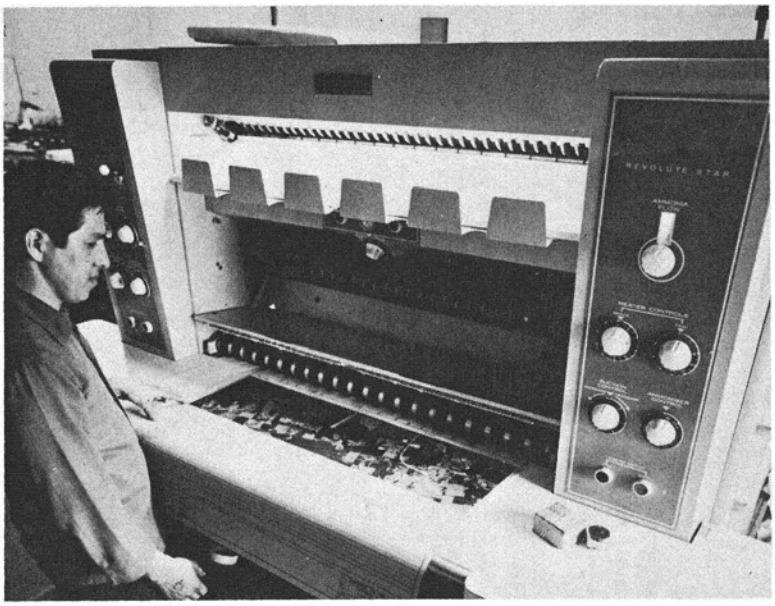

FIG. 1. Diazo reproduction is relied on heavily for reproduction of maps furnished regularly to customers. The firm produces close to a half-million square feet of diazo copies each month on this Bruning 880 whiteprinter. Prints are reproduced on blue-line paper to make them difficult to copy.

Diazo Reproduction Important To Tobin Surveys, Inc.*

DRAWING FROM AERIAL PHOTOGRAPHS of more than 1,000,000 square miles of continental United States, Tobin Surveys, Inc., headquartered in San Antonio, Texas regularly supplies some 60 major oil companies with up-to-date maps displaying property ownership and mineral rights leases in more than 700 southern U.S. counties.

For this and a variety of other highly specialized services, the firm relies heavily on blueline diazo reproduction, consuming close to a half a million square feet of paper each month. Reproduction is achieved through the use of a Bruning 880 diazo whiteprinter (Figure 1), a product of the Charles Bruning Company, division of Addressograph Multigraph Corp., which also furnishes print media.

Those who rely on Tobin mapping services include 130 oil companies, the Trans-Alaska Pipeline System, Public Service Company of Colorado, and a substantial number of public utilities.

For the Trans-Alaska Pipeline, which will carry oil from rich new areas in the northern part of the state to the southern coast, 800 miles of rugged terrain were photographed by Tobin aerial crews and reduced to 420 feet of pictures. One hundred diazo copies of each of these thousands of aerial views were furnished to those contractors bidding on the construction of the pipeline.

But for sheer impressiveness, the Tobin display room takes top place (Figure 2). There, laid out on the floor and on one wall is a 120-foot-long aerial view of the southern United States, from Florida to New Mexico. It is made up of several thousand aerial photographs pasted together in mosaic fashion (Figure 3).

Pictures like these on display constitute only 10 percent of the total job of mapping

* Submitted by Public Communications Inc., 35 East Wacker Drive, Chicago. Ill., for Charles Bruning Co., Mt. Prospect, Ill. Tobin Surveys, Inc., is a Sustaining Member of the American Society of Photogrammetry.

FIG. 2. You're looking at the Mississippi River delta area and portions of Arkansas, Louisiana, Mississippi, Alabama and Tennessee from a point out over the Gulf of Mexico. Altitude some 18,000 feet. What you see is just a part of a huge mosaic of aerial photographs covering the southern U.S. from Florida to New Mexico which is on display at Tobin Surveys Inc., San Antonio, Tex. Tobin has photographed more than 1,000,000 square miles of continental United States.

performed by Tobin specialists, according to C. R. Brown, President of Tobin Research, a subsidiary firm. The balance, handled by veteran cartographers, photogrammetrists, engineers and experienced computer programmers, makes the pictures meaningful and useful to Tobin customers.

Briefly, stated Brown, the work entails *control*, that is, establishing the exact location of the photograph on the face of the earth, then working up a stereo model to get planimetric detail, and putting onto the map the *thematic data* required by the client. In much of this work, computerization has replaced hand operations, but still a good deal of exacting effort is required by Tobin specialists.

The end product varies with the need of the customer. For a utility company the end product might be a series of aerial photographs of residential areas with film overlays drawn by computer (Figure 4) which show the precise locations of power poles, digital identification of these and their equipment, and which structures in the pictures are serviced from which poles. For a taxing body, it could be overlays which give immediate identification to structures which have been expanded since the previous assessment, so that assessors may accurately perform their duties.

In each instance, the customer receives diazo reproducible copies and film overlays for making composite prints of needed information for use in the field.

In its services to oil companies, Tobin furnishes property ownership maps and mineral lease maps from a file of some 700 southern counties which have been and continue to be meticulously researched (Figure 5). To establish the file on property ownership, for

example, the company sent men to county court houses to obtain accurate ownership information. It took two men two full years to complete the work on a single county.

Using the information gathered and aerial photographs, Tobin drew detailed maps showing the ownership and boundaries of each parcel of land. Researching mineral rights lease agreements, the company took the ownership maps a step further to provide a separate mapping service showing property ownership, lease ownership and locations of oil wells.

Lease maps covering 225 counties are furnished to customers on a monthly basis, each up-dating the information carried on the previously furnished map. These show locations of new wells, leases, assignments and cancellations.

To protect its rights to these hard-earned and copyrighted maps. Tobin reproduces them in blue-line diazo, according to Malcolm McLeod, plant manager, "which is difficult to copy." In addition, each map has a built-in feature of some kind which is recorded at Tobin. If a questionable map turns up, Tobin can readily ascertain by comparisons whether it was copied from a Tobin-originated map.

To provide maps for such studies as land use, drainage, geologic, selection of sites and route estimates, topographic maps are furnished by Tobin. These, too, begin with aerial photographs. As there is a planned 60 percent overlap in the photos taken from the air, two adjacent pictures, if properly positioned, can provide a stereoscopic, three-dimensional view of the area covered. Using a plotter specifically designed for the work, a Tobin employee views a stereo image and follows the contours he sees with a small dot on his viewing screen. This action simultaneously draws a scale image of the contours on

FIG. 3. Mosaicking area photographs to form a larger picture of the ground covered, this employee uses a contour map as a base on which he mosaics. The aerial pictures overlap 60 percent so that each picture in a series contains parts of another. In preparing a mosaic, the employee uses only the central parts of each photograph.

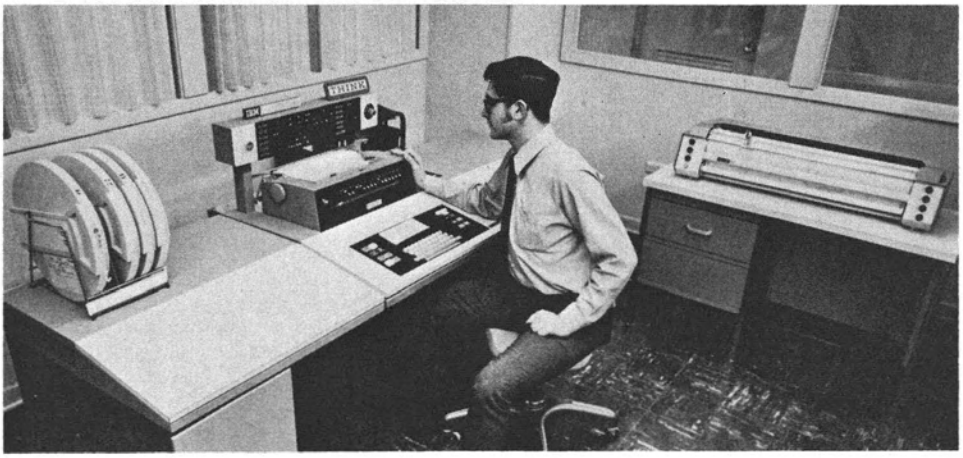

FIG. 4. Computerization in map making has become an essential part of Tobin's operations. This IBM 1130 computer produces overlays for aerial maps from information furnished it. The overlays provide a visual pinpointing of digitized information.

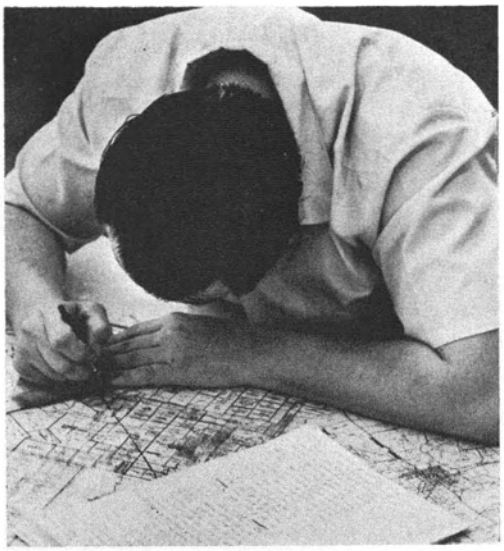

FIG. 5. From the aerial photographs, Tobin develops a wide variety of maps for as many uses. Here, an employee works on a mineral rights lease map, putting in data obtained from men in the field.

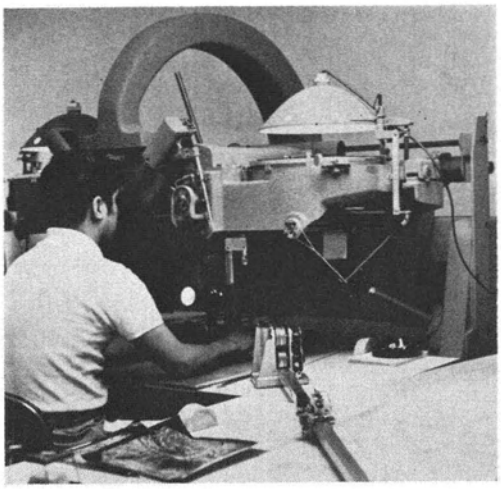

FIG. 6. Working with this Wild B8 plotter to draw the contours of the area photographed, the Tobin employee views a stereo image composed from two aerial photographs and follows the contours as he sees them.

a map placed an an adjacent table (Figure 6).

Tobin Surveys Inc. was founded in 1927 to provide reliable aerial photographic maps to a rapidly expanding oil industry. Although the need in the oil industry continues, Tobin has greatly expanded its services to include such things as right-of-way maps, trend or pool strip maps, county plat book systems, appraisals for tax equalization programs, and computer graphics.

The company employs some 300 individuals and operates a DC-3 and two Twin Bonanzas in aerial photography. Among the cameras used for high quality aerial photography is one recently purchased which cost $32,000.

Small wonder, then, that Tobin customers readily pay $2 or more per square mile for the maps they purchase. The cost of $2,000 for an average size county is little, indeed, when compared to the tremendous expenditure in money, time and experience necessary to create each map.

International Archives

The *International Archives of Photogrammetry*, Series XVII, Volumes 1 to 10 (which constitute the proceedings of the Eleventh International Congress of Photogrammetry in Lausanne in 1968) may now be ordered. Briefly, the Contents are: Vol. 1: Congress Affairs. Vol. 2: National Reports and Commission Reports, Vol. 3 and 4: "Invited" Papers. Vol. 5–10: "Presented" Papers.

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