the International Commission, remains provisionally in force [acc. to Article 78 (a)] until it is ratified or rejected by the next International Zoological Congress. It is the purpose of this note to make the new text available to the zoological profession as a whole, since until now, the fact of the revision of Article 23b has not been widely disseminated.

A major advantage of the new version is making clear that the well-used junior name is automatically protected. A second advantage is that by its provisions ("at least five different authors and at least ten publications") [see (i) above] it excludes *de facto* all areas of animal taxonomy that are inactive. This is well justified since there is no reason not to apply strict priority when the junior name is poorly known and has been used only sparingly. Finally, the Statute does not prevent applications to the Commission concerning names affected by Article 23b.

The new wording of the Statute of Limitation is a major step in the direction of greater stability of zoological nomenclature.

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References and Notes

1. The full name of the Code is: International Code of Zoological Nomenclature adopted by the XV International Congress of Zoology, London 1961.
2. The so-called "Declaration 43" [published in *Bull. Zool. Nomencl.* 27, 135 (1970)], purporting to repeal Art. 23b, does not represent the vote of the Commission. We understand it is now being withdrawn. Furthermore, the Commission has the authority to classify and interpret the Rules, but only the International Congress of Zoology can repeal any provision of the Rules.

29 September 1971

Sex Differences in I.Q. Pattern of Children with Congenital Heart Defects

In a recent report Honzik *et al.* (*1*) noted that in children with congenital heart defects there was a reversal of normally found sex differences in verbal and performance I.Q.'s. In contrast to the usual finding, girls with congenital heart defects had lower verbal I.Q.'s than boys, and performance I.Q. was significantly higher than verbal I.Q. in the girls. In interpreting these findings Honzik *et al.* suggested several possibilities which included the following: (i) The nervous system of girls is more sensitive to whatever stresses the congenital heart disease produces than is that of boys. (ii) The environments that boys and girls with congenital heart disease experience are systematically different from one another and presumably the reverse of those normally experienced by healthy children of each sex. (iii) There is a "sex-associated genetic factor" which links congenital cardiac defects with intellectual patterning. Honzik *et al.* left these possibilities as coequals wanting investigation by other workers.

To differentiate among these possibilities, and particularly to test the usefulness of the "sex-associated genetic factor" as a hypothesis, it is necessary to choose a sample of cases in which the risk of brain damage from defective oxygenation is eliminated. Thus, it is necessary in the first place to study a sample of children with severe congenital heart defects requiring surgical repair who are acyanotic. Second, these children should derive from a cultural milieu which is highly homogeneous with respect to the values it places on male and female children so that sex differences in familial management would be maximized. In such a group it would be possible to explore the degree to which the fact of sex as contrasted to the fact of differences in the handling of sick children of different sexes contributes to the patterning of intellectual competence.

To meet these objectives a consecutive series of 63 children with acyanotic heart defects awaiting surgery were selected for study. Forty-one were girls and 22 were boys, with ages ranging from 5 through 12 years. Age distributions in the two sexes were comparable. Types of pathology included patent ductus, interventricular and interauricular septal defects, pulmonic and aortic stenosis, tricuspid athresia, and one case of aortic coarctation. Defects did not differ between the sexes.

The children derived from a cultural background in which boys are valued far more highly than girls (*2*) and where excessive overconcern for illness in boys relative to girls is characteristic. In this segment of Mexican society boys with congenital heart disease are likely to be subjected to extreme restriction of activity and experience while similarly affected girls pursue relatively normal lives. As a consequence, a comparison of the patterning of intelligence in boys and in girls permits one in this culture to examine the relative influences of sex and child care practices on the pattern of intellect.

The cardiopathologic cases were compared with 61 comparably aged and sexed normal children from the same lower social stratum. All children were individually tested with the Wechsler Intelligence Scale for Children (WISC).

Table 1 summarizes the full scale, verbal, and performance I.Q.'s by sex of the children in the cardiopathic and comparison groups. As may be seen from this table, in the normal group a small and nonsignificant sex difference in I.Q. level exists. Further, no significant differences by sex or within sexes obtained for verbal and performance I.Q.'s. The male children with congenital heart defects have significantly lower full scale, verbal, and performance I.Q.'s than the normal comparison group (t values ranged from 2.11 through 2.37, $P < .05$). The females with congenital heart defects, however, despite equal severity of cardiac pathology, have full scale, verbal, and performance I.Q.'s that are insignificantly

Table 1. I.Q. pattern, by sex, in children with congenital heart defects and in normal children of the same social class.

	Full scale I.Q.		Verbal I.Q.		Performance I.Q.	
	Male	Female	Male	Female	Male	Female
Normal						
Mean	81.5	76.2	82.6	77.4	84.6	79.3
Variance	236.4	170.9	186.4	138.9	342.5	218.4
Cardiopathic						
Mean	71.9	79.1	73.9	83.3	72.9	78.4
Variance	242.9	218.1	227.3	236.7	232.0	243.7

different from the controls. Verbal I.Q. in the males with congenital heart defects is significantly lower than verbal I.Q. in the females with comparable disease. Moreover, there is a tendency for verbal I.Q. to be somewhat higher than performance I.Q. in the girls with congenital heart defects. This difference, however, does not reach an acceptable level of statistical significance.

These findings are not in agreement with those of Honzik *et al.* (*1*) in that they do not show an excessive reduction of verbal competence of girls with congenital heart defects. Moreover, the verbal I.Q.'s of the cardiopathic girls are significantly higher than those of the boys with congenital heart defects. This pattern is different from the pattern of sex differences found in the normal children but provides no support for the hypothesis that there is a "sex-associated genetic" factor which produces depressed verbal functioning in girls with congenital heart defects.

There is a considerable body of evidence (*3*) which indicates that the mental development of children with congenital heart defects is strongly influenced by the degree to which family reactions to the fact and threat of this illness result in the modification of normal childrearing practices. Parental concern and valuing attitudes toward the child result in different degrees of overprotection with systematic effects on the constriction of experience and environmental opportunities essential for normal development. In light of these findings the data are most parsimoniously interpreted as suggesting that in the particular subculture sex differences in the familial handling of children with congenital heart defects result in excessive experiential constriction for boys, with seriously deleterious effects on all aspects of intelligence. In contrast, girls, who are apparently far less experientially disadvantaged, perform at comparable levels with normal children of the same social class.

These findings suggest several possibilities for reanalysis and reinterpretation of the data that Honzik *et al.* have reported. Since they did not homogenize their cases with respect to the presence or absence of cyanosis it is possible that one of the sexes in their sample had a higher frequency of secondary brain pathology than the other. Such a difference cannot be defined from the data as presented but if present could result in the sex differences that were found. It is also possible that sex differences in familial practices with respect to care and handling of children with congenital heart defects in the population that Honzik *et al.* have studied may be the reverse of our own. In this event the findings of the two studies would be entirely consistent with one another and both capable of being interpreted as deriving from sex differences in developmental opportunities stemming from differential family practices in the management of boys and girls with congenital heart defects. Such differences in turn may reflect different valuing attitudes toward boys and girls in the two subcultures.

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2 March 1970

Cravioto, Lindoro, and Birch's finding of a complete reversal of the sex difference in I.Q. pattern of cardiopathic children in Mexico when compared with that of cardiopathic children tested in San Francisco is not only surprising but remarkable.

The notable characteristics of the San Francisco sample (93 boys and 78 girls) were the girls' low verbal I.Q.'s on the Wechsler Intelligence Scale for Children (WISC) as compared with the verbal I.Q.'s of the boys, and with those of the girls' own performance I.Q.'s (*1*). The sex differences were significant at the $P < .01$ level for the information and vocabulary subtests for children tested after open heart surgery. On these subtests, the girls not only had low verbal scores but appeared to have difficulty in recall or the retrieval of appropriate information. In contrast, Cravioto *et al.* report for 63 low-social-stratum Mexican children awaiting surgery that the cardiopathic girls' verbal I.Q.'s are higher than those of the boys, and higher even than those of a normal control sample. Cravioto *et al.* suggest that these cross-cultural differences may be due to (i) a possible higher incidence of cyanosis among the girls than the boys in the San Francisco sample or to (ii) the differential treatment of boys and girls in the two cultures, with more protective care accorded the boys in the Mexican sample.

The cardiac defects in the two samples differed. Cases with patent ductus were included in the Mexican sample but not in the San Francisco sample because this defect does not require open heart surgery. Cases of tetralogy of Fallot were excluded from the Mexican sample but included in the San Francisco cohort. Most of the tetralogy cases were cyanotic. Table 1 shows that in the San Francisco sample there were more boys than girls with the tetralogy diagnosis and that the boys' verbal I.Q.'s are higher than the girls' for this defect, as for all others. Considering the total San Francisco sample, more boys

Table 1. Sex differences in verbal and performance scores according to cardiovascular defect.

Cardiovascular defect	Sex	N	WISC verbal score		WISC performance score		WISC full scale	
			Mean I.Q.	t ratio	Mean I.Q.	t ratio	Mean I.Q.	t ratio
Tetralogy of Fallot	Boys	19	109.6	2.02*	108.8	1.92	110.6	2.30†
	Girls	7	96.8		99.8		98.3	
Atrial septal defect	Boys	13	107.8	2.14†	103.1	−.19	106.0	1.13
	Girls	23	98.0		103.7		101.0	
Ventricular septal defect	Boys	14	99.2	1.17	103.1	.83	101.0	1.14
	Girls	13	92.3		97.8		94.5	
Pulmonic or aortic stenosis	Boys	11	103.4	1.92*	106.1	1.36	104.9	1.81*
	Girls	8	91.9		96.0		93.4	
All cases (including rare "mixed" defects)	Boys	60	104.2	3.20‡	105.2	2.20†	105.1	3.05‡
	Girls	58	95.8		99.5		97.4	

* $P < .10$. † $P < .05$. ‡ $P < .01$.

than girls were cyanotic according to the medical histories, and a larger proportion of the boys had low oxygen saturation rates at the time of catheterization. It is clear then that the sex difference in the San Francisco sample does not stem from a greater incidence of cyanosis or oxygen deprivation among the girls.

The second explanatory factor, of a cultural difference in the experience of these children, is more difficult to analyze and evaluate. There is clear evidence in United States samples of normal children that the boys' later I.Q.'s are related to a warm, close relationship to the mother or caretaker in the first years of life (*2*). There is equally clear evidence that the girls' verbal I.Q.'s are negatively related to a too close or an intrusive attitude of the mother to her daughter. These findings would explain the high verbal scores of the boys and low verbal scores of the girls in the San Francisco sample. They would also explain the Mexican results for the girls, since these girls are not overprotected according to Cravioto *et al.* But the results for the Mexican boys do not appear to be in accord with what would be expected unless we take into account a further finding that later or prolonged maternal overprotectiveness (after the first 2 years) is negatively related to the boys' I.Q.'s (*3*). In other words, boys earn relatively high verbal I.Q.'s where there has been a close relationship in infancy with the mother but opportunities to explore later. Girls do best with a friendly, supportive but not an intrusive family situation.

The final question is whether these hypotheses constitute adequate explanations of the findings in the two cultures. We do not think so. The deficit observed in the verbal I.Q.'s of the San Francisco girls who had open heart surgery was highly specific, occurring to a significant degree only where the girls had to recall previously learned material. This may be a chance finding but it was noted in all economic and diagnostic subgroups of the 78 girls who were tested. We would like to know if the patterning of the verbal test scores of the Mexican girls revealed a similar pattern with relatively lower scores on the information and vocabulary subtests. We hope that there will be further reports on sex differences in I.Q. patterning in other samples of cardiopathic children, since there are probably a multiplicity of factors determining these results.

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27 September 1971

Multiple Genotypes in Individuals of Claytonia virginica

The report of variability in chromosome number within individuals of *Claytonia virginica* by Lewis *et al.* (*1*) is an interesting documentation of chromosome behavior in polyploid organisms. They proposed that this variability is under genetic control, and they implied that these "supernumerary" chromosomes may play an adaptive role in the populations where they are found. However, alternative interpretations of these data are possible. Chromosomal behavior can be greatly affected by environmental factors. For example, chromosomes of plants grown under conditions of water stress often display such phenomena as "stickiness" and irregular segregation. If a population of *Claytonia virginica* is in a marginal environment (as was the population studied by Lewis *et al.*), or if individuals are subjected to some sort of "traumatic" treatment (as in this study) that affects their normal functioning, then chromosome behavior may be irregular during both mitosis and meiosis. The result of this behavior would be cells with different chromosome numbers.

Such events are consistent with the data presented by Lewis *et al.*, since the cells with the highest chromosome numbers are in "traumatized" tissue (roots from floral stems) and microsporocytes which would be one of the first groups of cells to feel the effects of drought and one of the last to recover because of an inadequate root system or insufficient water supply. Although the authors reported meiosis to be "largely irregular" perhaps irregularities were not observed in a significant frequency owing to both the small sample size and the relatively high chromosome number.

Thus, there is no reason to assume that chromosomal variability in *Claytonia virginica* is genetically controlled. It is more reasonable to suggest that this variability is environmentally induced, and, inasmuch as the plants are polyploids with a degree of genetic redundancy, the irregular chromosome segregation would have no effect on cellular viability. Earlier, Lewis reported finding individuals of *C. virginica* from the same general locality as the population used in this study with chromosome numbers less than $2n = 28$ (*2*), the lowest number reported in this study. In other words, the "supernumerary" chromosomes offer no selective advantage (they may, in fact, be selectively neutral). The significance of the data of Lewis *et al.* is, in fact, to point out a possible selective advantage of polyploidy in extreme or marginal environments.

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17 July 1971

At least two reasons exist to suggest that chromosomal variability is genetically controlled in *Claytonia virginica*. Primary roots grown in the greenhouse have a high proportion of cells with the common polyploid number ($2n = 28$) even though other parts of the same plants vary by having one to five supernumerary chromosomes. These roots were grown in sterile potting soil, an environment alien to the soil and microorganisms of their native hill in Texas. If trauma and environmental factors have directly affected chromosomal behavior in *C. virginica*, then we need an explanation for the highly consistent chromosome numbers and behavior of mitosis in primary roots.

Data on meiosis are now known in some detail from this population (*1*). "We found over a 5-year period little meiotic irregularity in the microsporo-