Services Office of Health Planning and Resources Department. The document is undated, but the presence of data from 1976 indicates that it must have been prepared in the period of 1977 to 1979 when we received it. It was noted that there are apparent inconsistencies among several of the different tables. For example, Table III-1 gives data for the Marshall Islands for the period 1955-1975 and Table III-5 gives data for the infant mortality rate for 1976. In Table III-1, the infant death rate per 1000 births for 1970 through 1975 is given as 28.3, 33.6, 25.4, 46.4, 21.1 and 37.0. However, Table III-5 indicates the infant mortality rate to be only 17.04. We have used the data of Table III-1 in the following estimates, because it is more complete and it provides a self-consistent set of data. However, in view of the discrepancies, the results can only be considered as approximations. In my view this makes little real difference in view of the uncertainties in the risk estimating coefficients. There is also a bias built into the data because of the inclusion of Ebye and Majaro in the overall Marshall Island rates. This arises from the different death rates (particularly infants) at these two locations.

For the estimates we used the last 5 or 6 year average of the data as being most representative of current conditions. From this, we obtained:

1. Rate of increase of the population - 3.8%/yr.
2. Infant death rate - 3.2% per birth.
3. Overall death rate - 0.54% per year.
4. Birth rate - 4.2% per year.

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A population of 550 was assumed to be the one that may move back to an island. Values for other initial populations may be obtained by ratios of the results.

The total population at the end of 30 years is given by the compounding equation:

$$P_{30} = 550\ (1+0.038)^{30} = 1684$$

The number of births in 30 years are given by:

$$B = 0.042x550 \int_0^{30} (1.038)^x\ dx$$

where x is the time between 0 and 30. This gives

$$B = \frac{0.042x550}{\ln 1.038} [1.038^{30}-1] = 1277$$

Similarly, the number of deaths in the 30 year period would be:

$$Deaths = 0.0054x550 \int_0^{30} (1.038)^x\ dx$$

$$Deaths = \frac{0.0054x550}{\ln 1.038} [1.038^{30}-1] = 164$$

One other item needed is the reduction in 30 year dose to those born after the return because of the decrease in radiation levels and the smaller amount of time in the 30 year period that is spent on the island. For this, the total population dose for those born after returning assuming an initial dose rate of 1 rad/year is given by:

The assumption of no deaths in the original 350 returning was made for simplicity and the lack of good death rate data.

I also took a brief look at the age characteristics of the Marshallese from Table IV-3 and the U.S. population in 1970. This comparison is given in the attached curve. As you can see the slopes are similar above age 35 but the magnitudes are distorted by the high birth rate in the Marshall Islands. However, in terms of the relative risk the similar slopes mean to me that if the two natural cancer rates are similar, the relative risk for people above 35 in both populations would be similar because most of the cancer occurs at ages about 40 and above. However, the magnitude of the relative risk in the U.S. used for the Marshallese will be high by a factor of somewhere around 2-3 because of the distortion caused by the very high proportion of young people who have a relatively low natural cancer incidence.

Sincerely yours,

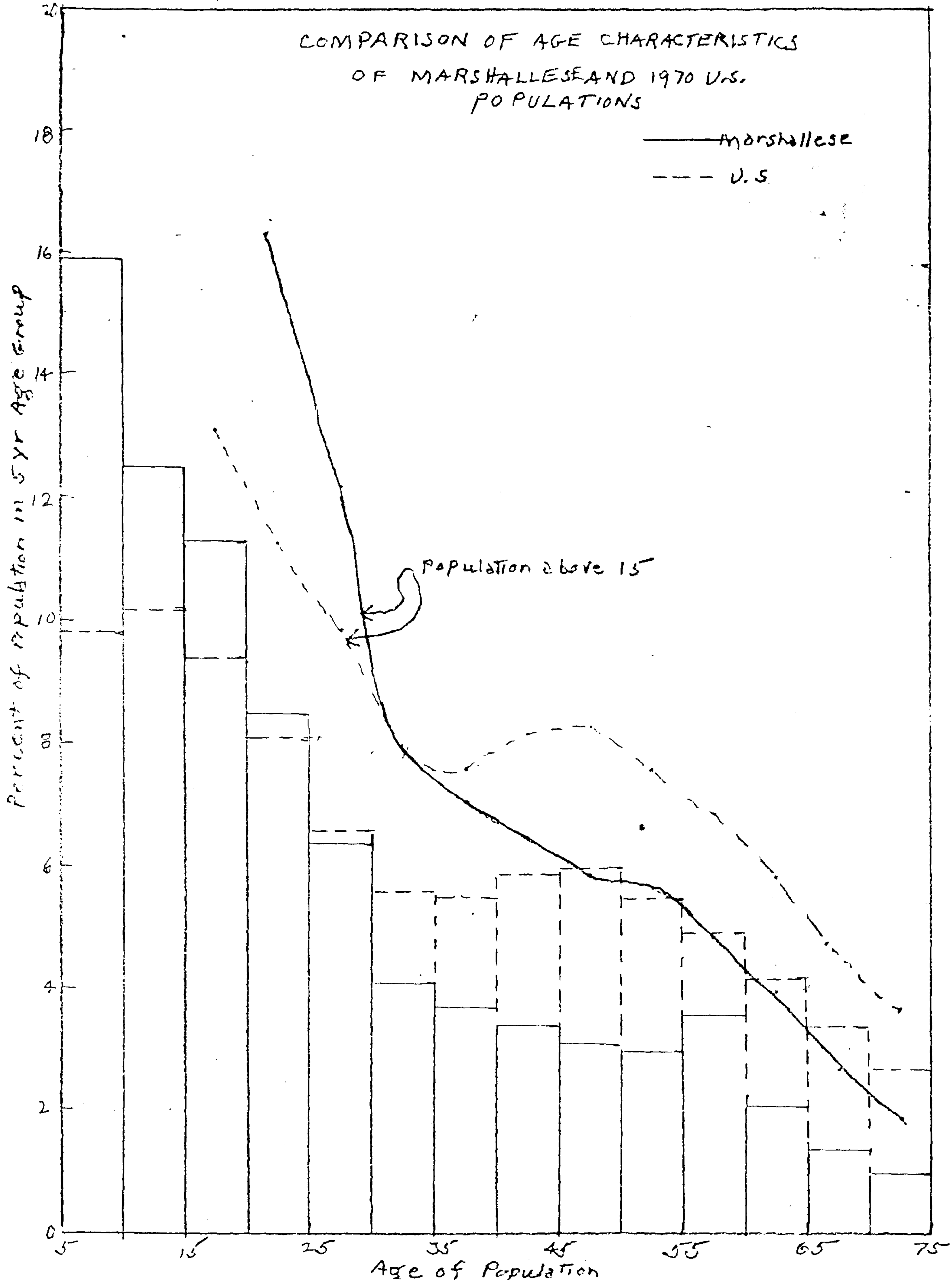
J. W. Healy

J. W. Healy

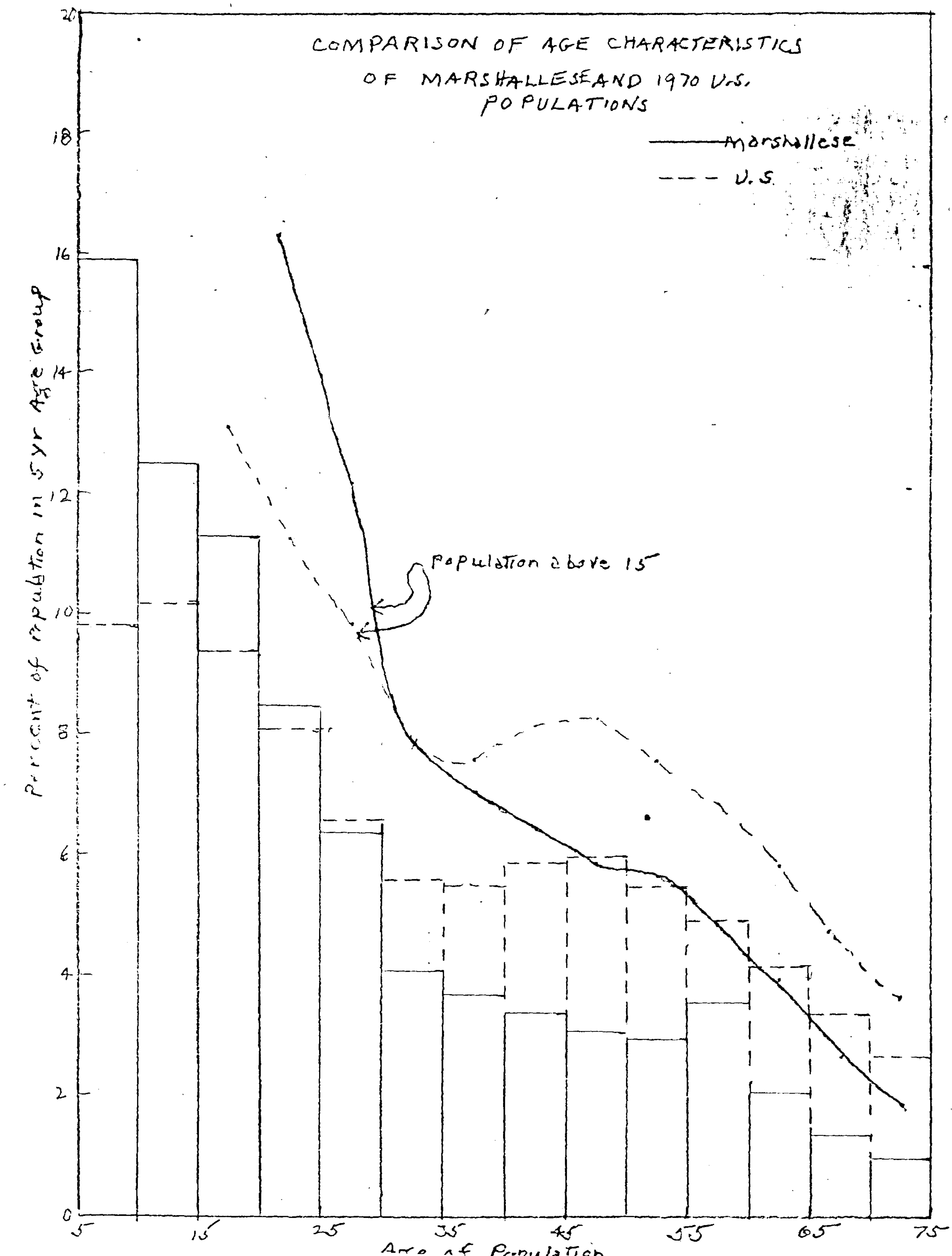
JWH:dl

Enc. a/s

xc: B. Wachholz, DOE/HQ, Washington, D.C., w/enc.



COMPARISON OF AGE CHARACTERISTICS
OF MARSHALLESE AND 1970 U.S. POPULATIONS
Marshallese
U.S
Population above 15
Percent of Population in 5 yr Age Group
Age of Population
0
2
4
6
8
10
12
14
16
18
20
5
15
25
35
45
55
65
75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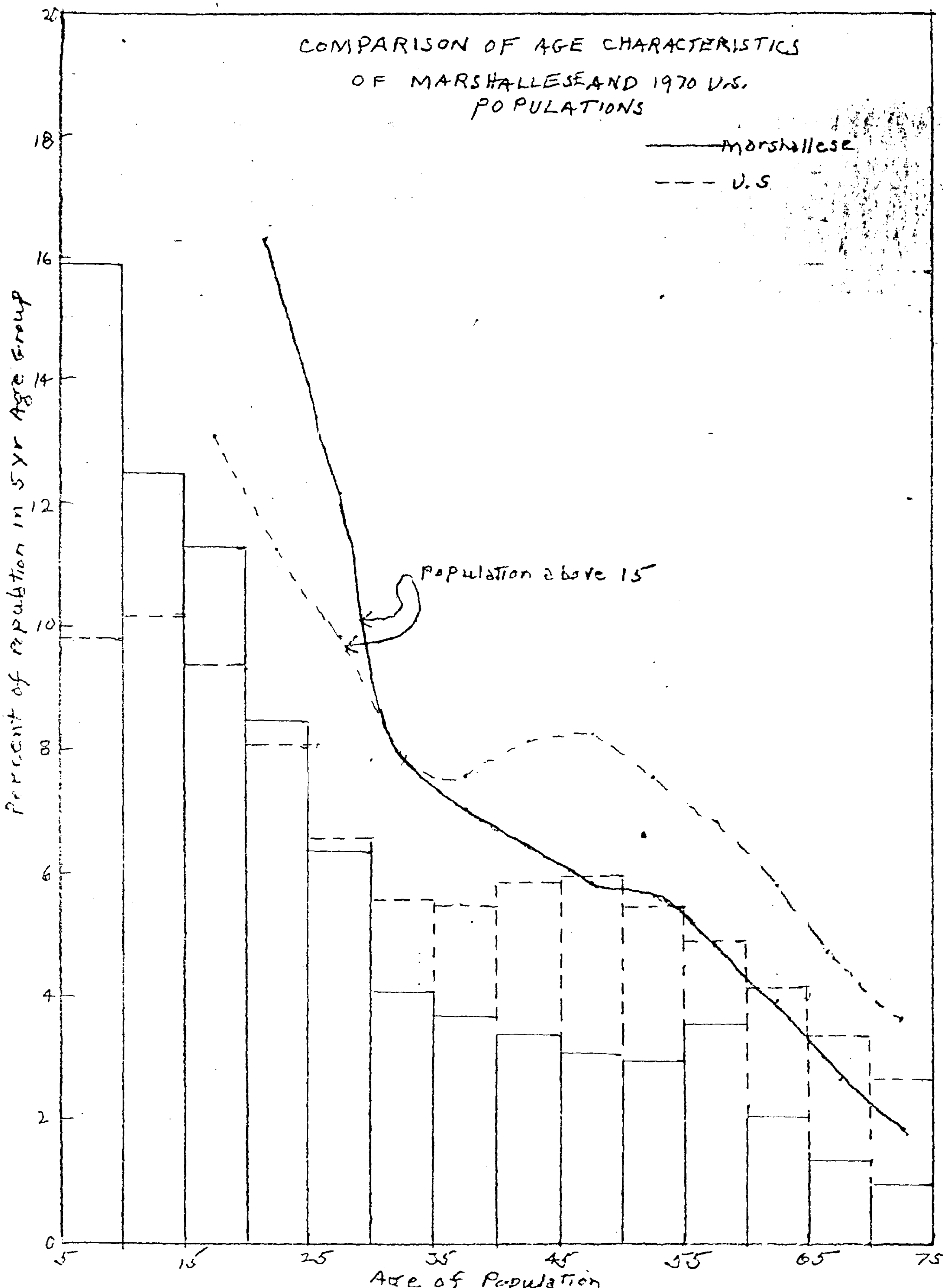
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