INTRODUCTION

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Before we consider the material from the excavation of building U6, a brief report on the research project of the Tarkhankut Expedition will be presented, together with a general characterisation of the settlement of Panskoye I and its necropolis, as well as of the surrounding palaeolandscape and modern landscape.

THE TARKHANKUT EXPEDITION

The expedition attached to the Chersonesos Museum of History and Archaeology (now, the National Historical and Archaeological Park of Tauric Chersonesos, in Sevastopol) was launched by the author in 1959. At the outset, the foundation and financing of the Expedition were supported by I.A. Antonova, then Director of the Museum; S.N. Bibikov, Director of the Archaeological Institute of the Ukrainian Academy of Science, and a well-known expert on the Palaeolithic period; and P.N. Schulz, then the Director of the Crimean branch of the same institute. In 1969 the Expedition was transferred to the Leningrad Division of the Archaeological Institute of the USSR Academy of Science (in 1991 renamed the Institute of the History of Material Culture of the Russian Academy of Sciences, St Petersburg).

The idea of launching an expedition to study the north-western Crimea, which at the time still remained a *tabula rasa*, first occurred to me in 1958 during an inspection of some ancient coastal town-sites carried out jointly with my teacher P.N. Schulz, who first discovered and described these sites. During this brief expedition the main questions were formulated that were to form the basis of the first stage of investigation of the sites of this region.

During this first stage (1959-1968), the programme of investigations comprised examination of the hypothesis proposed by P.N. Schulz after his archaeological surveys of 1933-1934. The hypothesis concerned a synchronous expansion of the Chersonesos Greeks and Crimean Scythians towards the western coasts of the Crimea in the 3rd and 2nd centuries B.C.; this expansion resulted in the simultaneous appearance of maritime Greek (Chersonesean) and Scythian fortresses that 'seemed to stand in confrontation to each other'.[1] This hypothesis eventually became a generally accepted theory. Indeed, many scholars considered it an axiom. Several general historical models based on it (without any archaeological investigation in the field, however) appeared during the late 1940s and 1950s, by way of explaining certain peculiarities of the historical process not only in the western Crimea but also in the south of Eastern Europe in the second half of the first millennium B.C. and the beginning of the first millennium A.D. These theories considered the problems of nomadism in the 'Scytho-Sarmatian' period; Late-Scythian culture; the history of the development of Scythian society; and Graeco-Scythian relations in the northern Black Sea area.[2]

However, the theory of opposing Greek and Scythian fortresses (which was put forward only very cautiously by its author) had first to be tested by carrying out largescale regional, archaeological, and landscape researches; mapping the sites, and studying their stratigraphy; and establishing the typology and chronology of settlement sites. The first ten years were devoted to these tasks.

After the accomplishment of the regional project had brought fairly representative results, it was decided to limit the studies to an archaeological investigation of only the Greek (Chersonesean) settlement system in the territory of the western Crimea. Such an approach, it seemed, would make possible a thoroughly exhaustive study of the spatial structure of a particular type of Greek state – a peripheral Doric *polis* as represented by Chersonesos. The project therefore focused on stationary excavations of those sites that could be considered as the most representative ones.

THE STRUCTURE OF THE TARKHANKUT EXPEDITION

The structure of the Expedition varied according to the objectives that were set before it. In the first stage, when the main task was a regional study of a vast territory, the team included a Surveying Detachment (1959-1968), a Palaeogeographic Detachment (1959-1968), an Archaeological and Geophysical Detachment (1963-1964), and a Detachment that during the period 1960-1967 conducted the stationary excavations. Beginning in 1969, when the project concerned with the Greek sites alone was initiated, the detachments that carried out permanent excavations became the most important ones; they included the teams that, since 1969, have excavated the settlement (Panskoye I) and the kurgans (the necropolis of Panskoye I), and also those detachments that worked on the other shore of the lake (1978) and on the sites of Bolshoi Kastel (1983-1987) and Ğangul (1983-1984). In 1994 a team from the University of Aarhus headed by L. Hannestad took part in the work. In addition, the Palaeogeographic Detachment (1969-1973), the Geophysical Detachment (1970-1980), and the Surveying Aero-topographical Detachment (1979-1985) pursued other studies associated with separate projects.

It should be specially noted here that the project was carried out in close co-operation with specialists from different fields of scholarship and from various scientific institutions. Otherwise the projected programme of research could not have been achieved. I welcome the opportunity to mention the contribution made in different years by the following archaeologists: G.M. Kutykina (Nikolaenko) and O.Ya. Savelja (assistants at the Chersonesos State Museum); N.K. Belaja, E.Ya. Rogov, V.F. Stolba, M.Yu. Vachtina, Yu.A. Vinogradov (LOIA – The Leningrad Division of the Institute of Archaeology of the USSR Academy of Science, now IIMK – The Institute of the History of Material Culture of the Russian Academy of Science); O.Yu. Bogoljubova, A.M. Gilevič, I.I. Saverkina (The State Hermitage Museum); A.V. Gadlo (The Leningrad / St Petersburg State University); and E.V. Jakovenko (The Chernigov Pedagogical Institute); I must mention, too, the geographer N.S. Blagovolin (The Institute of Geography of the USSR Academy of Science, Moscow); V.I. Kac, an expert in ceramic epigraphy (The Borisoglebsk Pedagogical Institute, The Saratov State University); the archaeologist and ceramist S.Yu. Monachov (The Saratov State University); the geophysicists K.K. Šilik (LOIA), G.A. Vnučkov (The Institute of the Magnetism of the Earth, Ionosphere and Propagation of Magnetic Waves, Moscow), V.V. Glazunov (The Mining Institute, St Petersburg), T.N. Smekalova (The Institute of Physics of the St Petersburg State University); the experts in geophysical equipment A.P. Naumov and I.S. Chasiev (The D.I. Mendeleev All-Union Institute of Metrology, St Petersburg); K.V. Šiškin, a topographer and expert in deciphering aerial photographs (The Institute of Archaeology, Moscow); as well as many other assistants.

The laboratory-processing and studies of the archaeological materials (pottery, glass, coins, and art objects) were carried out in the first years in the Chersonesos Museum and

later in various laboratories of the LOIA/IIMK of the Russian Academy of Science and the State Hermitage. The palaeobotanic material was investigated in collaboration with a group of experts from the All-Union Scientific Research Institute of Plant-Growing (VIR, Leningrad) headed by M.M. Jakubciner (identification of cereal seeds) and G.N. Lisicina (identification of wooden remains) from the Institute of Archaeology of the USSR Academy of Science (Moscow). From 1969 the study of the plant remains was conducted by Z.V. Januševič and N.N. Kuz'minova (The Botanical Gardens of the Moldavian Academy of Science, Kishinev), and O.S. Čavčavadze (The Botany Institute of the Russian Academy of Science, St Petersburg); in recent years this work has been carried out by G.A. Paškevič (The Institute of Archaeology of the National Academy of Science of Ukraine, Kiev). Osteological finds were identified by N.N. Ščerbak, O.V. Topačevskij and A.S. Umanskaja (The Institute of Zoology of the Ukrainian Academy of Science, Kiev), and by A.K. Kasparov (IIMK of the Russian Academy of Science). The ichthyofauna was studied in co-operation with B.D. Burdak (The Institute of Biology of the South Seas, Sevastopol).

During the thirty-five years of the Expedition project's existence, a huge amount of work has been done by students of the Department of Archaeology, the Department of the History of Ancient Greece and Rome, and the Department of Classical Philology at St Petersburg State University, and by students of the Historical Faculty of the Saratov University, who did their field archaeological training with the Expedition. Much of the architectural measuring was done by students of the architectural faculties of the I.E. Repin Institute of Painting, Sculpture, and Architecture (Academy of Arts, St Petersburg) and of the Leningrad Institute of Building Engineering. The geophysical studies were carried out mainly by students and post-graduates of the Department of Geophysics of the Leningrad/St Petersburg Mining Institute and St Petersburg State University. For many of the students and post-graduates the material obtained became the basis of their diplomas or theses.

REGIONAL PROJECT 'NORTH-WESTERN CRIMEA'

The regional studies of 1959-1968 comprised the area of western Crimea that stretches about 250 kilometres along the sea coast from the city of Chersonesos as far as the Bakal Spit and up to ten kilometres inland (Pls. 1-4, *1*). The methods and techniques used for the study, together with surface surveys and excavations at certain selected sites that will be mentioned below, also included: study of aerial photographs and visual observations from the air; palaeogeography and geomorphology; palaeobotanics; and archaeological and geophysical field mapping of buried buildings by electrical profiling, *etc.*[3]

Besides studying the topography of the settlements, fixing them on maps, and identifying their typological peculiarities, special stratigraphical test trenches were laid out that complemented the maps based on surface observation. This enabled us to obtain comparable stratigraphical profiles for the whole area studied. The regional search activities were combined with long-term excavations that were to prove or disprove the data observed before the excavations. Between 1960 and 1966 the expedition team excavated a small Scythian fortress of the 2nd century B.C.-2nd century A.D. that had been erected in the place of a former Chersonesean settlement at the settlement-site of Tarpanchi in the centre of the southern coast of the Tarkhankut Peninsula.[4] In 1963-1966 a Greek (Chersonesean) farmhouse near the Bay of Vetrenaya was excavated.[5] In 1963 excavation of the previously surveyed settlement-site of Belyaus was initiated jointly with the South-Donuzlav Expedition of the Archaeological Institute of the USSR Academy of Science (O.D. Daševskaja).[6] This latter settlement original-

ly arose as a Chersonesean fortress formed from a block of fortified one-towered farmhouses. After destruction of the Chersonesean fortified settlement its ruins were used for building a Scythian fortress in its place.

The working programme of the Expedition comprised components of archaeological and landscape study aimed at obtaining material for the reconstruction of the natural and cultural (anthropogeneous) landscapes in the historic period. To that end, observations were begun in 1960 to evaluate the character and rate of erosion of the seashores at the places where ancient settlements had been situated. The Archaeological and Palaeogeographical Detachment of the Expedition carried out a geomorphological investigation in north-western Crimea, and on the basis of archaeological data conducted an evaluation of relative changes in the land and sea levels during the historic period.

The most interesting results obtained during this period concerned the discovery and investigation of traces of ancient land-tenure in north-western Crimea, which had previously been considered uninhabited. In 1962 the remains of a Greek land plot of the 4th-early 2nd century B.C., with traces of vineyards and orchards were discovered for the first time near the Cape of Oirat (Uret). The site was in a unique state of preservation for the Greek Mediterranean and Black Sea area.[7] In the same year remains of ancient Greek land lots and a farmhouse of the 4th century B.C. (date of origin) were found near the Bay of Vetrenaya, and during the following two years traces of the Greek cadastral system were discovered in different places in the vicinity of the Bay of Ak-Mechet (or Bay of Chernomorskoye or Uzkaya) on the north-western and southern coasts of the Tarkhankut Peninsula.[8] In 1966-1967 traces of the cadastre were revealed by means of aerial observation in other coastal areas of north-western Crimea.[9]

The first palaeobotanical and osteological material to be obtained from the region for laboratory and experimental studies later enabled us to change radically our previous ideas on the ancient natural and cultural landscapes of the steppe of north-western Crimea. Analysis of carbonised wood remains from hearths and combustion-sites, in combination with other signs, indicated that in the first millennium B.C. considerable areas of woodland and shrubs existed in the present semi-desert steppe regions.[10] In 1960, by means of X-ray analysis of hand-made pottery produced on the site, it was first established that vines were grown in 4th-3rd centuries B.C on the southern coast of the Tarkhankut Peninsula – just in the very locality which had hitherto been considered by botanists and soil scientists as quite unfit for cultivating this plant species.[11] Excavations and surveys subsequently confirmed this conclusion through a number of convincing examples. Detailed research and identifications of species enabled us later to recognise the basic composition of the cultivated plants that had constituted the bulk of the crops and thus of the economy of the region. Moreover, an experiment carried out in the Chersonesos Museum made it possible to reconstruct the weight of the Tarkhankut wheat (one hectolitre equalled 74.7 kgs). This data corresponded with the information provided by Pliny on the weight of Chersonesean wheat (NH XVIII, 66).[12] Osteological analysis brought information on the wild and domestic fauna; consideration of fish bones and scales found during the excavations enabled us to form an idea of the ancient fishery, the composition of fish stocks, and, indirectly, of the temperature profile of the sea.[13]

The results of the first stage of the project made it possible to determine a number of regularities in the stratigraphy and chronology of sites in the north-western Crimea in the period from the 6th century B.C. to the 3rd century A.D. The development of a new typology for the settlements became possible. In addition, data were obtained for a reconstruction of the ancient landscape, the main branches of the economy of the region, and its economic relations. Material was also gained for study of the spatial, social, economic and ethnic structures of the

settlements and of the traditions and innovations in their cultural development. On the basis of this material a new periodisation of the history of north-western Crimea was established that was related to the history of one of the most significant Greek settlements in the Black Sea region, *i.e.* the *polis* of Chersonesos and of its relations with local tribes of Taurians and the Late-Scythian kingdom in the Crimea.[14] Here is a brief summary of the results achieved:

1. The hypothesis of P.N. Schulz proposing the simultaneous appearance of Chersonesean and Scythian fortified settlements in north-western Crimea proved to be erroneous, having been based on superficial studies of the settlements. In fact two consecutive stratigraphic levels were identified in the whole area: the earlier – Greek (second half of the 4th-3rd century B.C.) and the later – Scythian (from the end of the 3rd or early 2nd century B.C. to the 2nd/3rd century A.D.). Each of these levels consisted of a number of consecutive layers, with corresponding building remains.
2. The material of the first stratigraphic level suggests with a high degree of probability, that Greek fortresses (including Kalos Limen) and fortified and unfortified rural settlements of different types, including isolated farmhouses, were built in evidently previously uninhabited coastal sites during the first chronological period (second half of the 4th-first half of the 3rd century B.C.). The predominance of Chersonesean pottery and the system and technique of construction characteristic of Chersonesos (just as had been supposed by P.N. Schulz for the settlements described by him) seemed to be connected with the activities of the Chersonesean Greeks. All the evidence mentioned suggests that an intensive territorial expansion of Chersonesos into north-western Crimea occurred probably in the second half or last third of the 4th century B.C. In the course of that expansion it is likely that Chersonesos subdued Kerkinitis and mastered a vast tract of maritime territory in north-western Crimea. The land was divided into lots according an orthogonal (Hippodamian) system – in the same way as the land in the close vicinity of Chersonesos itself, on the Herakleian Peninsula in south-western Crimea. No Scythian settlements had existed in the region under consideration.

   The material obtained enabled us to identify the flat country in north-western Crimea as the region mentioned in Chersonesean inscriptions (*IOSPE* I^2 318, 401), as forming part of the territory (χώρα) of Chersonesos called 'the plain' (πεδίον). The fortresses (τείχη) subject to Chersonesos were located in that territory. According to the inscriptions, grain was grown and vineyards existed on 'the plain'. This fact has been confirmed by the discovery of a cadastral system of a typically Chersonesean structure with fields and vineyards, as well as by palaeobotanic data which suggest that cereals and vines were the main agricultural species in the region.
3. All Late-Scythian fortresses in north-western Crimea appeared at the turn of the 3rd-2nd or in the first half of the 2nd century B.C. on the sites of destroyed and burnt-down Greek fortified settlements. Typologically these fortresses are very close to the Late-Scythian settlements in the Lower Dnieper regions. The culture of the fortresses may be considered a local variety of the Late-Scythian culture. The majority of the fortresses in the north-western Crimea perished during a total devastation in the late 1st or at the turn of the 1st-2nd century A.D.; probably only some of them survived till the 2nd-3rd century A.D.

The new data obtained by the Expedition demanded a revision of those historical models that were based on P.N. Schulz's hypothesis. Subsequently I made an attempt at a new interpretation of the evidence.[15] This interpretation was based largely on then prevailing ideas on the development of Scythian culture and society. According to this hypothesis the steppe-dwelling Scythians of the Dnieper transferred their main centres to Crimea in the 3rd century

B.C. under pressure from the Sarmatians, thus endangering Greek states. Hence, it seemed probable that the Scythians' intention of occupying the prosperous maritime territory of north-western Crimea was the direct cause of the conflict between Chersonesos and the Scythians. The results of the regional studies suggested that Chersonesos possibly lost its territorial possessions after a long period of Scytho-Chersonesean wars in the 3rd-2nd century B.C. The apogee of those wars fell towards the end of the 2nd century B.C. when an expeditionary corps of Diophantes – a general of Mithridates VI Eupator – was acting on behalf of Chersonesos (*IOSPE* I² 352).

However, notwithstanding that the above-noted chronological and typological schemes have stood the test of time, my hypothesis on the character of Scytho-Chersonesean relations is now out of date. The results obtained during the subsequent one and half decades of the 'Chersonesean territory' project demand a revision of my views. The new interpretation, which I have reason to hope is more accurate, will be briefly presented below.

PROJECT: 'STUDY OF THE CHERSONESEAN TERRITORY (CHORA) IN THE WESTERN CRIMEA'

In the second stage of the Expedition, initiated in 1969, verification and a detailed working out of the chronological scheme previously developed were carried out. The regional research and palaeogeographic studies were proceeded with (Pl. 4, *3)*. However, the focus of the project became a more detailed archaeological investigation of the *chora* of Chersonesos as one of the structural elements of the Greek colonisation in the Black Sea area. This objective was achieved through long-term excavations at some previously selected 'clean' Chersonesean sites – the ones that had not been disturbed by Late-Scythian fortresses. The main targets for excavation in this period became the settlement and necropolis of Panskoye I (1969-1994);[16] Panskoye III (1978)[17] – an unfortified farmhouse of the 4th-early 3rd century B.C.; a 4th-2nd century B.C. one-towered fortified farmhouse typical of Chersonesos in the Bay of Bolshoi Kastel (1981-1986); and the remains of a sanctuary of the 2nd century B.C. in the *urochishche* (isolated forest-steppe area) of Ğangul (1983-1984).[18] Special attention was paid to the search for and investigation of the remains of the Greek cadastral system in the north-western Crimea (1980-1985); the study of the cadastral system in the south-western Crimea – in the close vicinity of Chersonesos itself – also continued. This was done by means of analysis of aerial photographs and by surface surveys (1980-1996). It was in those years that a large land-division system occupying an area of more than 100 square kilometres in the western part of the Tarkhankut Peninsula was identified (Pl. 4, *2*), and the mapping of the cadastral system on the Mayachnyi Peninsula was completed. The results of these projects constituted one part of the material for compiling an archaeological and topographical atlas of the western Crimea.[19] Between 1970 and 1980 were conducted archaeological and geophysical experiments concerned with the application of remote sensing methods for studying the layout of buried structures and the physical properties of cultural deposits before, or without any, excavation.[20]

On the basis of the material obtained through these projects, the following more precise historical model may be proposed. At the turn of 5th-4th century or at the very beginning of the 4th century B.C., new settlements appeared on the coasts of the north-western Crimea, founded by representatives of the Ionian Greek culture that came, most probably, from the Lower Bug regions (from Olbia or its surroundings). It seems that during this period Kerkinitis and the entire north-western Crimea belonged to the sphere of Olbian economic interests. However, about the middle of the 4th century B.C., following the territorial expansion

of the Doric Chersonesos, this territory became a part of the latter. The archaeological evidence suggests an aggressive character in that expansion and possibly even a military conflict between Chersonesos and Olbia. A second stage of intensive Chersonesean colonisation of the region belongs to the last third or quarter of the 4th century B.C.[21]

A combined consideration of the archaeological sources and some important Chersonesean inscriptions (*IOSPE* I^2 401; Solomonik 1984) enabled me jointly with Yu.G. Vinogradov to suppose as already suggested by V.V. Latyšev (Latyšev 1909) that at the turn of 4th-3rd century B.C. certain political disturbances occurred within the Chersonesean state that resulted in splitting the society in two. Even a degree of military conflict between the two parties cannot be ruled out. It is just during this period that the desertion of the isolated farmhouse of Panskoye III took place, as well as the fortifying of house U13 with a tower built into one of the rooms.[22]

It has been reliably established that in the first third or quarter of the 3rd century B.C. there took place a total devastation of every one of the Chersonesean settlements in the north-western Crimea, including Kalos Limen (the town-site of Chernomorskoye = Ak-Mechet) and the town of Kerkinitis. If one compares this occurrence with similar and synchronous events in other regions of the Black Sea area (the Eastern Crimea; regions of the Lower Bug and Lower Dniester; territories that made up part of Bosporos; Olbia, and, possibly, Nikonion) as well as with the sudden disappearance of the north Black-Sea steppe Scythian culture from the historical scene, it becomes evident that my previous supposition of a prolonged Chersonesos-Scythian conflict in the 3rd-2nd centuries B.C. is not justified. The hypothesis most probable for the present is that the destruction of rural territories of Chersonesos and other Greek states in the Black Sea area as well as the disappearance of Scythian culture of the Dnieper and Crimea must have been due to the crushing incursion and ensuing devastation of Scythia as so vividly though briefly described by Diodorus (II, 43).[23]

The settlements of the north-western Crimea perished in fires in the early 3rd century B.C. and lay in ruins for a long time. Some of them (including Panskoye I) were deserted ever afterwards. However, in the second half or at the very end of the 3rd century B.C. many of these sites were occupied again (*e.g.* Bolshoi Kastel, Oirat, Chaika).

The final and total destruction of Chersonesean settlements in the north-western Crimea evidently occurred not later than the second quarter or half of the 2nd century B.C. This devastation is fairly well recorded in the material from excavations of the fortified farmhouse of Bolshoi Kastel and the sanctuary in the *urochishche* of Ğangul. The appearance of Late-Scythian fortresses belongs to the same period, and these fortresses were built on the ruins of the former Chersonesean fortifications. Probably it was during this period that Chersonesos lost its territories in the north-western Crimea. Thus, according to the archaeological evidence, the appearance of the Late-Scythian sites is not to be dated to the earlier period. This fact, in its turn, demands a new look at the questions concerning the emergence of the Late-Scythian culture in Crimea and the rise of the Late-Scythian kingdom.[24]

THE SETTLEMENT OF PANSKOYE I AND ITS SURROUNDINGS

THE ARCHAEOLOGICAL AND GEOGRAPHICAL MICRO-REGION NEAR THE BAY OF YARYLGACH: THE MODERN AND ANCIENT LANDSCAPES

The steep north-west coast of the Tarkhankut Peninsula, washed by the waters of the Bay of Karkinitis, presents an almost even contour. Along its whole length, it is collapsing and

receding under the influence of the sea. According to our observations over ten years, the erosion rate is extremely high. In some areas of actively eroding limestone cliffs, at the edge of which the ancient settlements are situated, it amounts to 7-12 centimetres per year.[25] At about the middle of the eroded coast, the shore line is breached, and here is a sizeable depression which forms the Bay of Yarylgach (otherwise Yarylgachskaya Bay) – the largest such bay on the Tarkhankut Peninsula. It cuts almost three kilometres into the land, while the distance across its entrance is three kilometres. In its interior the bay widens out to 4.4 kilometres. On the south-west and the east, the large but shallow salt lakes of Panskoye (the old name was Sasyk), Ğarylgach, and Olenye (Karlav) adjoin the bay, but are separated from it by barriers of sand and sea-shell accumulations. At the southern end a very shallow nameless lagoon, with a growing but not yet quite closed sand barrier, is connected to the bay (Pls. 4, *1* and 177-178).

The bay, together with the lake system and the territories surrounding it, forms a distinct micro-region – a landscape that covers a relatively small area (of not more than 50 square kilometres).

A low flat coastal plain, from two to four kilometres wide, covered with steppe surrounds the bay. From the south-east it is screened by a low flat-topped ridge – the Ğangul Rise (*Uval*) – reaching up to 130-140 metres above sea level, its rocky undeveloped soils overgrown by semi-desert vegetation. To the north-east of the Bay and Lake Ğarylgach there is the low Bakal Rise up to 50 metres above sea level, with chernozem soils covering its flat top. To the west the plain stretches for about ten kilometres, gradually rising along the foot of the Ğangul *Uval* as far as the Bay of Chernomorskoye (former Ak-Mechet or Uzkaya) – the Καλὸς λιμήν of ancient literary and epigraphical sources.

The plain is covered by fertile soils of the southern carbonate chernozem type formed on Tertiary limestones and partially on Quaternary limestones and loams. The land is now arable, and planted with modern cultivated crops (wheat, maize, and vines). Only some very small parcels (including the area of the settlement of Panskoye I and its necropolis), which have not so far been ploughed up, preserve remains of the virgin steppe vegetation.

The modern system of settlement in the vicinity of the Bay of Yarylgach differs in principle from the one existing in ancient times, which has been identified by excavations at archaeological sites. The modern settlement system was evidently formed before the end of the 18th century and was first recorded on early detailed Russian maps of this region. The Tartar villages, later Tartar and Russian ones (from the 19th century) and subsequently Russian and Ukrainian ones (since the 1960s), are situated (with only one exception) far from the seashore, on the slopes close to the foot of both the Ğangul and the Bakal *Uvals* (Pl. 178). Such a tradition, which was not violated till the 1960s, arose in the first place from a local economy based mainly on pasturing (sheep-rearing) in the conditions of an arid steppe zone with only insignificantly developed agriculture. It is noteworthy that even the intensive development of arable farming in the 20th century has not changed the traditional settlement system very much. However, this fact finds other explanations that are beyond the scope of our consideration.

By contrast, the ancient (Greek) settlement system was closely connected with the sea coast and the shores of the lakes, one of the settlements (Panskoye IV) having been found at the bottom of the lake bearing the same name (Pl. 179, *A*). Such a situation enabled us to suppose, that not only the economic and cultural character of the inhabitants of the plain (*i.e.* Greek settlers) but also the type of the natural landscape was of importance in the ancient settlement system. The test of this inference necessitated carrying out a special archaeological and palaeogeographical study of the immediate vicinity of the settlement of Panskoye I

out with the aim of reconstructing the ancient natural and cultural landscapes. The data obtained in the course of previous researches was also used during this study.

Lake Panskoye (Sasyk) is about 4.5 kilometres long from west to east, and about 1.0 to 2.15 kilometres wide; its area is about 4.5 square kilometres. The maximum depth is 1.1-1.2 metres. It is separated from the Bay of Yarylgach by a barrier of sand and sea-shell accumulations about 150 metres wide. The water level of the lake was in former times higher than the sea level in the bay, varying in different years from 0.2 to 0.4 metre above that of the sea. But in the early 1970s, when the construction of a sea port began, a channel was dug through the barrier. After this the water level in the lake naturally sank and became equal to that of the sea.

The first geological and limnological description of Lake Sasyk (Panskoye) and its surroundings was made by A.I. Dzens-Litovskij in 1933.[26] In 1945 the Bay of Yarylgach was studied by the oceanologist V.V. Longinov as a member of the expedition of The Institute of Oceanology, Academy of Science of the USSR, directed by V.P. Zenkovič.[27] At the very end of the 1950s, the region of Lake Panskoye was investigated by the geographer P.D. Podgorodeckij.[28] His researches revealed that the Bay of Yarylgach and the lakes adjacent to it were formed as a result of ingress of the sea, in the course of which the water submerged the mouths of *balkas* (gullies) situated along the axis of the synclinal depression. The axis of the syncline passing through lakes Panskoye and Ğarylgach is practically parallel to the Kara-Burun anticlinorium (the Ğangul Anticline).

The geological, limnological, and oceanological studies mentioned above were not linked together in one project, and for that reason a number of major problems remained unsolved. These problems are related to the *causes* of the ingression and the subsequent genesis of the bay, lakes, and sand barriers, as well as to the absolute chronology of the events.

One hypothesis, first grounded by A.I. Dzens-Litovskij, explains the formation of the bay and lakes by vertical tectonic movements – a lowering of a wing of the Kara-Burun anticlinorium. According to P.D. Podgorodeckij, some areas of the eroding shore of Lake Panskoye show a continuous sinking of the land. However, V.V. Longinov did not find any traces of synclinal sagging in the mouths of the submerged *balkas*. He came to the conclusion that the bay, lakes, and sand barriers between them were formed not as a result of a tectonic sinking of the land but in the process of a rising of the sea level, the barriers not having shifted from their places since the time of their formation. V.P. Zenkovič did not consider the causes of the ingression in particular and was not concerned with the absolute chronology of the shore dynamics. However, he built the following model for the genesis of the bay and lakes: in the period when the sea level was 10-12 metres lower than the modern one, the bay was quite small and the lakes did not exist. Later, as the sea level rose because of tectonic or eustatic factors, the sea flooded the synclinal vales, and it was in their places that the lakes separated from the bay by barriers were formed. It should be noted that, based on observations in the Bay of Karkinitis, the value mentioned (equal to minus ten or twelve metres according to the calculations of E.N. Nevesskij) corresponds to a time period of 3000-2500 years ago (or 10th-5th centuries B.C.) for the sea level. According to other evidence, the minimum level of the Black Sea occurs in the middle of the first millennium B.C. and corresponds with the so-called 'Phanagoria' Regression phase identified by P.V. Fedorov. Different scholars define this level as being from minus three-five (P.V. Fedorov, N.S. Blagovolin, A.N. Ščeglov) to minus nine-ten metres (A.B. Ostrovskij, K.K. Šilik) in relation to the modern sea level.

The divergences of opinion outlined above are explained to a certain degree by the fact that the archaeological objects found on the lake shores and at its bottom were not known to

the scholars concerned and hence reliable chronological reference points for the observed facts were not available to them. This compelled us to undertake a new series of archaeological and palaeolandscape research (*cf.* Appendix I):

1. Observations conducted since 1969 show that the erosion of the shores of Lake Panskoye diminished after the digging of the channel that connects the lake with the sea. The lake level has sunk and now corresponds with the bay level. As a result, some low-lying areas in the vicinity of the settlement of Panskoye I that had formerly been boggy or under water were drained; as also was the lagoon with an area of one hectare in the eastern part of the lake that had previously flooded and washed away a part of the settlement.
2. Geoacoustic research undertaken along two profiles across the Bay of Yarylgach and underwater visual observations revealed the edges of two submerged terraces at depths of -3 and -4 metres. They probably correspond to lower sea levels from the times when the bay shores lay about 150 and 300 metres respectively away from the modern ones, and the west side of the bay facing the sand barrier of Lake Panskoye was about 400 metres wide. The height of the edge of the second submerged terrace is over one metre.
3. A geophysical study of the beach barrier by resistivity surveys revealed the presence of two buried *balkas* cut into the bedrock. Subsequent drillings in the barrier and in the lake showed that in the north part of the lake two very deep *balkas* meet; the beds of these *balkas* are filled with silts, above which are the lake water and the bulk of the barrier. At the watershed between the *balkas*, 800 metres to the south-west of the settlement of Panskoye I and at a depth of about three metres, building stones, fragments of tiles, Chersonesean amphorae, and household pottery were found during dredging work. The material was found on the surface of the limestone bedrock in the lake silt deposits. The character of the finds indicates that there was an isolated structure here, probably a farmhouse (Panskoye IV) which can be dated summarily to the 4th-3rd centuries B.C.

Another farmhouse – that of Panskoye III (the 4th or the turn of 4th-3rd century B.C.) – was excavated by us on the north-west shore of the lake, 3.2 kilometres to the south-west of the settlement of Panskoye I. The coast here is subject to severe erosion. The remains of the house are located on the very edge of a small precipice, 1.6-2.0 metres high. Almost half of the house has been ruined in the course of modern erosion of the shore. Exploration of the bottom of the lake showed that at a distance of 10-12 metres from the eroded precipice and down to a depth of 0.6 metres there is a slightly sloping bench with an almost flat rocky surface; further down liquid silts begin. The maximum depth in the middle of the lake opposite to the settlement of Panskoye III does not exceed 0.9 metres.

A comparison of all the evidence led us to the conclusion that Lake Panskoye within its modern limits was formed some considerable time after the destruction of the settlements, the remains of which lie now on its shores and at its bottom. Thus, the lake took on its present shape much later than the 3rd century B.C. During the existence of the settlements, in the 4th-beginning of the 3rd centuries B.C., the sea level must have been at least five metres lower than the modern one, and possibly even more. The Bay of Yarylgach was narrower. Lake Panskoye did not exist: in its place there was a low coastal vale or a depression covered with fertile soils and crossed by two *balkas* joined at their mouths. One of the *balkas* stretched along the valley and along the axis of the synclinal lowering, the second ran across the syncline from south to north. It had its origin on the northern slope of the Ğangul *Uval*. The remains of the farmhouse Panskoye II lie on the slope of this *balka*, not far from where it falls into the south-west part of the lake, and on the right bank of the same *balka*, not far from the mouth, the settlement of Panskoye I was situated. The latter was the largest unit, and un-

doubtedly represented the centre of this agricultural oasis. Isolated rural houses (*e.g.* Panskoye II, III) were situated at the edges of Panskoye I and some including Panskoye IV were located within the valley. On the bottom of the lake, remains or traces of some other structures of the same type are likely to be found.

One may suppose with a fair degree of probability, that the mouths of the *balkas* were submerged and presented narrow bays or inlets of the ria type. It is possible that the barrier, though subsequently shifted seawards, already existed at the time. Probably it was not closed and ships could sail directly to the settlement of Panskoye I.

Thus it seems likely that the lake was formed as a result of the modern transgression, probably complicated by some slight tectonic movements. However, the submerging of the fertile maritime basin occurred after the catastrophic destruction of the settlements at the beginning of the 3rd century B.C. (Pl. 4, *3*).

There are reasons to suppose that in the 4th-early 3rd centuries B.C. the vegetation and climate in the micro-region under discussion differed from their modern counterparts.

Small areas of the Tarkhankut landscape that have not undergone long-term ploughing, are covered at present with typical steppe vegetation, or with a steppe vegetation transformed by many years of cattle pasturing. This applies to the territory of the settlement of Panskoye I and its necropolis as well as to a tiny plot of land near the settlement (or farmhouse) of Panskoye III. Here, there are numerous types of Lessing feather-grasses (*Stipa lessingiana* Trin. et Rupr.), hairy feather-grasses (*Stipa capillata* L.), Ukrainian feather-grasses (*Stipa ucrainica* P. Smirn.), as well as of Wallis fescue (*Festuca valesiaca* Schleich. ex Gaud.), couch-grasses (*Elytrigia elongata* (Host.) Nevski), crested wheatgrass (*Agropyron pectinatum* (Bieb.) Beauv.), Junegrass (*Koeleria cristata* (L.) Pers.) and other wild cereals. Motley grasses are represented by endemic Tauric asphodelinae (*Asphodeline taurica* (Pall. ex Bieb.) Kunth), wilting sages (*Salvia nutans* L.), flax (*Linum tauricum* Willd.), prickly *zopnik* (*Phlomis pungens* Willd.), Shrenk tulips *(Tulipa Schrenkii* Rgl.), steppe irises (*Iris pumila*), different species of *kermek* (*Limonium*), and cloves, as well as by some other ephemerae, ephemeroides, and perennial plants. Of subshrubs, among other species of wormwood, the Crimean wormwood (*Artemisia taurica* Willd.) is the most widespread. Thyme (*Thymus*) and astragalus (*Astragalus*) are also found. Along the banks of the lake, especially at the submerged areas of the settlement of Panskoye I, the salt-marsh plants are widespread. Here, *sarsazan* (*Halocnemum strobilaceum* (Pall.) Bieb.), saltwort (*Salicornia europaea* L.) and sea-blite (*Suaeda prostrata* L.) form continuous fields of red, crimson, and green with shoots of flowering lilac *kermek*, dove-coloured wormwood, and green warty goosefoot (*Halimione verrucifera* (Bieb.) Aell.). On the sand barrier between the bay and the lake, clumps of sea-holly (*Eryngium maritimum* L.) are widespread.

The vegetation covering the area of Panskoye I and its surroundings forms today one of the few unique natural floral landscapes still preserved in the Crimean steppe. However, it is not the original vegetation as is evidenced by the palaeobotanic data.

During excavations at the settlement of Panskoye I and its necropolis, charred and unburned remains of wood from downy oak (*Quercus pubescens* Willd.), juniper (*Juniperus* sp.), and beech (*Fagus* sp.) were found. The same and some other deciduous species, except for the beech, have been reported from other synchronous Greek coastal settlements in the north-western Crimea. It is of importance that the samples consisted mainly of charcoals which had formed from small branches constituting hearth trash. Moreover, from the filling of a well dated to the first quarter of the 4th century B.C. at Panskoye I, seeds of wild vines (*Vitis silvestris* C.C.Gmel.) and stones of domestic olives (*Olea europea* L.) were recovered. At another ensemble dated to the turn of 4th-3rd century B.C. 27 fruits, evidently of wild oleaster, were found. Among the ethnopalaeobotanical material from excavations in the north Black Sea region, oleaster is here recorded for the first time.

The excavation evidence thus suggests that both trees and shrubs grew in the vicinity of Panskoye I as well as in other coastal areas of the north-western Crimea. Accumulations of the shells of garden and vineyard snails (*Helix vulgaris* Rassm.) often found in the cultural layers present a further indication of the existence here of tree and shrub biotypes. Hence, it is justifiable to suppose that the shallow fertile depression crossed by *balkas* and now lying under Lake Panskoye (Sasyk) had a forest-steppe landscape formed by plant species of Sub-Mediterranean type. This fact allows us to form an idea about the climate (microclimate?) of the basin under discussion.

The climatogram of the genus of *Vitis* indicates a monthly minimum average temperature of -4°C for January. The olive-tree is also adapted to a climate with warm moist winters and hot dry summers. Its climatogram has an average index equal to -3°C for January. For the growth of such heat-loving trees as beech and downy oak, too, a warmer and moister climate than the modern one is necessary. One of the factors influencing the spread of beeches is an average annual precipitation that must exceed by 100 millimetres the modern level for the Tarkhankut Peninsula. A southern plant such as oleaster is distinguished by its drought- and salt-resistance and its adaptability to both heat and cold: it grows well in low, saline places. In our case, it may be supposed that thickets of oleaster were widespread in the immediate vicinity of the settlement, along the banks of branches of the Bay of Yarylgach, and possibly even within the settlement itself.

These facts suggest that the climatic conditions in the agricultural micro-region under discussion – the fertile depression on the site of the modern Lake Panskoye – were very favourable in the 4th and at the beginning of the 3rd century B.C. The average temperature in January, according to the above-mentioned data of the climatograms of plants must have exceeded the modern temperature by approximately 3°C. It seems likely that during the whole period of the existence of the Greek settlements there were mainly mild winters and, possibly, rather lower summer temperatures compared with the modern ones.

THE SETTLEMENT AND NECROPOLIS OF PANSKOYE I – A BRIEF DESCRIPTION

General Topography, and State of Preservation

The settlement is located in the north-western sector of a low, flat, narrow isthmus that protrudes in the form of a cape into the Bay of Yarylgach between Lakes Panskoye and Maloye Solenoye. The isthmus is 600-800 metres wide. Almost the whole of it is now ploughed up. The settlement lies on the limestone bedrock shore of a shallow boggy lagoon separated from Lake Panskoye by a narrow secondary barrier of sand and shell-accumulations (Pl. 177). The axis of the settlement lies from north-west to south-east. Its length is about 300 metres and its preserved width is about 170 metres. The entire extent of the settlement is about four hectares; however, traces of intensive building are discernible over an area of only 2.8 hectares, the northern and south-western parts of the settlement (that is approximately two hectares more) having been submerged or turned to bog by the lagoon waters (Pl. 5). The cultural layer and virtually all remains of any buildings that stood on the ground now occupied by the lagoon have been washed away and destroyed both by the rise of the waters of the lake and by the fluctuations in their level related to the processes of the shore erosion. Of the buildings that were located within the lagoon area, only some remains of the walls of house U14, and some remains of house U13, half destroyed by erosion (Pl. 6), have survived.

There is an ancient road running along the north-east side of the settlement. Such remains of it as may be traced in the ground are preserved in the area that has never been

under the plough. The road starts on the cliff directly above the shore of the bay (an additional evidence of the marine ingression) and runs south-west in a straight line. An analysis of aerial photographs has enabled us to trace its course even further, for almost two kilometres, through a field that has been ploughed up for growing cereals. For part of its length it runs near and parallel to a modern field road.

Beyond the road lies a necropolis with both kurgans and unmounded graves. It stretches alongside the road as a strip 230 metres long and 150 metres wide (Pls. 5 and 6). In an area of about 3.5 hectares there is a dense accumulation of kurgans varying in height from ten centimetres to two metres. They form groups in the shape of clusters and chains, and number over 60 visible burial mounds which have also been documented by aerial photography. There is another small and separate group consisting of four kurgans 200 metres south-east of the main area. Probably there was a necropolis with unmounded graves located between the two groups of kurgans. But the fact that the land in this area is in constant cultivation has prevented us from checking this conjecture.

The settlement, the remains of the road, and the necropolis present a single archaeological ensemble and the main elements of a non-urban type of community. Considering the strictness of the layout and the size of this settlement, it was quite possible to suppose, even before excavations commenced, that it had no parallels in the *chora* of any Greek colonial settlement either in the Black Sea area or in the Mediterranean. It was clear that we had come across a settlement of a new type, and moreover, a settlement and necropolis that were exceptionally well-preserved.

At the time of its discovery the major part of the settlement area and the northern part of the necropolis were covered by untouched steppe vegetation and had not been significantly damaged. The general features of the layout were clearly visible to the eye and were especially apparent on aerial photographs. Here and there on the surface of the settlement site, there was slight evidence that certain of the stones had been broken off from ancient buildings. This probably occurred around the end of the 19th and the beginning of the 20th century, when there were several salt pans at the lagoon near the site. Buildings related to those salt-works were put up to the south of the settlement. However, it cannot be ruled out that in the search for ready-cut building stone, people came here from the villages four kilometres to the south near the foot of the Ğangul *Uval*. In addition to these relatively old disturbances, two small but deep trenches were dug in 1960 by a local bulldozer operator hunting foxes. He also damaged one of the kurgans in the necropolis. Finally, part of the north-eastern outskirts of the settlement and the southern group of kurgans have been destroyed by long-term ploughing of the fields and clearing them of stones.

Explorations

The kurgan group on the cape near the Bay of Yarylgach was plotted on Russian military maps in the 19th century. It was described for the first time by P.N. Schulz in his field diary during his survey of 1932. At the end of 1963 I received a letter from G.I. Aleščenko, a local resident, in which he informed me that a kurgan had been damaged by a bulldozer near the Bay of Yarylgach. During a survey by the Tarkhankut Expedition project of 1964 which included an inspection of the damaged kurgan, a large and previously unknown settlement was discovered lying not far from the kurgan group. Immediately, a preliminary plan of it was drawn and a stratigraphic trench dug, while the Palaeogeographic Detachment of the Expedition prepared a geomorphological description and explored the erosion and accumulation of the shores in the region of the settlement (*cf.* Appendix I). In the same year the settlement was inspected by members of O.D. Daševskaja's expedition.

In 1967 a stratigraphic pit 0.5 × 3.0 m was sunk in the internal courtyard of the building near the well (square G-4).

Regular excavations of the settlement and its necropolis began in 1969 and continued till 1994. During that period, the Settlement Detachment of the Expedition excavated a monumental building in area U6 on the south-eastern outskirts of the settlement, the central area U7, the northernmost structure (U13), the remains of house U14 located in the lagoon, and houses at the north-eastern edge of the settlement in area U2. In the final year, excavations in area U10, on the southern outskirts, were started (Pl. 6). Altogether, an area of about 7,000 square metres has been explored covering approximately 25% of the total area of intensive building. The main objectives that were set during the exploration of the settlement were as follows: (*1*) to excavate the monumental building U6; (*2*) to study the topography and layout of the buried buildings by means of remote sensing; (*3*) to elucidate the stratigraphy and planigraphy of the central area U7; (*4*) to explore the limits of the settlement. These objectives determined the selection of the areas for investigation. Attention was focused mainly on studying the stratigraphy and building remains related to the latest periods of the history of the site.

In the period 1969-1985 the Kurgan Detachment excavated 33 kurgans and several dozen inter-kurgan unmounded graves in the central part of the necropolis. Four kurgans that had been severely damaged by grave robbers (including two in the southern group) were explored later.

Between 1970 and 1980, besides excavation, the Archaeological and Geophysical Detachment carried out an experimental investigation of the settlement by means of remote sensing. The first attempt at such investigation was undertaken in area U6. Subsequently, over a period of ten years, and on the basis of a fixed net of observation points an analysis of aerial photographs, survey of microreliefs, geobotanic cartographic recording, resistivity survey based on symmetrical profiles and magnetometry survey were carried out on two test grounds including the central area U7 and area U13. Also, experiments were conducted on the use of kappametry and the so-called biophysical method of surveying (dowsing). The experiments were intended to throw light on the possibilities and limitations of each method for classical archaeology, and above all, to determine the possible benefits of combining different methods of remote sensing to elucidate the layout of buried remains and physical features of cultural layers prior to excavation. At the same time the efficiency of different scientific instruments (various types of opto-mechanical, proton, and quantum magnetometers) for archaeological and geomagnetic survey was tested.

The Main Results

During excavation of the central, *i.e.* the most ancient, part of the settlement (U7) two main horizons of the cultural layer – the upper A and lower B – were identified. To these horizons four main building periods were related. The stratigraphy and planigraphy of the settlement are well synchronised with those of the necropolis. The relationship of the structural and temporal elements of the archaeological assemblage enabled us to reconstruct with a fair degree of probability the principal features of the structure and to identify the main periods of the history of this area from the time of its first occupation and down to the moment of its sudden destruction.[29]

NOTES

1. Schulz 1937; 1941.
2. *Cf.* Artamonov 1948; Tjumenev 1950; 1955; Solomonik 1952; Grakov 1954; Daševskaja 1954.
3. Beginning in 1959 information on the work of the Expedition was regularly published in the annual 'Archeologičeskie Otkrytija'. For particulars of the general conclusions, *cf.* Ščeglov 1978, *passim* (with references); 1985, 3-5, 6 f.
4. Ščeglov 1963; 1965; 1978, 69-71, 85.
5. Ščeglov 1967, 249-256.
6. Daševskaja and Ščeglov 1965.
7. Ščeglov and Malikov 1963; Ščeglov 1965, 141 f.; 1967a, 212; 1977. *Cf.* Wąsowicz 1972, 211-213.
8. Ščeglov 1967, 249-256.
9. Ščeglov 1978, 99 ff.; 1980a, 62 f.
10. Ščeglov 1978, 24 ff.
11. Ščeglov 1961a; 1961b; 1978, 109 ff.
12. Ščeglov 1978, 106. *Cf.* Jardé 1925, 32.
13. Ščeglov and Burdak 1965; Burdak and Ščeglov 1966; Ščeglov 1969; 1978, 114 ff.
14. Ščeglov 1968, 335 ff. For particulars *cf.* Ščeglov 1978.
15. Ščeglov 1978, 116-135.
16. Ščeglov 1987. For yearly information on the excavations see the annual 'Archeologičeskie Otkrytija', nos. since 1969.
17. The material from the excavations remains unpublished. For the plan of the farmhouse, *cf.* Ščeglov 1987, 259, fig. 2, *II.*
18. Bogoljubova 1988; Ščeglov 1988.
19. The material is partly published. *Cf.* Chtcheglov 1992, 225 ff.; Ščeglov 1993.
20. *Cf.* Ščeglov 1977; 1980; Vnučkov, Glazunov *et al.* 1977; Glazunov, Naumov *et al.* 1979; Alekseev, Vnučkov *et al.* 1980.
21. For particulars, *cf.* Ščeglov 1986a. Also *cf.* Ščeglov 1984, 45; 1985a, 84-86; Ščeglov and Rogov 1985, 86-88; Vinogradov and Ščeglov 1990, 321 ff. For criticism of the hypothesis on the supposed military conflict between Chersonesos and Olbia, *cf.* Zubar' 1998, 113 ff. However, the article arguing in favour of this hypothesis (Ščeglov 1986a) was unknown to the latter author.
22. For details of the military and political situation in Chersonesos at the turn of the 4th-3rd centuries B.C., *cf.* Vinogradov and Ščeglov 1990, 333 ff. Probably the destruction of a fortress on the isthmus of Mayachnyi Peninsula in the South-Western Crimea was related to the same events. *Cf.* Ščeglov 1994b, 37 ff.
23. *Cf.* Mačinskij 1971; Ščeglov 1985.
24. *Cf.* Ščeglov 1989; 1998.
25. Ščeglov 1978, 19.
26. Kurnakov, Kuznecov, Dzens-Litovskij and Ravič 1936.
27. Longinov 1955.
28. Pidgorodec'kyj 1961.
29. For details *cf.* Ščeglov 1987; Chtcheglov 1992, 238 ff., 268 ff.