REVIEW

of the Department of Geography,
University of Istanbul

International Edition
1997 Number 4

A GEOGRAPHICAL HERITAGE OF ANATOLIA : PAMUKKALE

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Humankind in countries wordwide, is gradually and increasingly getting more conscious and aware about ensuring delivery of the inherited natural and cultural values of the ancient to the generations coming. This process of becoming more aware and cognizant is not limited to territorial lands but covers all the world under the «World Heritage» concept.

As for one the most preeminent and significant of the globe's natural and cultural values, it was inherited from the geological eras and the antiquity in the lands of Anatolia. What we are trying to mention are the Pamukkale travertines and the Hierapolis town located at the ancient Lycos valley between Phrygia and Lydia of the antiquity or in the northeast part of Çürüksu river's valley at upper parts of Büyük Menderes River (Figure 1) While maintaining its important status for many branches of science, this region particularly and greatly concerns and is geography due mainly to the geographical conditions related with formation of travertine terraces enabling foundation of a town. Therefore, it should indisputably be agreed that Pamukkale is a geographical heritage of Anatolia.

This research study deals with the geographical conditions forming Pamukkale with respect to the past, current and future plans made considering the main aspect of Pamukkale, tourism. The principal aim is to ensure continuance of the conditions forming this paramount geographical heritage in balance with nature and human utilization.

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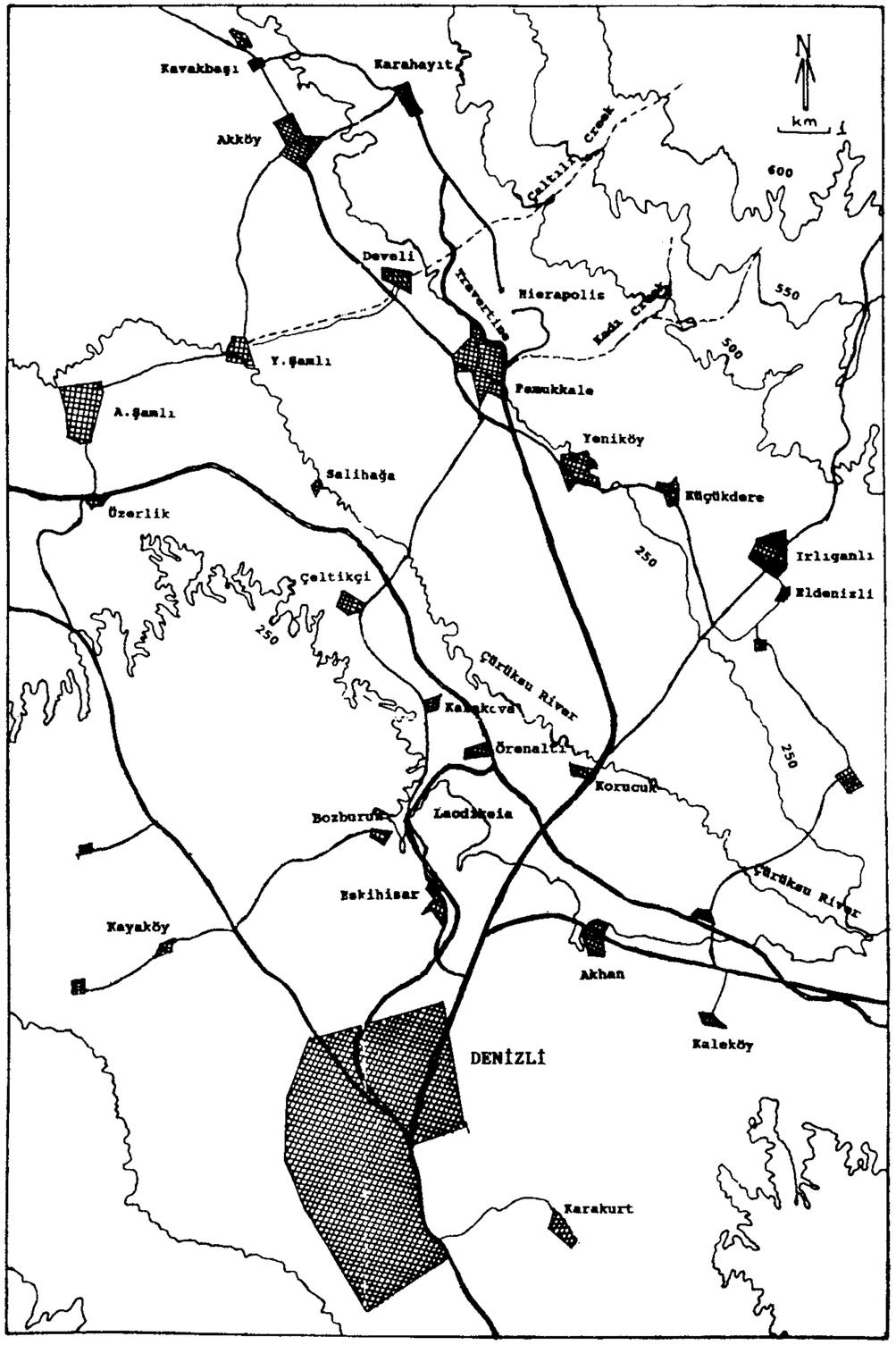

Figure 1 — Location of the Research Study.

A View To Pamukkale's Touristic Aspect

Pamukkale originally drew people's attention on itself in religious respect due to the underground originated hot waters and the poisonous gas emitted from a cave. Flourishing around the religious building erected at first sight, the town than drew the attention people from the surrounding regions and other parts of the empire owing to the healing effects of the hot waters. In this respect, it would not be much to say that a touristic movement which we can name as thermalism in today's words started in Pamukkale during eras of antique ages. Today, Pamukkale travertines, the thermal waters and Hierapolis town concern nature tourism, thermalism and culture tourism respectively.

Nature Tourism

The most attracting attribute of Pamukkale travertine region is the variation of travertine body (terraces, natural pool, channel, etc.). Whereas travertine formations are commoon around thermel spring waters or in caves both in Turkey and various parts of the world, those of Pamukkale are regarded as peerless owing to the area covered and properties such as their shapes and colors. This matchless visual beauty is mainly why Pamukkale bears so much importance for nature tourism. The Pamukkale travertines are natural monuments which have been formed upon concurrent occurrence of particular geomorphological, hydrogeological and climatological conditions at the same place. As for other important aspects of Pamukkale, one is the carbonate bedrock at the junction of the Büyük Menderes graben extending in east-west direction and the Gediz graben in northwest-southeast direction and the springing water finding its way through a web of cracks extending in various directions[1]. Natural factors such as the location of the thermal springs, their flow rate, the shape of the flank,

1 E. Altınel - P.L. Hancock «Active Fissuring and Faulting in Quaternray Travertines at Pamukkale. Western Turkey» Zeitsehrift für Geomorphologie Supplemantary vol. p. 286.

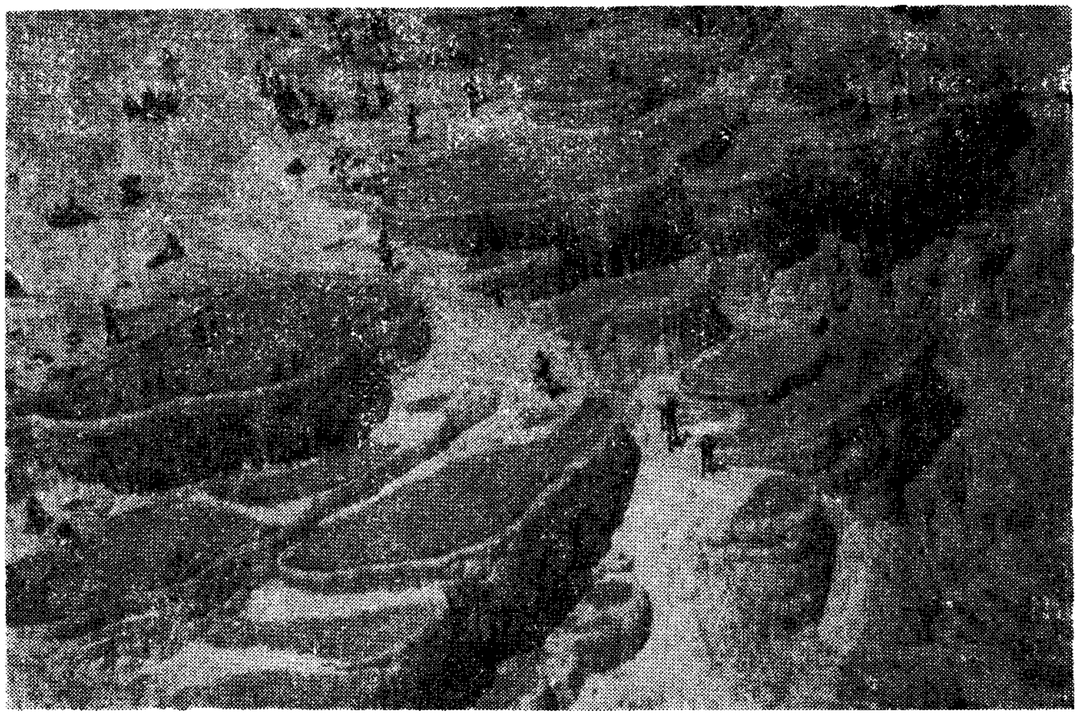

Photo 1 — Natural Thermal Pools of Pamukkale travertines.

Photo 2 — Pamukkale Self-built Channel Travertines.

first sight will be the antique town with the necropolis expanding on a large area and the remains of the theater and the hot bath. In the west direction of the town and the travertine terraces, the agricultural lands, villages (Akköy, Develi, Y. Şamlı, Pamukkale), rural appearance of Çürüksu valley and a geographical view of mountain chains between Honaz Mountain (2528 m.) bordering the valley and Babadağ (Akdağ, 2300 m.) come in sight. The travertines covering the zone from high levels towards lower are fastinating at each point. Besides this visual attraction, people's contact with the water at first level is undoubtedly more fascinating. However, such utilization of the travertines interrupt the formation of springs which are essential for attracting tourists. These shapes have evolved and are continuing their evolution under natural conditions. The calcium-carbonate crystals sedimenting in the pools and the terraces form travertines by hardening in time. In this respect, the natural travertine formation process has been interrupted by people's walking and swimming in the pools.

Thermalism

Even though first steps of settlement in Pamukkale was based on religious purposes, thermal springs have contributed a lot to the development of the town and its becoming known by others. The hot baths remaining from the Romans' time were used by the citizens and visitors coming from other parts of the country. Strabon (2nd century A.C.) writes, «there is plenty of water here and there are many natural pools and hot baths in the town»[3]. Despite benefiting from and becoming known by the thermal springs, Hierapolis town suffered much because of them due the earthquakes caused by the boundary fault which helps the underground waters to reach the surface. It is the presence of thermal waters which led people's continuing to settle at the place despite ruining earthquakes. The town was further maintained as a thermal spa during the Byzantine period. Although Turks did not

3 Strabon, Geographika, 13, IV, 14.

settle in the Hierapolis, the natural pool which formed upon sedimentation at the point where the water with the highest flow rate rose over the surface was used as an open hot bath by the surrounding villagers and citizens of Denizli. Construction of a pool and a closed hot bath in 1934 had been the first step in this course. Whereas the first scientific analyses were made in 1947, it was 1971 when suitability of the thermal spring water for balneotherapy was put forward. The analyses revealed that the water with a temperature of 35°C flow rate of 330 1t/sec. composed of bicarbonate, sulfate, calcium, sodium, magnesium and carbondioxide[4]. It is found to have positive healing effects on the diseases resulting from the circulatory system and rheumatismal synd--romes when used for bathing and on the digestion system when used in drinking cures. The most recent study on the thermal spring waters has been made by Hacettepe University under the Pamukkale Protection Project[5]. This study was firstly concentrated on searching the geological and hydrogeological characteristics enabling the formation of the thermal waters. A new conrete and covered channel system of 3500 m. length was built between the hot springs and travertines.

The thermal waters of Pamukkale in thermalism is limited to recreation in open pools. Healing with thermal water requires some time to stay, however, average stay period at Pamukkale's accommodation facilities is 1 day. There are no treatment facilities for thermal springs in Pamukkale and Karahayıt. In order to encourage development of thermalism for both local and foreign tourists, sanitary sections should become active in addition to the pools and hot baths.

Culture Tourism

The remains of the antique Hierapolis town located on the plateau bordered by the travertine terraces of Pamukkale enables maintaining both thermalism and culture tourism at the same

4 Türkiye Maden Suları 3, Ege Bölgesi (İstanbul, 1975), pp. 45-59.

5 Ş. Şimşek, Pamukkale Termal Kaynaklarının Geliştirilmesi ve Tracertenlerin Korunmasına Yönelik Hidrojeoloji Çalışmaları (Ankara, 1995),

place. The remains of the antique town cover a large area of 1000x800 m. among elevations of 370-450 m. on the plateau bordering Çürüksu plain in northeastern direction at the lower skirts of K. Çökelez Mountain towards southwest. There are a few basic prevailing factors in chosing this location for settling and developing. Inspired from the poisonous gas (CO_2) emitted from the cave and the thermal underground waters, first steps of settling appeared by building a temple at the opening of the cave to reach Hades, the god of mortal world. The religious function of the town which increased afterwards continued during the periods that followed. The geographically superior characteristics of the town's original location greatly contributed to development of other functions. Watching over the Mt. K. Çökelez and its north and northeastern parts, the town's location at 400 m. altitude enabled control of a very large area between Babadağ and Mt. Honaz which bestowed a prominent status to the town as a military colony during the period of Pergamus Kingdom. Then it became a thermal spa while under the sovereignty of the Romans owing to the healing thermal waters. The facility of communication provided by Çürüksu and B. Menderes rivers connecting the town with important trade centers helped the commercial activities flourish. Today, Pamukkale village takes over the position of a thermal spa, while Denizli carries out the commercial activities.

Excavations and restoration works in Hierapolis started in 1957 by Torino University and in 1974 by Lecce University of Italy still continue today. The Apollo Temple, baths, churhes, two theaters, St. Phillip's mausoleum, fountains and necropolis are quite interesting and attracting sight for culture tourism (Photo 3). Monumental gateways opening to important trade ways exist at two ends of the columnar main avenue bisecting the city in north-south direction. Roman gateways remained out of the city as Byzantine ramparts did not enclose the entire vity. Today, there are two gates named «north gate» and «south gate» built under the new plannings and put into service in 1995. Access of the tourists to the city is provided through Turkish, Roman and Byzantine gateways. The Byzantines did not erect any ramparts around the travertine area whereas they surrounded the city in

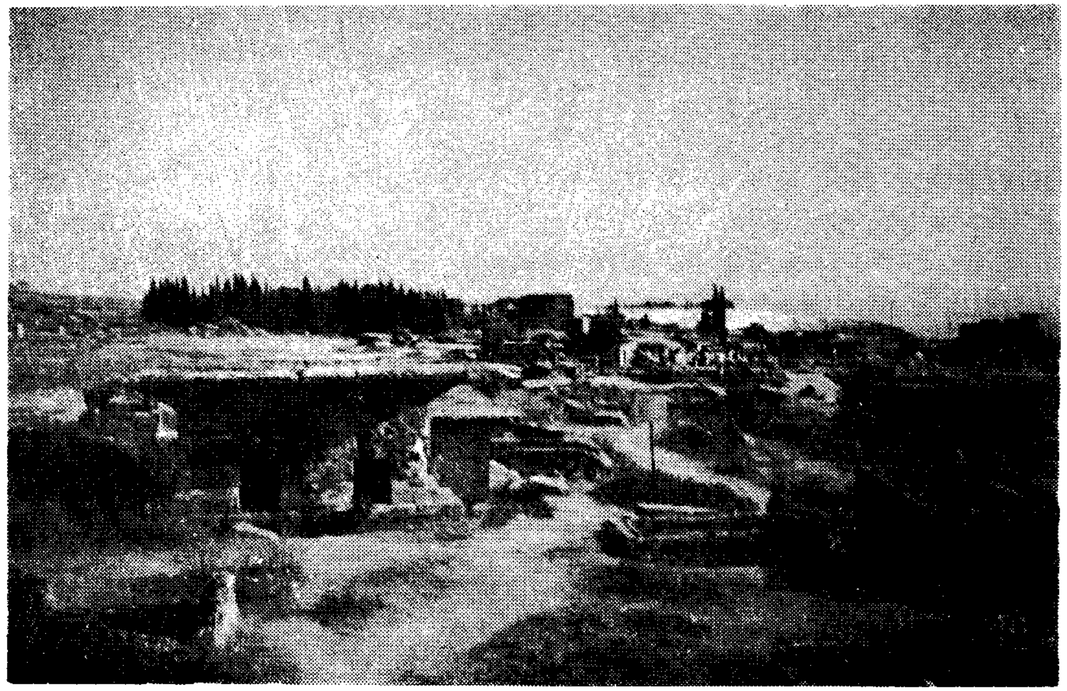

Photo 3 — Northern Cemetery of Hierapolis Town.

north, south and east directions. Recent archaeological excavations have revealed ruins of Seljukian ramparts nearby a touristic facility (Tusan Motel) in this direction. Predictions suggest the presence of a Seljukian castle possibly built over a Byzantine castle but research cannot be proceeded as the mentioned accommodation facility is founded thereon. It is also assumed that the place is named as Pamukkale (Cotton Castle) after the castle built on the travertines resembling piles of cotton grown.

The most attractive archeological sights of the Hierapolis antique town are the Roman theater, northern cemetery, Roman and Byzantine gateways in the north and south respectively and the northern part of the columnar avenue. Three closed sections of the Roman hot bath were opened for visitors as a museum after 1984 in consideration of culture tourism. Now the hot bath, theater and the travertines are lightened at night after some arrangements made in 1996.

The Past, Today and the Future of Pamukkale

Pamukkale has always been subject to the effects of human utilization after the travertine terraces and the travertine plateau were rendered apropriate for settlement. The plateau permanently hosted many settlers between 2nd-12th centuries A.C. Though direct effects of human beings on the travertines and the thermal spring waters during this period are not obvious today, it is understood from the remains of hot baths and channel travertines that thermal water was taken to hot baths and to channels. After settlement ended in 13th century, the thermal water was used for irrigation purposes in agricultural fields of settlements starting in Çürüksu plain in the form of farms than being turned into villages during the Seljuks and Ottomans. While settlement was mainly based on the thermal water during the antique ages (Hierapolis), agriculture in the plain constutited the basic reason of settlement during the Seljukian and Ottoman periods. Today, it is clear that Hierapolis stood up in remains at the end to the 19th and in the beginning of the 20th centuries and the thermal waters were used for irrigation purposes in the plain and for bathing in a natural pool formed by accumulation of water in a depression zone. In the beginning of the Republican period, the Pamukkale travertines had turned into a daily visiting sight frequented by people from Denizli and the surrounding villages for daily stays of for a few days to spend in tents. Not provided with any service facility, transportation to the place could only be made through village roads which served at the seasons of no rain. Upon increasing interest of student groups on Pamukkale, in 1934 studies were commenced to arrange transportation from Denizli and the road passing through Denizli-Eskihisar-Goncaali-Karakova-Çeltikçi to Ecirli (Pamukkale) village was brought into a good condition to allow transportation in every season[6]. An open pool and a closed hot bath were built at the natural lake of thermal water and a footpath climbing up to the travertines was made. By 1950s, increasing demands led to the provision of basic requirements such as municipal water, telephone and mailing services and the

6 F. Akçakoca Akça, Pamukkale Suları (1946, İstanbul), p. 19.

surrounding was planted with trees[7]. It was 1957 when the first accommodation facility was built in the travertine area and when Italian archaeologists started excavations in Hierapolis. The most remarkable development of the 1960s was completion of Pamukkale-Denizli motorway (1964) passing through Çürüksu plain which is still in use today. However, asphalting of the footpath serving as an xetension of this motorway resulted in the detrimental effects which have been carried to the present. Construction of the second accommodation facility in the travertine area (1962) was followed by the first hotel in Ecirli (Pamukkale) village (1964) and the third (1964) and fourth (1967) and the fifth (1970) accommodation facilities erected in the area, the final being the last one built since then (Figure 2). Utilization of thermal waters which provided the formation and whitening of the travertines and then flowing down through the irrigation of the plain in touristic facilities has brought up the question of darkening of the travertines. Efforts for turning Pamukkale into a national park for protective aims were to no avail. Scientific analyses concluded in 1971 heralded suitability of the thermal spring water for thermalism. Then in 1983, the Ministry of Tourism prepared the Pamukkale Development Plan. Another remarkable improvement in Pamukkale's tourism was being announced as a Tourism Center covering Pamukkale and Karahayıt villages (1986). New touristic accommodation facilities were built in Pamukkale and Karahayıt villages through credits provided by the Ministry of Tourism. However, the most eminent and outstanding issue regarding protection of Pamukkale was the action of UNESCO (United Nations Education, Science and Culture Organization) to cover Pamukkale under the World's Natural and Cultural Heritage (1988). Followed by this an area of 44 km covering Develi, Karahayıt, Pamukkale, Yeniköy and Akköy was announced as «Pamukkale Special Protection Area» (1990). Consequent positive actions continued with preparation of Pamukkale (Hierapolis). Protective Development Plan in 1991 and commencement of its implementation in 1992. The asphalted road bisecting the travertines which was once a footpath was demolished (1993) and replaced with 16 concrete

7 T. Toker, Pamukkale (Hierapolis) (1959, Denizli), p. 21.

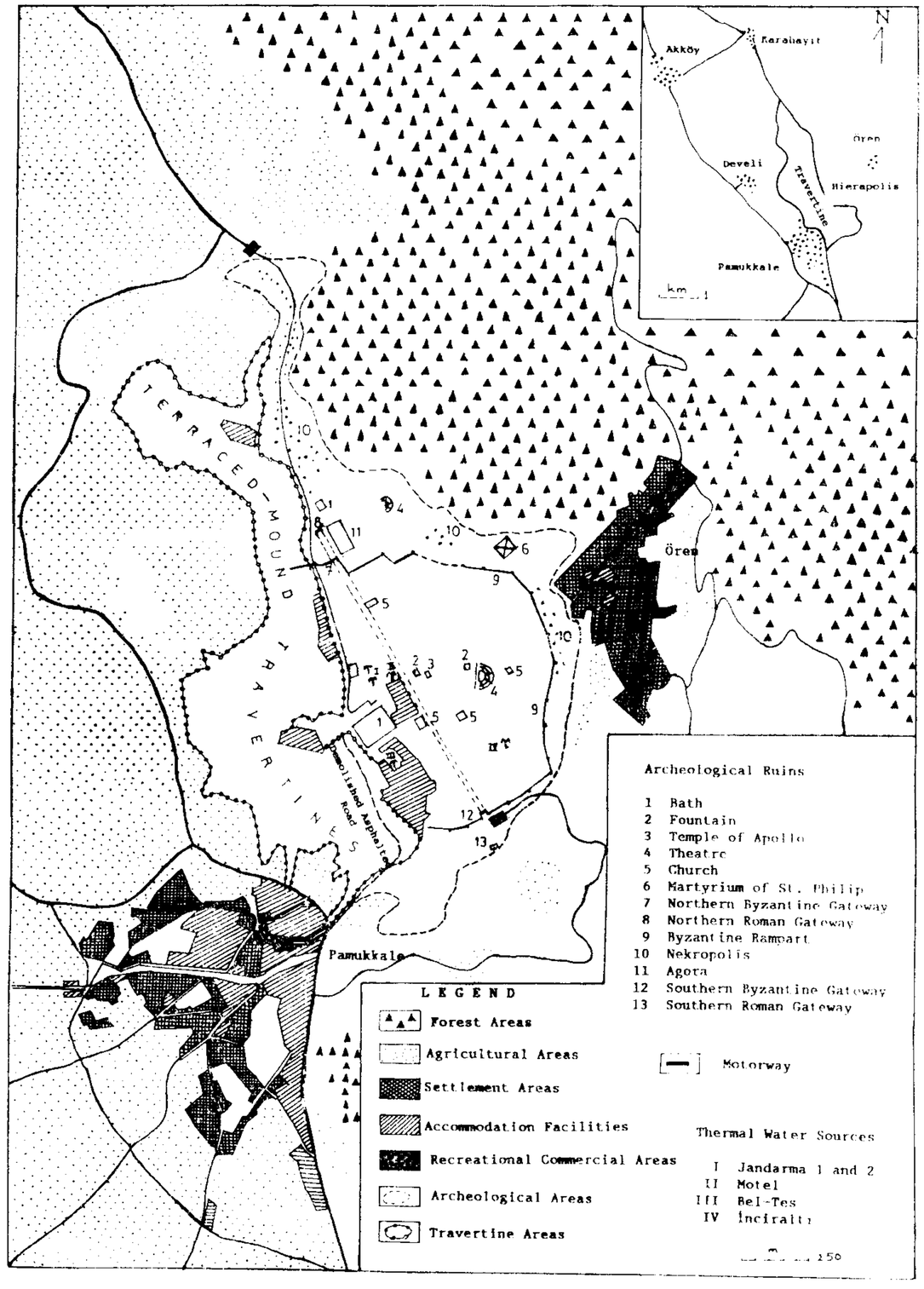

Figure 2 — Land Use Around Pamukkale

pools (1994) with a view to reducing the destructive effects on the travertines. Furthermore, two new roads and an entrance gate were built for walking around the antique town and the travertines.

First actions towards whitening the travertines and enlarging the area comprised systematizing the thermal spring waters which resulted in completion of the concrete channels carrying water (1995) and a new program was devised to enable flow of water through these channels. Tremendous touristic development brought along some changes on Pamukkale village (former Ecirli village) like construction of new hotels. (Photo 4). The main artery of the village, Atatürk Avenue was turned into a shopping center. Karahayıt is another village affected by tourism movements. Big hotels starring four five were built in the village exit after 1992. The bedding capacity of 9 facilities built here is 3104.

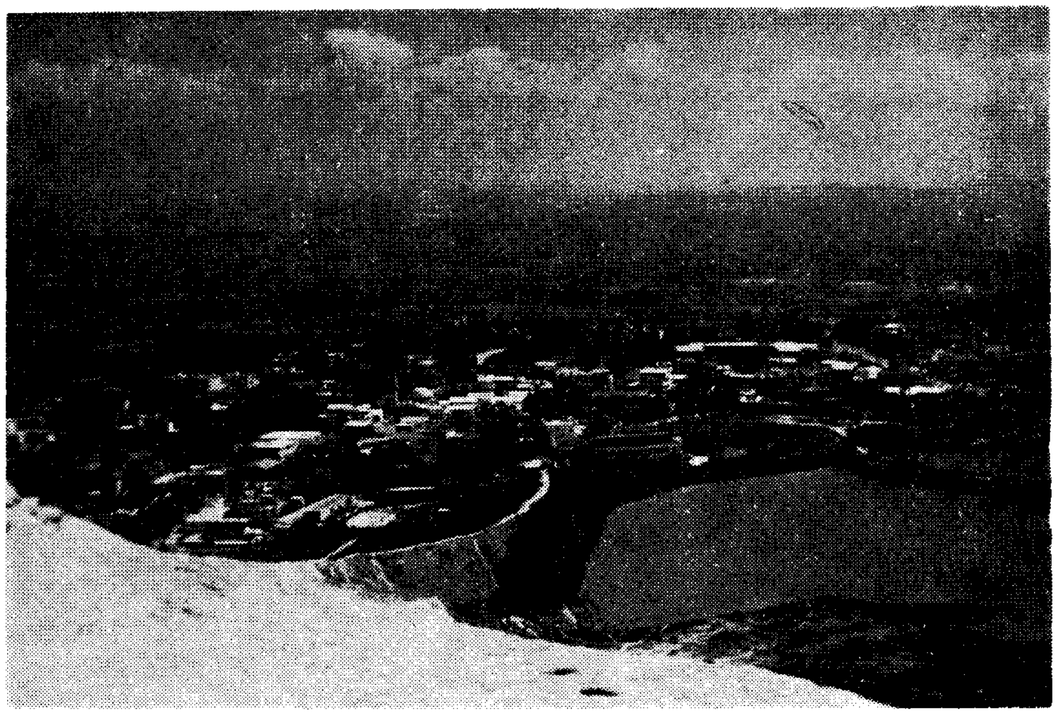

Photo 4 — Pamukkale Village in The Çürüksu Plain.

Tourism in Pamukkale generally consists of organized bus tours planned for 40 people for each bus. As the location of Pamukkale allows daily tours due the geographical proximity to

Muğla city and coastal tourism centers (Bodrum, Marmaris, Fethiye), Antalya and Kaş, the village is frequented by an average of 350-400 buses daily during the summer season one third of which stay one night and the remaining visit daily.

Accommodation in Pamukkale's tourism is centered in Pamukkale, Karahayıt and Denizli. Boarding capacities of Denizli, Karahayıt and Pamukkale are 2420, 4067, 3562 beds respectively totaling up to 10049. As for the number of local and foreign visitors, figures of 1995 demonstrate 433107.

Ongoing implementation studies of Pamukkale project incorporate prohibition of walking on visually graceful travertine terraces in the south part of Pamukkale and arrangement of sightseeing terraces. Furthermore, the travertine area at Domuzçukuru district in the south will be whitened and opened for walking thereby pursuing tourists' contact with the water. Despite completion of the northern and southern roads and gates comprised in the plan, the motor vehicles enter into the sit area as the northern gates stay far away. Future plans will provide for use of battery-vehicles for transportation to the travertine from the gates.

Conclusion

Pamukkale travertines are rarely seen geomorphic formations which have evolved through time upon concurrent occurrence of particular geological, geomorphological and other conditions.

The place concerns nature tourism with the travertines, thermalism with the thermal waters and culture tourism with the antique Hierapolis town. It owes its fame to the thermal waters during antique periods and travertines today. Thermal waters which are fundamental elements of nature and thermalism are particularly reserved for use of thermalism by being directed to the accommodation facilities around the place. Utilizing the healing properties of thermal waters requires some time, whereas average stay epriod in Pamukkale is only 1 day. Thermal waters are currently used for recreation purposes in open pools by nature tourists, however, the still-evolving travertines should be considered in the first place in use of thermal waters.

These geomorphological relief forms accepted as natural monuments are mainly used for development of tourism. However, they are open laboratories for scientists being the documentary proofs of geological and geomorphological history as antique towns. Therefore, the fact that tourism could have detrimental effects on such scientifically important places should be reconsidered and protective measures should be taken to stop destruction of the place and a nature museum is to be built nearby to serve nature tourism.

The five accomodation facilities mentioned before have expanded their coverage by time and become harmful on the archaeological sit area and partially the travertines. While the protection project started to be implemented in 1992 comprises demolishing of such facilities and moving them to the south parts of Karahayıt village, economic aspect of tourism have seemed to be given more value thereby leaving the prohibitions and restrictions out of force. Plans for the future will turn Pamukkale into a natural wonder where travertines will be viewed from sight-seeing terraces, some parts will be opened for walking, no touristic facilities will spoil the view and sit area closed to traffic. In this respect, human being are going to bequeath Pamukkale to the coming generations as a waterfall with thermal waters flowing through its terraces. Walking on the travertine terraces and swimming in the travertine pools is absolutely restricted since May of 1997.

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