MATHEMATICS

at

MANCHESTER
MATHEMATICS AT MANCHESTER

A guide to the Department of Mathematics for students and prospective students
The Tower of the Mathematics Building

Manchester University Library
Photographs Department
GENERAL

The highest University building on the east side of Oxford Road, and opposite the University of Manchester Museum, is the new Mathematics Building housing the lecture rooms, libraries and offices of the Department of Mathematics.

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The highest University building on the east side of Oxford Road, and opposite the University of Manchester Museum, is the new Mathematics Building, housing the lecture rooms, libraries and offices of the Department of Mathematics and the Department of Mechanics of Fluids.

The Department of Mathematics, which includes the Statistical Laboratory, consists of about 400 undergraduate students specializing in mathematics, about 35 postgraduate students and a similar number of staff.

The Department of Mechanics of Fluids consists of about 80 undergraduates specializing in Aeronautical Engineering, and over fifteen staff and research students.

The Mathematics Building consists of a 4 storey podium built round a first floor patio, and in one corner, a tower rising to the 18th floor.

The undergraduate areas are mainly on the first three floors of the podium, and include the undergraduate library and workrooms, as well as lecture theatres and lecture rooms. The top floor of the podium is equally divided between the Statistical Laboratory and the Department of Mechanics of Fluids.

The remainder of the building consists mainly of offices for the remaining members of the Mathematics Department.

The Student Union, University Refectory, and offices of the Bursar and Registrar are on the opposite side of Oxford Road; to the east, the Faculty of Science offices may be found in the Roscoe Building, which is the second building on the north side of Brunswick Street.

The entrance to the podium is on the first floor up a ramp from Oxford Road. The ramp leads on to the Computer Building, and will in due course cross a bridge containing a café to shops and the University Precinct Centre on the opposite side of Oxford Road.

From the entrance you can see across the patio the Max Newman room. This is the centre of student social activity in the Mathematics Tower. On the right of the entrance hall is the Upper Library from which a spiral staircase descends to the Lower Library. These three rooms offer the principal work and relaxation areas for undergraduates.

On the sixth floor is the Conference Room. This is used to entertain gatherings of visiting scholars, but in day-to-day use it serves a valuable additional function. Staff and students meet there informally for tea and coffee. The department considers such contacts very important and goes to some pains to foster them. In this we are helped, as are other departments, by an endowment from the late Lord Simon, which we use to finance parties for staff and students.
THE MATHEMATICS DEPARTMENT

The Mathematics Department contains over 500 people learning, discovering and teaching mathematics.

About 400 undergraduates are working for Bachelors’ degrees in mathematics (or mathematics and something else). About 35 postgraduates are working for Masters’ or Doctors’ degrees, and assisting with the undergraduate examples classes. Over 50 academic staff, Lecturers, Readers and Professors, teach and invent mathematics—and frequently there are also visitors here for research. The vital services are provided by 9 secretarial and computing assistants, headed by the Administrative Assistant, and also porters and cleaners.

What do they all do?

With a very few (short-lived) exceptions, the undergraduates come with some interest in mathematics, the intention of earning a degree, and the will to do the hard work required for it. And the objective of a degree remains central even when the wider value of university life appears.

The postgraduates learn mathematics near the frontiers of knowledge, and try to cross the frontiers into new ground.

The staff, who have been appointed to teach and to invent mathematics, (for the degree course is still sufficiently near the frontiers of its subject to need staff in touch with current developments), come with an enthusiasm for mathematics, and the intention of discovering more. They teach courses to the mathematics students, and to each other in the seminars held each afternoon for reports on the latest discoveries made here and elsewhere.

But the difference in roles can be exaggerated: learning mathematics is often a private discovery, and students may frequently learn from each other, staff be stimulated by a student’s remark or be foxed while trying to learn some new mathematics, just as they were when undergraduates.

Undergraduate Courses.

A degree is earned by passing examinations, mainly, and the relevant mathematics is learned by attending four or five courses each term. A course consists of 2 or 3 hours lectures, a further hour of more informal classes, where exercises are done or considered, and (advisably) rather more time in private study, aided by whatever handouts the Department prepares, and actual books (!).

The choice of course is restricted in the first two years, which are principally spent in exploring the central core of mathematics. The student may then, with knowledge of himself and his subject, choose further courses from a wide selection. Some students switch to the fixed selection of courses in the Ordinary Degree, which provide a broad and very sound education, or to a joint degree,
with half the courses taken in a different department.

The total set of alternative programmes available is described, in the section on Course Structure.

Counsellors, Supervisors, Tutors.

To assist each student he is assigned a Counsellor for the duration of his undergraduate course, from the academic staff. The Counsellor will advise the student on his progress, and his choice of courses and eventually will be available for the writing of descriptive, accurate and kindly testimonials. It is important that he be kept informed of any changes of circumstances, particularly address. The counsellor is also available to help sort out various problems that students meet, sometimes by passing them to the Senior Tutor.

The Senior Tutor oversees all the Counsellors, arranges changes of course, makes application to Faculties on students’ behalf, transmits the sharper opinions of examiners to laggard students, tidies up all the loose ends, and has certain discretionary powers for permitting students to take combinations of courses for special reasons. For Ordinary Degree students both the roles of Counsellor and Senior Tutor are played by the Ordinary Degree Tutor.

During the first year, students are also assigned two supervisors (or tutors) who conduct small tutorial groups each week. The supervisors are either members of staff or research students, who have volunteered to do this duty unpaid.

Examples Classes.

When a lecture course is accompanied by examples classes, a set of examples is prepared each week, printed and circulated to the students, who attend the class in the hope of getting help or illumination from talking with a member of staff or a research student attendant on the class.

Variations on this procedure are always being tried; in particular the examples classes in some second year courses have in part been replaced by tutorials conducted by Supervisors, on a slightly different basis than in the first year. For any of these schemes to work well, patience, cooperation and diligence on both sides are required.

Schedules, and the Courses and Teaching Committee.

The lectures in the first two years follow carefully worked out programmes, which are frequently revised for all sorts of reasons; the third year lectures usually change every year being governed by the interests of the lecturer. Compilations of all of each year’s schedules of courses together with reading lists are given to all students at the beginning of the session.

The Courses and Teaching Committee is a small Committee of about ten staff and five students, to oversee the teaching arrangements, and make recommendations. There are always proposals to change things going about, and this
Committee is the forum where proposals are discussed in detail. There is a special board in the Max Newman room to give notice of meetings of this Committee and its judgements. Most of the recommendations are accepted by the Departmental Board.

**Board of the Mathematics Department.**

This enormous group consists of all the academic members of staff. A group of about a dozen students, elected by the students, also attends all meetings (except the examiners’ meeting), and plays an active role. It is a place where opinions are ventilated, so that a body such as the Courses and Teaching Committee can work out a detailed scheme which the Board will later accept. Once a year it meets as an examining board, to consider all the examination marks and determine the results. But a lot of its business is semi-formal or is concerned with making good resolutions.

**Staff/Student Liaison Committee.**

Another Committee which has altered departmental habits is the staff/student liaison committee, composed of about six students, elected by the students in each of the three years, the Head Porter, and certain members of the academic staff who currently hold some of the departmental offices, such as the Senior Tutor, the Ordinary Degree Tutor, and the Departmental Chairman (see below). This meets about three times a year, and makes recommendations of every kind, some to be dealt with administratively (such as a request for omitting question 13 on examples sheets,) and some for the Departmental Board of the Colloquium (see below) to consider. There is a special board in the Max Newman room for meetings of this Committee.

**Chairman of the Mathematics Department.**

The professors have formal responsibility for the department, for its internal arrangements and for representing it outside. One of the professors is therefore appointed each year to be in charge of all the administrative arrangements (such as paying bills,) while the others get on with teaching and research. The Chairman’s duty is to represent the views of the Department in such higher university bodies as Faculty and Senate and to implement the decisions of these bodies within the Department. He will also receive suggestions (or complaints, or even praise) about the existing arrangements within the Department from any individual or group of students or staff.

**The Mathematical Colloquium.**

This is the undergraduate society for members of the department. Its elected officers are frequently consulted on student opinion. But its main function is to save budding mathematicians from insanity. This it does by arranging talks on both mathematical and general topics. The mathematical ones are often,
though not always, of a light-hearted nature (for example “Chip Machines” – Control Theory – and “Gambler’s Ruin” – Theory of Games). The Colloquium has a more or less permanent dialogue with the staff on teaching methods and course content, and lively meetings on these subjects are organized from time to time. A second-hand bookstall is also organized.

Social occasions, sport and other outdoor (not to mention indoor) activities take place under the auspices of the Colloquium, and its magazine, Iota, is a vehicle for all of the above activities.

The Library Committee.

The department has two libraries: the research library and the undergraduate library. Each has a member of the academic staff as a librarian. The Library Committee contains both librarians, a member of the University Library staff, and members of staff and two students elected to recommend books for purchase.

House Committee.

This Committee consists of Officers of the Colloquium and the student members of the Undergraduate Library Committee, and also the Administrative Assistant and the Head Porter. Its function is to supervise the work of the Stewards, (undergraduates, appointed by rota) in restoring order to the Library at the end of the day, and tidying up the Max Newman Room to a state that the cleaners regard as within their duty to restore. The House Committee and stewards (i.e. all students) have a considerable responsibility for ensuring that the Libraries and the Max Newman Room continue to provide the facilities expected of them.
The Ramp

The Undergraduate Library

The Conference Room

The Ramp from the Tower
COURSE STRUCTURE

Our course structure is very flexible and the student can select any one of a large number of possible programmes to suit both his interests and his abilities. The first year is something of a foundation year in Mathematics, and so this flexibility becomes apparent mainly in the second and third years. When the time comes to make your choice of programme, you will therefore have had ample time to assess your abilities and interests. Your counsellor and supervisors will also play an important role in helping you to make such choices throughout your career.

It is important to remember that the overall structure of the degree and the courses themselves are undergoing continued modification. Both the subject and the range of opportunities for our graduates are developing rapidly, so the course of learning must change correspondingly.

This is an informal account. A more formal statement is to be found in the Faculty of Science Prospectus (precise statement of ordinances and regulations) and in the Faculty of Science Syllabus of Classes (list of courses given in all the science departments).

Registration.

On entering the University to do Mathematics, you will have to register for one of the following degrees:

- Honours B.Sc. Mathematics
- Honours B.A. Mathematics
- Joint Honours B.Sc. Mathematics and Social Science
- Joint Honours B.Sc. Mathematics and Philosophy

If in doubt, the simplest is to choose the first of these (or the second if you have Arts A-levels). At various stages in your later career, you may wish to consider transferring to other degrees within this group or to one of the following alternatives:

- Honours B.Sc. Psychology with Mathematics
- Honours B.Sc. Computer Science
- Ordinary B.Sc. Mathematics and Psychology
- Ordinary B.Sc. Mathematics and Social Science
- Ordinary B.Sc. Mathematics and Philosophy
- General B.A. Mathematics with Arts subjects

Your later choice may be limited by your performance in the various examinations you will have to take, but at this stage you should merely note that transfer to certain courses will require appropriate choices of subsidiary subject in the first year. This is made clear below.
First year programme.

The first year Honours B.Sc. mathematics programme is also the mathematics programme for the other honours degrees listed above. (There is no direct entry for the Ordinary Degrees listed; transfer to these, where appropriate, takes place at the end of the first year or during the second year.) All students attend the three courses MT110, MT111, MT112, a short course each on Probability Theory and Numerical Analysis, and a subsidiary subject course from the list below. The mathematics courses provide an introduction to degree level mathematics and are a foundation for the more advanced and more specialised courses of the next two years. Outlines of these courses are given below. There is usually no second year continuation of the subsidiary course, but the choice of subsidiary is particularly important for students who may wish to transfer to a joint honours degree.

The year as a whole is a transition and readjustment period between school and university and is really a preliminary or preparation year.

In addition to a counsellor (see previous section on the Mathematics Department), first year students in groups of about 8 have two supervisors with whom they discuss their current course work. The usual arrangement (by mutual agreement) is a visit to each supervisor in alternate weeks, but the scheme is essentially an informal one.

MT110 Analysis.

In this course, the aim is to make more precise the notions of differentiation and integration which have already been introduced at school under the heading of "calculus". The concept of a limit is fundamental — the derivative is the limit of a difference quotient and the integral is the limit of a sum. Integration turns out to be the inverse of differentiation, and in Analysis we examine the reason for this. Using the same concept of the limit, we analyse the convergence of infinite series.

MT111 Algebra.

The first years' algebra course serves as an introduction to a variety of topics in linear algebra and coordinate geometry. Many of these topics are treated in greater detail in more advanced courses later. Most undergraduates find the ideas new but there are few prerequisites (unlike analysis, where familiarity with calculus is assumed). A few of the topics covered are: sets and functions, number systems, linear equations, matrices and Euclidean geometry in n-dimensions.

MT112 Mathematical Methods and Mechanics.

In order to teach (and learn) mathematics, it is sometimes necessary to develop, in an informal manner, techniques taken from an area of the subject which the student has not yet studied in great depth. So it is with school 'calculus',
and in this course we continue this approach to certain topics in 'advanced calculus' including the solution of differential equations and the treatment of multiple integrals.

We formulate the laws of mechanics of a particle using the notation of vectors. These laws are then extended to study the motion of systems of particles and of rigid bodies, learning to use the conservation laws for energy and momentum where appropriate. We then begin to study the equations of motion of such systems using the powerful general equations of Lagrange.

In the third term there is an introduction to special relativity, including a treatment of collisions between particles at high energies, where their velocities are close to the velocity of light.

**Probability Theory and Numerical Analysis.**

The purpose of these two short courses is to give students the "flavour" of two areas of mathematics which they will have had little or no previous contact with, so that they will be better able to make the choice of their programme in the second year.

Thus the course in Probability Theory acts as an introduction to the various statistics courses (MT217, 227 and 207) offered in the second year while the Numerical Analysis course performs the same function for MT219 and 209.

Both of these courses are also connected with the Analysis course. Numerical analysis implements the methods of pure analysis in approximating functions, in integration, and in solving ordinary differential equations. The connection of Probability Theory with Analysis is less obvious, but if you follow both of these subjects into the third year, you will discover it eventually in MT327 (Probability Theory) and MT315 (Measure Theory).

**First year Subsidiary courses.**

The usual subsidiary courses are:

**Faculty of Science:**
- Computer Science
- Chemistry
- Philosophy (logic)
- Physics
- Psychology

Other Science subjects can be taken subject to approval by Faculty. This is a formality and depends only on timetable feasibility (see Faculty Prospectus).

**Faculty of Economic and Social Studies:**
- Economics
- Sociology and Social Anthropology
- Government
- Accounting
Second year programme

There is a wide variety of programmes available in the second year. This should enable any student to select one which suits his interests and which he can cope with. Your choice will be governed partly by your first year examination results and you will decide it in consultation with your counsellor and the departmental Tutors. You may also need to consult with the staff of other departments if you are considering taking one of the joint degree courses.

During registration week, before second year lectures begin, there is a four or five day computing course for all second year students who did not take computer science as their first year subsidiary. This course is a prerequisite for MT219 or MT209 but also provides a further opportunity for all students to acquire a basic understanding of computers and computer programming.

There are eight Honours and four Ordinary degree courses offered. A student taking Honours Mathematics normally takes five of the Honours courses, but he can vary this in two ways. He can substitute an approved science course (for B.Sc. Honours) or arts course (for B.A. Honours) for one of the five. It is also possible to substitute certain Ordinary courses (MT207, 209) for their Honours equivalents (MT217, 219) while remaining a candidate for Honours. This latter alternative has proved helpful for many students who are considering a possible subsequent transfer to the Ordinary degree programme. A candidate for one of the Joint Honours degrees takes three Mathematics courses and two courses from the other parent department. You should not find the second year work load excessive if you managed the first year. Although five courses are taken in place of four, some of your courses will be based on two lectures per week rather than three, so the number of lecture hours will remain comparable.

Students doing Ordinary degree Mathematics do all four Ordinary courses, while those doing Joint Ordinary degree do two Ordinary courses and two from the other parent department.

Below we give brief descriptions of the second year courses. If you do the Honours programme, you will be able to arrange your choice so that your programme is concentrated towards Pure Mathematics, Applied Mathematics or Statistics, or so that it contains an element of each.

Honours courses:

MT210 Analysis

This continues MT110 to deal with such topics as double limiting operations and complex analysis.

Functions of many variables are treated, as are infinite sequences of functions. This leads on to questions of reversal of the order of limit operations, such as the summation of a series and integration.
We then examine functions of a complex variable, and find that many of the elementary functions of analysis can be more simply described once their domain of definition has been extended from the real line to the complex plane. Again, many important definite integrals may be evaluated by the technique of contour integration in the complex plane.

MT211 Algebra

This course, which is on 'abstract' algebra, is designed to complement MT111, which deals mainly with linear algebra. The two courses together form a basic algebraic toolkit.

Many of the objects used in mathematics are ' juggled with' - that is added, subtracted and multiplied - in much the same way as the whole numbers. For example, polynomials, functions and matrices all share this feature. If we set down the rules of operation which are common to all these structures, we have defined what the algebraist calls a ring. This process of generalization or ' abstraction' is an important part of modern mathematics. Having arrived at the notion of a ring, we are able to study, and classify, more exotic examples such as the quaternions and the Gaussian integers.

We return to the whole numbers and add the fourth elementary operation - division. But this forces us to extend our basic set of objects from the whole numbers to the fractions - or rationals. Correspondingly, the set of rules is extended to cover the fourth operation, and we end up with what the algebraist calls a field. But, as with rings, we now find a whole wealth of new examples of fields - that is sets of objects which have the same rules of operation as the rationals. One such example is the Galois field known as GF(4). This has just four objects in it which are available for adding, subtracting, multiplying and dividing.

The course ends by bringing in some ideas from geometry via the study of transformation groups. This includes the study of symmetries both "discrete" (as when a hexagon is rotated through 60°) and "continuous" (as when a circle or sphere is rotated through any angle).

MT212 Methods and Hydrodynamics

The 'methods' part is a continuation of the applied calculus in MT112. The hydrodynamics is a new area of Applied Mathematics which is developed from scratch.

The course in the first term is a continuation of the Methods course in MT112. It is an introduction to the partial differential equations of mathematical physics and to the area known as Vector Field theory. As such, it is an important course for students intending to study the more advanced courses on hydrodynamics, electromagnetism, elasticity and quantum mechanics.

The second-term course is an introduction to hydrodynamics. Starting with the simple observation that the motion of a fluid such as water or air should satisfy the laws of mechanics - for example, the conservation of momentum and energy - we eventually obtain partial differential equations which describe the motion. This enables us to discuss, in mathematical terms, such physical phenomena as the flow of water down a plug-hole or of air past an aircraft wing.

MT213 Mechanics and electromagnetism

The mechanics is a continuation of MT112, and the electromagnetism is another new area of Applied Mathematics developed from scratch.

This course begins where MT112 left off in Mechanics. The emphasis is on systems with several degrees of freedom. The student will learn to recognize how many degrees of freedom a given system has and how to recognize which of the general conservation laws help us to find the motion. Where these laws are insufficient, Lagrange's equations will be introduced (see MT112). An important application is to 'small oscillation theory'. where it is found that, for certain systems, there is a normal mode of oscillation corresponding to each degree of freedom. The method is then extended to study vibrating strings, which have an infinite number of normal modes. This is a 'bridging topic' of great importance, since it connects not only with mechanics, but also with partial differential equations (MT212), and with the theory of Fourier series, which is an important topic in Analysis.

In the latter part of the year, attention is transferred to electromagnetism. As in MT212 Hydrodynamics, the aim here is to begin with a description of the physical phenomena and then to abstract a set of partial differential equations, Maxwell's equations, which make that description more precise. A substantial number of lectures are devoted to the physical background of the theory, and there is no explicit dependence on, for example, physics at A level. The theory is developed far enough to treat the propagation of electro-
magnetic waves. More detailed questions, such as reflection and refraction of the waves, as well as the emission of waves by accelerated charged particles are dealt with in the third year course MT325.

MT217 Statistics

An introduction to the theory and practice of statistical inference. Includes practical work.

A knowledge of Probability and Statistics is important for many applications in Industry and Research and plays an increasing part in the study of Education. Up to seven courses may be included as part of the Honours B.Sc. in Mathematics, which altogether covers a major part of the material found in a B.Sc. in Statistics from other Universities. These courses form a basic training for entrance to higher degrees in Statistics, and students who subsequently take Actuarial Studies may gain exemption from some Statistics subjects. A combination of Statistics and Numerical Analysis courses is useful for a student interested in Operational Research.

The First year contains a short compulsory course in Probability (part of MT112). Further Honours courses are all optional. Of these two second year courses, MT217 is an introduction to Statistical Inference. This is the "experimental" side of the subject, and the course includes practical classes in which data are analyzed. MT227 develops the Probability Theory begun in MT112 processes which develop in time. Such topics as queues, storage and dam problems, epidemics and birth-and-death processes are discussed.

MT218 Mathematical Logic

An introduction to formal logic, set theory and the foundations of mathematics.

This course includes an introduction to propositional and predicate logic, set theory and the foundations of mathematics. It is concerned with developing tools with which to get fuller understanding of the general framework of modern mathematics. In particular, deductive reasoning and the axiomatic method will be examined, and it will be shown how mathematical notions and reasoning about them can be codified within an axiom system for set theory. This is a modern version of Russell and Whitehead's Principia Mathematica.

MT219 Numerical Analysis

This acquaints the Student with a number of methods in computational mathematics and with their theoretical basis. Practical work including an opportunity to try out the methods on one of the most powerful computing systems in the country.

In recent years, numerical analysis has become increasingly important in industrial and scientific applications, and this is the basic undergraduate course in that subject. It aims to acquaint the student with a number of methods in computational mathematics and their theoretical basis. The practical work is important, because correct choice of method may be crucial in the obtaining of an accurate numerical answer. The subject as a whole is an interesting bridge between Analysis and Applied Mathematics. It is hoped that students who take this course will benefit from its cross-disciplinary approach.

MT227 Stochastic Processes

Continues the Probability theory begun in MT112 to treat processes which develop in time. Such topics as queues, epidemics and birth-and-death processes are discussed.

Ordinary courses:

In all ordinary degree courses the students' coursework during the year is taken, together with examination results, as a significant part of his assessment.

MT200 Pure Mathematics

This consists mainly of another look at the material of MT110 and MT111.

MT201 Applied Mathematics

A continuation of MT112. Includes mechanics, partial differential equations, hydrodynamics and complex analysis.
MT207 Statistics
A parallel course with MT217, but a gentler treatment of the theory with more emphasis on practical work and applications.

MT209 Numerical Analysis
This has a similar relationship with MT219, again with an emphasis on practical work, and including computer programming.

Third Year Programme
In your third year you will be able, with help from your counsellor, to select your own programme from a very wide variety of courses. The Honours courses are all of one term duration - unlike in the first two years where they run the whole year. Students are normally advised to attend between eight and ten of these courses, but need offer only six for examination purposes.


By making a suitable selection of these courses and following them through successfully, you can be equipped, on graduation to pursue research in almost any area of mathematics.

There is also a scheme whereby you may elect to replace one course by a project or essay on a mathematical topic of your own choosing. This enables students to gain experience in discovering mathematics, and in sorting and collating material from several sources into a coherent exposition. Each student working on such a project does so under the supervision of a member of staff. The teaching staff also suggest each year a list of possible topics for projects.

For Ordinary degree students there are five courses, from which four are chosen by Mathematics students and two by students working for joint degrees. The courses offered in 1971-2 were
MT300 Pure Mathematics
MT301 Applied Mathematics
MT302 Control Theory and Linear Programming
MT307 Statistics
MT309 Numerical Analysis
As in the second year, it is possible for Honours students seeking a gentler programme to substitute some of these courses (MT302,307,309) for their Honours equivalents.

Examinations

You will have to take university examinations at the end of each academic year based on the work done during that year. A pass in the first year examination ('Preliminary' for Honours and 'First B.Sc.' for Ordinary) is necessary in order to qualify for admission to the second year. The second and third year examinations are both taken into account in assessing what class of degree to award you at the end.

There are also more informal examinations (known as 'Terminals') taken in January of the first year, and at the same time in the second year by Honours students. The purpose of these is to give you some experience of University examinations at an early stage. The results are also very useful to you and your counsellor in devising appropriate studying methods and making appropriate choices of courses.

During recent years, something like 80% of the students entering the Mathematics department have graduated three years later with Honours degrees and 15% with Ordinary degrees. It is extremely rare for a student to fail completely after staying the full three years, but inevitably there are a few who leave at some earlier stage.
General View of the Campus and the City

The Main Building from the Ramp

The Ramp
THE STUDENT IN MANCHESTER

We expect you to spend a good proportion of your time in Manchester studying mathematics and other disciplines, but we also expect you to partake of the cultural and recreational opportunities that stem from living in our city and belonging to our university.

It is true that Manchester can hardly be described as a physically beautiful city, though in recent years, as clearance schemes and rebuilding programmes have been carried out, the Coronation Street image has been becoming less appropriate. Most student flats, digs, and halls of residence are in the southern part of the city, an area that has relatively little industrial development and plenty of parks and trees. The huge Platt Fields park, containing a lake, gardens, a museum, a bowling green and playing fields, is about twenty minutes walk from the university. Just beyond it is Owens Park, the largest of the university's halls of residence, housing over a thousand students, and several other halls of residence are close by.

The campus itself is about one mile south of the city centre on both sides of Oxford Road. Most of the buildings are of modern design, and of these our own Mathematics Building is architecturally the most striking. Of the older buildings, the original quadrangle is a most impressive example of Victorian architecture, especially now that the stone has been restored to its original colour. The fact that the university lies on a main road close to the city centre seems to give those who study here a feeling of being in touch with the life of the city. This, perhaps, helps to combat the ivory tower impression, and the isolation, which a more secluded campus sometimes tends to foster.

The people of Manchester are friendly, even to non-Lancastrians, and the student community plays an active role in the life of the city. Many students spend a lot of their spare time in community projects organised by the Students' Union Community Action group, and almost everyone takes some part in the week of riotous good fun that is known as Rag Week, and takes place yearly in the Lent term. As well as being very enjoyable, this usually produces about £20,000 each year, and the money goes to local charities.

Another point of contact between local people and students in the city is a common interest in the fortunes of Manchester City and Manchester United football clubs, and an interest in either guarantees that you will almost never be stuck for a topic of conversation. Cricket at Old Trafford is another sporting attraction that is enthusiastically supported, and in recent years has been greatly livened-up by members of the city's immigrant population. Manchester's West Indian and Asian communities have had many beneficial effects on the city, not
least the many shops and restaurants selling non-European food. In general, Manchester is a good place for eating-out, and there are still some good restaurants that students can afford. In addition to the large number of Indian and Chinese restaurants, one can find Italian, Spanish, Armenian, French and even British restaurants.

For the person who likes to live in a city but escape into the countryside occasionally, Manchester has an ideal geographical position. At each of the four points of the compass, and within easy distance, lies some of England’s finest countryside. To the south lies the Derbyshire Peak district, and to the East this merges into the tough walking ground of the Pennine Way. Carrying on around to the North, the horizon disappears behind the haze of industrial Lancashire, but if you work your imagination hard you can visualise the hills of the Lake district beyond. Finally, to the West, beyond the docks (yes, Manchester is a port) and the Cheshire plain, lie the North Wales mountains. For the walker, hiker or mountaineer, it is an excellent centre.

Manchester has a long tradition of patronage of the arts, and the city has numerous museums, theatres and art galleries. The film enthusiast is also well catered for by the Manchester Film Theatre, and at least four other film societies, including two in the University. Besides performances by Manchester’s two famous orchestras, the Halle and the B.B.C. Northern, there are several regular series of chamber music, as well as frequent concerts and recitals arranged by the Manchester Royal College of Music, and the university. Folk and Jazz, and some poetry, flourish in the local pubs and clubs, and most of the big name bands of pop music have performed in the city (and sometimes in the University) in the past few years.

In general the pubs of Manchester tend to be rather featureless, but there are notable exceptions, some intimately connected with Manchester’s history. Two such are Jackson’s Boat, a one time Jacobite haunt by a footbridge over the River Mersey, and the old black and white Wellington Inn which is in the Shambles near the cathedral. This building has been considered of sufficient historic value to merit preserving in the middle of a massive city centre redevelopment. More organized entertainments, in the form of discotheques for example, abound in the city. Some of these have strong student connections.

The Students’ Union offers you your main opportunity to meet students from other parts of the university. Whether you prefer chatting in a coffee bar, mountaineering, decorating old peoples’ homes or playing tiddlywinks, the Union is the place to meet your fellow fanatics. It is run by students for students, and every Undergraduate is automatically a member. It organizes all manner of bar, catering, studying and sporting facilities, as well as many concerts and discothe-
ques. It represents student views and interests to the University, and, through the National Union of Students, to the government. If you have a mind to, you can become involved, through the Union, in all the great social and political issues, and the Welfare Section will help in many kinds of problems, such as finding accommodation or coping with bureaucracy, whether inside or outside the university.

We hope these notes will help to convince you that Manchester is a university and a city which can offer you not only enjoyment and excitement, but also education in the broadest and most valuable sense.