

Table 3. The IQ scores of 4-year-old children categorized by race and marital status of mother (see Table 2).

Race of mother	Marital status	IQ scores
White	Unmarried	98.5 ± 14.7 (22)
White	Married	102.3 ± 18.2 (39)
Negro	Unmarried	82.6 ± 16.1 (7)
Negro	Married	97.6 ± 12.8 (20)

the effects of marital status and sex are less, though always consistent with the findings for the children of Negro mothers.

Interpretation of the race effect should be tentative since the number of interracial subjects is small. The evidence presented here suggests that environmental factors may play an important role in the lower intellectual performance of Negro preschool children.

Despite no observed differences in mean educational attainment by race of mother, it is possible that child-rearing practices vary between the two groups. Racial differences in dialect usage would tend to militate against the children of Negro mothers on IQ tests, for example. Performance on intelligence and achievement tests might also reveal differences in favor of the white mothers.

The significant sex effect on IQ in favor of females has been reported before the Collaborative Study data (10) and is only one of many cognitive tasks which show females superior to males. Tasks involving relatively simple perceptual motor skills, such as speed of naming colors, reading, typing, and coding speed, all show female superiority (11). However, tasks requiring restructuring of the stimulus field, such as finding a simple pattern embedded in a more complex one, have shown consistent sex differences in favor of males (11). It was suggested that sex differences on cognitive tasks may be more adequately explained by physiological differences rather than by child-rearing differences between the sexes. Recent research suggesting a specific perceptual deficit associated with the absence or abnormality of one X chromosome in patients with Turner's syndrome is consistent with that hypothesis (12).

The association of single marital status with lower IQ performance has been documented before with interpretation based on increased disorganization in one-parent families (9). Since females tend to do most of the child-rearing during the early years even in

Table 4. The IQ scores of 4-year-old children categorized by race of mother and sex of child (see Table 2).

Race of mother	Sex of child	IQ scores
White	Male	99.2 ± 17.0 (27)
White	Female	102.3 ± 17.0 (34)
Negro	Male	84.6 ± 12.9 (11)
Negro	Female	99.9 ± 14.0 (16)

two-parent families, the relationship remains to be clarified. Lewis (13) pointed out that negative effects on children associated with one-parent families tend to diminish when socioeconomic status is controlled. If maternal education can be taken as an index of socioeconomic status, the unmarried group differs only slightly from the mean for the entire sample given in Table 1 [white mothers, 10.5 years ($n = 22$); Negro mothers, 11.3 years ($n = 7$)]. Since the designation of marital status is assigned during pregnancy and there is no information available on whether the postnatal years of the child did in fact agree with this original designation, no firm conclusions can be drawn.

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Stromatolites Used to Determine the Time of Nearest Approach of Earth and Moon

In recent articles (1, 2) and discussion (3, 4) in *Science*, the use of fossil stromatolites to determine the time of closest approach of the moon to the earth has been considered. Cloud (1) interpreted his stromatolite data as consistent with the view that this time was about 3500 million years ago, a time that he favored for other reasons. Alfvén and Arrhenius (2) interpreted the same data as indicating the latest Precambrian (600 to 700 million years ago) as the time of closest approach. These interpretations are based on the belief that, although some presently growing stromatolites are subtidal (5), "stromatolites that rise conspicuously above the surface on which they grow have so far been found only in the intertidal environment," and, furthermore, that their maximum growth relief equals the tidal amplitude (1). This, in turn, follows from Logan's in-

terpretation (6) of modern stromatolites in Shark Bay, Western Australia.

Figures quoted by Cloud are interpreted by him as showing that domal Precambrian stromatolites, and especially those older than 1000 million years, had a greater growth relief than younger forms. This, he concludes, is consistent with the hypothesis of moon capture and closest approach during the Early Precambrian. The largest stromatolites mentioned by Cloud are 6 m high and occur in the Otavi "Series" in southwestern Africa. Cloud gives the age of these only as Proterozoic, but they probably are latest Precambrian (7); this is one reason why Alfvén and Arrhenius (2) think that Cloud's stromatolite data fit meteorite evidence suggesting to them that closest approach of the earth and moon was about 600 to 700 million years ago. Alfvén and Arrhenius state (2) that

the oldest known stromatolites, those from the Early Precambrian of Rhodesia, are only 3 to 4 cm high, a height which suggested to them that tides then were very small. In fact, domed layers within these stromatolites have a relief of up to about 60 cm, as Macgregor's (8) illustrations show. Olsen (4) and Alfvén and Arrhenius (2) do not believe, as Cloud does (3), that moon capture and closest approach to the earth were necessarily simultaneous (in terms of geological time); thus they can accept Cloud's evidence for large lunar tides throughout the Middle and Late Precambrian while postulating the latest Precambrian as the time of closest approach.

A point not mentioned in earlier discussions is the fact that in Early to Middle Cambrian rocks (about 570 to 515 million years old) near Lake Baikal in Siberia there are large domal and subspherical stromatolites up to 15 m high (9). Individual layers within these have a relief of 5 to 6 m and in some illustrations appear to reach 15 m, although this is not clear. Laminae are not shown in the illustrations, but if successive layers (groups of laminae) have this much relief, then during growth the stromatolite itself must have projected at least this far above its substrate. Thus some Cambrian stromatolites during growth were as high as, or higher than, any known Precambrian forms, and those known Precambrian stromatolites with the greatest growth relief are probably latest Precambrian in age. Therefore if stromatolites are used as indicators of former tidal ranges, one would have to conclude that the largest tides occurred during the Cambrian and latest Precambrian. On the basis of geological evidence, Cloud (3) has discounted the possibility of a very close approach of the earth and moon at that time.

Doubt is cast on these interpretations by the fact that only rarely is there firm evidence that Precambrian stromatolites actually grew in an intertidal environment. Many may have formed subtidally. Furthermore, a recently published observation shows that the assumption that large domal stromatolites could grow only in the intertidal zone is invalid. Playford and Cockbain (10) have very elegantly and cogently demonstrated that Devonian stromatolites in Western Australia grew in water as deep as 45 m; they state that some of these are "mound-shaped" (the type considered here). These mound-shaped

stromatolites had a growth relief of 30 to 150 cm (11). They occur in the fore-reef facies of Devonian reef complexes, where geopetal structures indicate depositional slopes. Thus an interpretation based on the single published record of Recent stromatolites conforming in growth relief to the tidal amplitude is contradicted by evidence from the geological record. The conclusion that the growth relief of Precambrian and Cambrian stromatolites necessarily indicates the contemporary tidal amplitude is unwarranted.

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A Multiple Origin for Plastids and Mitochondria

Although I tend to agree with the general thesis advanced by Raven (1), it is only fair to state that the arguments against the symbiotic origins of chloroplasts and mitochondria are not as weak as he would have us believe. Particular mention should be made of work by Bell *et al.* (2) and Camefort (3) which presents substantial arguments against the symbiotic theory (4). Similar, over-enthusiastic statements of these concepts led to the downfall of the original theory advanced by Mereschkowsky (5), and caution should be used lest history repeat itself.

It should be noted that *Platymonas convolutae* is not a dinoflagellate as indicated in the text of Raven's paper, it is a species of Chlorophyceae belonging to the Pyramimonadales. Furthermore, the reference cited for the symbiosis between this alga and *Convoluta roscoffensis* actually deals with the endosymbionts of *Paramecium aurelia* (6), when the work of Parke and Manton (7) should have been noted. If contemporary examples of algal-invertebrate symbiosis are used to illustrate

points in a theoretical discussion of this type, the specific identities of hosts and symbionts should be given correctly since this can affect the validity of the conclusions that can be drawn.

In short, the theory of symbiotic origins for chloroplasts and mitochondria is now very attractive, and there is much evidence in its favor. Nevertheless, it is not yet dogma, and a great deal of study will be needed before it is unchallenged.

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Treatment of Organophosphate Poisoning

In his article Nachmansohn (1) said that "Pyridine 2-aldoxime methiodide is much more efficient and less harmful than atropine, still frequently applied by physicians in organophosphate poisoning." If a physician construes this to mean that atropine has been replaced by the oxime, the consequences could

be fatal. These two drugs are not competitive. An oxime has not and cannot replace atropine, but can be used as an adjunct to atropine.

Atropine acts by inhibiting the muscarinic parasympathetic effects of acetylcholine (for example, excessive secretions and smooth muscle spasm) but has

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