

PREFACE TO THE SYMPOSIUM, "NON-TOPOGRAPHIC PHOTOGRAMMETRY"

THE Publications Committee welcomes the opportunity to present the following symposium on the non-topographic uses of photogrammetry. Prof. Bertil Hallert of the Swedish Royal Institute of Technology is to be congratulated for having assembled an informative series of papers by distinguished colleagues on the Continent. American photogrammetrists will doubtless want to submit papers on similar subjects.

It is particularly appropriate at this time to lead the readers of PHOTOGRAMMETRIC ENGINEERING along paths not travelled by the average photogrammetrist. Vistas are opened for those who would strike off from the well-beaten way of the photogrammetric map compiler. However, such views are not always as remote from the topographic uses of photogrammetry as these enterprising spirits would have one believe. All photogrammetrists are funda-

mentally interested in the identification, form and extent of the subject photographed. Furthermore, topographic portrayal is most effective, be the subject the microscopic scratches of a tooth filling, the miniature extent of a denture, or a walnut or the macroscopic sweep of the earth's surface. Therefore, these special applications of photogrammetry are not properly described as non-topographic. Topographic expression is frequently the means employed by the specialist to portray his subject and invariably the technique of the photogrammetric surveyor be he a subterranean speleologist pointing his camera upward, a ground surveyor directing his photo-theodolite horizontally or an aerial surveyor orienting his camera axis downward.

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A SYMPOSIUM NON-TOPOGRAPHIC PHOTOGRAMMETRY*

INTRODUCTION

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PHOTOGRAMMETRY, a wonderful science embracing an extensive field from Astronomy to Microscopy, is generally defined as the science of measurements with the aid of photographs in order to determine such geometrical properties as size, form, and position of features imaged. Actually the topographic mapping of the earth is only one of its many uses, but nevertheless it is now the most important. It is believed that there is still insufficient recognition of the great possibilities of photogrammetry for purposes other than topographic mapping; such a use is sometimes called non-topographic or special photogrammetry.

With the aid of photogrammetry it is possible to determine distances of astronomical proportions as well as microscopic dimensions. In many cases there is no other method available to obtain such measurements, for example those concerning fea-

tures in movements such as water waves. Sometimes the feature is so sensitive that it cannot be touched with any kind of measuring tools. The photographic exposures can be made within very short times and without touching the object. The photogrammetric model can be established at any time and the measurements can be repeated at will. Furthermore, X-ray photogrammetry makes possible measurements within the human body or within objects of different kinds of materials.

Let us consider for a moment how much we would appreciate having single photographs of man made objects, people and events of ages passed. However, what would we be willing to give for stereoscopic pictures (photograms) of the same features? If we had these photographs we could make detailed studies, measurements, and accurate reconstructions of those things about which we now have very

* It is regretted that conditions resulted in postponing the publication of two papers in the Symposium. It is hoped that both will be in the December issue—*Publications Committee*.

little knowledge.

It is apparent that nearly everything around us is in a transitory state of destruction and that there may come a time when the rate of this destruction will be very rapid. Photogrammetry represents a most powerful tool, not to prevent destruction, but to permit an accurate, nearly ageless reconstruction. To my knowledge, the use of such a powerful tool for this and many other important purposes is not yet in sufficient widespread common use.

In many sciences there is a growing need for improved measuring methods. Often the opinion is expressed that at least in natural sciences the measuring techniques become more and more important and that there are several sciences in which measuring has become nearly a part of the science itself. Here too, photogrammetry has much to offer.

The need for mapping in the world is so great that most photogrammetrists have to deal with aerial photogrammetry. Instruments for non-topographic photogrammetry are not yet available to meet the need. The knowledge of photogrammetry is still too limited among people other than the photogrammetrists. Also

among photogrammetrists themselves there is sometimes too little knowledge about or interest in the methods and possibilities of non-topographic photogrammetry.

We will have to work hard to improve these conditions. The manufacturers of photogrammetric instruments must be stimulated and guided to make new types of cameras and other facilities. There must be closer cooperation between photogrammetrists and other scientists who may profit by the use of photogrammetry. Finally, photogrammetric training must be expanded to non-topographic methods.

Some of those points of view were given at the sessions of Commission V at the International Congress for Photogrammetry in Washington D. C. 1952 and were also accepted in the resolution of the commission.

The initiative of the Committee responsible for this journal to organize a symposium, covering parts of the non-topographic photogrammetry, deserves great recognition. I hope that the methods and applications that are later described will awaken interest and that the development of this important branch of photogrammetry will be greatly accelerated all over the world.

PHOTOGRAMMETRY AND MEDICAL RESEARCH

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MODERN technical resources are being applied more and more widely in medical research for the objectivization and measurement of physiological and pathological phenomena. To mention two examples, neurophysiologists are availing themselves of electrical technology, and both theoreticians and clinical workers are using isotope research. The progress of medicine has also been greatly assisted by increased facilities for the objective study of vital phenomena in both the healthy and the diseased organism.

Photogrammetry is an area in the technology of measurement which as yet has not had much attention from medical research workers. Its rapid development in recent years was brought out at the International Congress of 1952 in Washington, where new views on the medical applications of photogrammetry were demon-

strated (1). It therefore seems appropriate to suggest some areas in which this specialized type of photogrammetry may be of use.

Edema, the swelling which plays an integrating role in inflammation—the body's answer to trauma, in the broadest sense of the term—is harmful as well as useful. It may cripple, as when with an injury to a hand it may undergo a transformation to connective scar-tissue. It may even kill, as after burns or a brain operation.

The cause of edema, and its treatment when it becomes harmful, are thus important problems, with many questions remaining to be answered.

For measuring edema and the effect upon it of drugs or other therapy, plethysmography or methods based on the displacement principle have been employed. These methods have the disadvantage,