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ABSTRACT

This booklet is designed for leaders of mathematics programs in schools. These leaders may include department chairpersons, administrators, or experienced teachers. The purpose of the document is to help provide direction for these leaders in improving their mathematics programs. The following topics are discussed: (1) getting involved in mathematics programs and organizations; (2) department organization and functions; (3) support staff and administration; (4) publicity and communication; (5) being a school leader; (6) curriculum concerns; (7) finding funding; (8) leadership techniques; and (9) dealing with such things as, setbacks, support systems, and morale. Appendices include: addresses of resource organizations; comprehension questions for each chapter; and a brief annotated bibliography. (CW)

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(OMELC)

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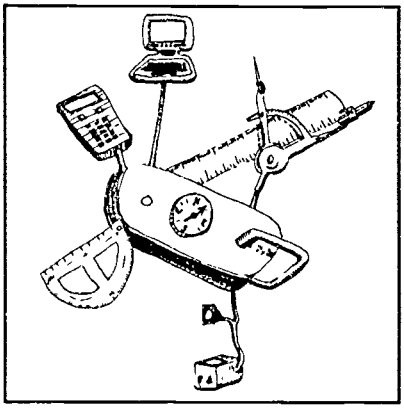
REAL ROUTES:
A Handbook for School-Based Mathematics Leaders

The Ohio Mathematics Education Leadership Council

1989



For those who may be puzzled by the title, we might observe that we have tried hard not to have anything to do with imaginary routes.

Copies of this book may be ordered from James Hassel, Box 433, Berea, Ohio, 44017. The price is $3.00, plus $1.00 postage and handling, each. Comments and suggestions may be sent to Rudd Crawford, 262 North Main Street, Oberlin, Ohio, 44074.

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REAL ROUTES:
A HANDBOOK FOR SCHOOL-BASED MATHEMATICS LEADERS

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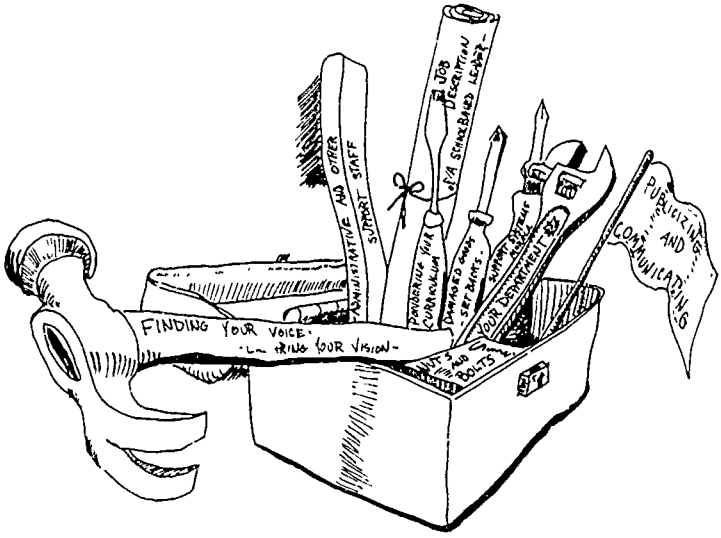

INTRODUCTION

The booklet you are holding in your hand was written by a small and diverse group who believe firmly that it should exist. We have done some reading and some talking, and we have some ideas to share with you and some questions for you to ponder.

We are making some assumptions about who you might be. Perhaps you are a mathematics teacher, probably not a beginner. You're pretty happy with what's happening in your own classroom, but you are concerned about what is happening in other mathematics classrooms in your building or system. You are seeing that your students' mathematics experiences from previous years still live in them during their year with you—both the skill levels and (more important) the attitudes they have slowly developed toward mathematics and toward themselves as learn-

ers. You may be beginning to think that working on a school-wide or system-wide level might make your job in the classroom easier and might help your students master more mathematics and develop more positive attitudes.

Perhaps you're just starting as a department chair, and you wish somebody would tell you how to describe, set goals for, and monitor the mathematics program for which you feel responsible and for which you have high hopes.

Maybe you're coming up with what you think are good questions and ideas, but nobody in your department seems to want to listen to them.

Maybe you've been a department chair for quite a while. Your job description is clear, and you're very busy, but the whole enterprise simply lacks oomph. Or maybe it has oomph, but student test scores aren't very high and retention from year to year seems poor.

Maybe you are feeling that your hands are tied by administrative decisions which you consider uninformed, and which you believe are hurting your program.

Perhaps you're a principal or superintendent, again feeling responsible for your mathematics program. You don't want to make uninformed decisions but you're not certain what you need to do, beyond worrying about PPO's, competency tests, the textbook order, and whether your key teacher is going to resign in June.

Maybe you're concerned about the devastating articles in the press about the sorry state of Ameri an mathematics education. You wonder whether your program is a part of this bleak scene, even though it's always seemed pretty good to you. Maybe, in fact, you're not even sure any more what a good mathematics program is, or what good mathematics teaching is.

If this latter is the case, stay away from our *Real Routes* until you ve read *Everybody Counts: A Report to the Nation on the Future of hematics Education*, published in February 1989 by the National

Research Council. Once you've read that, get a copy of the NCTM *Curriculum and Evaluation Standards for School Mathematics*, published a month later, and start working your way through those. Then come back to us.

But, now that you're back, perhaps you're feeling completely overwhelmed with how much needs to be done, and you need an energizing vision of just what people like you can actually accomplish within a real school. If this is the case, set *Real Routes* aside again, and pick up Mark Driscoll's book, *Stories of Excellence*, published by the NCTM. And then watch the movie *"Stand and Deliver"*. These illuminating works will open your eyes to what can happen in individual schools, with or without large budgets, with or without administrative support. And, after you have experienced these two works, if you are wondering how to map out and begin *your* march into the rosy future, then you're ready for *Real Routes*.

We think of this handbook as a small basic tool kit. Once you know something about what you want to build, perhaps we can help you to build it. Perhaps we can't. Probably, as you try, you'll find some tools we've never thought about. If that happens, let us know; we'll save them for the next edition.

Observe that there is an *Appendix A*, containing the addresses of the organizations that we mention in the text. There is also *Appendix B*, containing queries for each of the chapters. These queries will help you to measure yourself and your program against the material in those chapters. There are some overall queries included as well.

We remark that whatever pronouns we have put down on the pages that follow, we mean no sex bias. *Him/her*, and even *s/he*, are too awkward to use, and we can't yet bring ourselves to take the plunge and use *they, them,* and *their*, for singular pronouns, even though this may be the final solution to the problem.

We would like to acknowledge the help of the following schoolteachers. Their insights shared during a weekend workshop on school-based leadership at Oberlin College were a tremendous help in shaping this manuscript.

Lynn Aring, Bay High School, Bay Village
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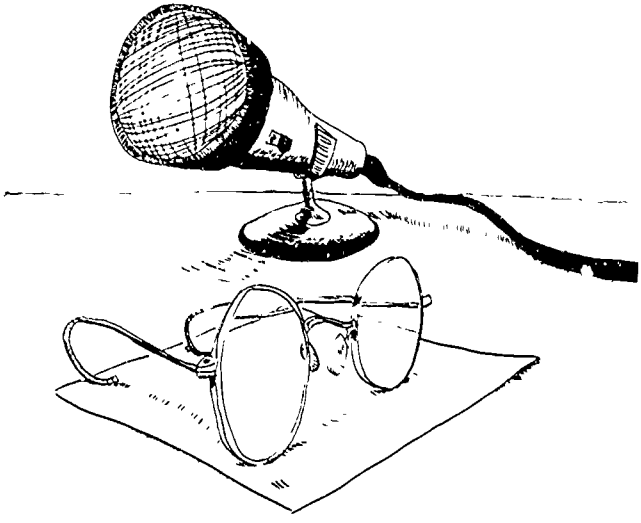
Bill Bourjaily, Midpark High School, Middleburg Heights
Antionette Brown, Rhodes High School, Cleveland
Linda Campbell, Open Door Christian High School, Elyria
Dennis Fox, Law and Public Service Magnet High School, Cleveland
Edward Klodnick, East Technical High School, Cleveland
Paul Lehman, Bay High School, Bay Village
Sr. Jeanne Moenk, Regina High School, South Euclid
Barbara Schumacher, Magnificat High School, Rocky River
Eric Segeler, Lake Ridge Academy, North Ridgeville
Virginia Smith, Avon High School, Avon
Richard Wittman, Glenville High School, Cleveland

RUDD CRAWFORD

1. CLEARING YOUR VISION, FINDING YOUR VOICE

There is a voice that is not heard often enough in schools these days: the concerned voice of the informed mathematics educator. We invite you to develop this voice. Having it, you can and should become an authority figure in your school—maybe not a power figure, in the sense that a principal has power—but an authority nonetheless. Your authority will come from knowing the things about the teaching and learning of mathematics that can be clearly known — knowing what is being tried around the country and with what success, knowing current opinions on what ought to be done, knowing your own program from stem to stern, and, above all, knowing the questions that one must keep asking. You will not necessarily have the power to use what you know—you may have a lot of convincing to do to those who have



the *real* power—but you will soon find that the old sayings, "Speak truth to power," and "Knowledge is power," are not empty words.

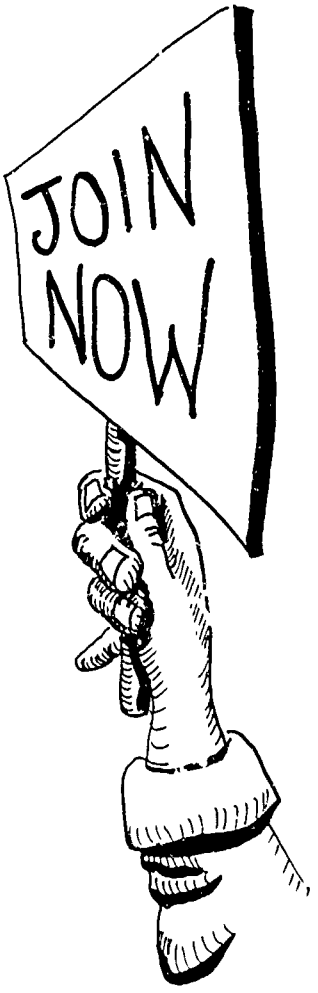
How to know the truth? It's a major quest. It takes determination and perseverance. Step one is simply to decide that you're going to do it. Don't wait for people to give you permission to become the mathematical voice of your school or school system—in many places the concept simply isn't understood. Don't allow yourself to be swallowed up any longer in the daily ins and outs of your job. Face it: you could work 30 hours a day and it still wouldn't be enough, so you might as well reserve half an hour or so daily, out of the time that you do work, for some research and development. Take it as a postulate of your own, obvious and not needing proof: your system needs more knowledge about mathematics education; you're going to find it. For starters, a roughly stated goal may help energize you: I'm going to put my school on the map! Or, I'm going to make mathematics a jazzy thing in this town! Or, next year something's going to be different around here.

How to proceed with your quest? Start with your own dissatisfaction with what you see around you. Do you see specific things that you already know need to be changed? Or are you feeling simply an unfocused gloom? Let your dissatisfaction spur you to (1) develop a clear vision of your program *as it exists*, and (2) build a very clear vision about what that program ideally *could be*. When those two pictures are living inside of you, then swing into action. Here are several things that can help you clarify those two views.

- **Study!**

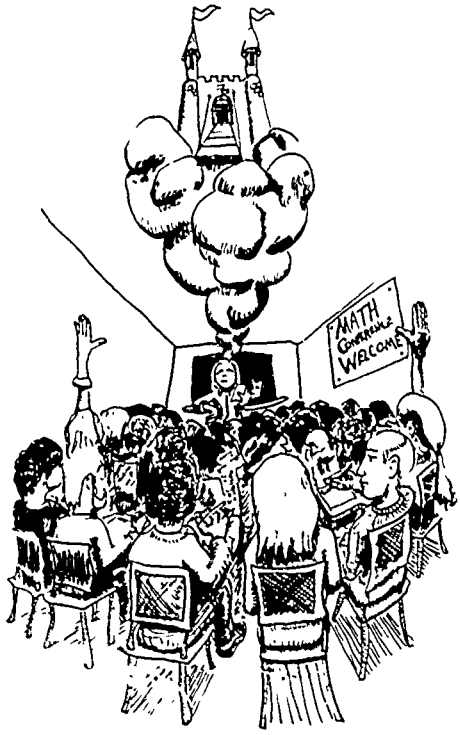
Become an expert of your own program, in your school and K-12. This is a two-part task. First, read the courses of study, the philosophy, the goals—everything that's on paper. This is the existing vision for your program. Second, no matter what you think of what you have read, try to find out the degree to which

your program is reaching its goals. That is, find out whether your program is succeeding in its own terms. This may take a staggering amount of work: it may not even be clear to you how to evaluate your program, before you actually do it. (If so, see Chapter 8: Nuts and Bolts.) But persevere. Once you have painted your program's portrait in this way, you will know a great deal, and you will have questions to ask: "Am I dissatisfied with our program because it's not reaching its goals?" "Or," (finally you get to ask) "is it the goals themselves?" These questions should be in your mind as you work on your second clear portrait: the ideal program.



- **Join!**

Your vision of your program will be the result of a tremendous amount of work. But you are far from being alone in your quest. Joining professional organizations will help you realize that. The National Council of Teachers of Mathematics is a terrific outfit. It's not cheap to belong ($40 annually), but it's



a bargain considering what you receive: a good journal full of informative articles, a news bulletin packed with things to write for, and, perhaps best of all, a listing of meetings to attend. The NCTM is providing more and more of a heartbeat for national program improvement.

Join the Ohio Council of Teachers of Mathematics, an affiliate of the NCTM. It's cheap: $3 per year. For this you receive a journal and a news bulletin, both of which have the distinct benefit of being focused on matters of Ohio concern. As with the NCTM, a major reason for joining OCTM is meeting people at the conferences.

Join your local affiliate of the Ohio Council of Teachers of Mathematics. OCTM has many local affiliate organizations scattered around the state. When you join OCTM, you'll be sent a brochure

listing these regional organizations. Join one near you, and you'll receive a bulletin about meetings: more people to meet and talk with.

Join the National Council of Supervisors of Mathematics. (NCSM) for yet another bulletin and publications list. Annual dues are $20.

Join the Association for Supervision and Curriculum Development (ASCD). It is high-powered, illuminating, more expensive ($45 annually), and worth it.

Join the Ohio Mathematics Education Leadership Council. OMELC (affiliated with NCTM) is a relatively new organization that is helping to develop and coordinate mathematics leadership within the state.

Join the School Science and Mathematics Association. Dues are about $21.

Join the mailing list of the Mathematical Sciences Education Board. This group is attempting to summarize, for the nation, exactly the material that you're trying to digest and organize for your school. Though new, this organization may well become one of absolutely central importance.

As a member of organizations, write letters and talk to people. Tell them what you're trying to learn and ask for help. Tell the journal editors what you want to read about. Tell the conference program planners what kinds of sessions you want to attend. *You* are where the rubber meets the road; these people want to function as your support system. Help them to do it.

Dues mentioned above are subject to change, but are still a bargain.

- **Read!**

Get the NCTM publications list (it's sent to you when you join): there is a splendid array of useful materials. In particular, be sure to get the new *Standards* that we mentioned in the introduction. Read the short bibliography to this handbook (Appendix C): we've listed only things that we think are particularly informative. Read the *New York Times*, if you can get it. There are education articles on Tuesdays and Sundays that expand one's outlook. *School Science and Mathematics*, *The Harvard Education Letter*, ASCD publications (their journal is called *Educational Leadership*), and *Education Week*, a newspaper of record for the entire field of education, are also valuable.

As you read, you may be astonished at what an ocean of information and ideas there is to paddle around in. Don't drown. See how your school and school system fit into the ideas that you come across. Bounce local reality and global grandeur off each other. You'll find new ways of describing your own situation. The context in which you are thinking will improve. The questions you are asking will become more incisive, and it will become clearer which of them have answers and which don't. But don't stop here.

- **Meet!**

Go to conferences. Attend workshops. Keep track of the people you meet. Volunteer for committees. All of this within reason, of course; you can sink like a stone if you say yes too often. But risk it, at least for a while. You will learn a lot, and you'll have a chance to share your ideas with colleagues who will take them seriously. And let them share their ideas with you. Realize that you are part of a loosely-knit community of concerned mathematics educators who may be isolated and lonesome within their own schools, but who can find genuine support from colleagues in other systems. If you can become part of a network, you have made a tremendous gain.

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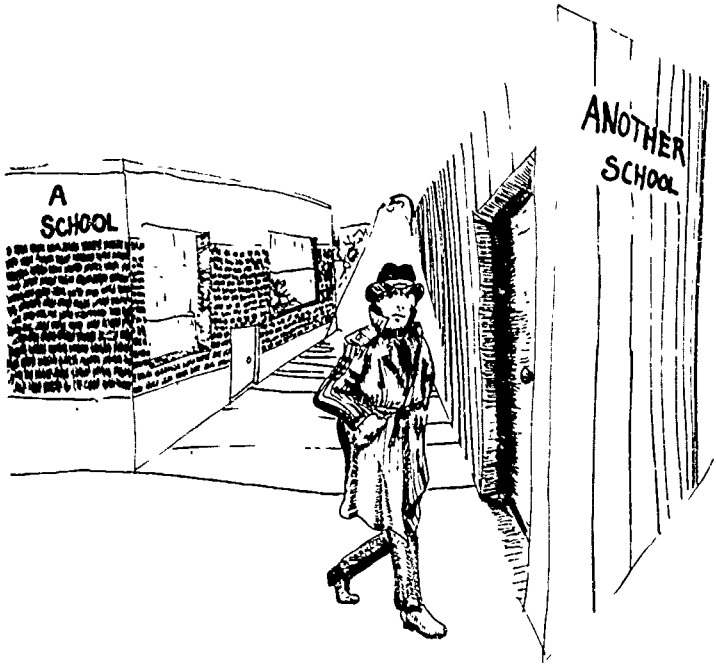


- **Visit other schools,** both in and outside of your district.

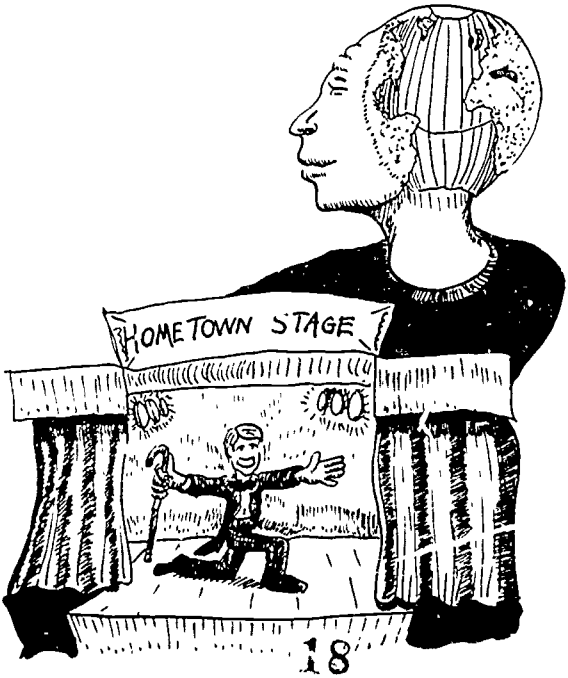
- **Know your sales personnel** that supply textbooks, software, and equipment. Find out from them what is going on and where. Sales people can be valuable sources of information about new products, and they can also give you freebies every now and then.

- **Start a wish list,** maybe in a notebook. "I wish our department...". What are the characteristics your program would have if it were excellent? Play around with your ideas: try to find relationships among the various wishes. Try to identify things that you could do right now, and those that would have to wait awhile. Try to figure out which, if any, you can do alone, which your department could do together, and which need administrative support. Plot and scheme. Then talk through all of this material with your department (see Chapter 2), and be emotionally willing for your cherished agenda to change. The department needs to "own" the dreams and plans. The chances for success of a plan that the department isn't buying into are pretty . You can't do it all alone.

• **Synthesize.** What does this wealth of information add up to for you and your system? Can you boil it all down into a few guiding principles that are clear and compelling? This is a crucially important step. The queries in Appendix B may help you do this.

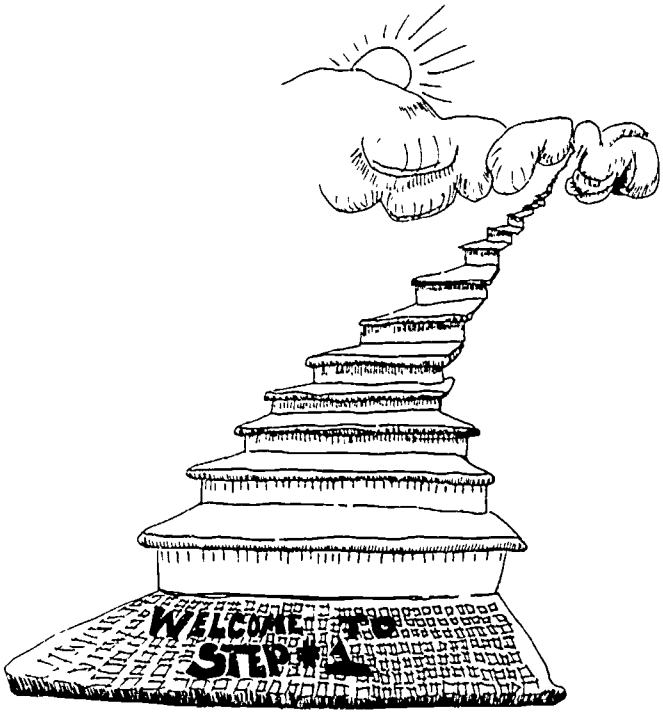
Summary.

What you're doing is making two visions: the picture of what your program is actually like, and the picture—as comprehensive as you can make it—of what it could someday be. The motto of this chapter could be: **Think globally, act locally.** It's not bad advice. It's wrongheaded to try to work on your program on the basis of local information only. But on the other hand, if you get too much national perspective you can go crazy with frustration because you can never decide for certain what is the "Ultimate Best Way." The trick is to act within the context of deep and broad issues, extracting what consensus and wisdom you can, and to act in ways that make sense locally. If a question has a



clear answer at this point (e.g.: What sort of computers do we need?), use local reality to help you decide what's best for your situation. It's a hard trick to pull off, but that's what good school-based leadership is all about. To paraphrase Cher, "If great mathematics programs came in a bottle, we'd all have them."

Now that your vision is improving, and you're finding your voice, you're ready to *articulate needs*. But first, you need allies. Read on.



2: YOUR DEPARTMENT

Your department is a group of people. Books have been written about groups. We can't add much. Here are some paragraphs that we believe are true.

Your department should run your mathematics program. It should be the authoritative group in the school that speaks for mathematics and mathematics education. The department should be a well informed, mutually supportive, and committed working group. You should speak with the same voice on the key issues. It takes hard work to reach this consensus, but it's worth the effort. In an elementary school, of course, there is not a mathematics department as such. However, there will be a number of teachers who particularly relish teaching mathematics. Consider this group as the department (as we do in the following).

The Climate of the Department

It will help to know your department members as individuals: their backgrounds, their teaching histories, their preferences for courses, their professional goals, and as much about their lives as you feel comfortable knowing. If your department members feel comfortable talking to you, they will feel somewhat more comfortable talking in meetings. Spend time with them individually. Invest in them. They are important.

If department members seem resistant to growth or are burned out, don't crowd them. Give them the elbow room they need. As your program grows they will probably be drawn along. Confrontations usually cost more than they gain. (See the *Nuts and Bolts* chapter for more suggestions.)

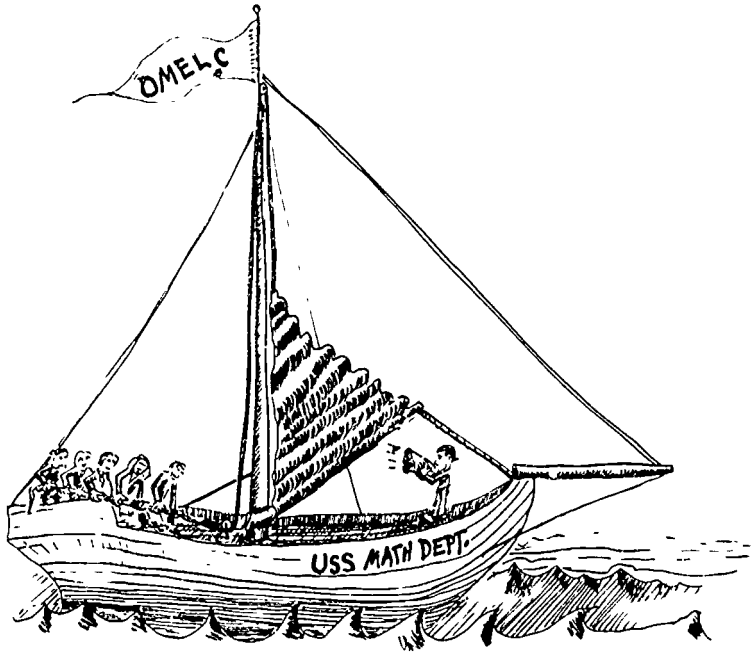
If you're going to put articles in people's boxes for them to read, be sure you've read them first. Know why you're sending a given article to a given person, and attach a note explaining this. If you can indicate the way that an article sheds light on some issue that is real to this person, reading the article will seem to be a lightening of the load rather than an added burden (one more thing I gotta do...). In this way you will increase the likelihood that the article will be thoughtfully read. And don't forget to pass along journals such as *The Mathematics Teacher* and *The Arithmetic Teacher*. Maybe someone will be encouraged to join NCTM and obtain her own copy.

Send your colleagues to conferences. Invite them to come with you when you go. Take a car full.

Search for a real soul-mate in the department, one who is as fanatical about improving the program as you are. If you have one, count yourself lucky. You can team up and support each other. But don't become an enclave within the department. The entire group should own the program. If there's no soul-mate on hand, well, that's one of the reasons you're getting to know people in other school systems.

Conceptualize your program as a ship — it has a structure, and it's going somewhere, being sailed by a skilled crew. You're also building it as it sails along, which is somewhat awkward (and which is why summer workshops for the entire department can be so valuable).

Work hard at achieving and maintaining good relations within your department.



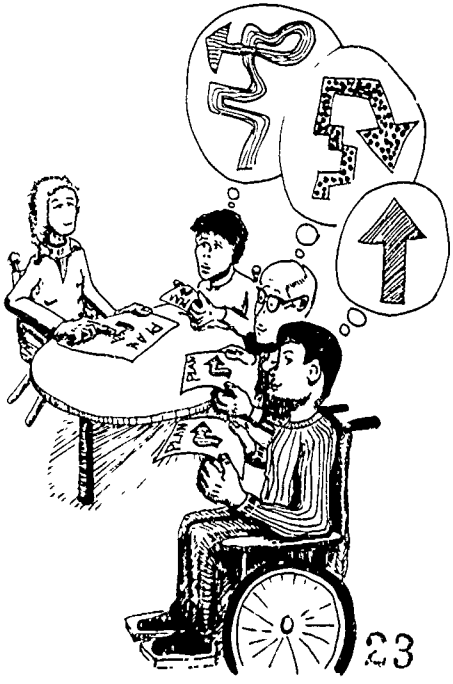
Specific Departmental Activities that are Worth Doing (by no means a comprehensive list)

Even though your program may be thoroughly described on paper, it's what's in the minds of the department members that matters. See how many statements about your program you can make that everybody agrees on. With everybody present, review the printed material about the program (e.g. course of study) from time to time.

Have students enter contests: the American High School and Junior High School Mathematics Examination (AHSME and AJHSME), the OCTM contest, the Ohio Math League, Mathcounts, regional math contests, whatever.

Find out about pilot projects going on around the state. Participate in them if they fit into the overall plans of your department.

A mathematics department at any K-12 level can apply for a grant from a local service club or a foundation. You could request a set of calculators for a classroom, travel for the department to a conference, NCTM memberships for department members, or even a computer for some special purpose. A group of concerned elementary teachers of mathematics could write a proposal to benefit their unique needs. The process of applying for a grant is good in three ways: (1) it focuses the attention of the department on a specific need, (2) it's good for department morale, increasing the sense of "sailing the ship," and (3) it brings to your department the actual bounty from the grant. (See Chapter 7, *Finding Extra Funds*, for details.)



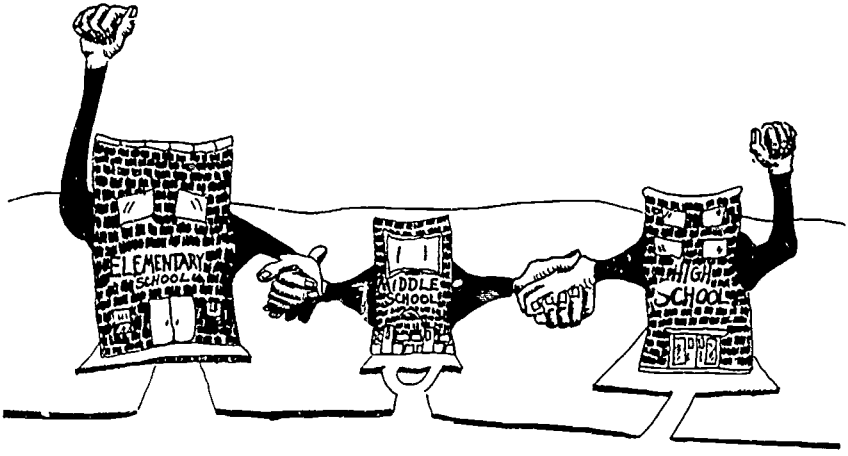
Schedule regular out-of-class time for students: an after-school mathematics lab run by teachers who each give an hour a day, rotating daily or weekly, a drop-by tutoring table at lunch or during study halls, preparation sessions for contests, SAT workshops, mathematics clubs.

Write a department handbook, with easily reproducible sheets, of procedures and policies, for handing out to students and parents at the beginning of the year. Such a handbook could include such entries as materials to bring to class (pencils, paper, notebooks, calculators), procedures for making up missed work, how to study mathematics, penalties for missing homework, anything that the department agrees on. If these handbooks are to be handed out at the beginning of the school year, individual teachers could add pages about their own particular courses.

Write competency tests that are really worthwhile — slave over them. It is very hard to write a good test, or to see that your test-making company comes through with something that's decent. But it's worth it to have a test that you can support. If your students fail your competency test but you don't like the test anyway, then what?

Maintain a good relationship with other schools in your system. There is a difficult balance to maintain between the internal authority of each building and the overall coherence of the entire program. In dealing with grade levels below those in your building be particularly careful of coming on too strong.

Study more mathematics. Several of you take the same course together. Perhaps you can wangle a reduced tuition for your group. Team up with several school systems and get a discrete mathematics course taught for the faculties in your region.



The Real Work of the Department

Your real work as a department is to come to consensus about what your mathematics program really is like and what it really could be. Then you make a Big List - a master plan - of what needs to be done, in priority order, and then you begin to work on that list.

But don't start too many things at once. Do something, evaluate it, and take some time to feel good about having done it. Then start the next project. Slow and steady wins the race.

Department meetings. Figure out a way for your department to meet regularly, with all members present (maybe at lunch). Have a good, clear agenda. Make sure things happen that are supposed to happen. Make sure that everyone knows where you all are on the Big List. Keep good minutes. Something should be noticeably different after each meeting from what it was before, or else why did you meet?

As this process unfolds, the mathematics department begins to assume authority and to make program decisions. It announces its plans and carries them out, enlisting the help of administrators and other support staff. (See Chapter 3.) You will begin to feel that you have achieved lift-off.

Summary

You're all in this together. Be good to yourselves. You are the people from whom your student body will learn its mathematics and decide what mathematics is worth. You are the authoritative group on mathematics and mathematics education in the school. You are informed and committed, and should expect your plans to proceed as you have formulated them. Who, after all, knows more than you?

"How can you pull this off?" you ask. Read on.

3: ADMINISTRATORS AND OTHER SUPPORT STAFF

Your superintendent and principal have legal responsibility for the school and school system, and have the power to make decisions about the academic program. However, there is no way, given the pressures on these people, that they can be as informed as you about what the mathematics program should be. Indeed, in the absence of other information, your principal may make program decisions in the context of her own priorities and knowledge. She may not realize how much she doesn't know. Your task, as a department, is to educate your principal about the general issues with which she is dealing. She has the power; your department has the knowledge. Use it to give her guiding principles within which to use her power. This is true in all schools, elementary as well as secondary. In an elementary school more of this work may fall on you as an individual, unless you have built a quasi-department of teachers who are particularly interested in the teaching of mathematics.

Rule 1. Your principal has a difficult job. Unless it's absolutely necessary for the growth of your program, don't make it harder.

Rule 2. Don't ever surprise your principal. Invite her to department meetings. Send her minutes of the meetings afterwards. Keep her informed.

Rule 3. Don't ever make your principal look bad. Go out of your way to make her look good.

Remark: If something nifty happens in your mathematics program, and it gets into the newspaper, make sure your principal's name gets in the article (Rule 3)—in fact, make sure that she knows ahead of time that there will be an article (Rule 2).

Rule 4. Avoid confrontations whenever possible. **Smoking your principal stunts your growth.** If there must be a conflict, make sure that it's about something that really matters, and do every-

thing you can to keep the principal from losing face if you win. If you argue for the good of the program, rather than from an I'm-gonna-win-and-you're-gonna-lose position, you have a much better chance of maintaining good relations after the battle is over. And you must be able to argue from this position if you know your program, know your goals, know your students, know your agenda—that is, if you are really an authority on mathematics in your building, and not merely someone with an opinion.

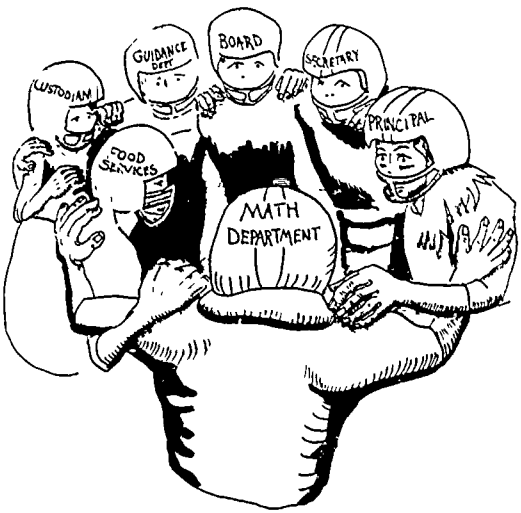
Rule 5. Speak the truth. Speak it clearly, in a friendly way. Never claim knowledge that you don't have. Don't say something that you only hope is true.

Rule 6. Be available to help with the technical aspects of making the school run: presentations to the board that involve graphs; the school schedule; interpretation of test scores; computers. Convey the idea that the mathematics department is always ready to lend a hand.

Other Support Staff

If you have a mathematics supervisor or curriculum director, (1) thank your lucky stars, and (2) treat this person as an informed colleague who can help you enormously in your quest for knowledge, and who can also be an ally in discussions with your principal if and when you need an ally.

Guidance counselors need guidance from you. Support them and educate them so that they can support the mathematics program. In particular, they need enough support from the mathematics department so that they will discourage students from taking courses for which they're not ready or qualified. Also, counselors need support and guidance so that they will not permit students to drop courses in which they were appropriately placed, but in which they refuse to do the work. Such support may have to include giving them lines to use with parents who are pushing for an unwise schedule change for their child.



You should offer plenty of help in scheduling students entering from other schools, providing a placement test if it seems appropriate.

Classified staff—secretaries, custodians, and bus drivers—should be treated with respect commensurate with the enormous power they wield. Follow up their support of your extra-curricular activities with suitable gestures of appreciation.

4: PUBLICIZING AND COMMUNICATING

It is very much in your interests to keep your community aware of the good things that are going on in mathematics in your school or schools. The community is paying for the program, for one thing: it should know what it's getting. Beyond that, the better your community feels about what is happening, the more support it will give to your program, the more support your students will feel and—always the bottom line—the better your students will do.

Here is a short list of ideas that can help to generate good will between your school and the community.

- Have your students enter mathematics contests and publicize their participation. Don't worry about whether your school wins; the fact that your students are active is news enough. As the years go by, you can keep records of your school scores (say, the total of the scores of the top twenty students), and you can set your own goals for having those scores go up, regardless of what the overall winners do (See *Nuts and Bolts*). Involve large numbers of students in these contest—don't send just your top rockets. Invite parents to help in transporting them.

- Start a column, "The Problem of the Week", in the parent-teacher newsletter or in the town newspaper.

- At open house, have interesting mathematics materials on the walls and around the building. Give parents a handout of some sort about the mathematics program. Hand out puzzles and problems to parents as they wait for their conferences, or set up work areas to occupy them.

- Take students on field trips to local industries. Get articles about the trip into the school and local paper.

- Use community members as resources: speakers in class, after-school tutors, so forth.

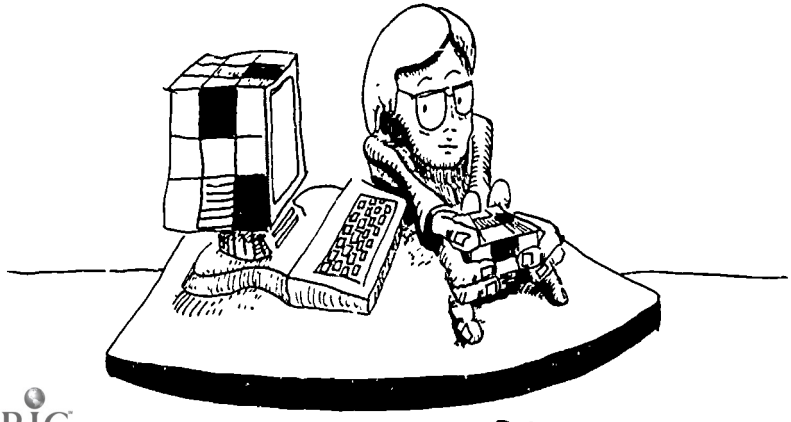
• Use local service clubs as foundations for small grants, as mentioned in Chapter 2. To "sell" the clubs on such expenditures, it will help enormously, once again, if you have an overall game plan for your department and can describe how each particular act of generosity fits into the overall plan.

• Select and publicize a mathematics student of the month.

• Publicize any extra services your department offers: after-school tutoring by faculty members (see *Nuts and Bolts*), SAT practice— how about a calculator workshop for local business-persons or parents?

• Write newspaper articles about conferences attended, grants received, student projects.

• Offer a Mathematics for Parents Night at which parents could come and be exposed to some of the exciting mathematics that their children learn.



You believe—or you want to believe—that your department is on the move, that students are challenged, are working hard, and are more and more successful. Your staff is busy, committed, and growing in competence. There is at least some evidence that this is all true. Share that evidence—share your vision—with the public. Success breeds success; thinking positively works. But don't get distracted; your goal is to have an excellent program, not just one that tries to look excellent. Remember Socrates: "*Be* what you wish to seem."

5: THE JOB DESCRIPTION OF THE SCHOOL-BASED LEADER

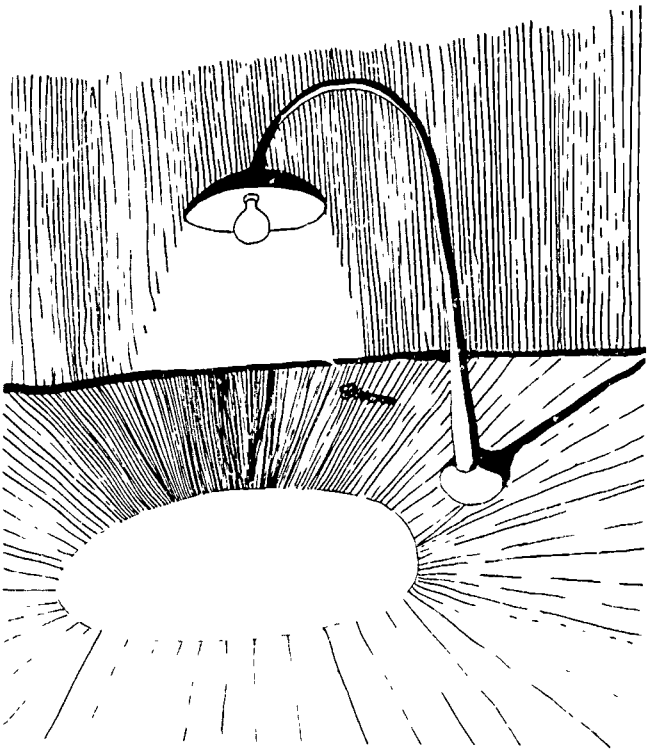
Here are aspects of a mathematics program that need to be monitored and nurtured. It is not possible for one person to do it all without considerable released time from teaching. And it is not necessary that all of these matters be your concern. Read through the list, and decide who should do what.

- promote and maintain a climate of high expectations for teachers and for students
- keep in touch with the field — bringing fresh information in to the department, such as state mandates, competency testing, and differentiated diplomas
- organize and maintain the department's course of study
- order and maintain the department's texts and other materials
- prepare the department's budget
- monitor the teaching in the department; observe classes
- orient and support new teachers

- assist substitute teachers (who are roving reporters about the schools in which they work: you can learn a lot from them about other systems, and—believe this—other systems will learn about yours)
- work with teachers at all grade levels to help articulate the K-12 program; ask for help from them
- evaluate teachers
- promote staff development within the department (a good, concrete goal: every department member attends at least one workshop or conference each year)
- maintain good spirit within the department
- establish department policies: grouping, pre-requisites for courses, etc.; share this information with counselors
- monitor the placement of students in courses
- apply for grants
- assign teachers to specific courses
- handle arrangements for examinations and contests
- evaluate the program
- conceptualize, coordinate, and articulate the curriculum
- publicize the program

Many school districts have written job descriptions for their department chairs. Write to them and ask for some.

It was suggested at a recent conference that the department chair's teaching load should be reduced by one class for every four persons in the department.



6: PONDERING YOUR CURRICULUM

A little story:

Fred sees Joe on his hands and knees under a bright street light, looking for something.

Fred: What are you looking for?
Joe: I dropped my keys as I was unlocking my front door.
Fred: But your front door's way over there.
Joe: Yeah, but it's too dark to see anything over there!

Why is this story in a chapter about curriculum? Read on...

In Ohio, each school district is required to produce a course of study in mathematics. This course of study outlines the content of each grade level's mathematics, K-12, including all of the different courses offered at every level. Each district is also re-ed to provide competency tests at various grade levels,

based on its course of study. (The exact details on these regulations can be found in your Superintendent's office.)

To produce such a course of study can be a monumental task. To decide what your students should experience and learn in Kindergarten, grade 1, grade 2, and so on up the line, and then to decide what should be in all of the high school courses can seem overwhelming. There is the mathematics itself that people need to know; there is the decision of what's appropriate for, say, an 8-year-old, or a non-college-bound 15-year-old; and then there's the decision of how to articulate among grade levels: what should precede what.

There's a fairly easy way to deal with this requirement. That is to consider the published materials that are available. Any comprehensive textbook program has many ancillary materials, including a carefully constructed "scope and sequence" from which a coherent course of study can be extracted. Commercial testing companies, with their data banks of ready-made questions, are ready to provide you with competency tests based on your course of study, whatever it may be. Relying on the help that is available commercially can be a relatively painless way of producing the materials that the State of Ohio requires.

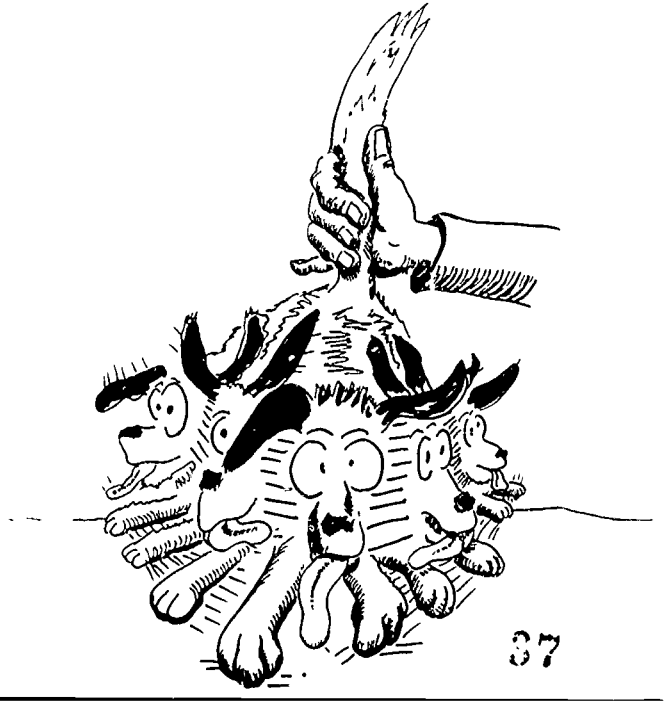
But think again. Your central problem is not to find an easy way to produce materials for the state. Your central problem is to ensure that your students master some mathematics. Will your following the path of least resistance help them to do this?

Well, you've been doing some reading. You're perfectly well aware that America's current international position in mathematics achievement is among the lowest, if not the lowest, in the industrialized world. We're simply not very good at mathematics. Not only that, we're not very good at attracting our students to study and to love mathematics. You are also aware that there has been widespread criticism of the textbook publishing industry, the most dramatic evidence of which was the State of California's recent rejection of all of the textbook programs that had been submitted for adoption by that state.

"Dumbed-down textbooks" is a common phrase these days; a recent article in The Arithmetic Teacher notes that the average amount of content in several prominent basal programs is as low as 30% per year in grades 1 through 8.

Given these sobering realities, perhaps it becomes clearer why the little story about Joe and Fred is here. The obvious place to look may not be the place Joe needs to look.

It is your responsibility to make sure that a course of study for your mathematics program is in place *before* you look at any particular published materials. You know your students; you know your town. You've become informed about the state of the field. You can decide what makes sense and what doesn't. This doesn't mean that your course of study has to be totally unlike anything ever seen on land or sea. It might be identical, in fact, to what Publisher X or Publisher Y has developed. That's not the point. The point is that you're worked it out for yourselves, you own the program; you're driving. Again, don't let the tail wag the dog. Americans believe in local control of education. We do not



have a national ministry of education dictating what we teach. There's no reason to allow the publishing industry to assume that role. To decide what should be taught simply by choosing among the published alternatives is giving away power that you must retain. It is abnegating your responsibilities to your students and your community.

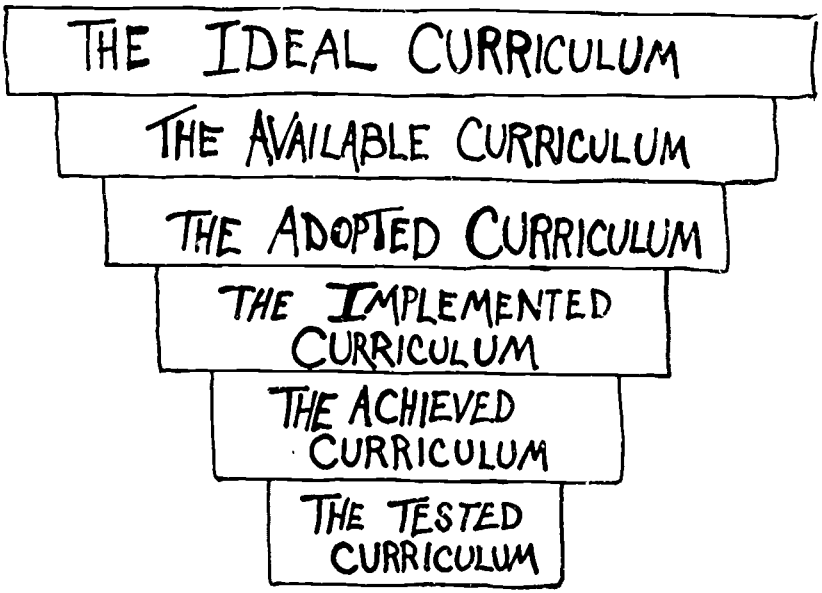
It's hard to write a course of study, as we've said. You need time in the summer to do it. Working on released days during the school year is not possible: you and your colleagues will need a considerable block of time. Isolated released days will not provide it. Once you have your time, and are at work, look at the State of Ohio monographs: you could take them as an excellent first draft. Look at what other school systems have done, as a source of ideas. And, of course, consult the *Standards*.

Once you have written a course of study, then look to see what's in print that you might use to teach it. Look hard. Be fussy. Think of a basal textbook series as one component of the curriculum. Sniff out the little-known publishers; find out what your colleagues in other systems use. Read book reviews, such as those in the NCTM's *Mathematics Teacher* and *Arithmetic Teacher*. You may wind up writing some curriculum of your own. Or you may wind up choosing Megapress's K-12 program, lock, stock, and barrel. But it's a much better thing to decide that Megapress fits your needs, than it is to get swept away and buy Megapress, and then define your needs in terms of what that program says it can do.

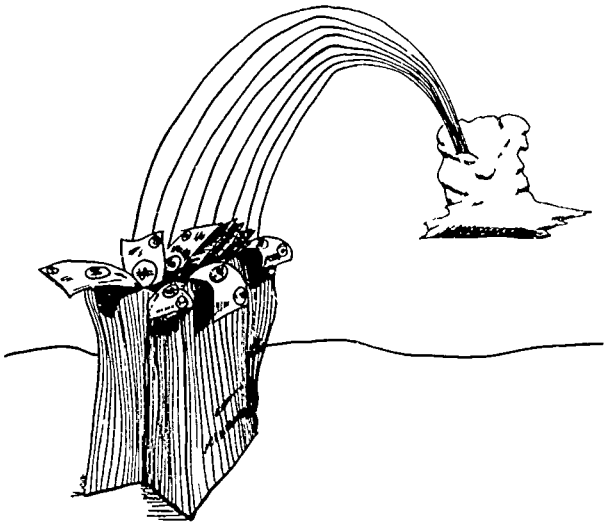
Sure, it feels like a David and Goliath situation. It especially feels that way if you have administrators who are going to feel nervous about admitting to their colleagues in other school systems that they're using math curriculum that nobody has ever heard of. But follow the rules: keep them fully informed (no surprises), speak truth to power, and you just might eventually be able to provide them with some evidence of student mastery, evidence that not only you but *they* will be delighted to see and show around.

So, who is Joe? Maybe many of us, looking for answers, for our particular situation, where none are to be found.

P.S. Henry Pollak, the noted industrial mathematician and mathematics educator, has pointed out a sort of triangle, made of strips of curriculum. He describes these layers:



He observes that, in general, each layer is a subset of the one above it. He also observes that any time the material in one level is greater than that in the level *above*, there will be stress felt somehow: stress on the system, stress on the teacher, or stress on the student. Our goal, of course, is to drive toward equality of all layers.



7: FINDING EXTRA FUNDS

Your mathematics program has a problem; you've got a great idea that will help to solve this problem. But there's another problem: you're going to need some money. And your district, like many others, is short on funds. Money for new projects is simply not available. Do you throw up your hands and accept the situation? No! There just might be someone out there who is willing to fund your idea.

Where do you start? First, get something written down: a short, clear letter (to nobody in particular) that describes the need of your school, your plan, how you'll pull it off, how you will evaluate the plan's success, and a rough idea of the money you'll need. Doing this writing serves two purposes. The first is that you'll get a clearer idea in your own mind of what you want to do, and second, of course, you'll have something to show people and to talk about with them. Share the letter with your depart-t, your principal, your supervisor—whoever might be af-

fected by it and whoever might like to get in on it. Get their reactions and modify your plan if necessary. (Remember about joint ownership being a good thing.)

Second, assuming that all has gone relatively well and you still feel as if your idea should be pursued, write a very careful revision of your letter—about two pages long—and send it off to some funding sources. Here are some places to start:

- **Local corporations, foundations, service organizations.** These groups are often willing to fund educational projects.

- **The library.** Two books listing sources of grant monies are The Annual Register of Grant Support and The Directory of Research Grants. Looks for organizations willing to fund your type of project.

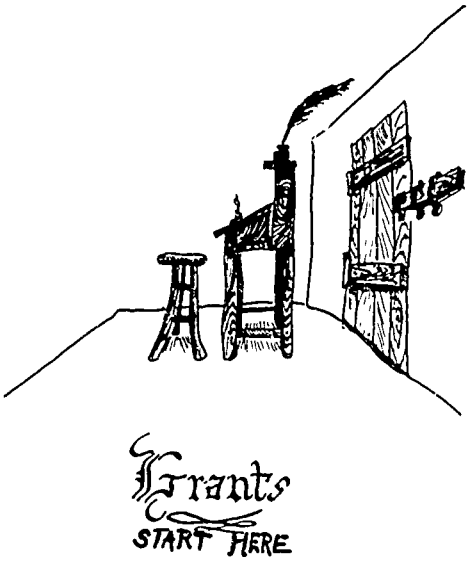
- **Local universities.** Some have access to a data base listing funding sources by "key words." Make some calls and check this out, they may be able and willing to help you.

- **The State Department of Education.** Begin with Margaret Comstock and Steve Meiring; they may be able to tell you about "special money" earmarked for projects such as yours.

- **The central office of your school system.** Some districts have a staff member who is responsible for writing grant proposals, or assisting others with theirs.

Look many places; send them all copies of your letter, make some phone calls.

When an organization shows interest in your project, have guidelines for grant applications sent to you. Use them as you write a formal grant proposal. Don't hesitate to ask questions if you are not sure how to proceed. Be sure you are aware of application deadlines, and do not be late.

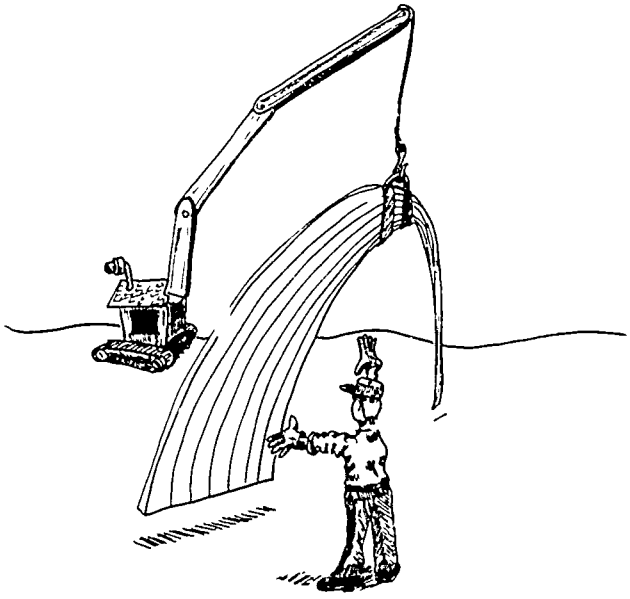


It happens that now is an excellent time to seek external funding for mathematics education. Mathematicians, scientists, politicians, and the business community are presently concerned about mathematics education all at the same time, and this is rarely the case. Not only are these groups concerned, but many are willing to help out financially. Some groups are offering grants for specific ideas of their own. These may suggest "handles" for developing your own grant proposal. But, as always, remember about tails and dogs.

Mathematics education is in the spotlight now—make the most of it!

8: NUTS AND BOLTS – TE[illegible]NIQUES

Mathematics departments, like mathematics classrooms, run on craft knowledge: things that work because they work. Here are some tricks of the trade that our committee members have found useful. If you have something to add, please let us know.



How to Evaluate Your Program

The following is tilted toward high schools.

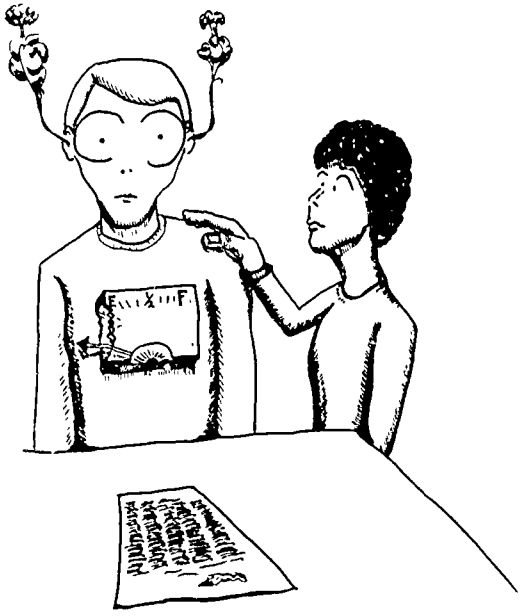
- Examine enrollment trends. The percent of students in your student body that take mathematics beyond the required two years is a good indicator.
- Consider the failure rate. Do you get students through their courses without sacrificing grading standards?
- Examine the content of your courses. Measure them against the new *NCTM Standards, Guidelines for Evaluating*

a Mathematics Program, or the *Mathematics Monographs*. (The latter two are available from the Ohio Department of Education.)

- Consider scores on achievement and competency tests, and look at what you do with students who do not do well on them.
- Consider scores on SAT, ACT, EMPT, AP exams, and contests.
- Poll past students. Did they find themselves prepared for college? for their job? Give a mathematics department party for alumni. Pick their brains. Mail out a survey.
- Read the NCSM book, *Facilitating Evaluation* (see bibliography).

Staff Development: How to Encourage People to Grow, and to Teach Better

- Make sure that all teachers, and especially new teachers, have *all* needed supplies: desks, chairs, a file cabinet, file folders, chalk, texts, teachers' guides, course of study—everything. Provide each new teacher with a mentor teacher in the department. See whether a local college has an induction-year program for beginners—such programs can provide tremendous support.
- Encourage teachers to attend conferences. Drive a carload there.
- Observe each others' classes. If you can afford it, hire a substitute teacher; have the sub cover one class for each teacher in the department, and let the freed-up teacher observe a colleague's class. (See remarks below on observation). Or, when giving a test, have a teacher with a conference period proctor your test so that you can go visit during that period.
- Make sure that your department meetings go well: talk about substantive things, make decisions, and move.
- Encourage your colleagues to attend weekend workshops and summer programs.
- Encourage the further study of mathematics.



How to Help a Burned-out Teacher

You can't do much, beyond hoping that overall program improvement will bring this person along somewhat, but try these suggestions:

- Provide support — someone to talk to. Don't crowd the person; don't isolate her.
- Give a few other responsibilities outside the classroom for which the "praise potential" from others is high — bulletin board displays for parents' night, for instance.
- If your system has an intervention program as part of its teacher appraisal plan, recommend that the teacher be evaluated for it.
- Explore the possibility of a sabbatical or change of environment.
- Search creatively and sensitively for an activity or new focus

that will capture your colleague's interest and rekindle her enthusiasm for teaching.

- Some school systems have an employee assistance program for dealing with employees' personal problems. Maybe you should explore this.

How to be More Efficient: Computerize Everything in Sight

- Keep your course catalog copy on disk; this makes it easy to update for the guidance department each year.
- Promote electronic gradebooks: dedicate one computer to their use.
- Put your course flow diagram—from course to course—on a spread sheet. You'll have to draw arrows, but that's not so hard.
- Keep an up-to-date record of the prices of your department's textbooks.
- Keep the course of study, curriculum guidelines and PPO's on disk, perhaps with a data base system.
- Print mathematics contest certificates.
- Keep an ongoing record of the number of courses taught, number of sections, students per section, failure rate, number of teachers. These long-range figures assist in planning and decision making (e.g. whether the cut in your department that the superintendent wants to make is justified).
- Print up routing forms for articles, catalogues, etc.
- Put meeting minutes on disk; send copies to the principal and the curriculum director.
- For committees you chair, make a page of mailing labels, (name and school of members) that you can paste on envelopes for quick memo mail service.
- Keep your book and equipment inventory on disk.
- Keep your department telephone calling tree on disk.
- Keep your department budget on disk.

How to Adopt Teaching Materials

- Read *Facilitating Evaluation*, which has sections about adopting teaching materials.
- At conferences, talk to the salesmen, make contacts, keep them. Also attend the Ohio Bookmen meeting, for the same reasons.
- Get two free sample sets of each book you're considering. Put them in one room in the building. Keep one set in the room and allow the other set to be checked out.
- Get a released day so that all teachers can peruse materials together.
- Evaluate materials according to how well they fit the course of study. Your books are not your curriculum. You pick books that help you *teach* your curriculum.
- Have each teacher using a particular textbook fill out an evaluation of that book at the end of the year. Accumulate these evaluations as an increasingly thorough evaluation of your current texts.
- Pilot-test materials if possible. Have each pilot teacher try at least two different programs so as to avoid making an emotional commitment to one particular program.
- Develop a procedure for previewing and purchasing computer software, and then have good reasons for using that which you purchased.

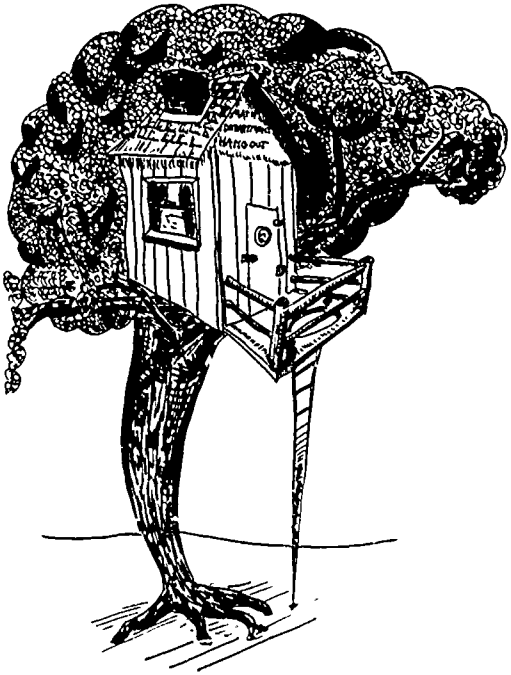
How to Observe Classes

- Be crystal-clear as to why you are observing (to evaluate the teacher, perhaps? to improve your own educational arsenal? to get insight about a particular student?).
- Have a pre- and post-observation session with the person whose class you are observing. In the preliminary session, make sure you are both clear about why you will be in the room. Hear about the lesson plan, and have the teacher tell you about what she expects to happen. In the post-observation session, discuss ways in which the class adhered to, or deviated from, the plans. (Deviation is not necessarily bad.)

- Observe that there are many formalized models for observation; pick one that suits your purposes.

How to Promote Department Unity and Cohesiveness

- Have a *place* — a mathematics office or some central hangout, where the department convenes naturally when not teaching.
- Try to get your lunches scheduled together. (Be nice to your counselor or assistant principal—whoever is in charge of the master schedule).
- Write a department handbook, as mentioned earlier.
- On a teacher workday, set up a party (snacks and maybe music) in some classroom for the rest of the school staff. Invite everybody.
- Get a grant, even a small one. The application process alone is extremely valuable to undertake, as we observed earlier.



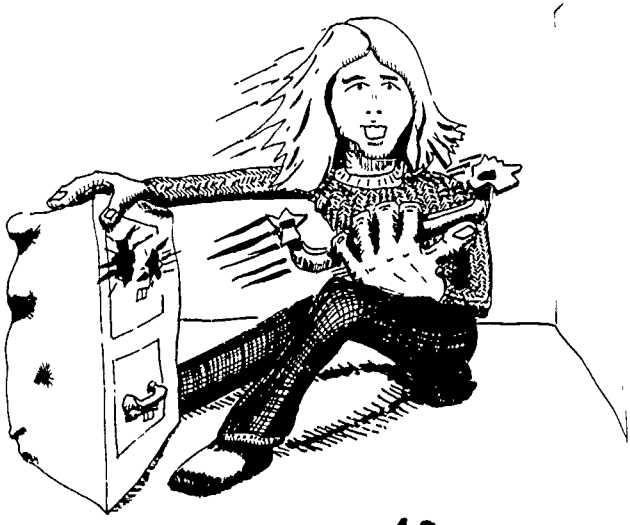
9: DAMAGED GOODS: SETBACKS, SUPPORT SYSTEMS, AND MORALE

If you are closely attuned to the current state of your mathematics program, and if you have a clear vision of what that program could be, then you are living in two worlds at once and that can drive you crazy. The gap between the real and the ideal can seem impossible to bridge at times. How can you protect yourself from discouragement, find support when the going gets tough, and keep from deciding that it's simply not worth it?

With great difficulty, probably.

Have somebody that you can really talk to about the frustrations you're facing. It might be somebody at school, somebody at home, or some colleague in another system.

Develop thick skin. Don't let criticism get to you. This isn't easy.



Focus on your successes. If you have made clear steps to your goals, celebrate each step that you have made, no matter how tiny. Share these successes. Remember that these successes are the *real* story of the mathematics department. Rome wasn't built in a day.

See petty and time-consuming irritations for what they are. A long-awaited set of cabinets arrives damaged. The custodians damage them further in assembling them but claim "They're good enough to live with." The central office is uncooperative in helping to return them for replacements. You have to do a ton of telephoning to make everything work out, therefore you didn't get your papers graded and may be late getting your midterm reports in — and on it goes. Well, can you find a way to back off, blow off some steam, and realize that that is simply how life works? Can you keep being creative when your principal buckles to parental pressure and schedules some students into honors mathematics who simply shouldn't be there? Can you keep going when a member of your department walks off the job in the middle of the year to take a position in industry that will double her salary? Can you deal with the fact that there are three unread issues of *The Mathematics Teacher* on your desk, causing you to feel professionally dead in the water?

It's tough. It's hard to come through for your students, or your colleagues, or your principal, when you're hit with setbacks like these. It takes tremendous dedication, patience, clarity of aim, and external support—from colleagues, friends, or family—to keep going sometimes.

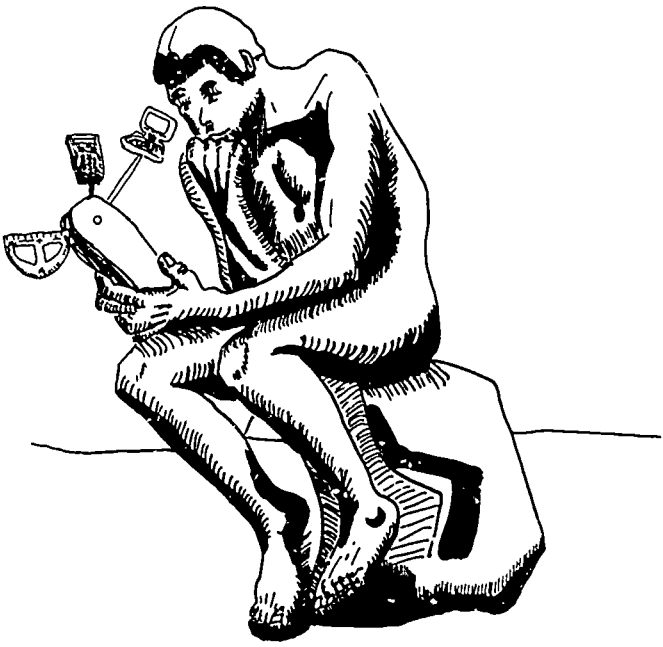
Of course, maybe things really *are* intolerable. Maybe you should leave the system.

Community and parental support can help. If you've been working at building positive relations (e.g. through newspaper articles, parents' night presentations, speaking at service clubs, simply talking up the mathematics program whenever you can), the support you've created can help see you through the tough times.

If you've been able to build good rapport in your department, you have each other. Your colleagues can be an invaluable resource.

Be flexible. There's more than one way to reach a goal.

Finally, keep in mind that our students are the nation's crop that needs to be brought in each year. Nothing is more important than what you are trying to do. You may feel inadequate, but who can do it better than you? If you give up, who



will they have? They're not going to disappear just because you do. The country does not value its students or the educational process as it should. Education does not get the support, financial or personal, that it should. But dedicated teachers go on in spite of this, waiting for it to rain. Articulating the need for that rain, with eloquence, can help keep your perspective.

Two elderly people are walking down the street together. One says, with a sigh, "Life is so hard." The other responds, "Compared to what?"

SUMMARY

Throughout this handbook we have been saying that mathematics education is a large and important field of study. If you explore that field with the idea of finding what it can tell you, you will learn valuable things. You will also begin to speak with a voice that may be new in your school, but that your school needs to hear. It is a voice that speaks from knowledge of what the real issues are, of what works for students and what doesn't. It is a voice of authority if not power. It is a voice that advocates the best for students, is not susceptible to parental pressure, resists shortcuts taken in the guidance office, and throws bright spotlights on administrative decisions made from an uninformed point of view. It is a voice that can articulate goals and can tell whether progress is being made toward achieving them.

It is the hope of OMELC that more and more people in Ohio will find that voice, and that you will be one of them. We send you our warm best wishes.

APPENDIX A: USEFUL ADDRESSES

American High School Mathematics Examination and American Junior High School Mathematics Examination
c/o Dr. David Stenson
Department of Mathematics & Computer Science,
John Carroll University
University Heights, Ohio 44118

American Mathematics Competitions
Dr. Walter E. Mientka, Executive Director
Department of Mathematics & Statistics
University of Nebraska - Lincoln
Lincoln, NE 68588-0322
(Ask for INFORMATION BOOKLET)

Association for Supervision and Curriculum Development
125 N. West Street
Alexandria, Virginia 22314-2798

Association for Women In Mathematics
Mathematics Department
Wellesley College
Wellesley, Mass. 02181

Blacks in Mathematics
c/o Mathematical Association of America

Education Week
Post Office Box 1939
Marion, Ohio 43305

Institute for the Study of Anxiety in Learning
The Washington School of Psychiatry
1610 New Hampshire Ave., N.W.
Washington, D.C. 20009

Mathcounts
142[illegible] Street
Alexandria, Virginia 22314

Mathematical Association of America
1529 18th Street, N.W.
Washington, D.C 20036

Mathematical Sciences Education Board
818 Connecticut Avenue, N.W.
Washington, D.C. 20006

Mu Alpha Theta
601 Elm - Room #423
Norman, Oklahoma 73019
(405) 325-4489

National Council of Supervisors of Mathematics
c/o NCSM Treasurer
1902 Whitney,
Houston, Texas 77006.

National Council of Teachers of Mathematics
1906 Association Drive
Reston, Virginia 22091

Ohio Council of Teachers of Mathematics
c/o Sister Mary Teresa Sharp, S.N.D.
Membership Secretary
Notre Dame Education Center
13000 Auburn Road
Chardon, Ohio 44024

Ohio Council of Teachers of Mathematics
T. Michael Flick - State Contest Coordinator
Purcell Marian High School
2935 Hackberry St.
Cincinnati, Ohio 45206

Ohio Mathematics League
Box 132, Canal
Winchester, Ohio 43110

School Science and Mathematics Association
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APPENDIX B: QUERIES

Chapter 1: Clearing Your Vision, Finding Your Voice

1. Am I familiar with all written documents about our own mathematics program? Could I describe our program, as written, to somebody? Am I familiar with the ways our program is consonant with those written goals, and with the ways in which it is not? Do I have carefully considered opinions about whether the divergences indicate needed changes in the goals, or in the program as it exists, or both?

2. Am I a member of NCTM? OCTM? a regional affiliate? other organizations?

3. Am I receiving a good flow of professional literature? Do I set aside time for reading? Do I think about what I read, pondering ways that my school relates to what I am reading?

4. Am I going to at least one professional meeting a year? Am I meeting new people? Do I have people that I can call on the phone when I have an idea or a question? Do I have somebody with whom I can have long talks about what I'm doing? Am I involved with some professional activity that is outside my school or district? Am I overcommitted?

5. Do I take a visiting day now and then, to see what is going on in somebody else's classroom or school besides my own?

6. Do I put in a little extra time talking to salespersons, at school and at conferences?

7. Am I keeping a list of core issues, core wishes, or core dreams that I fool around with from time to time? Am I trying to get to the bottom of what matters most? Can I discuss my thinking with other people, presenting my thoughts in a coherent manner? If someone gave my math department one million dollars, would I know what to do with it?

Chapter 2: Your Department

1. Am I comfortable with the other members of my department as individuals? Am I supportive? Am I crowding any of them? Do I accept them as they are?

2. Have I done specific and well-chosen things to stimulate each of my colleagues' professional growth?

3. Have I found a person with whom I can discuss my school situation with complete candor and honesty? Is it someone who can offer me help with the difficulties I face? Do I feel a part of a supportive network?

4. Do the members of my department make the same overall comments when describing our program? To what degree do our evaluations of that program agree? When we have differences of opinion, do we keep our arguments firmly grounded in research?

5. Does our department carry out activities beyond the teaching of our classes? Do we collaborate on projects of any sort?

6. Does our department "talk up" mathematics? Do we show enthusiasm as a department for our students and their progress?

7. Does our department have a shared vision of what our program could be? Do we agree as to how to work toward this vision ?

8. Are department meetings regular, well-attended, efficient, and productive?

9. Is our department a mutually supportive group?

10. Does our department maintain a high level of expectations for itself and its students?

Chapter 3: Administrators and Other Support Staff

1. Am I putting creative energy into maintaining good relations with my principal and/or immediate supervisor? Have I found the areas in which we agree? Do we each feel comfortable about our areas of disagreement?

2. Am I careful to follow the six rules outlined in the chapter? Do I support the principal? Do I avoid surprises? Do I take pains to avoid making her look bad? Do I avoid confrontations? Do I make sure that what I say is true? Do I make myself available to help around the school?

3. Do I maintain supportive relationships with the guidance staff? Am I actively educating them so that they can support our program in ways that make long-range sense and that avoid short-term pressures?

Chapter 4: Publicizing and Communicating

1. Is something about our mathematics program appearing at regular intervals in the school and local newspapers?

2. Does our community view the mathematics department as an active department?

3. Did our mathematics department do something noticeable and worthwhile when parents were last in the building?

4. Does our department provide extra services for students beyond those given in the classroom? Does the community know about these?

Chapter 5: The Job Description of the School-Based Leader

1. Is my job description clear? Is it clear to my principal? Do we agree on what I am to do?

2. Does my department agree on what I should be doing? Is my job description, as officially described, in harmony with the way I want to relate to department members? In particular, am I responsible for evaluating their work? Is this a comfortable situation?

3. Would it be useful for me to compare my job description with those in similar positions in other schools?

Chapter 6: Pondering Your Curriculum

1. Is my mathematics department in control of its program?

2. Does the course of study have the assent of the Department?

3. Do we spend time "off stage" discussing what we are trying to teach?

4. Am I satisfied with the printed curriculum we are using?

5. Am I trying to develop our curriculum without enough time to do it well? Are we setting aside summer time for the task?

6. Are we keeping in touch with our administrators about our curriculum?

7. Am I Joe? Am I looking where I should be looking for the key to my problems?

Chapter 7: Finding Extra Funds

1. Do I sit around saying "if only...", without daring to make a plan that could make something happen?

2. Do I know anything about the local service clubs in town (Rotary, Kiwanis, etc.) who might fund projects?

3. Have I tried to obtain a grant?

4. Do I hear about grant money that's available?

Chapter 8: Nuts and Bolts — Techniques

1. Have I stopped to evaluate the efficiency with which our department runs? Have we had a department meeting about this?

2. Do we have a good mechanism for evaluating our program? Have we used it? Do we know what we think of what we are doing?

3. Is the department staff growing professionally?

4. Am I sensitive to the needs of any burned-out teachers in our department? Am I protecting the interests of the students? Am I in consultation with the principal about helping this teacher?

5. Are we using our computers as effectively as we might in running department business? Do we have a computer that is reserved for faculty use?

6. Do we adopt materials in an efficient and well-thought fashion? Is it easy to evaluate prospective materials in terms of our course of study?'

7. Do we observe each others' classes? Do we do this in a formal way, so as to maximize our learning?

8. Do I take steps to promote departmental unity and cohesiveness?

Chapter 9: Damaged Goods: Setbacks, Support Systems, and Morale

1. Do I have a support system myself for times when things are not going well? Am I too reluctant to talk about my troubles?

2. Do I have a fairly realistic overview of how things are going, against which I can measure my daily perception?

Overall Queries

Based on the conditions necessary for substantial program growth, listed in *Stories of Excellence* (p. 101)

1. Does my community value mathematics achievement? Are these values effectively communicated to students? Do our students want to learn?

2. Do we pay attention to the amount and quality of homework we assign, the feedback we give on it, and its connection to the practicing we do in the classroom?

3. Is our program structured, and understood by staff and students, so that students can and do move flexibly within an array of courses and levels to maximize success?

4. Does the mathematics curriculum have the assent of the mathematics staff? Is there a sense of ownership of it on the part of the staff?

5. Are high expectations for success in mathematics consistently and effectively communicated to students?

6. Is there a consistently supportive environment for classroom learning that accommodates risk-taking?

7. Is class time used efficiently by both teachers and students?

8. Do mathematics teachers spend considerable extra time working with students and/or preparing materials?

9. Is the staff dedicated? Does it function as a cohesive, sharing, and mutually supportive unit?

10. Does our program have the leadership that produces a well-run, well-organized department that frees teachers from non-instructional distractions?

11. Does the leadership of our program make it possible for teachers to feel and act as professionals, and does that leadership stimulate questioning, sharing, and taking part in ongoing professional interactions?

APPENDIX C: ANNOTATED BIBLIOGRAPHY

Driscoll, Mark. *Stories of Excellence.* NCTM 1987.

106 pages that can change your whole outlook. Ten "excellent" (though not perfect) schools profiled, with hypotheses about what it takes to achieve excellence, and a good bibliography for further exploration. This is must reading.

Driscoll, Mark. "Transforming the 'Underachieving' Math Curriculum". *ASCD Curriculum Update*

An overview of current national projects, including the University of Chicago Project. Also a summary of exemplary programs in mathematics education, emphasizing students as active participants in the mathematical process and teachers as creative leaders of the instructional process. A valuable source of addresses.

Johnson, David R. *Every Minute Counts* and *Making Minutes Count Even More.* Dale Seymour Publications

Easy reading booklets that can be read in one sitting. David Johnson's simple techniques keep teachers on task and can add weeks to your teaching time.

Lindsay, Dianna Mattern. "You Decide: Are Department Heads Management or Labor?" *Executive Educator*

A short checklist to help you figure out where your responsibilities lie at present, and a stimulus to thinking about where they should lie in the future.

National Council of Supervisors of Mathematics. *Facilitating Evaluation: The Role of the Mathematics Supervisor.* 1986.

An 86-page publication dealing with supervision and evaluation of teachers, with teachers helping each other, and with the general evaluation of textbooks. There are nine chapters containing research information, useful one-liners, and prepared forms for text evaluation.

National Council of Teachers of Mathematics. *Curriculum and Evaluation Standards for School Mathematics.* Reston, Virginia. March, 1989.

A central document, created to "(1) create a coherent vision of what it means to be mathematically literate both in a world that relies on calculators and computers to carry out mathematical procedures and in a world where mathematics is rapidly growing and is extensively being applied in diverse fields"; and "(2) create a set of standards to guide the revision of the school mathematics curriculum and its associated evaluation toward this vision." This document is not intended to be the course of study for the country as a whole or for any school system in it, but is intended to be studied and pondered as school systems develop courses of study of their own. 258 pages. Read 'em all!

National Research Council: *Everybody Counts: A Report to the Nation on the Future of Mathematics Education.* Washington, D.C. National Academy Press, 1989.

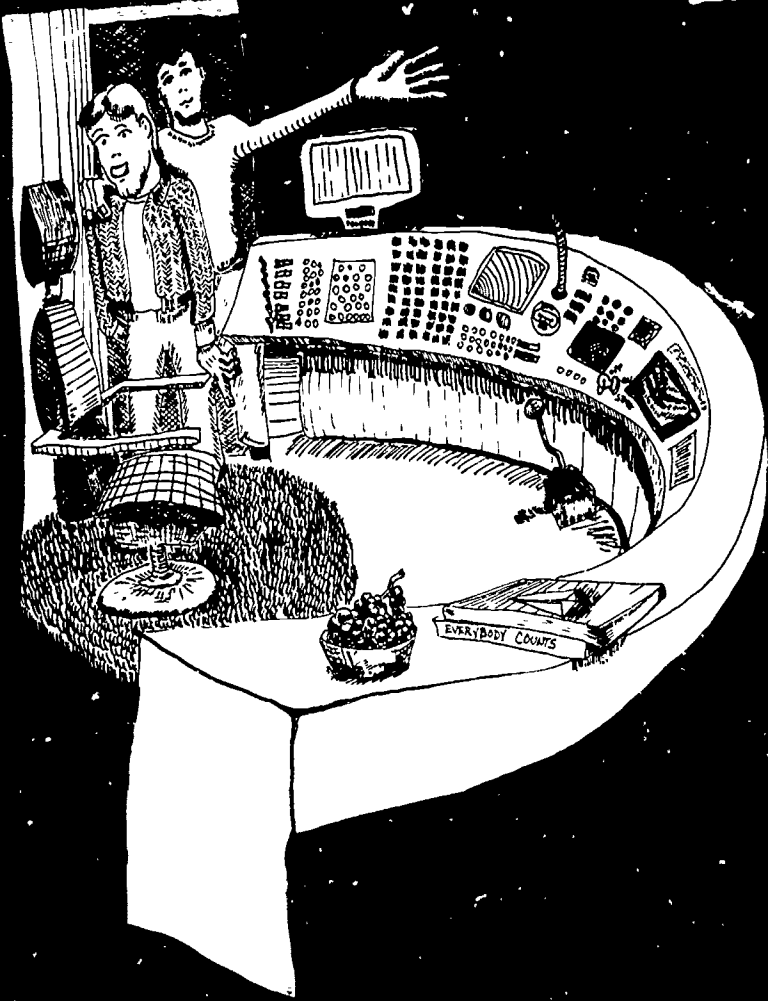
Wake up, America! A strong, clear, lapel-shaking statement of the problem, considered at the national level but very clear about the power of the local school systems in effecting or impeding change. Written by very heavy hitters in the field of mathematics education, this is must reading for everyone, from parents to the Superintendent and the Board, and especially you. Call the MSEB for information on getting copies.

National Study of School Evaluation: *Evaluative Criteria for the Evaluation of Secondary Schools.*

A generic North Central-type instrument for departmental evaluation, helpful in deciding what kinds of questions are of importance to your departmental programs.

Taylor, Ross. *So You're a Mathematics Supervisor.* Reston, Virginia: National Council of Mathematics Teachers/National Council of Supervisors of Mathematics. 1982.

Twenty pages of easy reading, offering advice on the human relations of being a supervisor or leader. Topics relate to generic leadership and could be of use to non-mathematics department chairs.



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