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Incorporating Science News Letter

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COVER: With evidence supporting both sides of the controversy, intrauterine devices have become one of medicine's most debated topics. If Congress acts on a bill presented last week, the FDA may soon have the power to regulate the sale of what some physicians feel are inadequately tested contraceptive devices. See p. 226. (Illustration: Ann Lunsford)

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To the Editor

The math of physics

We scientists can only chuckle at the problems of mathematicians regarding the foundations of mathematics (Steen's article, SN: 2/15/75, p 108). Fortunately, we do not have to rely on internal consistency as the test of validity, but rather turn to the real world for testing. From this point of view the "reality" of infinitesimals is beyond doubt, since the applied calculus is well confirmed in its physical predictions.

I agree with Demys's remarks (letter: SN: 3/8/75, p. 147) on this subject, but would take exception to his remark about integers. He says it has been obvious for centuries that they have no upper limit. Pure mathematics is a game where one can make up any rules. Only internal consistency is required. Thus cyclic integer systems such as $N + 1 \equiv 0$, where N is the *largest* integer, are "valid" mathematical objects. It is a different question as to which describes the real world of physics.

It is rather surprising that the existence of antimatter can be taken as an indication that the infinite integer system is the math system of physics. Dirac's relativistic electron equation has the solutions $E = \pm mc^2$. The $E = -mc^2$ solutions have been found to correspond to anti-electrons (positrons). If a cyclic number system were used then $A + (-A) = 0$ would mean that $(-A)$ is to be found among the integers 0, 1, 2, . . . N. There would be no *separate* "class" of objects -1, -2, -3, ... It now appears that every particle in high energy physics has a corresponding antiparticle. There is a natural "match" to the real number line. A few particles are their own antiparticle (e.g., photons of light) and thus sit on the fence between the worlds of matter and antimatter. There *may* be no such thing as infinity in the real world, but the natural number system appears to be the usual fractional number system (the rationals), which contains countable infinity in an essential way.

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Tropical giganticumes?

In the very excellent article "Supernovas: Quickie Tropical Storms" (SN: 3/8/75, p. 152), I was surprised to read that these newly studied storms are referred to as supernovas, a word already used in astronomy, and well established, for a far different entity in their own field of study. With this confusion, how is anybody going to explain the word "supernova" to a high-school student?

These cloud formations need a descriptive name unique to their action and function as super-rapid, threatening, nocturnal, tropical accumulations of cumulus clouds, the name employing either derivation of initials, descriptive name, or even a combination of shortened descriptive names. Scientists should be able to come up with something better than my own suggestion of "tropical, oceanic giganticumes."

Mrs. Marcia G. Norton
Orient, Wash.

Moral judgment

Unfortunately, the conclusions expressed in your research note "Moral Judgment in Children" (SN: 3/1/75, p. 136) seem hardly the result of any experimentation. The basic definitions of terms such as "sociopathic child," "well-adjusted child," and "moral judgment," *entail* the results. So it seems that we have learned nothing that wasn't already there once the child had been *defined* as sociopathic.

It was just as objectionable that your article also implied the causal relationship in one direction, between cognitive development and moral development. While the Campagna-Harter experiment may have shown a correlation between the two, I doubt seriously that this correlation could be shown to have causal relationships

The entire issue of the relationship between cognitive development and moral development is too complex to be adequately discussed in this letter. It should be noted, however, that, in actual practice, deviant behavior in a child very often disrupts the child's education on a daily basis. This disruption is, in part, a function of the child itself, but it is also a function of the attitude and treatment of the child by its peers, teachers and community.

After many years of reading SCIENCE NEWS, I apologize for my first letter being critical. But experiments designed to amplify, clarify and spend time on definitional tautologies hardly seem worth the effort.

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