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MEDIA HIGHLIGHTS

This column allows readers to monitor a broad spectrum of publications, professional activities, and instructional resources. Readers are encouraged to submit items that will be of interest to colleagues in the mathematical community. Send all contributions to Warren Page.

The Numbering Crisis in World Zone 1, Brian Hayes. *The Sciences* 32:6 (November/December 1992) 12–15.

It might be supposed that the ten digits in standard telephone numbers in World Zone 1 (U.S., Canada, some Caribbean countries) would be ample to meet the needs for some time to come. But when it is considered that many telephone numbers are now being used for devices (modems, faxes, etc.) other than traditional telephones; that there exist certain conventions (such as those restricting uses of 800-, 900-, and -555- numbers); that needs are very unevenly distributed among the sets of users represented by area codes; and other constraints (have you noticed that the middle digits area codes in World Zone 1 are always 0 or 1?)—the possibility of a problem becomes evident. In fact, there is a problem: usable numerals are "in short supply." This lucid article describes the history of "telephone" numbers in World Zone 1, analyzes the extent of the problem, and comments on probable future attempts at solution. It is a nice example of elementary combinatorics in action. DWB

Object Lessons, Dominic Olivastro. *The Sciences* 33:1 (January/February 1993) 45–46.

The "modern" way of multiplying two multidigit integers in the base-ten place-value system is second nature to us all, from university professor to grade school student. It is, of course, not the only method. One interesting algorithm that was still being used as recently as the turn of this century in Ethiopia involves no skill more complex than the ability to count, to double, and to divide an integer by two (discarding the remainder if the number was odd). There was no need to memorize the multiplication tables up to 9 times 9. To multiply two integers, one would, in essence, turn the larger number into its base-two representation and multiply the smaller number by each contributing power of two in the larger. For example, to multiply 7 by 22, one would take some supply of counters (small stones or sticks would do nicely) and begin by placing 7 counters in one calculus instruction at the beginning of the next decade will be far different—and more successful—than it was at the beginning of the last. VJK

Attitudes Towards Mathematics: Male/Female Differences in Three Grade Levels, Antonella Cupillari, Robert P. Hostetler, and Robert T. Tauber. *New York State Mathematics Teachers' Journal* 42:3 (1992) 1654–172.

This is a well-written and well-documented study of sex differences in mathematical performance and attitudes towards mathematics in grades 3, 5, and 7. Among the results noted was a higher test-anxiety level for girls, which appears as early as the third grade. A slightly lower mathematical self-esteem among girls appears in all three grade levels. There was an age-related decrease in mathematical self-esteem for both boys and girls. Students do not appear to harbor a belief that one sex is better at mathematics than the other. Both boys and girls are conscious of the fact that mathematics will help them find a good job, that they will use mathematics in their future. The authors suggest that school districts utilize anxiety awareness programs for teachers, students, and parents. They also suggest increased student involvement with mathematics and its applications. LSG

Why the Ant Trails Look So Straight and Nice, Alfred M. Bruckstein. *The Mathematical Intelligencer* 15:2 (Spring 1993) 59–62.

In *Surely You're Joking, Mr. Feynman!,* Feynman described some experiments he did examining the behavior of ants because he wanted to figure out how ants communicated the location of their sources of food. He discovered that, while individual ants traveled very irregular paths, which they mark, the trails left by long strings of ants turn out to be quite straight. Why? The "pioneer ant," after finding food, returns to the anthill (marking a very wobbly path) and recruits followers. Then the recruited ants follow one another, basically, in pursuit mode, roughly along the previously marked path. The nth ant recovers from slight deviations from the marked path by pursuing the $n-1$st ant, and the whole sequence of ants gradually yields a path that converges on a straight line. In effect, the sequence of ants acts to smooth out the path. Bruckstein formalizes this sequential pursuit problem with a differential equation and proves that the limit of the paths is a straight line, so the whole sequence of ants can exhibit geometric intelligence while individual ants know nothing of straight lines. Surprisingly, the solution to this problem is near the limits of solved pursuit problems, and if one varies some of the parameters a bit, the resulting nonlinear differential equations quickly become extremely difficult to solve. Essentially, the only solved cases involve ants following ants walking in straight line segments or circular segments. The author examines a few other interesting pursuit problems, including the lion pursuing a man in a closed arena. JJK

Computers, Formal Proofs, and the Law Courts, Donald MacKenzie. *Notices of the American Mathematical Society* 39:9 (November 1992) 1066–1069.

Recently, controversy concerning mathematical proof of computer correctness was discussed in the *Notices* (September 1989). Since the formal notion of proof will probably become indispensable in setting standards for high-integrity computer systems, it can be expected that such controversy will more frequently become a legal issue. The focus of this article is the question of what kind of mathematical argument is indeed a proof. After