case in both Sweden and Switzerland. However, it is the more general practice to undertake research projects.

No general attempt has been made for the general practice of "on-the-job" training in Photogrammetry, either as a supplement to or substitute for formal training, with the possible exception of Sweden and France, where inspection trips to view various photogrammetrical projects and equipment are considered advisable.

Research is being conducted in the photogrammetrical field by a few educational institutions in all of the countries reporting. In these few instances, both teaching staff and students participate on a part time basis. In Finland, student participation is limited to thesis work. It would seem to be the unanimous opinion, as evidenced by the national reporters, that a certain amount of continuous research is essential, both from the standpoint of instructors and students in any educational institution, to develop improved instruction in Photogrammetry. It was further felt that educational administrators in institutions presenting photogrammetric instruction should encourage and facilitate in any way possible photogrammetric research.

The demand for research on the part of the government or commercial concerns was considered by Sweden, Holland and the United States to be sufficient to warrant their paying the cost of such photogrammetrical research being conducted by educational institutions.

TERMINOLOGY

As an aid to facilitate the interchange of ideas between national societies and their individual members as well, it might be advisable to consider the adoption of a set of standard definitions of terms, and to include also a standard set of symbols for use in discussing mathematical topics in photogrammetry.

Attention is directed to the following:

"Definitions and Formulas in Photogrammetry" 1937; a report of the Committee on Standardized Terminology, Germany.

"Mehrsprachiges Wörterbuch für Photogrammetrie" in German, English, French, Italian, and Spanish. Copyrighted 1934 by Deutsche Gesellschaft für Photogrammetrie, Berlin.

"Standard Definitions of Terms" adopted 1943 by the American Society of Photogrammetry.

"Standard Symbols for Photogrammetry" prepared by the Committee on Nomenclature of the American Society of Photogrammetry, G. C. Tewinkel, Committee Chairman.

In answer to the question of the advisability of adopting a standard system to include both definitions of terms and symbols used in photogrammetry and photogrammetric computations, considerable difference of opinions was expressed by the national reporters. It was agreed, however, that this would be desirable, at least from the standpoint of the more important symbols. Several suggestions were made which involved 2 sets of terms, one for International and another for National use. Some of the comments made in connection with this evidenced considerable study and thought. These will be included in the more detailed report. This question might well be discussed at length at the Amsterdam meeting.

The question as to the form in which such proposed standard definitions and symbols should be reproduced, from the standpoint of language and format, received considerable attention. It would seem advisable that this matter should be discussed with some benefit at Amsterdam.

Sweden, France, Czechoslovakia and the United States apparently have national systems, while in Finland, a system seems to be in process of preparation. No strong opinion was expressed as to whether any of these national systems might be applicable to International use.

In general, the consensus of opinion would indicate that any attempt of international standardization of definitions and symbols must be based first upon the formulation of national standards. The subsequent effort by Commission VI, or a sub-committee thereof, would then be to adapt these into an international system.

BIBLIOGRAPHY

The establishment of a standard international bibliography on photogrammetry is becoming increasingly important. The longer the delay in the establishment and agreement on the fundamentals of its ultimate composition, the greater the task of compiling it will become. Reference is made to the following proposals that have been made in regard to the establishment of such a policy concerning the assembling of an international bibliography:

"The Question of Bibliography for Photogrammetry," by O. v. Gruber, Jena. *Photogrammetria* II, 1939, 2.

"On the Arrangement of Bibliographies for Photogrammetry," by Otto Lacmann, Berlin (4D, Vi. E. B.).

"Draft for an International Bibliography for Photogrammetry," by W. Schermerhorn, *Photogrammetria* III, 1940, 3.

"Deutsches Schrifttum über Bildmessung und Luftbildwesen, Nachweis der wichtigsten Veröffentlichungen," by Dipl.-Ing. Gottfried Albrecht.

The results of the questionnaire indicate considerable difference of opinion as to whether the suggestions made in the references can be further simplified, without detracting from their purpose and effectiveness.

Prof. Roelofs of the Netherlands and Prof. Odenkrants of Sweden have both submitted detailed plans by which this simplification can be effected. Switzerland expresses the opinion that simplification can be accomplished and the United States apparently took the attitude that simplification would be exceedingly difficult. It is, therefore, recommended that delegates to the Congress

carefully review the references mentioned here. In addition, it is recommended that both Prof. Roelofs and Prof. Odenchrants present the suggestions to which they have given so much time and study. Comments on classifications which might be considered as essential to users of the bibliography, include:

In the opinion of the French, Prof. Clerc's system with 4 general headings.

Czechoslovakia favors Lacmann's system.

Sweden refers to a paper submitted by Prof. Odenchrants which will be included in the detailed report.

Holland suggests that the classifications be limited to contents and author in accordance with suggestion made by Prof. Roelofs.

The United States suggests the classification according to book, articles, bulletins, patents and communications.

It is obvious, from the diversity of suggestions made, that this question should receive consideration at the Amsterdam meeting with a discussion of the various suggestions made.

The minimum detail which should be in the subject catalogue, without reducing its value to users and readers, should include Subject or Contents, Author, Language, Date, and Publisher, in the opinion of most of the national reporters, although additional suggestions as to edition, price, reliability of work, and the author's location, were suggested.

Detail and classifications, which might be considered desirable but not essential, included type and scope of contents, number of pages, number of illustrations, format, quality of paper, and separate index of authors.

To provide for collection and publication of the bibliography, it was agreed, most generally, that a revival of PHOTOGRAMMETRIA should be effected. Additional suggestions were made which would put the responsibility for the collection of this information on the National Societies, with a central agency for clearing and reviewing the information received.

Further emphasis was made by the national reporters that the cost and repetition involved in any such bibliography should be minimized.

STANDARDIZATION

In any field of endeavor, the question of standardization of both procedures and methods is a recurrent one. Experience has shown that standardization results in greater economy of both effort and cost although it also tends to slow down individual effort and ingenuity. Any attempt to standardize must take into account the status of development of the procedures and equipment with which we are concerned, and a balancing of the comparative benefits which may be gained by the standardization against a possible decrease in new developments. There is no doubt that certain equipment and procedures may be standardized with only beneficial results, provided the tendency to standardize is not made all inclusive.

From the information sent in by the national reporters, there appears to be no clear cut general opinion as to standardization of specifications covering the extent and accuracy of photogrammetric work. In some cases any attempt to standardize accuracies appears to be inadvisable because of widely varying conditions and purposes. France expressed the opinion that standardization should apply only to operational procedures as well as special educational personnel. The United States reports that standard specifications were established by the American Society of Photogrammetry and published in the *MANUAL OF PHOTOGRAMMETRY*.

Apparently no attempt has been made to standardize photogrammetric methods or procedures except in Holland, where it is stated only German and

Swiss equipment are available. The standardization of qualifications for photogrammetric personnel seems to be of immediate concern to only a few of the nations represented by the national reporters. Sweden believes it is possible to classify photogrammetrical employees. Sweden expresses the opinion that graduate engineers and highly trained specialized personnel should be qualified for aerial triangulation and difficult restitution, with qualified specialists employed for ordinary restitution. The United States advises that a special committee of the American Society of Photogrammetry is working with the United States Civil Service Commission in an attempt to establish standard ratings, qualifications, and salaries for governmental photogrammetric employees.

With respect to standardization of training for photogrammetric personnel, Holland believes that such standardization for supervisory personnel is both desirable and practicable. They consider the standardization of production personnel both undesirable and impracticable. Sweden believes that both teaching and training should be defined clearly for different types of photogrammetric personnel. The United States suggests a minimum requirement of photogrammetric personnel, of a Civil Engineering degree from an accredited institution, with at least the equivalent of a three-hour semester course in photogrammetry.

It was the general opinion of the national reporters that standardization of procedures would be undesirable, as it was felt that such standardization would tend to limit initiative and further progress.

The question of standardization of equipment desirable at this or at some future time, based on experience of photogrammetrists reporting, included the following:

- The standardization of surveying and mapping instruments.

- A uniform system of linear measurements, preferably metric.

- A uniform system of angular measurements, preferably centesimal.

- Uniform attachment heads for all ground surveying instruments.

- A standardization of parts for the various stereoscopic mapping instruments, including Multiplex projectors.

HISTORICAL

The development of photogrammetric equipment and processes during the past few years has been rapid. A chronological history of this development is well worth preserving as a ready reference. This history could be obtained through a search of archives, papers, bibliographies, etc. This would require a considerable amount of labor and possibly result in duplication of effort. It is believed that much greater accuracy and completeness would be obtained if a definitive historical record were written and published by international cooperation.

All national reporters agreed that a historical record of the developments in photogrammetry would be of sufficient value to warrant its establishment in the near future. All further reported that such a historical record should include: date, development or accomplishment, name of individual or organization responsible for the development or accomplishment, an indication of extent of use, evaluation of progress and report of present status.

All national reporters further agreed that the historical record should include the organization date and all recorded meetings of The International Society for Photogrammetry. Holland, Sweden, Czechoslovakia and the United States expressed the idea that the history also contain the pertinent data on the established national societies as well.

The question of whether the historical record also should be an international

record of all photogrammetric developments and progress resulted in a considerable difference of opinions. France expressed approval; Switzerland approved, if limited to 50 to 100 pages; Finland thought completeness should be limited only by money available for the purpose; Sweden believed that this might be combined with bibliography; and the United States that detail should be only that necessary to identify, develop, or accomplish.

All national reporters agreed that the historical record should be published periodically to include all information subsequent to last publication, with supplements issued at intervals until replaced by latest historical compilation. France suggested that each national society publish supplements to cover developments made between international meetings. These national supplements might be combined into an official publication of the International Society for the period between meetings.

It was felt unanimously by the national reporters that the historical record should be entirely of a chronological nature and should not attempt to express approval of any particular development, person, or organization.

CONCLUSION

Summing up the results of the replies to these questionnaires, it seems apparent that:

1. Photogrammetrists over the world do not conform to any stereotyped pattern of thinking or action. This augurs well for future developments and improvements.
2. The questions raised have resulted in considerable time, effort and thought on problems common to all which should serve as a solid base for the discussions and program of Commission VI at the Amsterdam meeting.
3. The opinions expressed will serve as food for thought and possible action by those who may read this and the subsequent detailed report, which in turn may result in improvements, particularly in the educational-research phases of photogrammetry.

The President of Commission VI wishes to express his sincere appreciation to all national reporters and their associates who contributed to this report, by completing the questionnaires within their own national societies. He further hopes that still other national societies will find it convenient to send in their comments prior to the Sixth International Photogrammetry Congress and Exhibition in Amsterdam in September.

It appears that Commission VI has definite duties to perform relative to Bibliography and History, and that much valuable information concerning the other topics can be exchanged through discussion at the Congress. Hence, to expedite the proceedings of the Commission, an agenda is being prepared which is planned to implement our efforts in Bibliography and History, and to stimulate discussions of the other topics assigned to the Commission. A copy of this agenda, together with the detailed report will be furnished to each of the Commission members. Copies will also be furnished on request to those who are especially interested, and will be available at the Congress.