Meilen führen von Tavium (Büyük Nefesköy) auf dieser Strecke in den Abschnitt zwischen Emirler und Kalecikköy, nicht allzuweit südlich von dem zuletzt genannten Dorf als ursprünglichen Standort der beiden Steine. Der weite Abstand der Fundorte (Emirler/Kaymaz-Eskiyapar rd. 14 km) erklärt sich daraus, dass der eine aus dem Gebirgübergang und dem engen Defilé heraus nach Nordosten (Eskiyapar), der andere nach Südwesten (Kaymaz) verschleppt worden ist. Auch der ohne Distanzangabe gebliebene Stein Nr. 1a war wohl für jenes Segment der Strasse bestimmt, das in die Gegend von Emirler fällt. Die beiden Meilensteine ergänzen die in IM 6, 1955, 24 gegebene Liste.

THE DURATION OF LIFE OF THE CHALCOLITHIC AND COPPER AGE POPULATIONS OF ANATOLIA

MUZAFFER ŞENYÜREK

Two papers on the duration of life of the ancient inhabitants of Anatolia have already been published by me. In the first paper I studied the longevity of the ancient inhabitants of Anatolia from the Chalcolithic Age to the end of the Byzantine period at Alişar Höyük[1] and in the second, I confined myself to the study of the duration of life of the Chalcolithic and Copper Age populations.[2] Since the publication of the last paper more Chalcolithic and Copper Age skeletons have come to the Division of Palaeoanthropology from the various excavations carried out in different parts of Turkey. Therefore, I have considered it worthwhile to restudy the longevity of the Chalcolithic and Copper Age populations of Anatolia on this augmented series.[3]

The material studied by me includes 125 Chalcolithic and Copper Age skeletons from Ahlatlıbel, Alaca Höyük, Alişar, Babaköy,[4] Büyük Güllücek, Dündartepe, Fikirtepe, Kaledoruğu, Karahöyük (Konya), Kumtepe, Kusura, Maşat Höyük, Ovabayındır Köy, Polatlı, Şeyh Höyük, Tabara, Tekeköy, Tilkitepe, Yazılıkaya and Yümüktepe. To these have been added the data on 28 skeletons published by various writers from Gözlükule (Tarsus),[5] Chatal Höyük and

[1] Şenyürek, 1947. See also Şenyürek, 1946, pp. 238 and 250.

[2] Şenyürek, 1951.

[3] This paper was read in Turkish in the Vth Turkish Historical Congress held in Ankara, 12-17 April, 1956 (Şenyürek, M. Anadolu'nun Kalkolitik ve Bakır Çağı Halkının Ömür Süresi). But since this paper was presented 6 Copper Age crania from Karahöyük in Konya (excavated by Sedat Alp) and 5 skulls from Ovabayındır Köyü in Balıkesir (excavated by Ekrem Akurgal) have arrived in the Division of Palaeoanthropology and this new material has been incorporated in the series.

[4] Two skulls excavated by İ. Kılıç Kökten.

[5] Data from Ehrich, 1940

Tell Al-Judaidah,[6] Babaköy,[7] Hanaitepe,[8] Troy[9] and Yortan Kelembo,[10] thus bringing the total to 153 skeletons.[11]

Regarding the method of age determination followed in my first study I had stated :

"*The age was determined by means of the stages of eruption of the teeth and the union of sutures, excepting 2 specimens where epiphyses were also used. Observations were made both ecto-and endocranially in the majority of the cases. At first the age was determined on the basis of the ectocranial closure, for which a summary of Martin's ('28) data given by Vallois ('37, fig. 1 and table 1) was utilized. Afterwards the data were studied in relation to the endocranial figures of Todd and Lyon ('24), which were also applied to the few cases where the ectocranial surface alone was observed. Both methods of assessing age yielded the same general result, namely, that the ancient Anatolians died relatively young. In the ensuing tables all the figures given are those obtained by Todd and Lyon's method. No corrections have been made for individuals where only the ectocranial surface was observed (to these also endocranial figures have been applied), as they were in their early twenties, excepting 2 which were definitely old.*"[12] In the material that has been added to the series since my first publication on this subject the age has been determined by the stage of synostosis of the sutures, eruption of the deciduous and permanent dentition, the state of fusion of the epiphyses of the long bones and the state of pubic symphysis.[13] In this new material, also, the state of closure of the sutures on both the inner and outer surfaces of the skull was recorded, but the age was determined on the endocranial aspect of the crania

[6] Data from Krogman, 1949.

[7] Data from Angel, 1939.

[8] Data on one skull from Angel, 1951 (this skull had originally been described by Virchow, 1882).

[9] Data from Angel, 1951, including the four skulls originally described by Virchow, 1882.

[10] Data on one skull from Angel, 1951 (This skull had originally been described by Houzé, 1903).

[11] For the ages of the above skeletons taken from the literature see Şenyürek, 1951, pp. 449-450.

[12] Şenyürek, 1947, pp. 56-57. Of the two definitely old individuals referred to one belongs to the Copper Age, while the other dates from the Hittite period.

[13] See Todd, 1920.

by applying Todd and Lyon's figures for the endocranial suture closure in whites.[14]

Age distribution of deaths amongst 153 Anatolian crania, of both sexes, from the Chalcolithic and Copper Ages is as follows:[15]

Age Groups (Yrs.)	Number of Individuals and Percentages
0-12	41 (26.7%)
13-20	24 (15.6%)
21-40	51 (33.3%)
41-60	30 (19.6%)
61-x	7 (4.5%)

In the above list 6 individuals from Şeyh Höyük are also included, which the archaeologists believe to have been killed.[16] If the Şeyh Höyük series is excluded we obtain the following figures :

Age Groups (yrs.)	Number of Individuals and Percentages
0-12	41 (27.8%)
13-20	23 (15.6%)
21-40	47 (31.9%)
41-60	30 (20.4%)
61-x	6 (4.0%)

The percentages obtained do not differ much from the first ones. Thus, in the tables appended to this paper, the figures for the larger series are employed.

The percentage of child mortality in the Chalcolithic and Copper Age series, as I stated before, must be considered rather low.[17] The additional figures for a series from Alişar Höyük, adapted

[14] See Todd and Lyon, 1924. For the ectocranial closure in whites and for the progress of suture closure in negroes see Todd and Lyon, 1925.

[15] This list includes also the figures for 28 individuals taken from the literature.

[16] See Şenyürek and Tunakan, 1951, pp. 431 and 439.

[17] Şenyürek, 1947, p. 60 and 1951, p. 452.

from Krogman,[18] who unfortunately has lumped all individuals over 20 years of age as merely adults, are listed below :

Age Groups	Chalcolithic Period	Copper Age	Total Chalcolithic-Copper Age
0-14 yrs.	8 (66.6%)	9 (19.5%)	17 (29.3%)
14-21 yrs.	1 (8.3%)	3 (6.5%)	4 (6.8%)
Adult	3 (25.0%)	34 (73.9%)	37 (63.7%)

The percentage of child mortality in Krogman's Chalcolithic series from Alişar is rather high, but the figure for the Copper Age series is definitely too low, and indeed lower than in my series as well as Krogman's Alişar Höyük series from later periods.[19] An examination of Table 1 reveals that the infant mortality among the Austrians of the 19th century was higher than that in the Chalcolithic and Copper Age Anatolian series and indeed higher than those of Krogman's Alişar series from various periods, with the only exception of his small Chalcolithic series, and further that the decrease in infant mortality has taken place only recently in Austria. Because of this I consider it highly probable that the actual figure of child mortality in the Chalcolithic and Copper Age populations of Anatolia might have been much higher than the figures available, though perhaps not as high as that of Krogman's small Chalcolithic series from Alişar Höyük.

In studying ancient skeletal series, it must be remembered that the skeletons especially of newborn and very young infants would be more likely to disintegrate and perish in the earth than those of the older individuals or that the excavators, if they are not keenly interested in this subject, may overlook or fail to record these fragile remains, which would lead to lower figures of infant mortality than actually is the case.

An examination of the figures listed in Table 1 shows that about three-fourths of the Chalcolithic and Copper Age skeletons from Anatolia had passed away before the age of forty. The percentage

[18] Krogman, 1937, table 1.

[19] *Ibid.*, table 1. See also Şenyürek, 1947, table 5.

of individuals who had died after the age of 60 is a small one. The average age at death of the 125 Chalcolithic and Copper Age individuals of both sexes studied by me is 26.76 years,[20] which indeed is a low figure. Thus, as I had stated in my previous studies, in the Chalcolithic and Copper Age populations of Anatolia, death at a relatively early age was the norm and that their average duration of life was briefer than that of the present day civilized man.[21]

The Chalcolithic and Copper Age populations of Anatolia are not unique in having a relatively short duration of life, as there is ample evidence to show that death at a relatively early age was the norm among all the ancient forms of man. Vallois, the eminent French palaeoanthropologist, has already shown that the longevity of the Palaeolithic and Mesolithic men was relatively short, due to their precarious and rugged existence.[22] A glance at Table 1 shows that among the various ancient series listed, with the only exception of the population of the African territories of ancient Rome, the majority, from 64 to 88%, represent individuals who had died before the age of forty, and that among these, in most cases, relatively few, from 1 to 15.2%, had died after passing the age of sixty.[23] In addition,

[20] This figure includes the 6 Şeyh Höyük skeletons. Without the Şeyh Höyük series the average age at death is 26.68 years.

[21] Şenyürek, 1947, p. 61 and 1951, p. 452. Also compare the figures for the Chalcolithic and Copper Age Anatolians with those of the recent civilized peoples listed in Tables 1 and 4.

[22] Vallois, 1937, pp. 525-531. The late Weidenreich has shown that the majority of the skeletons of Peking Man, which is now attributed to *Pithecanthropus*, belong to relatively young individuals (see Weidenreich, 1939, pp. 35-36).

[23] It will be seen from Table 1 that the percentage of old individuals in the peoples of the African territories of ancient Rome is a high one, being higher than those of the ancient Greeks, peoples of the territories of Hispania and Lusitania of ancient Rome and is even higher than that of the Austrians of 1900 A.D. Regarding the population of the African territories of Rome, in my previous study (Şenyürek, 1951, p. 454), I stated: "*Although I see no valid reason for supposing that among the ancient Metal Age peoples some sturdy individuals could not have lived to be one hundred years old or more, still in view of the relative rarity of the authentic centenarians among the recent civilized peoples and the conspicuous divergence of the peoples of the African territories of ancient Rome from the ancient Greeks and from other peoples of ancient Roman Empire in this respect it is difficult to accept the percentage of the centenarians and indeed the high percentage of aged individuals among the peoples of African territories of ancient Rome as being correct. In this connection it is also worthwhile to note that according*

in a Neolithic series studied by Sauter[24] only 3.1% of the total (7.6% of Chamblandes series), and in the Aulnay-Aux-Planches Neolithics, cited by Fusté,[25] 3.6% represent individuals over 60 years of age, while among the ancient skeletal series from Greece, from the Neolithic to Byzantine times, studied by Angel, the percentages of individuals over 60 years of age varies from 0 to 9.6 in different periods. [26]

Regarding the peak of old age death, Todd, in a study on the skeletons of some early populations as well as some recent primitive peoples, stated: "*The chief difference between these peoples and civilized populations of today is the apparent fact that the peak of old age death is a comparatively modern achievement resulting from greater safety and improved conditions of living.*"[27]

It is thus clear that among the ancient populations cited, a large proportion of individuals had died before reaching the age of forty and only a small portion of them passed away after the age of sixty, that is, their average longevity was shorter than that of the present day civilized peoples. However, as I stated in my previous studies, this should not be taken to mean that the Chalcolithic and Copper Age inhabitants of Anatolia and other ancient peoples listed in Table 1, did not have the potentiality of reaching old age. In

to both MacDonell ('13) and Todd ('27, p. 485) in at least a number of cases of the peoples of ancient Roman Empire the precise ages were probably not known and that Todd ('27, p. 485) has already questioned the authenticity of the large number of centenarians especially among the peoples of the African territories of ancient Rome studied by MacDonell ('13)." The lower percentage of old individuals (20.8 %) in a Roman period series from Tarragona and Ampurias (Gerona) in Spain, cited by Fusté (Fusté, 1954, table 2, after Pons, 1949), than that of the peoples of African territories of ancient Rome, in spite of the fact that in this ancient skeletal series from Spain no individuals under 20 are listed, which no doubt augments the percentage of the aged, would also indicate that the high percentage of the aged individuals in the population of African territories of Rome is probably incorrect.

[24] Sauter, 1947/48 and 1948/49.

[25] Fusté, 1954, table 2.

[26] Angel, 1947, table 1. Regarding the ancient inhabitants of Greece, Angel (1947, p. 23) concludes: "*From the third millenium B.C to classical times (650-150 B.C.), longevity in ancient Greece increased slightly but significantly, as shown by study of skeletal remains.*"

[27] Todd, 1927, p. 495.

fact, the occurrence, although rarely, of some old individuals in the Chalcolithic and Copper Age series of Anatolia and among other ancient peoples cited, indicates that they had this potentiality. Nevertheless, the conditions under which these ancient Anatolians as well as the other ancient peoples lived were apparently such that most of them passed away before the age of forty and only a relatively small portion of them managed to live over the age of sixty. [28]

From Table 1 it is seen that in the ancient series listed, with the only exception of the population of ancient Rome, the percentages of child mortality are lower than that of the Chalcolithic and Copper Age Anatolians. Indeed, in all the series listed in this table, the percentages of children are less than those in the Austrian series of the 19th century, A.D., listed in the same table. The arguments advanced on page 98 are also valid for the skeletal series listed in Table 1, but do not apply to the ancient Greek series and the series of the Roman period from Hispania, Lusitania and Africa which are derived from sepulchral records. Nevertheless, I consider it very probable that among the ancient Greeks and peoples of Roman times from Hispania, Lusitania and Africa, and perhaps even in Rome, the child mortality was higher than the figures seen in Table 1.

From Table 2 it is seen that in the Chalcolithic and Copper Age series of Anatolia, the percentages of females between ages of 13-20 and 21-40 years are greater than those of the males, while in age groups of 41-60 and over 60 the percentages of the males exceed those of the females. [29] The same situation also exists in the other ancient peoples listed in Table 2, with the exception of 61-x years group of the Bronze Age series from Austria, as well as in the ancient inhabitants of Greece, from the Neolithic to Byzantine period, studied by Angel.[30] This greater frequency of female deaths in younger

[28] For a discussion of potential duration of life and average duration of life see Pearl, 1926 and Todd, 1927.

[29] Without the Şeyh Höyük skeletons, the percentages of the Chalcolithic and Copper Age Anatolians are as follows :

Age Groups	Male	Female
13-20 yrs.	10 (16.6%)	11 (25.0%)
21-40 yrs.	24 (40.0%)	23 (52.5%)
41-60 yrs.	22 (36.6%)	8 (18.1%)
61-x yrs.	4 (6.6%)	2 (4.5%)

[30] See Angel, 1947, table 1.

age groups has also been observed by Franz and Winkler in the series of Bronze Age skeletons from Austria, [31] and by Vallois in Palaeolithic peoples as well as in the series of Egyptian mummies of Roman period. [32] The same sex difference is also brought out by the comparison of the average ages at death of males and females over 12 years of age, listed in Table 3. The mean age at death of 53 Chalcolithic and Copper Age Anatolian males, studied by me, is 35.88 years, while that of 44 females, again studied by me, is 29.15 years, [33] that is, the average age at death of the males is considerably higher than that of the females. [34] The average age at death of the females is lower than that of the males also in the other ancient peoples listed in Table 3, in the Bronze Age skeletons studied by Franz and Winkler [35] and in the ancient inhabitants of Greece from Neolithic to Byzantine times, studied by Angel, [36] whereas in the Austrians of 1855 and 1900 A.D., listed by Franz and Winkler, the averages of females exceed those of the males. [37]

It is clear that not only in the Chalcolithic and Copper Age Anatolians but also in the other ancient peoples listed, or cited, the percentage of female mortality was greater in early ages than that of the males which is the opposite of the condition seen in modern white populations (see Table 5). Franz and Winkler attributed this sex difference in the ancient populations primarily to the child-bearing function of the women. [38] Vallois accepts this idea of Franz

[31] See Franz and Winkler, 1936.

[32] See Vallois, 1937, pp. 529-530.

[33] If the Şeyh Höyük individuals are left out, the average age at death of 51 Chalcolithic and Copper Age males is 35.49 and that of 40 females is 30.0 years.

[34] The reason why these averages are higher than the average age at death of the total series given on page 99 is that, in the averages of the sexes only individuals older than 12 years have been taken into consideration.

[35] See Franz and Winkler, 1936.

[36] See Angel, 1947, table 3.

[37] See Franz and Winkler, 1936. Regarding the expectation of life of males and females in ancient and recent peoples, Angel (Angel, 1947, p. 21) states: "*Such selective factors almost certainly increase the sex difference in age at death. But the epigraphic data published by MacDonnell (15) agree with Greek skeletal material in suggesting that in ancient civilizations female life expectancy was lower than the male rather than greater as is true today.*"

[38] Franz and Winkler, 1936.

and Winkler, but also thinks that the slower rate of suture closure in females may also be involved at the same time.[39] A glance at Table 3 shows that in all the skeletal series listed the females have higher percentages also in 13-20 years group, where the age is usually determined by the eruption stages of the teeth, which erupt earlier in girls than in boys, as well as the fusion of the epiphyses. Furthermore, the higher percentage of female mortality in 13-20 and 21-40 years groups is not confined to the skeletal material, but also occours in the series from ancient Rome and territories of Hispania, Lusitania and Africa of ancient Rome, which are based on written records. An examination of Table 5 shows that the heavier female mortality in younger ages, that we have observed in ancient peoples, occurs also in the recent Negro population of America and especially among other racial groups living in America. Regarding the white Americans, where the above situation does not exist (see Table 4), Scheinfeld states: "*From birth all the way through to the end of the road there is now not a single point among the American Whites at which the male death rate is not higher than that of the female. For all ages collectively the female death rate is about 25 per cent lower than the male's. Even during women's childbearing periods, when formerly their mortality exceeded that of males, their death rate among Whites is now 20 to 30 per cent lower. Among Negroes, the death rate of the female is now higher only in the age group of fifteen to nineteen years.*"[40]

To sum up, the slower progress of sutural union in females does not explain the sex difference seen in the 13-20 years group in the skeletal series. It may perhaps be involved to some extent in the sex difference in mortality in the ancient skeletal series in ages over 20 but, as the same sex difference also occurs in epi-

[39] See Vallois, 1937, pp. 530-531. Vallois (1937, pp. 530-531) states: "*On peut alors se demander si la différence indiquée par les tableaux existe réellement. Ne serait-ce pas une apparence, due à ce que le crâne féminin se synostoserait moins vite? Todd et Lyon ne mentionnent pas de différence sexuelle dans leurs série de Noirs et de Blancs, mais, pour les Européens, Schwalbe et Frédéric déclarent avoir constaté un retard de soudure chez la femme, et ce doit être un fait vraiment général, car Bolk le signale aussi pour les Anthropoïdes et divers Catarhiniens. A âges réels égaux, un crâne féminin paraîtrait ainsi plus jeune qu'un masculin, ce qui expliquerait la moindre fréquence des femmes dans les catégories les plus âgées. Ceci ne s'oppose d'ailleurs pas à l'explication émise par Franz et Winkler, et il est très possible que les deux motifs aient joué simultanément.*"

[40] Scheinfeld, 1944, p. 186.

graphic data, even there the influence of this factor must be extremely slight. As I stated before, the higher percentages of female mortality between the 13th and 40th years observed in the ancient skeletal series, as well as in epigraphic data, corresponding in general to the childbearing period, must be considered primarily to be a result of the accidents that took place during pregnancy or at the time of delivery.[41]

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[41] Şenyürek, 1947, p. 65 and 1951, p. 458.

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TABLE 1

Age Distribution of Deaths Among Various Peoples, Ancient and Recent (Both Sexes)*

	0-12 yrs.	13-20 yrs.	21-40 yrs.	41-60 yrs.	61-x yrs.	Number of Individuals
Chalcolithic and Copper Age Anatolians	41 (26.7)	24 (15.6)	51 (33.3)	30 (19.60)	7 (4.5)	153
Neolithic and Eneolithic peoples of Spain (Fusté 1954)	25 (24.8)	15 (14.9)	42 (41.6)	18 (17.8)	1 (1.0)	101
Ancient Inhabitants of Austria (Bronze Age). (Franz and Winkler, 1936) †	19 (6.9)	47 (17.2)	109 (39.9)	78 (28.6)	20 (7.3)	273
Ancient Greeks from literary evidence (Calculated from Richardson, 1933)	380 (18.7)	474 (23.4)	685 (33.8)	277 (13.6)	206 (10.1)	2022
Ancient Egyptians from Roman period (Calculated from Pearson, 1901—1902)	28 (19.8)	20 (14.1)	56 (39.7)	23 (16.3)	14 (9.9)	141
Peoples of Ancient Rome (Calculated from MacDonnell, 1913)	3074 (38.1)	1611 (19.9)	2428 (30.0)	579 (7.1)	373 (4.6)	8065
Peoples from territories of Hispania and Lusitania of ancient Rome (Calculated from MacDonnell, 1913)	188 (9.4)	329 (16.4)	775 (38.8)	399 (19.9)	305 (15.2)	1996
Peoples from the African territories of ancient Rome (Calculated from MacDonnell, 1913)	1064 (9.9)	1006 (9.4)	3047 (28.4)	2105 (19.6)	3475 (32.4)	10697
Lower Austria, 1829 (Franz and Winkler, 1936) †	(50.7)	(3.3)	(12.2)	(12.8)	(21.0)	—
Lower Austria, 1857 (Franz and Winkler, 1936) †	(48.3)	(3.2)	(14.3)	(15.2)	(19.0)	—
Lower Austria, 1900 (Franz and Winkler, 1936) †	(44.3)	(2.0)	(12.1)	(15.7)	(25.9)	—
Lower Austria 1927 (Franz and Winkler, 1936) †	(15.4)	(2.7)	(11.9)	(22.6)	(47.4)	—

* The figures in parentheses are percentages in all the tables.

† It should be noted here that in Franz and Winkler's lists the first two age categories are 0-14 and 14-20 years.