

The Impact of Famine on I.Q.

By NATHANIEL WEYL

In its September 1972 issue, *Science* published a landmark study of the influence of maternal starvation on the subsequent intelligence of children.¹ This extremely painstaking inquiry came to the unexpected conclusion that prenatal exposure to famine caused no ascertainable subsequent impairment of the mental performance.

The investigation was based on the Dutch military induction examinations of the classes of recruits who were carried *in utero* during the *hongerwinter* of 1944-1945.

The historical background is briefly as follows: In September 1944, British paratroopers landed at Arnhem to force a bridgehead across the Rhine. In support of this attempt and on orders from the Netherlands Government in Exile, railroad workers in western Holland downed tools. The paratroop effort failed and in reprisal the Nazis placed an embargo on all land transport to western Holland. A severe winter froze the canals and stopped barge traffic. Soon no food reached the large cities. The Dutch *hongerwinter* became acute in November 1944 and continued until May 1945 when Allied troops liberated Holland. During December 1944-February 1945, per capita food intake averaged 740 calories against a Food and Agriculture Organization estimated requirement of 2420 calories. During the next quarter, average food consumption dropped to 670 calories. The famine was thus unusually severe and starvation deaths were common. Proteins, fats and carbohydrates were about equally affected.

The team of four Columbia University scientists decided to investigate the after effects of this calamity because it provided a unique opportunity to study the impact of hunger on intelligence. First, the *hongerwinter* was sharply defined in both time and space. Second, it occurred in a country where statistics are comprehensive and reliable. Third, the extent of nutritional deprivation was known.

Zena Stein and her associates analyzed the intelligence tests given all Dutch military recruits who had been conceived or born during the famine months. These 19-year-old recruits were divided into three-month age-cohorts so that any observed differences in I.Q. could be correlated with the period of pregnancy during which mothers had been exposed to famine.

¹ Zena Stein, Mervyn Susser, Gerhart Saenger and Francis Marolla, "Nutrition and Mental Performance," *Science*, Vol. 178, No. 4062, September 1972, pp. 708-713.

The Nazis inflicted the food embargo on western Holland only. Hence, recruits from such hunger cities as Rotterdam and the Hague could be compared with a control group from such unaffected towns as Maastricht and Breda. Fortunately, the Dutch draft boards used Raven Progressive Matrices, probably as culture-free a test of intelligence as has yet been devised, to determine the I.Q.

The results of this admirable controlled investigation were unexpected. Babies conceived or born during the famine tested 19 years later were as high in I.Q. as those whose mothers had had normal nutrition. Prenatal exposure to famine conditions over an eight-month period had had no permanent discernible effect on mental performance.

This finding is in apparent contradiction to widespread recent claims that severe protein deficiency during the gestation period critical to brain development causes permanent mental impairment of the infants affected. Since the brain grows mainly by absorbing and synthesizing proteins and since the bulk of this growth occurs during gestation and the first year of nonfetal life, the *prima facie* case for irreversible damage to the minds of victims of the *hongerwinter* seemed formidable.² A variety of studies have shown that infants who suffer from drastic fetal or neonatal protein deprivation have substantially lower I.Q. frequency distributions and smaller brains than control groups.³

Zena Stein and associates observe that the apparent contradiction between their findings and those of earlier investigators may be due to the fact that the Dutch famine lasted only eight months. By contrast, the South African, Guatemalan and Chilean babies studied had been born to mothers who presumably had been exposed to drastic malnutrition and undernutrition since birth.

Moreover, the studies of fetal and neonatal protein deprivation which I have seen suffer from a basic defect. The malnourished parents may be paired in terms of socioeconomic status with the control-group parents, but the two groups are not paired as to I.Q. Hence, the possibility always exists that the

² Some 70 per cent of brain growth occurs before the infant's second birthday (Arthur E. Jensen, "How Much Can We Boost I.Q. and Scholastic Achievement?" *Harvard Educational Review*, Vol. 39, No. 1, Winter 1969, p. 73).

³ M. B. Stoch and P. M. Smythe, "Does Undernutrition During Infancy Inhibit Brain Growth?" *Archives of Disadvantaged Childhood*, No. 38, 1963, pp. 546-552. The authors found a 20-point spread between extremely malnourished and normally nourished South African colored neonates. They added that the D.O. and I.Q. gap between the two groups remained constant eight years after birth. Studies in Guatemala, Chile and elsewhere have yielded similar findings.

drastically malnourished parents are of substantially lower I.Q. than the control group and are unable to make a living for this reason. If this is the case, an unknown part of the difference in I.Q. and brain size between the two groups of infants could be hereditary.

Various social scientists, publicists and politicians have seized upon the posited relationship between extreme maternal protein deficiency and permanent brain impairment in children to assert that malnutrition in general causes irreversible I.Q. loss. This supposed fact has then been advanced as an "explanation" of the observed difference of about one standard deviation between American Whites and American Blacks. This crude equation between malnutrition and brain damage was never warranted by the evidence. The landmark study of the Netherlands *honger-winter* should serve to refute it decisively.

The Anthropological Find from the Szabadszállás-Boczka Estate in Hungary

By PAL LIPTAK*

A skeleton was recently uncovered at a depth of 180 cm. in a stratified layer in the Boczka estate on the outskirts of Szabadszállás, Hungary. The find was a result of the excavations conducted by Dr Elvira H. Tóth. The skeletal material probably dates from the fifth century A.D. From the archaeological viewpoint, there is no analogue in Hungary to this particular grave. The archaeological aspects of the excavation—including the find of an early Byzantine glass-cup—are discussed by Dr Tóth in her report.¹

The more important metric data relating to the cranium are presented in Table 1 and Table 2. The morphological traits are described in Table 3. Finally, the most important measurements of the long bones are listed in Table 4. From these measurements the stature was estimated by the method of Wolanski's nomogram.

The absolute measurements of the cranium are not large. According to the cranial index, the skull is mesocranial—although on the border of dolichocranial (long-headed). The skeleton is incomplete. The skeletal bones are in a medium state of preservation.

On the basis of the well preserved pelvis, the characteristics of the skull and of the other bones, the find can clearly be established as male. A degree of uncertainty arises only due to the circumstances that the cranial contour from the top view is pentagonoid and the mastoid apophysis (processus mastoideus) is small. In Figure 1, the skull is shown in four views.

The taxonomic analysis indicates that we are concerned here with a type of relatively greater—really above average—stature. The find can also be denoted as Atlanto-Mediterranean in racial type.² The Mediterranean aspect can be characterized by the above-mentioned two anthropological traits. In consideration of the rather broad face, we can also denote a lesser degree of Cro-Magnoid influence.

* Translated from the German by Donald A. Swan.

¹ Elvira H. Tóth, "Kora-bizanci üvegpohar egy szabadszállási mágányos sírból." ("Early Byzantine Glass-Cup in a Solitary Grave at Szabadszállás Kecskemét, 1969"). *Act. Arch. Ach.*, Vol. 23, 1971, pp. 115-138.

² Pal Lipták, "On the Taxonomic Method in Palaeo-Anthropology," *Acta Biologica Univ. Szegediensis*, Vol. 11, 1965, pp. 176-183; Pal Lipták, *Embertan és emberzármasztan. (The Anthropology and Origin of Man)*, Egyetemi tankönyv, Budapest, Hungary, 1969.