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BRITISH SOCIETY FOR THE HISTORY OF MATHEMATICS - Dr. J.M. Dubbey

The Society was first thought of one early morning in February 1971 at St.
Pancras Station buffet where I had my first meeting with Arthur Morley from
Nottingham College of Education. Arthur was one of the few people to have read
my book "Development of Modern Mathematics" and as an outcome he suggested we
meet to consider the possibility of people interested in the history of
mathematics doing something together.

As a result we arranged an exploratory meeting at Thames Polytechnic in July
with very home-made publicity and to my great surprise over fifty people
attended with Professor G.J. Witrow (Imperial College) taking the chair. Short
papers were presented on the value of the History of Mathematics in various
sectors of education, and the tone of the meeting was very favourable towards
the idea of a national society. This feeling was confirmed at the next meeting,
also at Thames in December 1971 when it was formally agreed to institute a
society to be known as the British Society for the History of Mathematics. This
turned out to be the first of its kind in the world. More recently there have
been moves to organise such national societies in the U.S.A. and Canada.

Conferences have since been held at South Bank Polytechnic, Nottingham College
of Education and The Open University. The first residential conference took
place at St. Hugh's, Oxford, on 15th and 16th September 1973. These meetings
have been well supported and aroused considerable interest and enthusiasm. At
each one it is almost invariable that I will be taken to task by someone claiming
that this is the kind of Society they have been hoping for for years but only
heard about it in a very second-hand way. What's wrong with the publicity etc.?
For this reason I very much welcome the opportunity of writing for M500 and
making the Society known. Membership is open - available to anyone supporting
our general aims and willing to pay the £1 subscription to the Treasurer, Arthur
Morley. At present there are 140 members, mainly drawn from Mathematics
Departments in Higher Education.

Subsequent experience has increased our awareness for the need of this Society.
The History of Mathematics has been a very neglected subject (especially with
respect to British Mathematics) and the inaccuracies of past writing badly need
to be corrected. There are few researchers in this field but they tend to work
in isolation and while it is early days for the Society to promote group work,
at least the beginning of a structure is there. The History of Mathematics is
increasingly being seen as an integral part of a Mathematics course (I would
like to think that my own efforts on Ml00 radio units 7, 22 and 27 illustrate
this point), and again isolation is felt among enthusiasts for teaching this
subject who often feel unqualified, uncertain of books and sources to recommend,
or how to develop the course.

The History of Mathematics has great possibilities for giving
insights into conceptual development and creativity in Mathematics,
an understanding of the changing roles of Mathematics in Society,
and in providing an essential bridge over the ever-widening gulf between
the numerates and innumerates. It can provide non-mathematicians
with some idea of what Mathematics is about

without submerging them in technical details, and give the mathematicians an
indication of how the other half lives. It's also a demanding intellectual study
requiring rigour both in Mathematics and in History, and deserves every effort
and encouragement in its pursuit.

Dr. J.M. Dubbey, Department of Mathematics, Polytechnic of the South Bank,
Borough Road, London SE1 OAA - Secretary of the B.S.H.M.

PROBLEM CORNER No.8 - Richard Ahrens

A mathematician confronted his son, who wanted to borrow £10, with the following
proposition. He took twenty £10 notes and twenty £1 notes and two hats. "You
may divide these forty notes into two bundles in any way you choose," he said.
"I will put one bundle (shuffled) into each hat. You will then be blindfolded
and will choose either hat. Having made your choice, you will draw one note
from that hat. If it is £10 you may keep it. If not, you wash the car."

How should his son divide the money to give himself the best possible chance
of getting the £10, and what is his probability of success?

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SOLUTIONS TO PROBLEM CORNER No.7

Squaring the balls: 24 layers (GY, MG, JB and MS) (Actual total number
                      of balls not quoted here, since it may spoil MG's
                      Crossnumber for someone.)

Notation: Yes, true. Solution lengthy.

Barbers: Yes, if Allen stays in. (RS-B, MS)

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QUOTE OF THE MONTH - Dr. B.A. Orman, M100 C-T, Southampton/Poole

Overheard at Keele M201 Summer School, after a lecture on Chebyshev
Approximation:

"The best is not good enough, and the best is not too good."

It reminds me of my old school motto: "Nid da lle gellir gwell."

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DEAR PROFESSOR BRUCKHEIMER...

Readers will be interested in the following extract from Gertrude Stein's
'Autobiography of Alice B. Toklas[1]:

"She sat down with the examination paper in front of her and she just could
not. 'Dear Professor James', she wrote at the top of the paper, 'I am so sorry
but really I do not feel a bit like an examination in philosophy today,' and
she left.

The next day she had a postcard from William James saying: 'Dear Miss Stein,
I understand perfectly how you feel. I often feel like that myself.'

And underneath it he gave her work the highest mark in his course."

*****

A VIEW OF M251

Having enjoyed the computing parts of M100 and M201 "An Algorithmic Approach to Computing" was a course I found it impossible to resist. The information in "Degree Handbook 1973" did not mean very much before taking the course as one only understands what was written as the course reveals it. The description does not do justice to an excellent course.

As I will mention time and time again the structure of the course is superb. It is so well constructed that the books are an intrusion and one wonders why the Course Team did not do the whole thing themselves.

The first four units introduce flow-charts, a written notation, and cover a great deal of BASIC programming. The structure of the course can be appreciated better in retrospect - there is seen to be continual preparation for the work ahead. - This does not, unfortunately, make work easier for the student who does not know enough to appreciate the careful organisation of the material with which he is presented. I don't know how this difficulty could be overcome, though some techniques would be easier to learn, and more importantly quicker, by demonstration rather than reading. An important detail can easily be overlooked when only mentioned once in the text or in an exercise.

Unit 6 is about subroutines and their use. It made me realise how indiscriminately I had been using the GOSUB statement in BASIC (though I doubt if this was intended). In later units the value of subroutines becomes more apparent.

Unit 7 deals with processing in the computer, and machine language. The program which simulates a computer which has to be programmed in machine language is an excellent aid to understand this section of. the work. It is disappointing that we cannot try the real thing but that is clearly impossible. A demonstration of this machine simulation program would have saved a great deal of time, as would some instruction on how to put machine-code on paper-tape.

Units 6 and 9 concern data structures, that is the ordering of data in store so that it can be retrieved for particular purposes. At this stage a feel ing of uncertainty developed whenever the concepts did not definitely follow previous experience. It is easier to be confident working with a typewriter keyboard than with imaginary boxes with addresses which you do not yet know how to handle. Once again the structure is superb but the student cannot make use of this whilst studying a unit for the first time.

The next units on Files produced much the same effect. Many of the practical ideas are abstract to the student who has never handled the kind of machine being discussed.

We have so far reached 'Strings and Compiling' (At the time of writing.) The Course team seem to have been aware of the problem

just described and have devised a special high-level programming-language called ACE which students can compile from machine code. This kind of facility is an excellent feature of the course but it does raise the question "Why am I learning this?"

I am delighted to be discovering the techniques involved but I wonder where I am going to find a computer to program from scratch. Has anyone a computer for sale - cheap?

Barry Chinchen
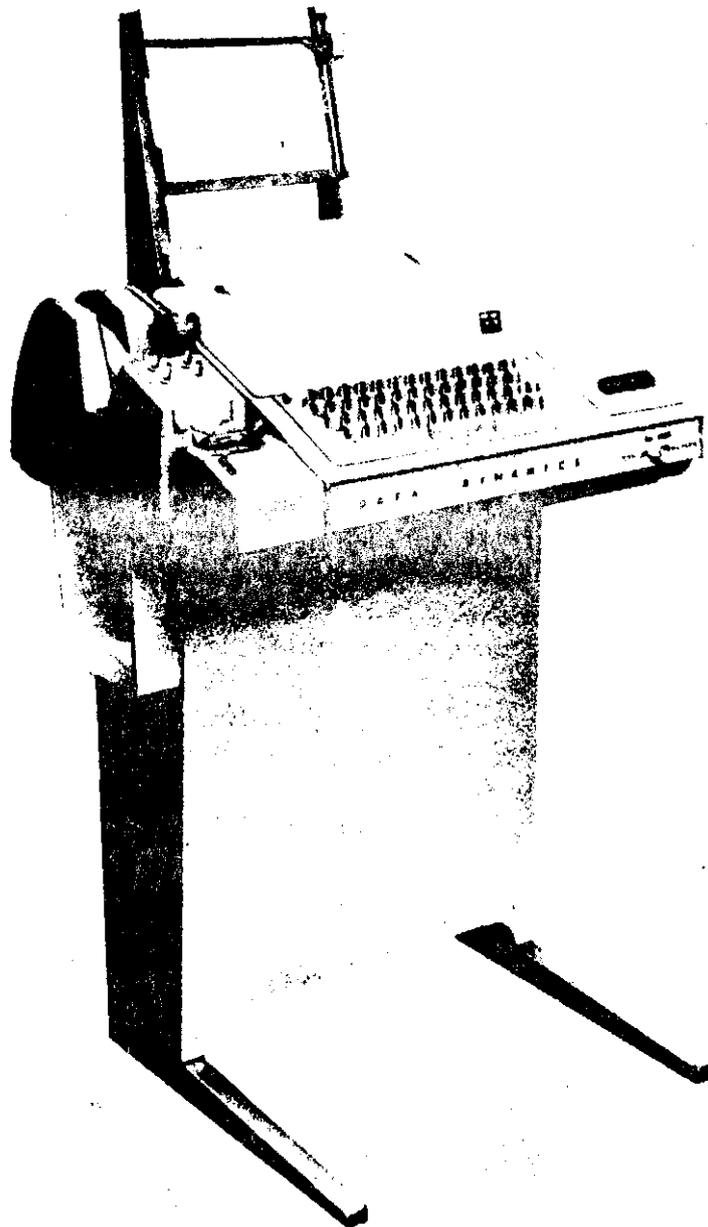
The terminal is the part of the system which we see yet it can be used to teach the processes taking place at the other end of the telephone line.

CROSSNUMBER - Michael Gregory, M202 Farnham

All solutions are positive integers.
Clues 10 down, 13 across and 4 down do not give unique solutions but the combined solution on the diagram is unique.

1	2	3	4	5
6				
7		8		9
10	11		12	
13				

ACROSS

1. U_7 such that $U_1 = U_2 = 1$
    $U_k = U_{k-1} + (U_{k-2})$
3. f(b) where b is a solution of 11 across and $f(x)=x^2-2x+1$
6. $^8P_4$
7. Square root of the number of balls in a pyramid with square base - ref Problem Corner No. 7
8. Maximum y where $y^2 + 4x^3 -48x^2 = 0$
11. Larger root (i.e. x such that y=0) of equation 8 across
12. Tenth Fibonacci number.
13. Product of five different prime numbers.

DOWN

1. Larger prime factor of 10489
2. Sixth pyramidal number for triangular base.
3. Year Evariste Galois died after a duel.
4. a^2b^4 such that a+b=8
5. Fermat number, smaller factor of 10489
9. a, such that a=3a'/4 - 11 where a' is the reverse of a.
10. Sum of the primes of 13. across.
11. $(+)_{27}((+)_{73}$ 141)*

*(+) represents the symbol used in M100 unit 11

RESOLUTION FOR 1974?

"It's not absence of progress but the speed of progress which sometimes upsets the mighty. Remember to refuse to be hurried. Wait upon time. Exercise your mind with but 6 questions per diem and rebel against additional problems such as irate superiors, and you are bound to succeed." (Arthur Upfield. Venom House. Penguin.)

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THE M202 DEBATE CONTINUES...

Patrick Sharkey - M100 Counsellor, Portsmouth

I was glad to see some Views of M202, hut saddened by the course writers' gloom. M202 can stand on aesthetic appeal alone. However, here is a utilitarian thought: a largely unsung praise of such abstract courses is that they show mathematicians to be tackling the problem of information explosion. Generality and depth lead to clearer perspective, economy of expression and organisation of facts. (By contrast, practitioners in other fields, e.g. the paramedical sciences, merely wring their hands at the receding horizons in their subjects.) Thus, while the spirit of the course must not be allowed to die, the content and packaging might be improved as follows:

1.   Relabel the course M292 (to show its difference in philosophy from M201,)
2.   Recommend M201 and M100 as normal prerequisites, M201 contains material to motivate a more abstract approach; M100 can hardly be said to do so.
3.   Compactify the material as follows:

   a) <u>Start</u> with M. Bruckheimer and D. Mansfield's book: "Background to sets and groups".
   This would consolidate the relevant M100 material. Also, the topological gilding at its chapters' ends would prepare people for the well-chosen Mendelson.
   b) <u>Retain</u> the latter and Herstein, as at present.
   c) <u>Transfer</u> the content of Minsky to M251.
   d) <u>End</u> with Halmos' 12 or 13 leading chapters. Is not this more digestible as dessert than as hors d'oevres to the axiomatic structure of groups, rings and fields?

I accept that no set of repairs is likely to make M202 easy. But then nothing worth-while is!!

<div align="center">+++++</div>

<u>Maureen Childs</u> - M202, Dudley, Worcestershire

Many thanks to Allan Solomon for a truly worth-while week of study at Keele. Tape slides were for me a great success, and a second acquaintance with the semi-direct product (that dreaded outcast as far as many are concerned, it seems) together with 'Colouring the Cube' and the Galois project made all the hard work of previous months worthwhile. I am at last seeing through the structure of axioms and theorems to the true beauty.

I would like to lift a little of Ian Dey's depression in suggesting that perhaps those who are not so adversely critical of the course don't make quite so much noise. No course should be judged entirely until one has 'gone through the system' - and that entails summer school.

The peaks and heights of academic disciplines are there to be scaled, not scaled down. I would like to feel, along with the writer of an early article in SESAME that OU Maths students will be among the best ever!

<u>A. Rickard</u> - M202, Farnham

Cheer up, Dr. Dey! I think M202 is a marvellous course and really dread reaching the end of it, for nothing quite as stimulating can follow it - next year will be the let down.

Very few of the fellow students I've met, either at tutorials or at summer school would agree with the views you quote. Please try to remember you are hearing only the vociferous minority.

Just one favour, though. Please stop telling us how hard 202 is and how disappointed you all are with it - you're taking all the joy out of it for us. More and more students are believing you - in fact, you'll even convince me next!

<u>Tony Brooks</u> - M202, Portsmouth

I have read and heard many attacks on M202, but in my view most of them have been made too soon. Only now is an overall picture of the course emerging for me. Most of us had a bad start with the first TMA, but since then I think the level of difficulty of the course units and the TMA questions has, in general, been reasonable. I think that providing one has a real interest in pure maths, M202 can be mastered. All the TMA questions I have read have been related to the appropriate unit, and if I have not been able to do them this has been due to a lack of appreciation on my part of the course material.

I believe it has been a mistake not to issue an M202 Handbook at the very start of the course. I have wasted too much time searching for definitions and notation I have forgotten. If these were printed at the start of the unit in which they were used (as in M100) this would have helped. Please, please give the Handbook to next year's M202 students with Unit 1.

Finally, I must say that despite the faults that do exist in M202 I have enjoyed the course immensely. I do not regret for one minute choosing it. I will try and encourage other OU students to do it in future years, when hopefully many of the first year 'bugs' in M202 will have been removed.

<center>+++++</center>

Ed: In fairness to 'the vociferous minority' - of which I must be a 'very vociferous' member - and in order that M100 readers, in particular, should not be misled - it should be pointed out somewhere that the I.E.T. does a very professional job of RANDOM sampling continuously throughout every course. Presumably Maureen and Ricky have not yet been selected by The Computer to fill in the weekly forms - a chore, but obviously essential in order to protect students and staff against the 'vociferous minority' which would otherwise be heard. With all readers of M500/7, I was surprised and emotionally impressed (a fallacy, Dr. Dey, of the highest order!!) by the depression of the Course Team. I expected to be

pulverised into the ground by the three Views which I requested to counter ours of M500/6, and instead was reduced to patting them on the shoulder and saying it's not <u>that</u> bad! (Grade B, actually?) Anyway, here's an opportunity to say that even the critics thank the Course Team for their labours, and for introducing us to the realms of modern pure mathematics, and to hope they will eventually be allowed to produce a 3rd-level continuation - or should it be 4th level.

<center>+++++</center>

<u>REVIEW</u> - John Bennett, M202 Eastleigh, Hampshire

On the recommendation of the M202 Course Team I bought 'Introduction to the foundations of mathematics' by R.L. Wilder (Wiley, £3.15) as background reading. If anyone likes this almost philosophical subject, I recommend this book to them. It is far better than any popular introduction skimming logic and set theory for the non-mathematician, but it is far easier than many of the indredibly opaque works which are often the next step. I am curious to know whether it would be possible textbook in a future OU course on foundations.

The first part of the book covers the axiomatic method and applies it to set theory (as in Halmos), the real number system and groups (as in Herstein). The second part is less technical, covering the history of formalism and intuitionism with chapters on Gödel's Theorem and the author's view of mathematics as a part of a general culture. For me, the whole book would be worthwhile for an example in the first part where topology, in the form of open sets defined as all arithmetic progressions of integers, is used to prove the infinity of primes in three or four lines of easy logic. This example, which may yet appear in M202, says more than any abstract construction can about the power of modern mathematics. Wilder's book is pitched at exactly the level where easy proofs may be profound.

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<u>LETTERS TO THE EDITOR</u> - not world- or OU-shatteringly provocative but do serve to introduce new members of MOUTHS rather better than a mere name on a list.

(Readers who noticed Diane Miles' appeal for a Club for Lonely Minds in September Sesame will be pleased that she has joined us...)

<u>Diane Miles</u> - M100, Uttoxeter, Staffs.

Thank you for your copy of M500. I wish I had known about you months earlier. I think MOUTHS and self-help is a wonderful idea. I wonder whether others waiting to be discovered could be reached through SESAME SMALLS?

The main problem, with being an isolated student is that time and effort are used most uneconomically. When I come to a 'stone-wall', as I frequently do, the two courses open to me are:

1. To spend hours bashing away at it, reading and re-reading, flipping between the glossary and the text, trying to extract a meaning from the definitions, searching for a line read too hastily which will prove the key to the mystery.

2. To give up until I can contact and get a response from a staff tutor or Bietchley. This may take hours or days. Meanwhile, progress grinds to a halt and good study opportunities may he lost. (Good study opportunity: children in bed and mind still able to function!)

For me, the ideal solutions would be:

1. A beautifully clearly written text, with lots of exercises like a high school book. Then if the student could not deduce the meaning from the text, then he or she might be able to gather the meaning by induction (not mathematical induction!) from the questions and answers. In the M100 text I find I have to 'waste' a lot of exercises by using them as examples to try to understand what the question meant, and yet I would like to do a lot of exercises to try to etch the matter into my brain.

2. A telephone line with a mathematical mind at the end of it - run on the lines of a fire-station.

Perhaps MOUTHS provides the nearest practicable approach to (2). Does it? Do they (or we) phone each other up and say things like 'Do you understand about kernels?' or 'Can you translate the notation in book so-and-so, page so-and-so?' I think MOUTHS is a worth-while experiment, and I hope it succeeds.

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Ed: Yes, we do telephone each other in the way described. We also argue about CMA questions, since they are short, interesting and relevant - one learns to argue to the death when one's CMA result depends on it, and this is mathematically beneficial. Sometimes we just want a fellow victim to cheer us up after a low grade, because even the most sympathetic family/friends do not talk our precise language, really.

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Ron Davidson - M100, Southampton

The Summer School was just fantastic. I'm sure you can imagine my reaction. One big surprise was meeting Geoff Yates at the top of a 1300ft. hill behind Stirling's campus one afternoon. One of the tutors decided that an afternoon's relaxation would do us all a power of good, and it seems that someone in Geoff's course had the same idea. Peter Weir was also at Stirling the week I was there. You get a great feeling out of this!

My studies got seriously out of line over the past month, what with work, moving (which was rather protracted for various reasons) and a holiday. There were times in the wee small hours when the candle was getting low and my spirits were following it as I wrestled with a TMA. I thought "I must be mad to go on like this.'" - however, I've persevered (and got 9.67 for the TMA!)

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A MESSAGE FOR BOURNEMOUTH/FAREHAM M202 from Dr. Elliott

I just want to wish all my students the best of luck in your examinations and future courses, and to say that I have enjoyed tutoring you. I will be repeating M202 next year, and M100, and it will be rather pleasant to be on a 're-run', but I shall miss the present group. Maybe I'll see you again sometime on one of the analysis courses.

In the meantime, do let the style of proof we have used in M202 influence you in the way you look at problems in future courses. I shall be looking forward to hearing you have a degree in the future. Sorry if I've kept you late for Saturday lunch, etc.

THE LAST EDITORIAL OF 1975

I was on the verge of murdering M500 in its sleep, due to general lack of response from about 60 students,when a letter arrived from Walton Hall...

It seems that the Faculty would like to help initiate some sort of Remote Mathematics Student Service, to be informal and student-operated, growing larger according to student interest. This is very good news. So M500, and MOUTHS in particular, must not be allowed to die - they are perhaps destined for greater things in the future. 12 students and staff have already sent £14.55 without even being asked, and a further 20 or so are suggesting hefty subscriptions such as 5p, 10p or even 20p per issue, plus postage, but 30 readers is not sufficient to ensure a constant flow of written contributions, and M500 must expand or die.

At the time of writing, the Faculty has not suggested how the proposed RMSS - which I prefer to call MOUTHS, since we are ALL isolated - is to be initiated, or expand. Without access to addresses, students are helpless. Postage on even 5 copies to volunteers to distribute at tutorials is prohibitive when multiplied all round, and in any case this method does not reach people like Diane Miles, who cannot get to tutorials. Nor does it reach tutorial groups where we do not have a volunteer, and also, cash is wasted in distributing copies to students who are not interested. Advertising in Sesame costs real money.

However, pending further developments, M500 will continue into 1974, so please send along plenty of written contributions - URGENT. Only two items are in hand for No. 9, so far. As for cash, it would be nice if those who have suggested a subscription would send along whatever they think M500 is worth, for the present. A fixed rate of subscription in the future would probably be about 3p. per issue plus postage, but it is not yet obvious how many issues per year can or will be written.

A full list of MOUTHS is appended, to complete the year. Remember that we started with three members. Many members, including those known to be very active telephonists, have not yet sent details of their 1974 courses, but one can try extrapolation.

I wish everyone as merry a Christmas as it is possible for us to have without knowing what results will be!

<u>M.O.U.T.H.S.</u>   October 1973

MOUTHS = Mathematics OU students' Telephone self-Help Scheme, and has been operating since January 1973. The following is a complete list of members, with the latest information supplied on their courses. Members are urged to use the scheme frequently, and not to wait until they run into special difficulties. During 1973, many complete strangers have become good friends over the telephone. Those without telephones can still join, using public telephones.

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[...] x 4

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MIHIHISTORY OF THE INFANT M500 NEWSLETTER

Winter 1972   Editor's friends all wildly volunteering to convene Self-Help Groups for A, D and E courses. Ed. says maths students do not want SHGs, judging by previous experience, but maybe would like personal telephone contact with other students?

Jan/Feb 1973 - No. 1   Ed's friends in some difficulties, since A,D,E students objected to 'waste' of precious tutorial time spent arranging 'student affairs'. Ed dashed off Solent M202 Newsletter No. 1 - 24 copies - in 4 hours flat at midnight before M202 tutorial, to which appended form of application to join the Solent OU Mathematics Self-Help Scheme, intended as a 'non-time-wasting' handout. Course Tutor helpful and sent copies to those not present.

March 1973 - No. 2   C-T provided minibiography including mathematical interests, hobbies, current job, etc. etc. in humourous vein, thus hopefully becoming a real person to those not attending tutorials. Ed. reported on typing TV sound tracks for deaf maths students. (NB - volunteers are always needed - contact Dr. Vida Carver, Counsellor at London Region Office.) C-T resigned!! (First victim of M202 overload ??)   Bournemouth and Fareham tutorial groups amalgamated under Bmth C-T, thus doubling potential readership overnight. First list of the Self-Help Telephone Scheme members issued.

April 1973 - No. 3   Contained the first student contributions. Telephone Scheme dubbed M.O.U.T.H.S. by mnemonic-minded A302 friend. Second list of M.O.U.T.H.S.members issued. John Mason invited to chat us up.

May 1973 - No. 4   Still growing - now included any, (i.e. non-M202) students who replied to the invitation to the JM Visitation. Contained the offprint handout from Mathematical Spectrum, supplied to the ed on request, and subsequently issued, or made available, to all-comers at Summer Schools, by OU.

June 1973 - No. 5   Contained the first general issue of the so-called Kingsgate Questionnaire, supplied to ed. on request, in order to estimate likely demand for weekend/midweek residential 'summer' schools for 1974 maths ½-credit students. Otherwise a bit dull! Not much 'news' because we had all talked

a lot at the JM Visit.

July 1973   M100 C-T volunteered to distribute the newsletter at Poole
No. 6   and Southampton M100 tutorials. Potential readership
              doubled again. Contained the first truly mathematical
              'article', and three students' views of M202, composed in
              response to enquiry from a counsellor in No. 5. Readership
              expanding in all directions, since now picking up any who
              replied to the Kingsgate Questionnaire. M202 Course Team
              were invited to supply three personal views of M202 to
              counter the students' views. Letter re Kingsgate courses
              went to Sesame (for August issue). Readers were invited to
              supply a new title for the newsletter, since no longer
              Solent and no longer M202.

August/Sep. 73   (Actually duplicated in August and issued 50 copies
No. 7   to students at Keele Summer School.) Contained the M202
              Course Team personal views. Title changed to 'M500
              Newsletter', suggested by Peter Weir (M100, Coventry) for
              reasons:
              1.   Why not
              2.   A top-level course in communications. Full Credit.
              3.   It's an overview of OU maths,
              4.   Why not
              6.   I thought of it.

              Only three other titles had been suggested, viz:
              1.   Mathematics Newsletter - a bit formal.
              2.   OU Mathematics Society Journal - visibly false,
                     although perhaps desirable.
              3.   Maths Nuts for Nutcrackers - too facetious.

              The first voluntary donations/subscriptions arrived, to
              help with ever-increasing costs of postage and stationery.
              200 copies issued.

Readership can, of course, only continue to expand if readers themselves
now start to spread the glad news of the existence and purpose of the
M500 Newsletter - the latter being primarily to facilitate inter-student
and student-staff contact and to break down student isolation. Since the
ed has proved by experiment that it is possible for one student to find
a large number of other students, even with no access to addresses, it
is hoped that every enthusiastic reader will set out to find at least
one other OU maths student, course-tutor or counsellor to introduce the
M500 to them, and that everyone will try to think up something no matter
what, so long as it is of some interest to OU mathematics students, to
write about. Masterly prose is not expected, and may be even undesirable
if it inhibits spontaneous communication. Length should always be
'reasonable' - rarely more than one A4 page perhaps, unless of lively
importance. Diagrams should be supplied using a B pencil if possible,
for reproduction by infra-red stencil.

Finally, in answer to many questions, let it be said that the ed. finds
the typing and duplication a trivial task, and in any case could always
farm it out to commercial firms for reproduction if necessary. All I ask
is for some contributions and cash! MS