STATUS OF AERIAL PHOTOGRAPHY OF THE UNITED STATES

Map Information Office, Geological Survey

THE first postwar effort to present a comprehensive picture of the photographic coverage of the United States has been made by the Geological Survey. The index map inserted at the end of this article is the result. The last compilation of this nature appeared nearly ten years ago as a publication of the Federal Board of Surveys and Maps. Since that time vast areas in this country have been photographed from the Air, so that today more than three-fourths of the country is covered by aerial photography.

Government agencies and the public which use aerial photographs most urgently need some simple, reliable means of ascertaining whether photography exists for a given area and from whom reproductions may be obtained. In the absence of a suitable index showing these facts, they have but one alternative—the costly, time-consuming process of conducting an individual search among some nine Government agencies and a number of commercial concerns each time work is planned for which aerial photographs are needed. The gravity of this situation is further accentuated by the fact that millions of square miles of aerial photography have been procured since the old index was published and that some of it was obtained during the war years when the dissemination of such information was restricted. Now that peace-time activities are being resumed, and new aerial photography is being proposed and placed under contract, there is also an urgent need for a central clearing point for new projects so as to eliminate entirely any possibility of two or more agencies having the same area photographed when one set of photographs might suffice.

The Map Information Office of the Geological Survey has compiled, on the basis of reports of existing and proposed new aerial photographic coverage from the agencies listed below, the accompanying index to serve these widespread needs. Reports from the four commercial aerial survey firms included in the list were received in response to letters of inquiry directed to all such firms known to be active a few months ago. Detailed information regarding the photography of each agency may be obtained by directing inquiry to the addresses given below.

Field Service Branch
Production and Marketing Administration,
Department of Agriculture,
Washington 25, D. C.

Soil Conservation Service,
Cartographic Division,
Department of Agriculture,
Washington 25, D. C.

Forest Service,
Department of Agriculture,
Washington 25, D. C.

Geological Survey,
Department of the Interior
Washington 25, D. C.

Bureau of Reclamation,
Department of the Interior,
Washington 25, D. C.

Tennessee Valley Authority,
Chattanooga,
Tennessee.

U. S. Engineer Department,
Office, Chief of Engineers,
War Department,
Washington, D. C.

Army Air Forces,
Photographic Branch (AC-AS2),
Pentagon,
Washington, D. C.

Coast and Geodetic Survey,
Department of Commerce,
Washington 25, D. C.

Fairchild Aerial Surveys, Inc.,
224 East 11th Street,
Los Angeles 15, California.

Aero Service Corporation,
236 East Courtland Street,
Philadelphia, Pennsylvania.

Mark Hurd Mapping Company,
230 Oak Grove Street,
Minneapolis, Minnesota.

Robinson-Standard Aerial Surveys,
Teterboro Air Terminal,
Teterboro, New Jersey

In addition to the existing aerial photography, areas which are under contract, or which are otherwise definitely scheduled for new photography, are indicated. However, due to the limitations in showing a number of different classifications on one map, no attempt has been made to indicate which agency may be obtaining the new photography: that fact should be ascertained by direct inquiry to the Map Information Office. In areas previously photographed, scheduled new photography may be for a different agency than the one having the existing photography.

While it is impossible to show on this index any details pertaining to the scale of the photographs, the date of the photography, and the focal length of the camera lenses, general information regarding the types of photography obtained and used by the principal agencies may be summarized as follows.

The Field Service Branch, the Soil Conservation Service, and the Forest Service, of the Department of Agriculture, usually require an $8\frac{1}{4}$ inch nominal focal length lens and a scale of about 1:20,000. In a few cases, scales of 1:31,680 and 1:40,000 were required. The photography was in general obtained between 1936 and 1946.

The Geological Survey photography was taken either with 6 inch, 5.2 inch, or 4.0 inch nominal focal length lenses. The scales of the photography vary considerably, being governed by the desired map contour interval. As an example, in some areas the scale is as large as 1:12,000, while in others it may be as small as 1:48,000. A large part of the photography was obtained since about 1939.

The photography of the Tennessee Valley Authority may be divided into two general classifications. For mapping, practically all of the area shown was photographed with a 4 inch lens, the resulting exposures being 7×7 inches in size. In addition, considerable special-purpose photography at scales larger than 1:20,000 was taken with $8\frac{1}{4}$ inch, or longer, focal length lenses.

The existing photography of the Bureau of Reclamation is usually at the scale of 1:20,000 and taken with an $8\frac{1}{4}$ inch lens.

The photography of the Coast and Geodetic Survey is generally either 1:10,000 scale or 1:20,000 scale. Part of it was taken in the special nine-lens camera, and the remainder was taken in single lens cameras either of 6 inch or of 12 inch nominal focal length.

The aerial photography of the U. S. Engineer Department and of the Army Air Forces varies so widely as to scales and types that no reasonably accurate generalized description may be given. Lenses of various focal lengths were utilized. While a large proportion of the photography is vertical, some is of the Trimetrogon type which consists of three simultaneous exposures—one vertical and two obliques.

The photography obtained by the commercial firms listed above also varies considerably as to scale, focal length of lens, and type. Since all commercial firms are grouped under one color legend on the map, a prospective user should first ascertain from the Map Information Office which firm has the photography he desires after which detailed information may be sought directly from that firm.

In many cases areas in the United States have been photographed more than once. This is occasioned by several major considerations. First, in many areas cultural and physiographic features on the ground do not remain the same. Changes are constantly taking place—new highways are constructed, dams are built and areas are flooded, forests are cut and farms become established, the courses of streams are changed, and other similar changes occur. Obviously, for any use which requires a correct knowledge of features as they appear on the ground, the photographs must be recently taken. Also, for mapping purposes it is often required that the photographs be taken in seasons when deciduous trees are bare of foliage. Consequently new photographs are often necessary to replace those several years older, or those taken during late spring or summer. The second consideration is a purely technical one. Modern, accurate maps are most economically and efficiently produced by the use of aerial photographs and stereoscopic plotting instruments. However, the plotting instruments impose limitations on the types of photographs that can be used and in this country most of the instruments in use require aerial photographs taken either with a 5.2 inch or with a 6 inch nominal focal length lens. Now, diametrically opposed to this consideration is the fact that for general land-use studies, planimetric work such as acreage measurements and direct distance measurements, the preparation of mosaics, and other allied non-stereoscopic uses, photographs taken with a longer focal length lens are much more desirable. Practically all photographs obtained for those purposes are taken with lenses of at least $8\frac{1}{4}$ inch, and often 10 inch or 12 inch, focal lengths. Consequently, except in certain rare cases, one type of photography will not economically suffice for the uses mentioned above and for concurrent use in map plotting instruments. This consideration has often resulted in more than one set of photographs for the same area.

It would be very difficult, if not impossible, to show clearly on one map these duplications of aerial photographic coverage without resorting to a complicated system of colors and printing patterns and consequently only one coverage for each area is shown on this index. This limitation posed a rather serious problem in selecting the photographic coverage to show in cases where two or more sets of photography existed.

The selection was based on three main considerations—utility for average needs, age of the photography, and scale. Without exception, preference was first accorded to single-lens vertical photographs. Multiple-lens vertical photography or combinations of vertical and oblique exposures such as Trimetrogon were only shown where no single lens verticals existed. In cases where there were more than one set of single-lens vertical exposures, age was the most important factor and scale was of secondary influence in governing the selection. Therefore, in many cases the coverage indicated is that most recently obtained even though it may be at a small scale, while photography several years older but at a larger scale was omitted. Of course, there was reasonable limit to this conception, and in some cases very new photographs of extremely small scale were omitted in favor of coverage several years older having a considerably larger scale.

At this point it is important to stress that for any area some other photography beside the coverage shown on the index map may exist and that one seeking photography for a specific purpose should investigate this possibility by inquiry to the Map Information Office, where records of additional coverage are maintained. That office can readily furnish the names of all agencies known to have any photography of a given area. The prospective user may then seek further detailed information from each agency involved.

Copies of the index are being furnished to the agencies which reported the coverage for critical examination and notation of corrections. In particular, it is desired to verify that each agency has the aerial film for the areas which are shown in its particular color-legend. At a later date it is planned to issue a reprint of the index at a scale of 1:5,000,000, which will be twice as large as this issue. Copies of that issue may be utilized as a means for notifying of new scheduled projects and of completion of projects in progress.

Mosaics or photo-maps of numerous dispersed areas in the United States have been prepared from existing aerial photographs by Government agencies and commercial concerns. An index showing those areas is urgently needed and that compilation will be commenced in the near future. While no prediction can be made as to a completion date, it is hoped that copies can be made available for distribution within a few months.

NEWS NOTE

M. Herbert Eisenhart, President, has announced that the Bausch & Lomb Optical Company's permanent plant expansion and equipment modernization plant is now in the process of realization.

Negotiations to purchase the Navy Building, which was released to Bausch & Lomb during World War II, have been approved by the Secretary of the Navy and the Naval Affairs Committee of Congress.

The opening of a modern manufacturing plant at Wellsville, N. Y., represents the company's first venture out of Rochester.

The company announces that $6,000,000 will be spent in their plant expansion and equipment modernization program.

In addition, Mr. Eisenhart announced that research and development expenditures were at an all-time high and that strides were being made in the development of new glass making techniques, production of coated lenses, television optics and plastics.

The company has recently retained two additional well known research consultants, Dr. W. Ewart Williams of Pasadena, Calif., and H. W. Zieler of New York.