

1 AERIAL SURVEYS IN SOVIET CENTRAL ASIA

by

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During the 1945-1946 seasons the first archaeological aerial surveys were made at Khwarazm in Uzbekistan. From 1937-1945 the main cultural periods were established from the fourth millennium B. C. to the fourteenth century A. D. However, there are many monuments in the Kizil-Kum and Kara-Kum deserts and on the Usturt Plateau where ground surveys proved only partly effective or satisfactory. These difficulties in-

1. Translated from *Vestnik of the Academy of Sciences*, No. 6, pp. 54-68, Moscow, 1948, by Mrs. Kathleen Price and edited by Henry Field.

2. For references to previous work see H. Field and Eugene Prostov, "Archaeological Investigations in Central Asia, 1917-1937," *Ars Islamica*, vol. 5, Pt. 2, pp. 233-271, 1939; "Excavations at Khwarazm, 1937-1938," *Ars Islamica*, vol. 6, Pt. 1, pp. 153-166, 1940; "Excavations in Uzbekistan," *Asia*, pp. 243-244, May, 1941; "Archaeology in Uzbekistan," *Antiquity*, vol. 15, No. 58, pp. 194-196, 1941; "Recent discoveries in Uzbekistan," *American Journal of Archaeology*, vol. 46, No. 2, pp. 277-281, 1942; "Excavations in Uzbekistan, 1937-1938," *Ars Islamica*, vol. 9, pp. 143-150, 1942; "Recent discoveries in the U.S.S.R.: Khwarazm, 1940-1941," *American Journal of Archaeology*, vol. 48, No. 3, pp. 298-302, 1944; and "Recent Excavations at Khwarazm," *Ars Islamica*, vols. 13-14, pp. 139-148, 1948. See also Henry Field, "Neolithic station in the Kizil-Kum Desert," *Southwestern Journal of Anthropology*, vol. 2, No. 2, p. 239, 1946; and "Contributions to the Anthropology of the Soviet Union," *Smithsonian Miscellaneous Collections*, vol. 110, No. 13, pp. 183-184, 204, 1948.

creased in 1945 when the Expedition completed its first task, which was the exploration of a zone 50-100 miles away from inhabited regions. Then the problem arose of the relationship of Khwarazm with the Syr-Darya region, with the basin of the ^aZeravshan and with Eastern Europe.

The method employed in aerial surveying was to locate a monument, photograph it and the surrounding territory extending the area by rings so as to be able to map the distribution of ruins, irrigation systems and roads. Landings were made near the large monuments and an aerial party joined by an auto-group which established bases along the way; ~~there~~ ^{for example},

the Kizil-Kum route ~~established bases on~~ ^{by study} Chirik-Rabata, Kum-Kala, and Dzhan-Kala (Lzhenda). Two methods were employed:

1. Aero-visual research from POG planes for topographical surveying of the Turtku^l and Shabbaz regions of the Kara-Kalpak ASSR, as a result of which a map of ancient Khwarazm covering 2,000 sq. km. was made. Desert conditions with so-called "sand-smoke," brilliant light and very turbulent atmosphere made reconnaissance difficult.

2. Photographic work was based on the nature of the monuments: (a) those with poorly demarcated relief, partly covered by sand and vegetation; and (b) those with walls and towers. In order to photograph (a) the best conditions are immediately after sunrise and before sunset, when details stand out very clearly. This is also the best time for visual observation. The best results are also obtained when the

plane flies over the monument in a direction opposite the sun and the object is viewed from the side of the shadows which determine its form. If the monument has low relief, the ~~more~~ ^{effective} survey, ~~of the plan~~ should be ~~done~~ from a low altitude with the camera at a 30°-70° angle. Surveying against the sun by changing the angle of the camera in the manual camera was one of the fundamental methods of work which permitted the discovery of new objects and obtained the best results in photographing ~~complicated surveys~~ ^{Confidential}.

To bring out details in relief and to cut through sand in the atmosphere a red filter was helpful. Thus, were located the individual buildings in the medieval city of Vazar (Nov-Nosken) on Usturt Plateau. Former gardens, impossible to locate on the ground unless guided by aerial photographs, played an important role in determining the extent of large complexes.

However, standing walls or towers should not be photographed early or late because the long shadows hide the area around the building. Different exposures throughout the day produce excellent composite photographs.

The optimum medium altitude of flights in archaeological research varied from 200-600 m., which is the cruising height at which monuments are easy to describe and discover. For a planned topographic survey of a region and of more complex monuments, a higher altitude is necessary.

During the Kizil-Kum explorations in 1946, we came

out into the region of the ruins of Dzhah-Yala at an altitude of 300 meters. Here we expected to find the medieval city of Dzhend, but we discovered in the high bush only isolated ruins at a great distance one from another. Only on rising higher we saw the plan of the entire city with its wall, main city buildings, caravanserais and parks.

Aerial investigation of a monument is carried out in the following order:

- (a) Low altitude.
- (b) Middle altitude, 300-600 meters.
- (c) Maximum altitude, surveying, etc.

In the low altitude zone the plane circles over the monument gaining altitude during which visual observation should be made for details and lighting. In the middle zone the plane makes larger circles and visual observation is carried out for the study of the general configuration of the monument. In the higher zone visual observation is supplemented by a sketch and decisions are taken as to the best angles for surveying.

In the two seasons, aviation routes of the Expedition covered more than 9,000 kilometers in southwestern Kizil-Kum, Kara-Kum and the southeastern part of the Usturt Plateau, doubling the number of monuments discovered. From 1937-1945, 400 monuments had been located. Between the lower Syr-Darya and the Amu-Darya, following the old course of the ^{Dzhan} ~~Amu~~-Darya and the Kuvan-Darya, previously unknown types of monuments

were discovered, such as:

(a) Ancient Massagetae gorodishches (middle of the first millennium B. C.) of Chirik-Nabata type.

(b) Complexes of cities.

(c) Fortresses and fortified dwellings, such as Nabata-Azer (first half of the first millennium B. C.), which we consider a monument of the Syr-Daryan Tokhars.

(d) Along the eastern shore of the Aral Sea gorodishches of the Massagetae, Alani, Ephtalite Huns, ^{and} Oguz Turks.

(e) Dzhand, an important center of early medieval culture.

Exploration of southwestern Usturt revealed a system of forts and light towers forming the northeastern defense line of medieval Khwarazm as well as trade routes and strategic ways from Khwarazm to Eastern Europe i.e. the lower and middle Volga. A study of these monuments enabled us once again to reconsider the problem of the Khwarazmian-Kazakh-Bulgarian-Russian relations and to establish that they were close not only commercially but politically.

Exploration carried out in the Kara-Kum desert revealed monuments, which made possible the solution of the problem, much debated between Soviet geographers and historians, of the Uzboy-Sary-Kamysh question and the truth was found to be on the side of the geographers. The thesis proposed by V. V. Barthold about the flow of waters in the Uzboy during the

Middle Ages was not vindicated and no monuments were discovered there. Barthold had based his belief on the legend of the turning of the Amu-Darya into the Caspian Sea after the Mongol invasion, which apparently was based on the flow of waters in the western branch of the Amu-Darya, and the Daryalyk which falls into Sary-Kamysh Lake. A large dead oasis, attributed to the fourteenth-sixteenth centuries of our era, with numerous monuments, was discovered there. Furthermore, the ruins of the ancient medieval cities of Vazir, Terzek and Adak, mentioned in the Chronicles, were discovered in the basin of the Daryalyk. At Khwarazm it was possible through aerial research to make a historical map of the ancient irrigational network of the Chirchik-Yul Canal.

Detailed surveys of many monuments of ancient and medieval Khwarazm were made and a large dead oasis was discovered next to the city of Toprak-Kala.

Thus, it was possible to make an archaeological map (scale 1:1,500,000) of ancient Khwarazm as well as the entire northwestern part of Middle Asia from the Syr-Darya to the middle Uzboy.

Other expeditions are using the methods pioneered by the Khwarazmian Aviation Unit in researches at Karmir-Blur, Trans-Caucasia.

The development of aerial exploration will be an important step in Soviet archaeology.