Dinky Bird 23

comes from Ruth Berman, 5620 Edgewater Boulevard, Minneapolis Minnesota 55417, for the 80th SAPS mailing, July, 1967.

Teaching Baby Medicine

[Small boy playing doctor with a doll as patient:]

"Dammit, baby, why don't you get well?"

[When asked how he liked his visit to the hospital:]

"I see rabbit! I see guinea pigs!! I see autopsy!!!"

[From under the bed, demanding $2 in return for accepting a penicillin shot from doctor-father:]

"It's not as much as it'd cost if a real doctor gave it to me."

[To a lady who remarked, "Oh, how I would love to have a little boy just like you!":]

"Would you really? Well, you go home and tell your husband---" [Boy is hastily removed.]

[To a lady who remarked, "You're going to be a doctor? When you grow up you can deliver my babies":]

"When I grow up you will be too old to have babies. As a matter of fact, I think you are too old already."

[After being scolded for the fore-going, to a 55-year old lady]

"To me, you look about...[judicial pause]...sixteen."

Small confession on "Teaching Baby Medicine": actually, the producers of those mal mots were three children, not one.

I dunno...I don't really feel like mailing any comments. It's summer, and I just finished reading a deadly dull book called How To Write a Play by Lajos Egri. Like all such books, it is really a book on how to analyze plays—including your own, if you get so far as to write one—but no help at all in the writing. It is not as useful as most such books in the matter of analysis, being stiffer and more artificial than most. Besides, I don't think much of his taste. He dislikes Noel Coward and thinks Hamlet is a "tridimensional," fully consistent character. I much prefer Walter Kaufman's How Not To Write a Play, which is probably equally useless, but is much better written. Getting through Egri is enough effort for one day.

Still, there isn't all that much time left till the deadline, and I'm perfectly capable of whiffling it all away, and I suspect that I'm not capable of whiffling much of it away on pages of natter. I can try, of course. If I don't manage to natter much, I can always start in on comments. But, either way, I ought to get going sooner rather than later, despite my Egrigious fatigue.

Spring quarter I studied some more Latin under a poly-lingual teacher: a native of Germany and a citizen of Israel. It seemed odd, after the Latin I teacher made us carefully pronounce all the "v's" as "w's," to hear Mrs. Guggenheimer pronouncing all the "v's" as "v's." And in my English class I wrote a paper called "Rashi and the Medieval French Jewish Community." I was thinking of putting it into Dinky Bird and dedicating it to Jack Chalker, but I think if I put any of those English papers through here, it'll be the one on medieval mathematics, since there are some who would probably find that interesting in SAPS and probably none who would find the Rashi paper interesting. And what does either Rashi or medieval mathematics have to do with English? Oh, nothing, nothing...but the teacher told us to avoid literary topics, since we'd be assigned the reading in other courses, and not to worry about sticking to England, since medieval culture was sort of the same throughout Europe, and we all dutifully followed his advice.

And that's all the courses I took all year. Each quarter I signed up for one Latin course, one medieval English culture segment, and one other. Each quarter I dropped the other. I have (or had—like several of the department's other top members he is leaving) an adviser who is a bug on taking-a-full-load. I say it's spinach.

WHICH ALL SAPIENT PEOPLE KNOW

mailing comments

Yes. Well, one page of whifflo seems to be it. Meanwhile, back at the mailing...

Deadwood Sap 10--BRToskey

It's odd that so little of Sibelius' music is available. A couple years ago, when the U. of M. radio station did a production of The Tempest, using Sibelius incidental music to the play as background music, I got to like his "Suite from the Tempest" very much and tried to buy a recording of it, but was told it was unavailable. By now I have fotgotten how the music went, except for a few snippets of themes, so I cannot even enjoy recollecting the music.

Murias 5--Jean Berman

I like your illos. For that matter, I like your writing.

Pot Pourri 48--John Berry

The only trouble with "Strawberry Fields Forever" and "Penny Lane" is that they're still available only on the single disc. I could get it, but I wouldn't play it if I did--but, even so, I'd like to have the two songs very much. Maybe on their next LP the Beatles will include them. Certainly Sergeant Pepper's Lonelyhearts Band is a good LP...despite lacking the Fields and the Lane. I read in the Sunday paper yesterday (today is Sunday) that "A Day in the Life" has been banned by some English stations because it approves of drug-taking and that "Penny Lane" has been banned on some station in Texas because it is too "earthy." Whatever that means. Taking another look at the lyrics of "A Day in the Life," I guess it is about a man who takes drugs. Maybe. Of course, that still leaves you asking: So what? And, with a little ingenuity, I can find assorted perversities in "Penny Lane." The barber's photographs may be pornographic, and the fireman has a hangup on his clean machine, and there's certainly something wrong with that banker. All of which is fun as an exercise in decoding, but not likely to produce a run on the drug or fire engine market. Maybe radio stations just like the excitement (and publicity) of banning a record now and then.

¿Por Que? 33--Doreen Webbert

I liked Ironside, too. mostly, I think, because of the acting of Raymond Burr as Ironside and Donald Mitchell as Mark

Sanger. The other two leads, the pretty policewoman and the pretty policeman, were dull, and the writing was often pretty melodramatic. I almost liked it enough to want to watch Burr on a re-run of Perry Mason (I've never seen a Perry Mason show--or read a PM book, either, for that matter), although so far the impulse to see what Burr was like as Perry Mason has never coincided with the times the re-runs are on.

Last week I watched Gunsmoke for the first time, except it wasn't Gunsmoke, it was Matt Dillon and only half an hour long. I wonder just how old some of the re-runs we're getting are. I enjoyed the show...and have a sort of suspicion that I'll spend a good part of the summer watching old shows.

The Charlottan 12--Len Bailes

Your account of the sociology student trying to interview LASFS is hilarious.

Mitch Evans was one of the actors on Captain Video? Maybe that's why he looked vaguely familiar when I first met him. Who did he play? And what was the "on the air"slip of tongue which made him famous? Considering his sense of humor, it was probably better than the only slip I ever remember noticing on the show, when the Video Ranger, in a chase sequence, paused to lean against a brick wall and catch his breath. The brick wall began swaying slowly back and forth. Of course, there was the time when the Ranger and Captain Video were grouched behind some garbage cans waiting for the field to clear so that they could steal a space-ship. While they waited, the Captain took the opportunity to deliver a little lecture on why crime never pays.

From Sunday to Saturday--Don Fitch

Yes, but it is often impossible to buy asprin or a spool of green thread or some postage stamps or whatever while you're on a trip. It always seems as if you need them at night, when the stores are closed (and in a strange city you don't know where the all-night stores are). And some things you want to take on a trip because when you need them you need them fast--like a rip in your costume for the costume ball. Women don't take along twice as much as they need on a trip--they just take along what will be needed in likely cases. That's twice as much as we use, but the variation in what gets used and what doesn't is enough to make the surplus worth the strain of carting it all over.

Goliard 841--Karen Anderson

Enjoyed your account of the spring tournament.

Spy Ray--Dick Eney

I couldn't say what issue of the Mankato Review or how to get it when I wrote that bit on the Tolkien conference, because they hadn't decided themselves. It's Mankato State College Studies in English No. 2, Tolkien Papers, and its available from College Book Store, MAnkato State College, Mankato Minnesota 56001, for $1.50 (that's $1.25 plus postage).

Mest 22--Ted Johnstone

Well, it wasn't so much that I got my double dactyls wrong as that I got the directions wrong in the first place. That's what comes of trying to write a verse form a couple weeks after seeing it for the first time, and not having even that first-time-stuff available to check the format.

The Development of Algebra in Medieval Europe

Originally I meant to call this paper "The impact of Arabian mathematics on Medieval Europe," but I changed my mind, as the reading showed that, for reasons I'll discuss later, Arabian mathematics had no sudden impact on Europe. During the middle ages this "New Math" was gradually introduced, studied, and assimilated. Its full impact did not come until the 17th century, when René Descartes applied algebra to geometry, producing analytic geometry, and Isaac Newton studied the infinite and the infinitesimal, and developed calculus. Analytic geometry and calculus are the bases of modern mathematics. Both would have been practically impossible before the development of a simple, concise notation. Greek geometry put its proofs into syllogistic statements, using words throughout. Words are too long to examine quickly; their appearance is not related to the things they denote. Algebraic notation is simple and concise.

Both analytic geometry and calculus make use of rather complicated arithmetical processes. Arithmetic was drastically simplifed by the introduction of the zero. Calculus would have been at least theoretically possible Before the time of the Arabs. The Greek method of exhaustion--determining an area by filling it with smaller and smaller triangles--comes close to the theory of limits used in calculus to determine an area. Analytic geometry, however, is not even theoretically possible until both algebray and geometry are known; the medieval Arab mathematicians were the first to study them both intensively. The word "algebra" even comes from Arabic--as do "zero" and "cipher."

Algebra, "the branch of mathematics which treats of quantity and number in the abstract, and in which calculations are performed by means of letters and symbols," as the dictionary calls it, may be described more simply as abstract arithmetic. The first section of this paper, therefore, considers the simplicity the zero brought to arithmetic.

Arithmetic, if you remember the grief of learning to understand fractions or the drudgery of long division, is not very simple now--in the days before zero it was as difficult as starting a car on a day below zero. Consider a simple arithmetic problem in Roman numerals, forty-two times fifty-five, or

LV
mult. XXXXII.

Incidentally, I wrote XXXX rather than XL, because that was the more common practice. The "place value" system in Roman numeration which indicates that one unit should be subtracted or added, according as it is placed on the left or the right, seems to have originated as a way to save space. Parchment was expensive, and highway-signs were carved in stone--any stone-cutter would rather carve XCIV than LXXXXIIII if he wants to inform the public that they are 94 stadia from Rome. But where space was not important, most Romans wrote out fours in full, partly, no doubt, because the longer writing is a little easier to keep track of in calculation.

Returning to the multiplication problem, you see that I wrote "mult."--short for fifty-five "multiplicatur [is multiplied]" by forty-two. There was no symbol to indicate the operation of multiplication, only the verb or an abbreviation of the verb. To be sure, it makes no real difference whether you wrote a "mult" or a cross (and the cross-symbol was not introduced till 1631, in a text-book on arithmetic by William Oughtred), but a lack of operational symbols parallels inefficiency in notational symbols. Both indicate that the user has not yet realized how much of the work of arithmetic can be done in the writing, leaving the mind free. A more important example is found in the LV. To us, LV is fifty-five. There is an obvious relationship between the fif and the five, and that relationship is expressed by the likeness between the 5 in the ten's place and the 5 in the one's place when we write 55. To the Romans, there was an obvious relationship between quinquaginta and quinque, but there is not hint of that relationship in an L and a V. Instead of multiplying five by forty-two and then repeating the answer one place over for fifty times forty-two, the Roman had to go through this laborious process: two times five is ten. Write X. Forty times five is two-hundred. Write CC (CCX). Two times fifty is one-hundred. Add another C (CCCX). Forty times fifty is two-thousand. Add MM. The answer: MMCCCX. Incidentally, if you don't know 5X40 offhand, you can't just say 5X4=20 and tack on a zero. You must work it out, either by saying 5X4=20 and 10X20=200 or by adding five forties.

The addition involved in that multiplication problem happens to be fairly simple. If the number of X's or C's or M's had gone up to five or more, it would have been more complex. Indeed, it was so complex that the Romans did not bother with it. After all, there is no sense in going to the trouble of writing down the problem if writing it down does not help you in finding the solution. You can just as well turn to an abacus, do the whole problem on that, and not have to write anything down except the answer. And, in fact, the abacus was the principal arithmetical tool in Roman times in the the middle ages as well. As late as 1543, Robert Record included in his Arithmetic or The Ground of Arts a section on "accomptynge by counters."

The unquestioning assumption that arithmetical operations will be performed on an abacus, or an equivalent machine, shows up in a number of English and Latin words. For example, "casting accounts" means throwing little counters into the grooves of a prepared board. The Court of the Exchecquer was so called because they used a checkered board and counters in their reckoning. In a famous poems by Catullus, he asks Lesbia for thousands and hundreds of kisses, and then says "conturbabimus"—let's lose count. But literally "conturbare" means "to shake up together"—as the English word turbulence suggests—and Catullus is referring to the operation of shaking up an abacus so that all the counters are disarranged.

Still, it may be pointed out, the Romans were not particularly interested in mathematics and not particularly good at it. What of the Greeks?—who were fascinated by mathematics and, indeed, may be said to have invented mathematics as a field of study, since they were the first to demand rigorous proof instead of collecting assorted observations which might be correct, approximately correct, or correct only in a few particular cases.

The ancient Greeks had a system of numberation that was very much like the Roman system. Around the third century BC they evolved a system in which the first nine letters of the alphabet represented the numbers 1-9, the second nine letters represented the tens, 10-90, and the third nine letters represented the hundreds, 100-900. This is quite an accomplishment in an alphabet of 24 letters (they resurrected the digamma, the V or W sound which had dropped out of their language, and borrowed two symbols to complete the 27 needed).

The new system was much neater-looking than the old. For example, in the problem shown before, where the Roman wrote

LV / XXXXII, the Greek simply wrote NE [mu epsilon] / MB [mu beta].

In the older system, the Greek would have written

𐅄 Γ
ΔΔΔΔII .

The figure like a gamma is an old form of Π [pi], standing for "penta" [five], and the delta stands for "deka" [ten]. The symbol for fifty, 𐅄 , is a combination of pi and delta.

The Greeks dropped that older system for one which was much neater and probably more pleasing aesthetically. It was also, for purposes of computation, even worse than the other. The older Greek system, unlike the Roman, showed a relationship between five and fifty. Both systems frequently preserved such relationships in the number of symbols. XXXIII and ΔΔΔIII may be clumsy, but at least they indicate a certain resemblance between thirty and three; Λ Γ [lamda gamma] does not.

Moreover, the new Greek system could only count to 999. By adding accent marks they got it up to the myriads [ten-thousands], but both the Greek and Roman systems were limited by the necessity of finding a new name and a new symbol whenever they needed to count a number which was too large to be expressed conveniently in the symbols already existing. Fortunately for them, they did not need many large numbers, but, if they had, the Romans at least had plenty of letters left over to use; the Greeks had none. The Greek system was capable of extension. Archimedes, in the 2nd century BC, wrote Psammites [The Sand-Reckoner], in which he devised symbols capable of counting the number of grains of sand in the universe. Still, such an extension demanded ingenuity. If it had been necessary to use the system, memorizing it would have been a nuisance. When I was in grade school we learned a series of number names capable of expressing any number of to 10^{69}. I have forgotten all of them after the trillion, except the last: a vergintillion. I remember the vergintillion, 10^{66}, the googol, 10^{100}, and the googolplex, 10^{googol}, because I like the sound of their names, not because they are useful. That is not to say that the numbers themselves are useless. The number of possible ways of dealing a canasta deck, for example, is several times larger than a googol, though not as large as a googolplex. But we, in our calculations, no longer need to burden ourselves either with names or symbols. The system of place-value takes care of it for us.

Or, in other words--the Greeks had to do all their figuring on an abacus, too. What the Greeks called ARIΘMHTIKH was what we would call number theory, and it was severely limited by the difficulty of performing calculations, and by the fact that the Greeks interpreted numbers in terms of their first love, mathematically speaking: geometry. We speak of square and cubes, because the Greeks considered multiplication the extension of two lines to an area or three lines to a volume. As there is no perceivable fourth dimension, they invented no term for higher exponents, and did not investigate them. Nor did they investigate irrational numbers. They used pi, because they had to, and they proved it to be irrational, because their mathematical integrity forced them to do so (instead of setting pi equal to 3 or 3½ by fiat, as other peoples did), but they did not like pi. They found irrational numbers aesthetically displeasing--as indeed they are, in a system which has trouble enough handling ordinary fractions.

Fractions, indeed, were a problem. The one real problem in calculating with an abacus is that it cannot handle fractions, except decimal fractions, and decimal fractions were not much used. There were two common ways of calculating with fractions. One was to set the numerators equal to one and to express any fraction whose numerator was more than one as a sum of two or more fractions. The Egyptians are the first known to have used this system, and the Greeks took it over from them. It has no advantage that I can see except that it simplifies the problem of naming the fractions; I have not found any source that suggests any reasons. The single numerator system is very clumsy. The other system, of which our percent is an example, is to take a single denominator. The Babylonians set up a sexegesimal system for fractions which survives in our minutes, hours, days, and circles. The single denominator system works fairly well; most of the medieval Arabian mathematicians continued to use it in expressing fractions.

[which brings the history of Greek mathematics up to the Arabs. The next section starts over, taking the history of Indian mathematics up to the Arabs. Which makes this a good place to stop.]

TO BE CONTINUED