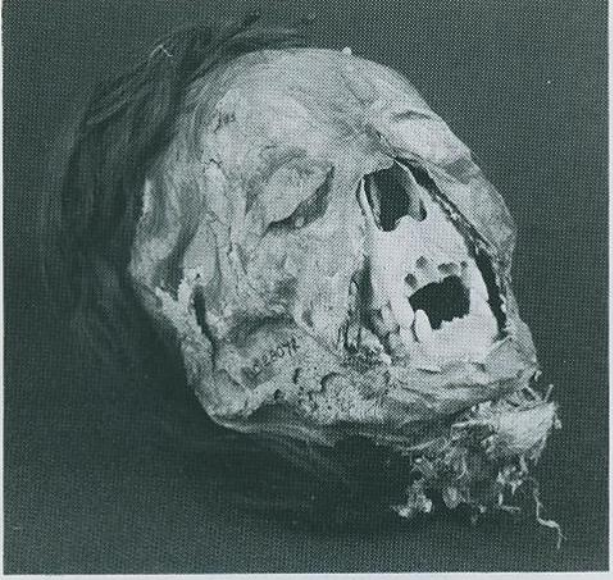


6 **Skull.** From the Roman period cemetery at Hawara in the Fayum, whose burials yielded many of the best mummy portraits. The excellent condition of the hair shows how effective techniques of preservation were.

7 **Relief of a negro treading an Archimedean screw.** The screw thread is set inside a pipe and the negro treads the steps which rotate the pipe and raise the water. Vines are depicted in the background. From Alexandria, first century BC.

preservative in mummification and in the manufacture of Egyptian glassware.

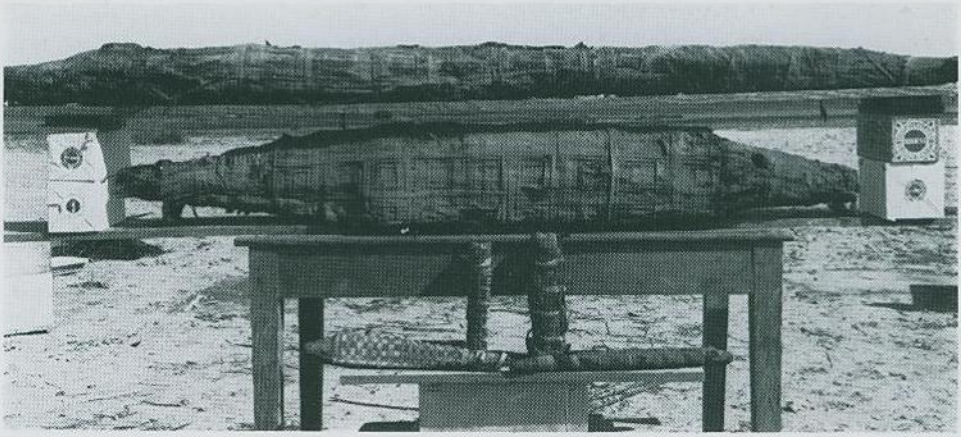
During the Pharaonic period, the ethnic characteristics of the population of Egypt were very heterogeneous. Recent studies by modern scholars have tended to be extremely cautious in the use of labels such as 'Semitic' or 'Negroid' and have been content with stating that the population mix reveals characteristics infused by the ethnic elements in the surrounding areas and undergoing relatively little modification, despite repeated incursion and invasion by foreign peoples, during the whole of the pre-Dynastic and Pharaonic periods. The population of Upper Egypt in the pre-Dynastic period is described as typically small in stature, with long, narrow skulls, dark, wavy hair and brown skin, whilst that of the delta tends to be taller and more sturdy, with broader skulls.[10] Regional variation is to be expected through to much later periods and the preponderance of more strikingly African characteristics is still evident in the far south.

Ancient observers were not able to employ sophisticated analytical tools; for Ammianus Marcellinus the people of Egypt were 'as a rule somewhat swarthy and dark of complexion, rather gloomy looking, slender and wiry, excitable in all their movements, quarrelsome and most persistent in getting their way.'[11] By that time, the infusion of the Greek element into the population over a period of seven centuries must have made some impact. Intermarriage with Egyptians was certainly not uncommon, though some strata of the native population in the rural villages may have remained relatively unaffected by it. The mummy portraits of the Roman and early Byzantine period from the Fayum are our best guide to the facial charac-

teristics of the people. But even these may be misleading: Sir Flinders Petrie, who first discovered and published them, remarked, perhaps under the influence of the clearly Greek ambience of the burials, that the Egyptian element was very poorly represented, but recent analysis of the skulls of the mummies reveals the same physical anthropology as that of the 'native' Egyptians of the Pharaonic period.[12]

The actual size of the population also poses some questions. Whatever estimate may be given for the Late Pharaonic period, there can be no doubt that there was considerable increase under the Ptolemies, and the population probably reached its maximum in the early Roman period. Josephus, writing in about AD 75, gives a figure of 7.5 million, excluding perhaps half a million residents of Alexandria, alleged to be based on the evidence of tax records, but some modern scholars consider this impossibly large.[13] Any trust which may be placed in it depends first, upon our assessment of whether a dramatic increase from, say, 3 million to 7.5 million is in itself plausible and second, upon the capacity of the land to support a population of this size. The increase from a Late Pharaonic population estimated at 3 million to one of 7.5 million would in fact take only about fifty years at an average annual increase of 20/1000 or 0.2 per cent, completely discounting any effects of immigration. As a useful analogy, an increase of this order can be documented for the years 1821–46, under the influence of political and economic improvements in the country brought by Mohammed Ali and although the rate of increase slowed thereafter, the census figures for 1882 record a population of 6.8 million.[14]

An estimate of the capacity of the land, published in 1836, reckoned that if all the land capable of cultivation were sown it could have supported an absolute maximum of 8 million.[15] Could Egypt have approached this level of productivity in ancient times? The simple answer is that we cannot be sure. But an oversimplified calculation in equivalence of wheat productivity over 9 million arourae of land and calorie requirements for 1.5 million families suggests that each aroura would need to return approximately the equivalent of a ten-fold yield in wheat to support such a



8 **Crocodile mummies**. Examples of mummified crocodiles of various sizes discovered by Grenfell and Hunt during their excavations in the villages of the southern Fayum in the 1890s.

population after taxes were paid.[16] Unfortunately, it is virtually impossible to be certain what average yields were, although there is no doubt that by ancient standards they were very high indeed. Ammianus Marcellinus claimed that under an ideal inundation the very best land would return a seventy-fold yield, but the average must be many times lower than this.[17] An average ten-fold yield is by no means impossible and may, indeed, be on the low side. Egypt was certainly the most populous country in the Hellenistic and Roman world and could well have supported a total population of the order of 8 million.

Apart from any question of an increase in population, there were other significant changes in the Ptolemaic and Roman periods of which we can be more confident. The political stability brought by the Ptolemies, and the foundation of a new capital at Alexandria, encouraged a shift of gravity towards the delta where many of the immigrants from the hellenised Mediterranean countries must have settled. They poured into the Fayum in great numbers too and this area underwent dramatic development in the early Ptolemaic period. The actual number of towns and villages in the valley will also have increased, as did the size of many of those already in existence. The use of the term 'urbanisation' might suggest something too sophisticated for the period and the area but there is no doubt that the towns grew in size and importance in harmony with their developing role as administrative, economic and cultural centres; and at the same time they will have encouraged the growth of villages in their sphere of influence.

Developments in the later Roman and Byzantine periods are more obscure. The population may well have declined somewhat – it is difficult to imagine that a

9 Mummy portrait. From the Fayum, probably late second or early third century AD. All the known examples of such painted panel portraits probably date to the first three centuries AD. The young boy portrayed here is holding a garland and a cup of wine, pagan funerary symbols; the latter may be connected with cult of Osiris.

10 Watercolour sketch. The great nineteenth-century pioneer Egyptologist, Sir John Gardner Wilkinson, spent a great deal of time in Egypt between 1821 and 1856, meticulously recording the monuments and inscriptions he observed. His artistic talent is evident in this sketch of an ox-driven sakkiyeh near Coptos. The machine itself, which consists of a waterwheel turned by cogs, is essentially identical to its ancient predecessor. See Plate 54.

devastating and widespread plague in the reign of Marcus Aurelius (161–80) did not make its effects felt. By the fourth century there are signs of decay and depopulation in some of the villages of the Fayum, although this may have been a purely local phenomenon which accelerated for particular reasons as the desert reclaimed once-fertile areas of land. If there was a decline in the valley and the delta, it was probably a very gradual one and perhaps ought not to overshadow the suspicion that under Greek, Roman and Byzantine rule Egypt as a whole attained a level of prosperity and development which was not matched again until the nineteenth century.

That prosperity was earned by labour and application, for growth and development depended upon the efficient use of the river's bounty. What underlay it was the maintenance of the irrigation system, which was certainly much improved under the Ptolemies. Irrigation was effected in one of two main ways, depending on the location and nature of the land. In the large areas which were open to natural flooding, the floodwaters were channeled into basins and retained by enclosing dykes, to be drained off when the river began to fall again. Areas which were not naturally inundated needed perennial inundation and this was accomplished by a variety of water-raising mechanisms, principally the shaduf, the sakkiyeh, or ox-driven water-wheel, and the Archimedean screw. Both the latter were Ptolemaic innovations and there is no doubt that the system of dykes and canals was greatly extended and improved as well. The most obvious large-scale development of the Ptolemaic period occurred in the Fayum, where the amount of land under cultivation was greatly increased by comparison with earlier periods. The maintenance of this

irrigation system was a constant and crucial preoccupation; dykes needed to be repaired annually, silted channels needed to be unclogged and machinery kept in good working order. Much of this was ensured through the imposition of compulsory labour obligations on the able-bodied males of the rural population. This is only one indicative aspect of the way in which manpower was systematically organised by the state to maximise efficiency of production.

The impact of Greek and Roman rule on the land of Egypt was felt in other ways too. The interlocking communication network of new roads and canals connecting with the river facilitated movement of goods and people all over the valley and the delta. Economic and trading interests may well have been an important stimulus, as for instance in the canal built by Ptolemy II Philadelphus and renovated under the Roman emperor Trajan, which ultimately linked the Nile to the Gulf of Suez. But better communications also ensured greater military security and a wider diffusion of new social and cultural patterns. It is the latter which reveal most clearly of all the effects of the Greek presence in Egypt and much of the remainder of this book is concerned with the relationship between the two major cultures, Greek and Egyptian, which coexisted in the land. The Greeks brought with them a level of literacy which had a gradual but ultimately massive impact. This was certainly an important feature of administrative, social and economic control by the government for it enabled it to record and control a mass of detailed bureaucratic operations. But its importance was not confined to the mundane and the routine. The Greeks up and down the Nile valley also bought books and read the works of many of the great classical authors of antiquity.

How far down the social scale this level of culture and literacy extended it is difficult to say. It might seem churlish to complain about this lack of precise knowledge when we know so much about Egyptian civilisation in this period, largely because of two factors – the habit of writing on papyrus and the role of the climate and the geographical environment in preserving the written record. The history which comes from this written record may be largely the history of the elite in the Nile valley, for the delta, which is too damp to allow the survival of papyri, is hardly represented at all. But it also offers a vivid and realistic picture of what life was like for the humbler inhabitants of the land in a period which was of surpassing importance not only in the history of Egypt itself, but in that of the whole of the Mediterranean world.

11 **The temple of Ptah, Karnak.** This small temple of the god whom the Greeks identified with Hephaestus lies within the complex of the great Temple of Amon at Karnak. It originated in the 18th Dynasty and is entered through a series of gates most of which date to the Late and Ptolemaic periods. The first gate includes scenes showing Ptolemy VI Philometor with a scribal tablet before Ptah and Ma'at and before Khonsu and Mut and, at the base, Ptolemy XII Auletes with fecundity figures, making offerings to various deities including Ptah.