

2. Report of the Senate Committee on Timetable (See Appendix A)

In introducing the Report of the Timetable Committee, Professor Bonham stated that the purpose of the Committee had been to devise a uniform timetable method. He explained that it had not been a question of dictating views but rather of recognizing that paedagogical interests as presented by Faculties and Schools must be the overriding factors. He noted that in order to allow for any kind of class or laboratory that might be needed, the Report provided for a forty-five hour week and a three part academic day broken up into three blocks of three hours each to accommodate various patterns. He made a special point of the need for a central co-ordinating committee with a representative from each Faculty who would have sufficient authority to act on behalf of his Faculty.

He pointed out that the Report was divided into four distinct parts:

- (1) General recommendations covering the broad aspects of timetable preparation.
- (2) Recommendations concerning the procedure for establishing and revising timetables.
- (3) Recommendations with respect to the academic day.
- (4) Recommendation and discussion concerning timetable pattern.

On motion of Professor Basmajian, seconded by Professor Campling, it was agreed that the Report be accepted in principle and that portions that the Senate wished to discuss be discussed. The Senate then considered the Report section by section.

On motion of Professor Slater, seconded by Professor Gibson, it was agreed to accept Recommendation 1 (Pages 10-12).

On motion of Dean Brown, seconded by Dean Harrower, it was agreed to accept Recommendation 2 (Pages 12-15).

On motion of Professor Love, seconded by Dean Lederman, it was agreed to accept Recommendation 3 (Pages 15-17).

On motion of Professor Campling, seconded by Professor Stinson, it was agreed to accept Recommendation 4 (Pages 17-18).

On motion of Professor Basmajian, seconded by Dean Harrower, it was agreed that the Senate Timetable Committee be asked to serve as a co-ordinating Committee to supervise and guide the development and operation of a University-wide timetabling system. It was agreed further that the Chairman of the Senate in consultation with the Chairman of the Timetable Committee should be empowered to make changes in the membership of the Committee as circumstances may dictate.

The Chairman expressed on behalf of the Senate, appreciation of the distinguished work done by the Timetable Committee.



faculty staff meetings wherever possible.

(8) That all faculties and departments be urged to adopt a standard one hour class period for introductory courses. It would also be desirable if 1 1/2, 2 and 3 hour class sessions in advanced courses were re-examined with a view to minimizing non-standard class lengths wherever academically feasible. It seems that, in particular, many 1 1/2 hour class sessions were introduced to adjust to the cessation of Saturday classes rather than on purely pedagogical grounds. Such odd length periods are much more likely to conflict with other courses than are one hour class sessions. Also, a uniform class period of one hour would greatly aid the operation of most timetable systems. It hardly needs to be said that laboratory sessions are not intended to be affected by this proposal.

(9) That a five day academic week be adopted, thus excluding evening and Saturday classes from the general timetable - although in special cases evening and Saturday schedulings may be required.

Recommendations for Establishing and Revising Timetables

The following recommendations are intended to outline in broad terms the procedural pattern leading to the development of the actual timetable. No attempt is made to describe all of the particular steps involved in constructing a timetable. Rather the proposals put forward in this part of the report should be considered more in the nature of guidelines than detailed procedural operations. Nevertheless the committee feels that these recommendations are sufficiently specific to include the most important points and that, as such, they represent a functional approach to the problem.

(1) It is contemplated that the timetable, once properly established, would be carried forward from year to year with changes being made only as indicated by circumstances.

*From Report of the Joint Timetable Committee  
Approved by Senate - Mail, 1967*



*Senate Office*

QUEEN'S UNIVERSITY

Report of the Senate Timetable Committee

April 1967

Members

Prof. D.H. Bonham - Faculty of Law (Chairman)  
Mr. R.F. Browne - Faculty of Applied Science  
Dr. J.B. Firstbrook - Faculty of Medicine  
Prof. C.A. Lawrence - School of Business  
Prof. J. Whitley - Faculty of Arts and Science

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	University of Alberta	
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Part I - INTRODUCTION

On November 25, 1966 the Senate of Queen's University established the Senate Timetable Committee to examine matters relating to the university timetable generally. The committee's terms of reference were not spelled out in any detail and as a result it was felt that the only safe course was to take a very broad perspective. Accordingly the report which follows, deals with as many aspects of the subject as appeared to the committee to be at all relevant. It is hoped that there are no important omissions.

Perhaps it might be noted at the outset that to some extent changes in timetable methods and format may not always occur as easily as might be expected. By its very nature, the timetable directly affects the day to day existence of every faculty member and hence considerations related to academic freedom, departmental and faculty autonomy or human emotions sometimes cloud the real issues. [In carrying out this study the individual committee members endeavoured to divorce themselves from parochial bias as far as possible in favour of a broader approach. All one can ask of those who have the responsibility of acting in relation to this report is that they adopt a similar attitude. In this way change will not be resisted merely because it is change and the best interests of the university as a whole may be served.

The committee has been conscious of the need to keep its report brief enough to be manageable and yet not so condensed as to be too deficient. It should therefore be emphasized that much more could usefully be said on the subject of timetabling than appears within these pages. Nevertheless it is hoped that what follows is complete enough to lead to constructive deliberation and to produce worthwhile results.

The committee wishes to thank those persons who provided information or assisted in other ways. A particular acknowledgment is owed to Mr. D.T. Arkett of the Faculty of Arts and Science for supplying valuable data and for contributing substantially in other respects.

## Part II - REVIEW OF THE PRESENT SITUATION

Undoubtedly any critical examination of University-wide timetabling policies and procedures must begin with a general understanding of the particular problems and circumstances which relate to individual faculties and to the various departments within them. In this regard the committee was able to utilize the knowledge and experience of its own members, representing Arts and Science, Applied Science, Business, Medicine and Law. Further, every department within the University was invited to communicate with the committee for the purpose of outlining its own difficulties and to provide an opportunity for expressing attitudes and opinions. The response to this invitation was quite favourable, thus providing a substantial volume of useful information. In spite of the limitations of time, the committee feels that it has gained sufficient familiarity with the present situation from these sources to enable it to render a meaningful report.

Space will not permit a comprehensive summary of all the various timetabling problems and factors which were considered by the committee. Nevertheless the following points which are characteristics of the current situation, seem significant enough to merit mention:

(1) Non uniform length of class period. Although the most common pattern is a fifty minute session two or three times a week, there are many courses which call for 1 1/2, 2 or 3 hour sessions. Various faculties and departments such as English, Geography, History, School of Business, Computing Science and Applied Science offer such courses. Many of these "non-standard" length courses affect only upper year, honours or graduate students where, because of restricted enrolment, timetabling ramifications may not be too serious. However, in other circumstances, scheduling difficulties may be significant.

In order to illustrate the magnitude of this problem, Tables I and II are included below:

Table I

Faculty of Arts & Science  
1966-7

(Undergraduates  
and Graduates)

Department	Number of Lecture and Seminar Classes of Different Lengths							
	1x1	2x1	2x1+*	3x1	2x1 1/2	1x2	1x3	HTBA
Anatomy		1		1				3
Art History				2	2	1		
Biochemistry	1			2				1
Biology	1	17				1	1	
Chemistry				18				
Classics	1			12			1	2
Commerce				10	7			
Comp. Science		3			1			
Drama				1	3			
Economics			1*	18	6			
English	4		11*	16	24	2		
French	1	13		26	6			
Geography		12		2			3**	
Geology		11***		1				
German		1		7	5	2		
Hebrew				2				
History	1		1*	11	9		11	
Mathematics		6		34				
Music				2	2	1		
Philosophy				14	7	1		
Physics		5		13				
Physiology		2						
Politics			2*	5	15	1	2	2
Psychology	1	5		4	2			
Religion					3			
Russian				2	6			
Spanish				12	3			
Total (462)	10	76	15*	215	111	9	18	8
%	2.2	16.4	3.2	46.5	24.0	1.9	4.0	1.8

\*plus tutorials    \*\*held in evening    \*\*\*2-one term classes equals 1 class

Table II Faculty of Arts & Science & School of Business  
1966-7

Some additional Graduate Classes

Department	Number of Lecture and Seminar Classes of Different Lengths							
	1x1	2x1	2x1+*	3x1	2x1 1/2	1x2	1x3	HTBA
School of Business		1			18			
Economics					11	1	1	
English						9		
Mathematics		2		3	5	2		
Politics	1	5			4	1	8	
Total (72)	1	8	---	3	38	13	9	---
Grand Total (534) Tables I and II	11	84	15*	218	149	22	27	8
%	2.0	16.0	2.9	40.8	27.9	4.0	5.0	1.4

Notes:

- (1) Information is not available for the graduate courses in Chemistry, Geology, History, Philosophy, Physics, and Psychology.
- (2) Information for the Faculties of Applied Science, Law Medicine and the School of Nursing is not included.
- (3) Information for the School of Physical and Health Education is not included.

(2) Dislike for non "prime" teaching hours. Most faculties are adverse to Saturday classes. Also there appears to be a general feeling against 8:00 a.m. teaching commitments, which feeling is perhaps slightly more intense than the antipathy shown towards late afternoon or evening sessions. The possibility of noon hour classes seems to provoke less unfavourable comment.

A classroom utilization study undertaken by Mr D.T. Arkett showed the following results for 1966-67:

% of Classroom Utilization

	<u>M.W.F.</u>	<u>T.Th.</u>	<u>Overall</u>
A.M. (8:00 to 12:00)	65%	61%	64%
P.M. (1:00 to 5:00)	38%	31%	<u>35%</u>
Average % of Space Utilization			<u>50%</u>

Note - These statistics, referring only to room utilization, give no information as to seat utilization within the rooms involved.

The above figures, being general averages, do not reveal the space utilization situation in any particular department or section of the university. Also, while the foregoing data do not isolate the degree of utilization during prime time hours, the information presented to the committee indicated that there was little idle space except at the beginning and end of the day. For instance Table III (presented below) shows that only twenty-five percent of available class and seminar rooms were occupied during the 8-9 a.m. period. The inescapable conclusion seems to be that, in general, Queen's University has sufficient classroom facilities for its present needs (without scheduling Saturday classes) if the less popular hours of the day were used to a greater extent. The question of laboratory facilities is another matter however.

Table III

Survey of 8-9 o'clock Classes in 79 Lecture Rooms and 25 Seminar Rooms (1966-67)

(a)

Department or Faculty	8-9 o'clock Periods	
	No. Used	% of Total No. Used
Mathematics	43	33.0
All Applied Science	17	13.0
Political Studies	13	10.0
Physics	11	8.5
Chemistry	10	7.7
All Medicine	7	5.4
School of Business	7.5	5.8
Biology	6	4.6
Geology	4	3.1
Geography	4	3.1
Economics	3	2.3
German	2	1.5
French	1	0.8
Psychology	1	0.8
English	0.5	0.4
Total	130	100.0

Math. & Natural Sciences	74	57.0
Social Sciences	21	16.0
Humanities & Languages	3.5	2.7
Applied Science	17	13.1
Medicine	7	5.4
School of Business	7.5	5.8
	130	100.0

% of possible 8-9 o'clock periods taught =  $\frac{130}{104 \times 5} \times 100 = 25\%$

(3) Lack of a central co-ordinating body. At the present time there is no central agency designed to co-ordinate timetable efforts at the inter-faculty level. Nor is there any defined method of determining timetable priorities or of prescribing procedures for setting timetables and allocating space. The present approach is best described as a "patch" system where new classes and sections of existing classes are merely added wherever they can be fitted in. Classes which happen to fall at unpopular hours may suffer for that reason alone. As the university becomes larger and more complex and as inter-faculty courses increase in number, the lack of a centralized timetabling body may reasonably be expected to cause much more difficulty than has been the case in the past.

(4) Timetable conflicts restrict the number of courses available to students. There is substantial evidence that timetable conflicts significantly limit the number of elective courses that are available to students. Obviously no system can eliminate all such conflicts but every effort should be made to control their number. This difficulty is particularly evident with respect to the humanities and social science electives for applied science students. Some of the specific effects of this problem in the Faculty of Arts and Science are mentioned later in this report under the heading "Recommendation and Discussion Concerning Timetable Pattern."

(5) Miscellaneous

(a) Since the cessation of Saturday classes the natural pattern of MWF and TTS sequences has not been possible. When this factor is combined with the growing importance of 1 1/2, 2 and 3 hour class sessions, the chances of achieving what might be referred to as a "neat" timetable system are greatly reduced.

(b) Not all physical facilities can or will be utilized all of the time. For example, various laboratories require set-up time before use. Also, some rooms are deliberately left unscheduled at various times so that they will be available for student or departmental purposes. The difficulty in obtaining suitable demonstrators and student assistants at certain hours may interfere further with the unlimited scheduling of some facilities

(c) Various faculties attempt to give staff members at least one day per week free from classes in order to facilitate uninterrupted research and other pursuits. In some circumstances these arrangements are quite firm and specify a particular day on which no classes are to be scheduled for the faculty member involved. In addition, some departments take the view that blocks of non-class time are important insofar as students are concerned.



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Use includes faculty - define

(c) provision for the selection of the maximum number of optional and major-related courses

(5) Although it is technically possible to separate timetabling functions from space allocation and control, such a division is not recommended on practical grounds. Therefore "timetabling" as used in this report will be taken to cover all aspects of the subject, including the allocation of classroom and laboratory facilities.

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(6) It is assumed that classroom and other facilities which were acquired for, or that normally are associated with, any particular department or faculty will always be primarily available for the department or faculty in question. Consequently, while other faculties and departments may be able to use such facilities, they may do so only to the extent of any excess after the proper space requirements of the prime user have been fully met.

(7) Although the committee is not venturing any opinion on the desirability of converting to a semester system, it is the committee's belief that most of the recommendations which follow are compatible with both term length and session length courses.

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(8) ~~It almost goes without saying that any timetable system may eventually become outmoded and require change.~~ Although the committee has attempted to consider long run implications as much as possible, periodic review and revision of the entire system will continue to be necessary if efficiency is to be maximized.

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#### Part IV - RECOMMENDATIONS

In view of the diverse range of problems considered by the committee it seemed advisable to divide this part of this report into four distinct sections, namely:

- (1) General recommendations covering the broad aspects of timetable preparation.
- (2) Recommendations concerning the procedure for establishing and revising timetables.
- (3) Recommendations with respect to the academic day.
- (4) Recommendation and discussion concerning timetable pattern.

The committee is of the opinion that these four areas, as they are presented, are largely independent of each other and therefore the rejection or modification of the recommendations in any particular area would not necessarily affect the validity of the proposals in other categories, except that the recommendation in section 4 presupposes the acceptance of the proposals contained in section 3.

##### (1) General Recommendations

After due consideration, the committee recommends that the following points be adopted in principle and acted upon as indicated, regardless of the decisions which might be made concerning the procedural aspects of setting the timetable or the specific form which the academic day or the timetable might take:

(1) That the present situation at Queen's University is such that measures to improve and co-ordinate timetabling should be initiated without unnecessary delay and preferably in time for the preparation of the 1967-68 timetable.

(2) That a central co-ordinating committee be established to supervise and guide the development and operation of a university-wide timetabling system. It is contemplated that each faculty would appoint one member to this committee, who presumably would have sufficient authority to act on behalf of his faculty. Quite obviously, inter-faculty relations depend basically on mutual understanding and co-operation and this committee would be established to foster that attitude. Consequently it is not suggested that the committee have any power to adjudicate in the

rare case of inter-faculty conflict. The Senate, being the supreme body in academic matters, might be called upon to resolve such inter-faculty deadlocks in the unlikely event that they might occur. However this central co-ordinating committee could play a very useful role in preventing conflicts of this type from arising. The particular functions of the central co-ordinating committee would depend to some degree upon the procedures adopted to construct and operate a timetable -- which procedures will be briefly considered later in this report. But regardless of the specific procedures relating to the timetable system itself, it is recommended that, in view of the importance of promoting inter-faculty co-ordination, such a central committee is desirable under any circumstances. Also, it might be mentioned that if this committee is to be an active force in timetabling matters, substantial time and effort will likely be involved on the part of committee members. Whether or not a permanent employee may be required at some point in time in connection with the committee's work is another question. At present it should be sufficient merely to caution against underestimating the volume of work which such a central committee might be called upon to handle.

(3) That the current system of appointing departmental timetable consultants be continued. It is assumed that the persons so designated will have power to make decisions affecting their departments and that they will act as the main channel of communication between their respective departments and the rest of the university.

(4) That in spite of faculty curricular differences, a uniform timetable plan is not only feasible but desirable. Undoubtedly there may be some exceptions to the normal timetable pattern but it is submitted that the same general timetable framework, if properly devised, can adequately serve the needs of all faculties concurrently and contribute substantially to the general benefit of the university in so doing.

(5) That each faculty be requested to maintain accurate records covering the utilization and availability of all classroom, seminar and laboratory space within its jurisdiction regardless of whether or not any of these facilities are normally used by more than one faculty or department. As the university expands, it may become advisable to institute a central registry of all such space on the campus, but under current conditions the committee feels that a central record is not necessary.

(6) That it is desirable to use the computer wherever possible to assist in the construction of timetables. At the present time the computer does no more than print and store the timetable, however in the future its role may be enlarged to include the scheduling function itself.

(7) That the timetable system be designed to provide a free time during the week to facilitate departmental and faculty staff meetings wherever possible.

(8) That all faculties and departments be urged to adopt a standard one hour class period for introductory courses. It would also be desirable if 1 1/2, 2 and 3 hour class sessions in advanced courses were re-examined with a view to minimizing non-standard class lengths wherever academically feasible. It seems that, in particular, many 1 1/2 hour class sessions were introduced to adjust to the cessation of Saturday classes rather than on purely pedagogical grounds. Such odd length periods are much more likely to conflict with other courses than are one hour class sessions. Also, a uniform class period of one hour would greatly aid the operation of most timetable systems. It hardly needs to be said that laboratory sessions are not intended to be affected by this proposal.

(9) That a five day academic week be adopted, thus excluding evening and Saturday classes from the general timetable - although in special cases evening and Saturday schedulings may be required.

(2) Recommendations for Establishing and Revising Timetables

The following recommendations are intended to outline in broad terms the procedural pattern leading to the development of the actual timetable. No attempt is made to describe all of the particular steps involved in constructing a timetable. Rather the proposals put forward in this part of the report should be considered more in the nature of guidelines than detailed procedural operations. Nevertheless the committee feels that these recommendations are sufficiently specific to include the most important points and that, as such, they represent a functional approach to the problem.

(1) It is contemplated that the timetable, once properly established, would be carried forward from year to year with changes being made only as indicated by circumstances.

(2) A classification system should be established to define course categories within the timetable system. It is recommended that the following system be adopted:

<u>Category</u>	<u>Given by Faculty</u>	<u>Taken by Faculty</u>	<u>Given by Department</u>	<u>Taken by Department</u>
1. (classes over 60)	A	A, B, C		
2. (classes under 60)	A	A, B, C		
3.	A	B or C		
4.	A	A	P	P, Q, R
5.	A	A	P	Q or R
6.	A	A	P	P

In general, the timetable ramifications of courses in category 1 will be greater than those of any other group because category 1 courses affect the greatest number of faculties and require the largest rooms. At the other extreme, category 6 courses, being restricted to a particular department, should have relatively little effect on a university-wide timetable system. For that reason, the central co-ordinating committee (see general recommendation number 2) will be predominantly interested in categories 1 to 5 only (in roughly that order of importance) although category 6 courses will have some bearing on classroom allocations. It might also be observed that some significant sections of the university would fall into category 6. For example, virtually the entire Faculty of Law, the graduate section of the School of Business and much of the Faculty of Medicine would be so classified.

(3) Early in the spring term each department, through its timetable consultant, would be requested to communicate with the central co-ordinating committee indicating the courses in categories 1 to 5 planned by the department for the coming academic year. This information would include estimates of the number of sections and enrolment in each together with any other particulars which might affect scheduling and room allocation. The central co-ordinating committee would devise special forms suitable for this purpose.

(4) On the basis of these departmental estimates, the central co-ordinating committee would begin construction of the

new timetable (using the previous timetable as a guide) by scheduling courses in categories 1 to 5 in that general order of priority. At this stage the central co-ordinating committee would be particularly concerned with course conflicts in an effort to make the timetable as flexible as possible. The committee would also make tentative allocations of classroom space, bearing in mind the priorities of individual departments, particularly in relation to category 6 courses. Ideally this whole process would lead to the completion of a draft skeletal timetable sometime in March of each year.

(5) The draft skeletal timetable would be distributed to all departmental consultants for the purpose of allowing each department to insert its category 6 courses. As has been previously indicated, it is assumed that each department which has classrooms or other facilities normally associated with it will be considered as the prime user of such space and thus will have priority with respect to these facilities. At this point each such prime user department would signify its intended use of its own facilities by allocating them to its category 6 courses on the timetable. Insofar as possible, category 6 courses should be scheduled so as not to interfere with the general timetable pattern of the university as a whole. (A recommendation concerning timetable pattern appears later in this report.) If such interference becomes significant, the scheduling of other classes will be adversely affected thus decreasing room utilization.

(6) Minor problems may arise at this stage in relation to both class scheduling and room allocations which may require action on the part of the central co-ordinating committee. Following the previous step, that committee can proceed to allocate free classroom space (beyond the needs of prime users) to other courses as required. Such allocations may be altered later if the anticipated needs of the prime user change.

(7) It is important that all of these steps be completed as promptly as possible each year so that the final version of the timetable (aside from changes required on registration) may be ready by about May 1. Past experience has shown that it becomes much more difficult to establish a timetable after the spring examination period because many faculty members who should be consulted are not available. In addition, early timetable preparation facilitates student course planning, aids pre-registration where this is desired, and may allow the timetable itself to appear or be referred to in the calendar.

In summary, these recommendations are put forward on the basis that they are reasonable and workable and that they

embody the principle of central timetable co-ordination without unduly encroaching on faculty or departmental autonomy.

(3) Recommendations With Respect to the Academic Day

(1) In view of the fact that both Saturday and evening classes are generally unpopular and because it is necessary to achieve a satisfactory degree of classroom utilization, it is recommended that Queen's University operate on a continuous nine hour academic day. Thus the weekly number of hours available within the normal timetable would be forty-five. This proposal does not contemplate a fixed general lunch break.

With the exception of the representative of the chemistry department, no one in the university who expressed a view seemed to be adamantly opposed to classes being held during the noon period. One should also note that if this recommendation is implemented, it does not necessarily follow that every department would be required to offer courses throughout the noon hour. The proposal really means only that no part of the nine hour academic day should be unavailable for class scheduling if required.

Although the committee was concerned with the effect which its proposals might have on student affairs, for various reasons no approach was made directly to student groups. However an informal contact with the Arts and Science Society was made through Prof. J.A.W. Gunn of the Dept. of Political Studies. Student opinion, as indicated by this source, was not opposed to the scheduling of classes throughout the noon hour except insofar as men's inter-mural team sports might be affected. There was some suggestion that this reaction might be related to the broader problem of the reduction of athletic facilities at Queen's University. Apparently the possible adverse effect which noon classes could produce on student clubs and organizations did not appear to be regarded as a significant problem. Whether other students would take the same view is not known at the date of writing this report. However the committee believes that academic considerations must be given paramount status and that these considerations tend to favour scheduling classes over the noon period.

(2) It is recommended that the academic day begin at 8:30 a.m. and terminate at 5:30 p.m. In reaching this conclusion the committee considered the following possibilities:

- (a) 8:00 a.m. to 5:00 p.m.
- (b) 8:30 a.m. to 5:30 p.m.
- (c) 9:00 a.m. to 6:00 p.m.

Because of the general dislike of 8:00 a.m. classes and because various laboratory facilities require set-up time prior to use, an 8:00 a.m. starting time does not seem particularly desirable. The committee was also influenced by the probability that as the university grows it will become increasingly more difficult to avoid scheduling classes during the first hour of the day. Therefore it seems virtually inevitable that, unless a change is made, more and more classes must be offered at 8:00 a.m.

Commencing the academic day at 9:00 a.m. extends the afternoon unduly. Because of a general dislike for late afternoon classes it was felt that a 6:00 p.m. closing hour was too late to be acceptable. Therefore an academic day from 8:30 a.m. to 5:30 p.m. seems to be the most satisfactory possibility under the circumstances and is proposed on that basis. The committee further recommends that hour-length classes begin on the half-hour and end at twenty minutes after the hour.

In relation to the question of selecting the most appropriate starting and closing times, some feeling was expressed that if classes commenced on the half-hour added confusion would result. However, the committee does not believe that that possibility constitutes a significant potential problem. Of more importance might be the matter of student accessibility to lunch facilities in university residences and in the students' union if classes were to end at twenty minutes after the hour. At the present time student residences serve noon meals from 11:35 a.m. to 1:20 p.m. While some inconvenience may result by changing residence meal hours, the committee is firmly of the opinion that any such inconvenience is not sufficiently significant to impede the adoption of an 8:30 a.m. starting time. In order that students be given an adequate opportunity to obtain lunch, it is recommended that university residences and the students' union serve noon meals from 11:45 to 1:45 each day, thus providing access for students finishing classes at 11:20, 12:20 or 1:20 as the case might be.

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(3) It is further recommended that the nine hour academic day be divided into three blocks of three hours each as follows:

- (a) Morning block                      8:30 a.m. to 11:20 a.m.
- (b) Mid-day block                      11:30 a.m. to 2:20 p.m.
- (c) Afternoon block                    2:30 p.m. to 5:20 p.m.

The significance of those divisions lies largely in the related proposal that any single course, seminar or laboratory be strictly confined to any one of these time blocks. Hence a course scheduled in the morning block, for example, could not

conceivably conflict with anything offered in the mid-day or afternoon blocks. This feature seems to the committee to be a simple but effective way of reducing course conflicts and hence of increasing timetable flexibility. Therefore the committee urges as strongly as possible that the three-part day be adopted as a general feature of the timetable structure. A further advantage can be gained if most laboratory periods are scheduled in the morning and afternoon time blocks. If this is done, those courses which are scheduled in the mid-day block would be generally available to students taking laboratory courses. Not only should the three-part day make a greater selection of courses open to students but it should lead to more efficient use of laboratory facilities. Laboratory periods for courses offered in the morning block could be scheduled in the afternoon block and vice versa. In order to accommodate all students in laboratories it may be advisable to schedule different sections of the same course in each of the morning and afternoon time blocks, with the laboratory session attached to each course appearing in the opposite time block.

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(4) Recommendation and Discussion Concerning Timetable Pattern

The question of timetable pattern provoked more discussion and became more contentious than did any other topic considered by the committee. As a consequence of its deliberations on this subject the committee is well aware of the difficulties of devising a common timetable format which might be suitable for all faculties. Nevertheless the committee wishes to reaffirm the principle presented as general recommendation number 4, namely that a uniform timetable plan is both possible and desirable, at least for most segments of the university.

The committee recommends that a timetable pattern, referred to as "The Queen's University Uniform Slot System", be adopted beginning in the academic year 1967-68. Because of the rather complex nature of this proposed system, it was felt that a fairly complete review of the problems and the recommendation was warranted. Hopefully the following comments will outline adequately the major features of the system and clarify the considerations which led the committee to make the above recommendation.

An analysis of the 1966-67 timetable of the Faculty of Arts and Science is presented as a basis for illustrating the shortcomings of the existing situation. The major reasons for restricting the analysis in this way are:

1. The Faculty of Arts and Science is by far the largest faculty at Queen's University and offers the widest variety of courses.

2. There is some discernible pattern to class times in this faculty which is not so evident in some other faculties, particularly in the Faculty of Applied Science.
3. The structure of this timetable has traditionally been a major factor in determining the structure of other faculty timetables.
4. Many courses offered by departments in this faculty must be made available to students in other faculties..

In order to show what the 1966-67 timetable "looks like", the committee is persuaded that a graphical analysis is necessary. It is futile to present the timetable as published for perusal since it merely represents a lexicographic ordering by departments of courses offered and their class hours. The timetable is based on:

1. A 5 1/2 day week with 49 teaching hours;
2. A 9 hour day on weekdays with 4 hours on Saturday morning;
3. The principle that, where possible, each meeting of a class should be at the same hour of the day.

The underlying structure of this timetable is displayed in Table A.

Table A

Standard Time Slots for 1966-67 timetable

13 slots of 3x1 type

Part 1

	<i>Mon.</i>	<i>Tue.</i>	<i>Wed.</i>	<i>Thu.</i>	<i>Frid.</i>	<i>Sat.</i>
8.00 to 9.00	1	11	1	11	1	11
9.00 to 10.00	2	12	2	12	2	12
10.00 to 11.00	3	13	3	13	3	13
11.00 to 12.00	4	14	4	14	4	14
12.00 to 1.00	5		5		5	
1.00 to 2.00	6		6		6	
2.00 to 3.00	7		7		7	
3.00 to 4.00	8		8		8	
4.00 to 5.00	9		9		9	

Table A

Part II

44 slots of 2x1 type.

	<i>Mon.</i>	<i>Tue.</i>	<i>Wed.</i>	<i>Thu.</i>	<i>Fri.</i>	<i>Sat.</i>
<i>8.00 to</i>	21	51	21	51	31	61
<i>9.00</i>	41	71	31	61	41	71
<i>9.00 to</i>	22	52	22	52	32	62
<i>10.00</i>	42	72	32	62	42	72
<i>10.00 to</i>	23	53	23	53	33	63
<i>11.00</i>	43	73	33	63	43	73
<i>11.00 to</i>	24	54	24	54	34	64
<i>12.00</i>	44	74	34	64	44	74
<i>12.00 to</i>	25	55	25	55	35	
<i>1.00</i>	45		35		45	
<i>1.00 to</i>	26	56	26	56	36	
<i>2.00</i>	46		36		46	
<i>2.00 to</i>	27	57	27	57	37	
<i>3.00</i>	47		37		47	
<i>3.00 to</i>	28	58	28	58	38	
<i>4.00</i>	48		38		48	
<i>4.00 to</i>	29	59	29	59	39	
<i>5.00</i>	49		39		49	

Part III

30 slots of 2x1 1/2 type

	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
8:00 to 9:30	112	412	112	412	312	512
9:30 to 11:00	212	512	312	612	212	612
11:00 to 12:30	123	423	123	423	323	523
12:30 to 1:00	223	523	323	623	223	623
1:00 to 2:30	145	445	145	445	345	545
2:30 to 4:00	245	545	345	645	245	645
4:00 to 5:30	167	467	167	467	367	
5:30 to 6:00	267		367		267	
6:00 to 7:30	178	478	178	478	378	
7:30 to 8:00	278		378		278	
8:00 to 9:30	190	490	190	490	390	
9:30 to 11:00	290		390		290	

While there appears to be a very large number of standard slots available in this system, it should be noted that if a student attends a class scheduled in one of the 87 standard slots he cannot attend classes given in any other slot with which this slot conflicts. The following examples are given to illustrate the effect of this constraint on the timetable.

Example #1

Any student enrolled in Biochemistry 310 which meets MWF at 10:00 a.m. cannot take a course scheduled in any of slots 23, 33, 43, 123, 223, 323.

Example #2

Any student enrolled in Geography 310 which meets MW at 10:00 a.m. cannot take a course scheduled in any of slots 3, 33, 43, 123, 223, 323.

Examples #1 and #2 show that in terms of conflicts a standard 2x1 slot has as much effect as a 3x1 slot.

Example #3

Any student enrolled in Politics 454 which meets MW at 9:30 a.m. for 1 1/2 hours cannot take a course scheduled in any of slots 2, 3, 22, 23, 32, 33, 42, 43, 223, 323.

A 2x1 1/2 slot conflicts with  
2 of 3x1 type  
6 of 2x1 type  
2 of 2x1 1/2 type

Example #4

Any student enrolled in History 322 which meets W at 9:00 a.m. for 3 hours cannot take a course scheduled in any of slots 2, 3, 4, 22, 23, 24, 32, 33, 34, 112, 123, 145, 312, 323, 345.

A 1x3 type class or laboratory conflicts with  
3 of 3x1 type  
6 of 2x1 type  
6 of 2x1 1/2 type

Example #5

Any student enrolled in History 214 which meets W at 2:00 p.m. for 3 hours cannot take a course scheduled in any of the slots 7, 8, 9, 27, 28, 29, 37, 38, 39, 167, 178, 190, 367, 378, 390. All of the standard 3x1 afternoon slots have been eliminated and only a limited selection of 2x1 and 2x1 1/2 slots are open to him. If he enrolls in English 215 which meets TT at 2:30 p.m. for 1 1/2 hours then he eliminates slots 57 and 58. In 1966-67 in the remaining slots only twenty courses were scheduled:

1 course in slot 59  
12 courses in slot 467  
7 courses in slot 490

Thus a student enrolled in History 214 and English 215 in 1966-67 could take no classes on either Monday afternoon or Friday afternoon. He had a very limited selection of courses available to him on Tuesday afternoon and Thursday afternoon. If he selected a course in slot 467 this produced additional conflicts with slots 6 and 56. Of the 20 courses offered only English 245 in slot 467 and English 225 or Drama 211 in slot 490 are likely to be taken by such a student.

Example #6

Any student enrolled in English 220 which meets TTF at 9:00 a.m. cannot take a course scheduled in any of the slots 2, 12, 32, 42, 52, 62, 72, 212, 223, 312, 323, 412, 423, 512, 523, 612, 623. This TTF pattern is by far the commonest irregular pattern in use and clearly reflects a reluctance on the part of some departments to teach on Saturday morning. Were this course given TTS at 9:00 a.m. in slot 12 it would conflict only with slots 52, 62, 72, 412, 423, 512, 523, 612, 623. As it stands this TTF at 9:00 a.m. conflicts with

2 of 3x1 type  
5 of 2x1 type  
10 of 2x1 1/2 type

Example #7

A typical student in a B.Sc. programme has at least two laboratory periods per week of two or three hours duration. If his laboratories are scheduled on two of Monday, Wednesday or Friday afternoons he has only a very limited selection of afternoon classes open to him. If his laboratories fall on one of Monday, Wednesday or Friday afternoons together with one of Tuesday or Thursday afternoons then there are no afternoon courses offered in 1966-67 open to him. With very few exceptions laboratories for students in the Faculty of Arts and Science are scheduled in the afternoons. As a result, most laboratory periods, administered by departments in the Faculty of Arts and Science, for students of other faculties, have to be scheduled in the mornings. Lectures and seminar classes available to Faculty of Arts and Science B.Sc. students are concentrated in the morning block with a few in the noon block. As a result of the constraints described above the majority of these courses are not available to students in the Faculty of Applied Science. If a Faculty of Applied Science student has a laboratory on Wednesday morning from 9:00 a.m. to 12:00 noon then this laboratory is in conflict with 178 classes of the 462 offered in 1966-67 by the Faculty of Arts and Science. If he also has a laboratory on Thursday morning then his two laboratories conflict with 273 classes.

These seven examples illustrate some of the natural constraints inherent in the 1966-67 timetable system. There are other constraints, not attributable to the system itself, which play a significant role in the utilization of the timetable.

1. Certain slots have come to be regarded as desirable while others are strongly disliked. It is commonly believed that it is unsound from a pedagogical viewpoint to schedule a class to meet two or three times a week at 8:00 a.m., 12:00 noon or 4:00 p.m. This restricts the utilization of slots 1, 5, 9, 11, 21, 25, 29, 31, 35, 39, 41, 45, 49, 51, 55, 59, 61, 71, 112, 190, 212, 290, 312, 390, 412, 490. 512. 612

2. Saturday morning classes are not popular and by a decision of the Faculty Board should not be held in the Faculty of Arts and Science. This restricts the utilization of slots 11, 12, 13, 14, 61, 62, 63, 64, 71, 72, 73, 74, 512, 523, 545, 612, 623, 645.

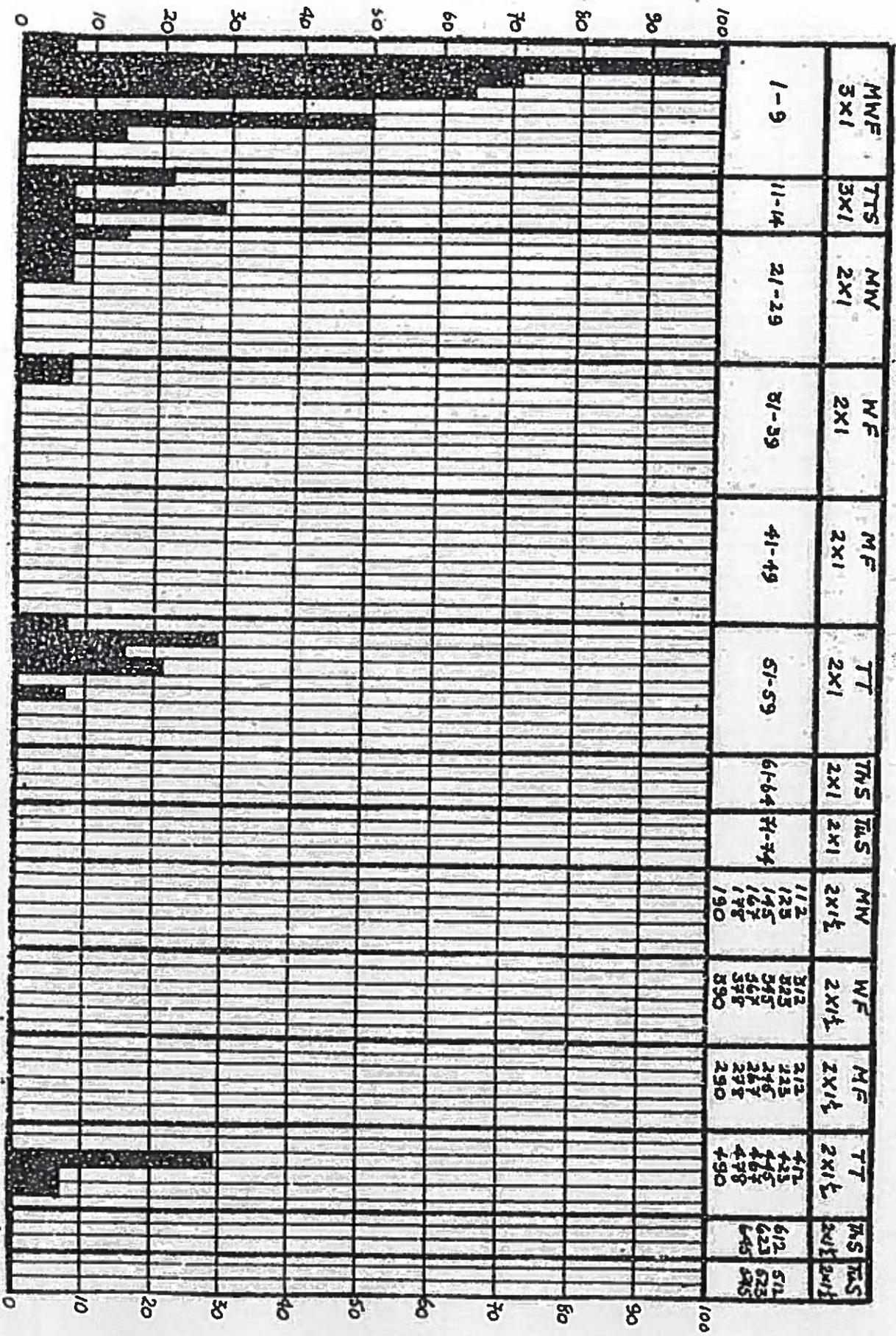
*Principles  
of  
TT*

It is not surprising then, in view of these and other less important constraints, that there is a non-uniform utilization of time slots and of available time. Slot utilization and time utilization for each 1/2 hour of the week are given in Tables B, C, D and E below.

Relatively few courses in the Standard First Year Programmes use the 2x1 or 2x1 1/2 type of slot. With this in mind, it is obvious that Tables B and C are almost isomorphic, as are Tables D and E. This means that the "shape" of the whole timetable can be seen if the "shape" of the Standard First Year Programmes is known. It is interesting to notice in Table E that classes scheduled in irregular patterns tend to accentuate peaks rather than fill in hollows.

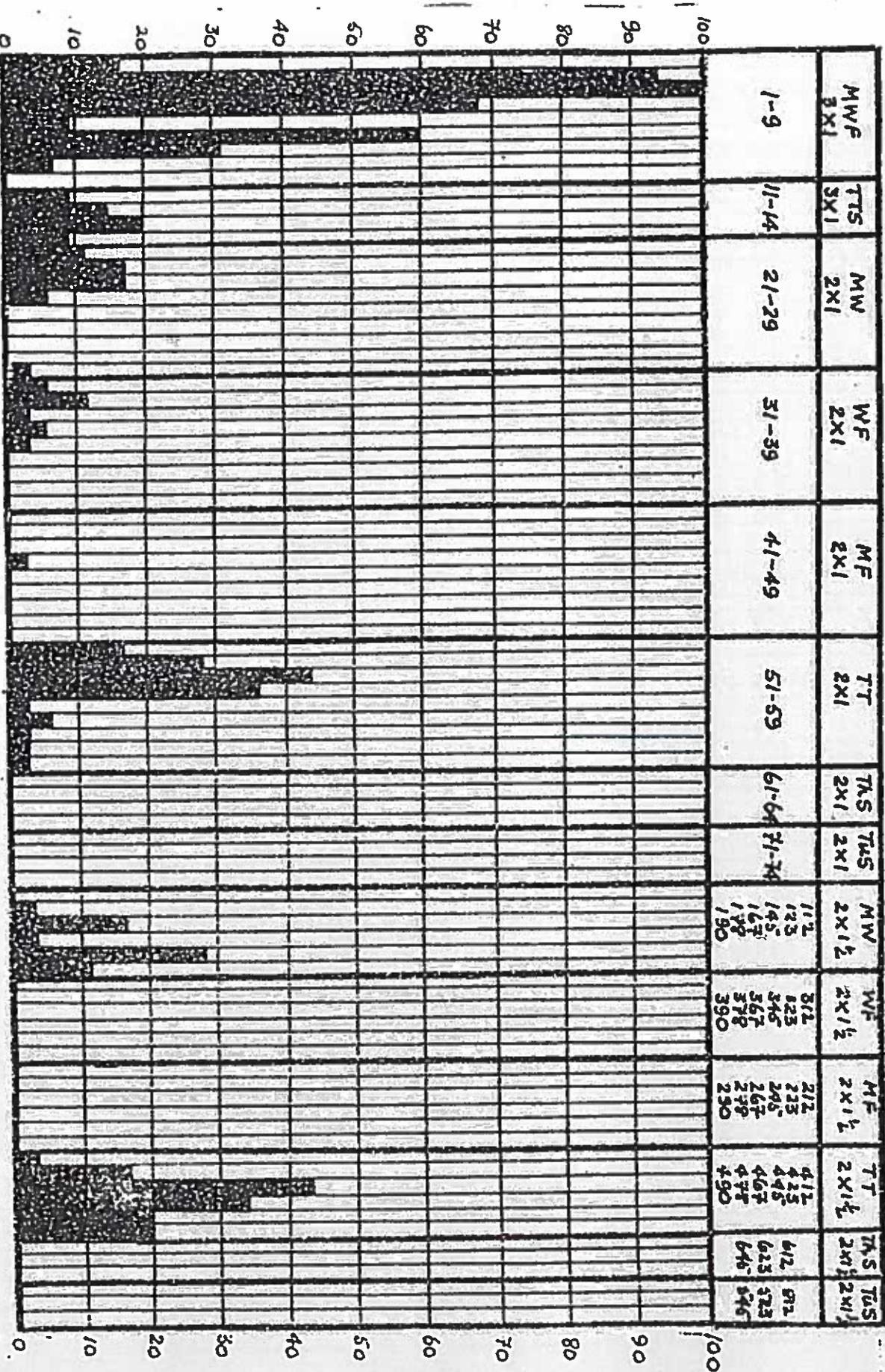
Table B

Slot utilization for courses listed in the Standard First Year Programmes  
 Normalized so that maximum utilization (slot 2) is 100%.



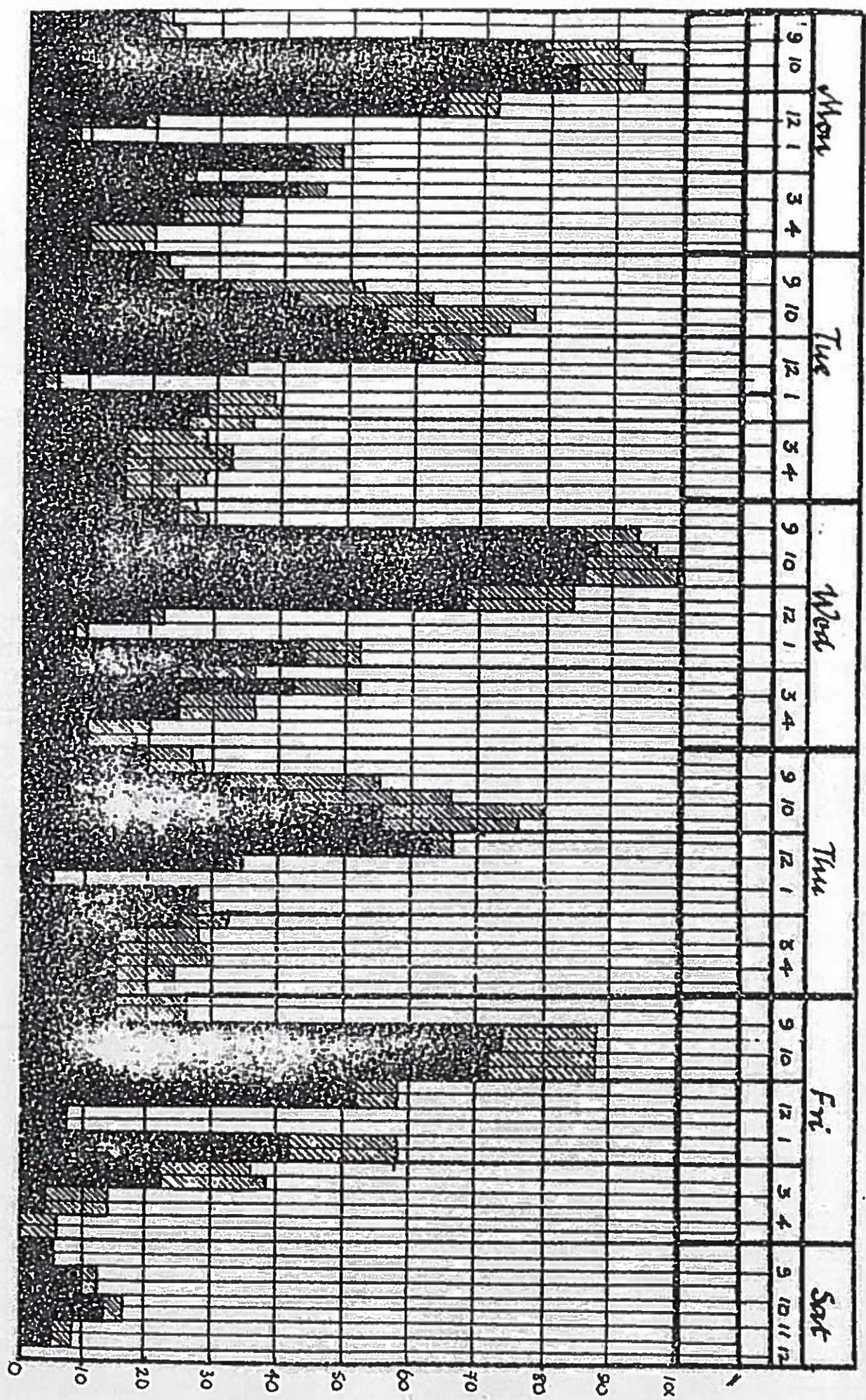
Ta  
C

Slot Utilization for all courses  
Normalized so that maximum utilization (slot 3) is 100%.





Time Utilization for all courses  
Normalized so that maximum utilization (Wed. 10:00 to 11:00) is 100%



Black columns represent time used by courses scheduled in regular slots.  
Grey columns represent additional use of each 1/2 hour period by irregular courses.

Table F

Percentage of classes in the Faculty of Arts and Science meeting in the most heavily used hours

	Mon	Wed	Fri	MWF totals	Tue	Thu	TT totals	MWTF totals
9.00	4.6	4.8	4.4	13.8	2.8	3.0	5.8	19.6
10.00	4.7	5.0	4.4	14.1	3.8	3.9	7.7	21.8
11.00	3.6	4.2	2.9	10.7	3.5	3.4	6.9	17.6
<i>totals</i>	12.9	14.0	11.7	38.6	10.1	10.3	20.4	59.0

Table F shows that 50% of classes are given in only 30% of the available time.

In Table III on Page 6 the distribution of 8:00 a.m. classes given by departments is shown. This non-uniform distribution is most certainly not due to the eagerness of mathematicians to rise before dawn. It is rather an indication of the inability of the system to accommodate courses, which must be available to B.Sc. students in the Faculties of Arts and Science and Applied Science, at more reasonable hours.

In Table I on Page 3 the numbers of lecture and seminar classes of each type is given. In Table G below some totals from Table I are compared with the number of classes of each type which fitted the regular timetable pattern when the Final Timetable of the Faculty of Arts and Science was published in September 1966.

Table G

	1x1	2x1	3x1	2x1½
<i>Totals Table I</i>	10	91	215	111
<i>Total standards</i>	10	79	153	70

When the 1966-67 final timetable was published there were 53 courses with class meeting times still undecided (H.T.B.A.)

Summary of Weaknesses

1. The present system has serious disadvantages when operated in conjunction with:
  - (a) Our laboratory system;
  - (b) 3 hour blocks of free time;
  - (c) Classes which meet in patterns other than 1x1, 2x1 or 3x1. (See examples 3, 4, 5, 6 and 7.)
2. It produces desirable and undesirable slots. (See Tables B, C, D, E and F) and in this respect may be referred to as a non-uniform slot system.
3. It is extremely difficult to add new courses if they must be kept available to a broad spectrum of students. In the experience of those people charged with timetabling responsibilities in the Faculties of Arts and Science and Applied Science, the insertion of a new course or the re-scheduling of an existing course produces a chain reaction of course changes. In some cases this has resulted in as many as 20 course changes but typically involves 8 to 10 changes. In "patching-up" the 1965-66 Arts and Science timetable to fit the needs of 1966-67 about 570 changes had to be made in the 750 I.B.M. cards needed to print-out the final timetable.
4. The concentration of teaching in relatively few hours of the week severely limits the choice of options available to students in all Faculties. This situation will be aggravated in 1967-68 by recent decisions of Faculty Boards to broaden the scope of academic programmes.
5. It is frequently impossible to schedule multi-section courses in as many slots as are needed to make the courses available to all students who should be able to attend these courses. It seems, at first glance, that this is an obvious way to fill-in lightly used slots. However, in practice this is not the case. The assignment of several time-slots to a multi-section course does make the course more available but limits the choice of time-slots available to single-section courses, in particular, those offered by small departments, and designed to attract students from all quarters.

The major advantage of the present system is that classes which fit the pattern are scheduled at the same hour each time the class meets. However in 1966-67 almost all classes in the Faculty of Applied Science and about 100 classes in the Faculty

of Arts and Science did not meet in this regular way.

In view of the overwhelming evidence that a change in timetable is desirable the committee decided to attack the problem in two stages.

1. Determine:

- (a) The number of days per week to be used;
- (b) The number of hours per day to be used;
- (c) The way in which the day is to be divided.

2. Investigate:

- (a) Timetable systems in use at other universities;
- (b) Modifications of systems in use at other universities;
- (c) Systems devised by members of the committee.

In order to make proper use of the present system it would be necessary to use a 6 day week of 54 hours. In addition to this extension of the teaching week it would be necessary to start afresh by re-distributing laboratory courses in both the morning and afternoon blocks. Many courses now taught at peak hours would have to be relocated at less desirable times. For reasons given earlier in this report the committee unanimously rejected this approach and decided in favour of a five-day week with each weekday divided into three equal three-hour blocks to be called the morning, mid-day and afternoon blocks.

The committee further decided that any system adopted at Queen's University should have the following properties:

1. It should be compatible with our laboratory system, 2x1 1/2 classes, 1x2 classes and 1x3 type classes.
2. It should provide uninterrupted blocks of time in which both students and instructors could conduct research projects and use library facilities. Any system which satisfies requirement #1 will also satisfy #2.
3. It should provide five standard 3x1 slots in each time block.
4. It should provide the maximum number of standard 2x1 1/2 slots.

5. No class should meet more than once a day.
6. No class should meet on three consecutive days.

The committee examined the systems used at the Universities of Alberta, Manitoba, Toronto and Waterloo and was forced to conclude that at these universities action had been taken to restrict both the variety of slot types and the choice of courses available to students. Various modifications of these systems were investigated but only one, a modification of the Manitoba system, proved suitable to our needs. This modified system is described later in the report.

There are many ways to fit 5 standard 3x1 slots into a 15 hour block. Requirements 5 and 6 above drastically reduce this number since they make it impossible to allocate two slots to the same three days, thus eliminating patterns of the following kinds:

Table H

1	④	1	⑤	1
2	5	2	4	2
3	④	3	⑤	3

1	2	1	5	1
2	④	④	④	5
3	5	3	2	3

1	1	4	1	⑤
3	2	3	⑤	3
2	4	⑤	2	4

Of the remaining patterns only seven showed any promise. See Table J.

Table J

A				
1	2	1	5	1
2	4	4	2	4
3	5	3	3	5

B				
1	4	4	1	4
2	1	2	5	2
3	5	3	3	5

C				
1	4	1	1	4
2	5	5	2	5
3	2	3	4	3

D				
1	4	1	3	1
2	2	4	2	4
3	5	3	5	5

E				
1	1	4	1	4
2	4	2	3	2
3	5	3	5	5

F				
1	4	1	4	4
2	2	5	2	5
3	5	3	1	3

G				
1	4	2	5	3
2	5	3	1	4
3	1	4	2	5

In order to analyse the systems the committee considered the case of a student, or instructor, with a two-course load in a block of 15 hours and then calculated the number of such programmes which could be fitted in with:

1. One laboratory or three hour period of free time;
2. No consecutive classes;
3. No classes meeting twice or more at 8 a.m.;
4. One conflict free 2x1 1/2 class; (In order to accommodate a 2x1 1/2 class a slot system must provide two days on which the two regular 3x1 slots, overlapped by the 2x1 1/2 class, are adjacent)
5. Two conflict-free 2x1 1/2 classes or two blocks of free time each of two hours duration;
6. One laboratory and no class meeting twice or more at 8 a.m.;
7. No consecutive classes and no class meeting twice or more at 8 a.m.;
8. One laboratory and one conflict-free 2x1 1/2 class.

The results of this preliminary analysis are shown in Table K.

Table K

<i>System</i>	1	2	3	4	5	6	7	8		<i>Total</i>
A	5	3	6	3	2	3	1	6		29
B	5	3	3	3	2	1	0	6		23
C	5	3	3	3	2	1	0	6		23
D	5	3	6	3	2	3	1	6		29
E	5	2	3	2	0	1	0	4		17
F	5	3	3	3	2	1	0	6		23
G	5	5	10	5	5	5	5	10		50

For example, it can be seen from Table K that under system G there are 10 ways in which a student or an instructor may have 2, 3x1 type classes and yet have no class meeting twice or more at 9:00 a.m. (condition 3). System E is clearly incompatible with 2x1 1/2 type classes since there are no ways in which 2 conflict free 2x1 1/2 type classes can be fitted in using this system (see condition 5 above).

It is clear that only 3 systems remain, which are worth considering and two of these, A and D, are in fact equivalent systems.

The committee next examined the capabilities of systems A and G to deal with typical problems encountered in setting-up a timetable. In Table L a suitable numbering of 2x1 1/2 slots in these systems is shown.

Table L

		14		14
23	45		23	45

12	45	23	51	34
23	31	34	12	45

3 standard 2x1 1/2 slots

5 standard 2x1 1/2 slots

A typical B.Sc. student will have two laboratory periods in one block. In both systems there are 5 combinations of two laboratories which have no 3x1 slots and 5 combinations which have one 3x1 slot. From an instructor's point of view this means that there are five possible ways in which he may teach in a 3x1 type slot and still have two days free in that block. (See Table M.)

Table M

labs	MTu	MW	MTh	MF	TuW	TuTh	TuF	WTh	WF	ThF	Totals
A	0	1	1	0	0	1	1	0	1	0	5
G	0	1	1	0	0	1	1	0	1	0	5

The number of 2x1 1/2 slots available for the various combinations of two laboratories or two free days is shown in Table N.

Table N

Labs	MTu	MW	MTh	MF	TuW	TuTh	TuF	WTh	WF	ThF	Totals
A	1	1	2	0	1	1	1	1	1	0	9
G	1	2	2	1	1	2	2	1	2	1	15

This table should be of particular interest to instructors who teach in those departments favouring 2x1 1/2 classes.

In Table P the number of 2x1 1/2 slots open to a student with one laboratory or one free day is shown.

Table P

	Mon	Tue	Wed	Thu	Fri	Totals
A	2	2	2	2	1	9
G	3	3	3	3	3	15

In Table Q the number of 3x1 slots open to a student with two 2x1 1/2 classes is shown.

Table Q

System A

Two 2x1 1/2 slots	14 23	14 45	23 45
Open 3x1 slots	1	2	1

See Table L

System G

Two 2x1 1/2 slots	12 23	12 34	12 45	12 51	23 34	23 45	23 51	34 45	34 51	45 51
Open 3x1 slots	2	1	1	2	2	1	1	2	1	2

In view of the clear superiority of System G in handling the situations described above the committee recommends that a modification of this system, to be called "The Queen's University Uniform Slot System", be adopted beginning in the academic year 1967-68.

The Queen's University Uniform Slot System

Table R

In this table the slot numbers for the various types of slots are given.

Standard 3x1 slots

	<i>Mon</i>	<i>Tue</i>	<i>Wed</i>	<i>Thu</i>	<i>Fri</i>
8:30	1	4	2	5	3
9:30	2	5	3	1	4
10:30	3	1	4	2	5
11:30	11	14	12	15	13
12:30	12	15	13	11	14
1:30	13	11	14	12	15
2:30	21	24	22	25	23
3:30	22	25	23	21	24
4:00	23	21	24	22	25
5:30					

The above table is also used for 2x1 slots.

Standard 2x1 1/2 slots

	<i>Mon</i>	<i>Tue</i>	<i>Wed</i>	<i>Thu</i>	<i>Fri</i>
8:30	31	34	32	35	33
10:00	32	35	33	31	34
11:30	41	44	42	45	43
1:00	42	45	43	41	44
2:30	51	54	52	55	53
4:00	52	55	53	51	54
5:30					

The above table is also used for 2x2 slots.

Table R (cont.)

Standard 1x2 slots  
2 hour labs.

8-30	<i>Mon</i>	<i>Tue</i>	<i>Wed</i>	<i>Thu</i>	<i>Fri</i>
	61	64	62	65	63
10-30					
2-30					
	81	84	82	85	83
4-30					

	<i>Mon</i>	<i>Tue</i>	<i>Wed</i>	<i>Thu</i>	<i>Fri</i>
9-30					
	72	75	73	71	74
11-30					
3-30					
	92	95	93	91	94
5-30					

If it is necessary to schedule a 2 hour laboratory in the mid-day block it will be assigned to one of blocks 111 to 115.

Table R (cont.)

Standard 1x3 slots  
3 hour labs

	Mon	Tue	Wed	Thu	Fri
8-30	101	104	102	105	103
11-30	111	114	112	115	113
2-30	121	124	122	125	123
5-30					

This particular slot numbering system is suggested since it facilitates checking for slot conflicts.

Example #1

Slot #4 conflicts with 33, 34, 63, 73, 74, 102, 103, 104.  
In other words, a standard 3x1 slot conflicts with  
2 of 2x1 1/2 type  
4 of 1x2 type  
3 of 1x3 type

Example #2

Slot #34 conflicts with 4, 5, 63, 64, 74, 75, 103, 104.  
In other words, a standard 2x1 1/2 slot conflicts with  
2 of 3x1 type  
4 of 1x2 type  
2 of 1x3 type

Example #3

Slot #64 conflicts with 4, 5, 34, 35, 75, 104.  
In other words, a standard 1x2 slot conflicts with  
2 of 3x1 type  
2 of 2x1 1/2 type  
1 of 1x2 type  
1 of 1x3 type

Example #4

Slot #104 conflicts with 4, 5, 1, 34, 35, 64, 75.

In other words, a standard 1x3 slot conflicts with

3 of 3x1 type

2 of 2x1 1/2 type

2 of 1x2 type

These four examples show that in this uniform slot system no particular kind of slot is especially damaging to the system. This is in marked contrast to the situation described in the examples used to point out the weaknesses of our present system.

Earlier in this report it was observed that there is a remarkable similarity between the shape of the timetable for Standard First Year Programmes and the shape of the whole timetable. (See Tables B, C, D, E.) A timetable for the Standard First Year Programmes has been constructed based on the 1966-67 Arts and Science timetable using the uniform slot system. The shape of this timetable is shown in Tables S and T below. The utilization of both standard slots and available time is much more uniform than is shown in Tables B and D. Some non-uniformity was imposed by the present laboratory system which was left unchanged. The relatively low utilization of slot 25 and of the time periods Tue. 3:00 to 4:00 p.m., Thu. 2:00 to 3:00 p.m. and Fri. 4:00 to 5:00 p.m. are due to an attempt by the committee to minimize teaching on Fri 4:00 to 5:00 p.m. when Faculty of Arts and Science Board meetings are held. The committee does not claim that this timetable makes optimum use of the uniform slot system. It is conflict-free and compatible with existing laboratories. Approximately 100 man-hours were needed to schedule Standard First Year Programmes within the framework of our present timetable. The same task, using the uniform slot system needed only 31 man-hours.





A further feature of the proposed system might be noted. Under the old system, department heads or their delegates, when faced with the task of re-scheduling a course, often were obliged to ask an instructor and his student to relinquish a comfortable MWF at 10:00 a.m. pattern. The choice of alternative times in most cases was virtually impossible to establish and as often as not was disagreeable to instructor and students alike. Under the proposed uniform slot system, the instructor will merely have to change from a schedule which gives him say Monday and Wednesday mornings free to one which leaves him free on Tuesday and Friday.

*Disadvantages*

① In recommending the adoption of the uniform slot system, the committee was cognizant of its disadvantages as well as its benefits. If the proposed plan is adopted it follows that almost no faculty member will be able to have a class scheduled at the same hour each time it meets. In some respects this is an unsatisfactory consequence. For instance, it may work hardship in those areas of the university which employ outside personnel. Also, the proposed system, depending as it does on universal acceptance, could entail some reduction in individual choice, a highly prized feature to the academic. Regardless of this possibility, the committee is of the opinion that the recommended pattern is the best system for Queen's University at this time, in spite of the fact that it could be disadvantageous or inconvenient to some departments or segments of the university.

② It might also be noted that the uniform slot system would produce equality in scheduling to a degree not previously known. For example, every 3x1 type class in a given time block appears once at each of the three hours in the block, but of course on different days. Thus no instructor would teach all the unpopular 8:30 classes while someone else enjoyed the more desirable 10:30 slots. The committee has been mindful of this feature but did not rate it very highly in reaching its conclusion. In some respects equality of treatment among staff members is not a desirable thing. Clearly there are differences among individuals in rank, status, tenure and taste. The uniform slot system, by reducing the possibility of recognizing these differences within the timetable system, may be subject to some criticism. Nevertheless, in the committee's opinion, this defect (if it is one) is not nearly sufficient to counter-balance the virtues of the proposed system.

At an earlier point in this report it was stated that the needs of faculty and students should be considered of greater relative importance than the utilization of physical resources and time. However in making that comment it was not intended to suggest that the latter two factors are not significant in

themselves. In summary, the committee feels that the proposed uniform slot system is consistent with the above principle. The recommended system will improve the scheduling of classes and increase the number of courses actually available to students without any substantial adverse effects on faculty and with the possibility of some benefits. Also physical resources should be employed more effectively if the proposed system is adopted. Consequently, from an overall point of view, the uniform slot system is advocated as being in the best interests of the university under existing conditions.

*ditto  
2006!*

Appendix

Timetable Patterns of Some Other Canadian Universities

U. of Toronto Timetable

General Course - Year 1

Time	Monday	Wednesday	Friday	Tuesday	Thursday	Saturday
8						
9	K	K	K	J	J	
10	B	B	B	A	A	A
11	E	C	F	F	E	C
12	D	D	J	G	H	
1						
2		G	H	G	F	
3	R		C	G		
4				D		
5						

1. 10 slots (A-K)
2. 3 slots with classes at a single hr.  
i.e. A, B, and K
3. G slot has 4 hours
4. no R a.m. classes  
no 1 p.m. classes  
no 5 p.m. classes
5. few 4 p.m. classes  
few Sat. classes
6. no complete afternoon slots

University of Waterloo

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8	1	13	1	13	1
9	2	2	19	2	4
10	3	4	3	4	3
11	5	14	5	14	5
12	6	15	6	15	6
1	7	16	7	16	7
2	8	9	8	9	8
3	9	10	20	10	10
4	11	17	11	17	11
5	12	18	12	18	12

University of Alberta Slot System

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
8	1	4	1	4	1	
9	2		2		2	
10	3		3		3	
11	6	9	6	9	6	
12	7		7		7	
1	8		10		8	
2	11	14	11	14	11	
3	12		12		12	
4	13		15		13	

A

M

B

1. 45 hours (15 slots)
2. 5 days.
3. 3 shifts or blocks.
4. 75 minute lectures on Tues. & Thurs.
5. 50 minute lectures on MWF at the same hour.
6. Multi-division labs in junior courses are scheduled in both A and B blocks.

The University of Manitoba

The "Slot-System" Timetable

This "Slot-System" timetable was adopted in the session 1964-65, and replaced a Monday-Wednesday-Friday and Tuesday-Thursday-Saturday a.m. lecture system. The new timetable has worked out exceedingly well, and most other faculties and schools on our campus have followed suit. At the time it was instituted, a new "Major-Minor General Course curriculum was introduced in Arts and Science.

This timetable has been constructed with the following objectives in mind:

- (1) It not only implements all the basic recommendations made by Departments with respect to desirable combinations of majors in one field with majors or minors in other fields (in the new Major-Minor Curriculum) but also permits many other desirable combinations as well.
- (2) It satisfies Departmental stipulations regarding pre-requisite courses.
- (3) It can also accommodate those students who are completing degree requirements under the former curriculum (which will henceforth be referred to as the "Sequence Curriculum").
- (4) It ensures that the new Science requirement for Arts students and the Basic Arts requirements for all students can be easily met, regardless of the timetable shift in which a student may be placed.
- (5) Certain classes of students (though not all) will be assured of a timetable which confines lectures entirely within the period 8:40 to 2:30 or within the period 11:40 to 5:30.
- (6) No instructor will be saddled with three 8:30 hours or three 4:40 hours in any one course.
- (7) The timetable allows for the creation of new courses or laboratory sections in the senior years, as needed, without making it necessary for other Departments, where classes are still small, to follow suit. The advantages of the principle

of "swing-shifting" are thereby retained, but the very great staffing costs which would be required to put all Departments on such a scheme are avoided.

(8) It ensures maximum possible use of our physical facilities, on which steadily increasing pressure is being exerted.

(9) It provides a much better means of extrapolating future space requirements than does the existing scheme.

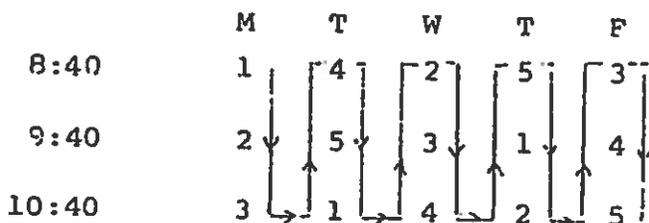
(10) No general course classes are scheduled for Saturday mornings.

(11) Finally, it is hoped that within a year or so, all of the purely mechanical details of sectioning, room assignments, etc., can be dealt with by machines, thereby greatly alleviating (if not entirely eliminating) the burden which has heretofore fallen upon academic staff at the time of registration. The new scheme can be readily adapted to such machine processing.

A brief explanation of the chief features of the new timetable follows.

The 45 hours available in a week (from Monday through Friday) have been subdivided for lecture purposes into 15 three-hour groups, each one of which is referred to as a "slot". The slots, which have been numbered 1 to 15, appear as column headings in the lecture timetable. For example, suppose a course appears in slot 7; slot 7 indicates lectures at 12:40 Mondays, 11:40 Wednesdays, and 1:40 Thursdays. Other courses given at the same hours will also appear in slot 7 and may be checked at a glance.

The arrangement of the slots has been devised so as to avoid scheduling lectures on three consecutive days for a given class, and also to avoid scheduling any one class at 8:30 or 4:40 throughout the week. Saturday morning has been left out since no advantage is gained without full use of both Saturday morning and afternoon. It may be helpful to note that the allocation of hours to the slots is an ordered system, and can be remembered easily by reference to the following scheme applying to slots 1 to 5 inclusive:



Slots 6-10, filling the 11:40, 12:40 and 1:40 periods, and slots 11-15, involving the hours 2:40, 3:40 and 4:40, follow a similar pattern.

As a rule multiple sections are divided between the two extreme groups of slots i.e., 1-5 and 11-15) to facilitate swing-shifting. Slots 6-10 are referred to as the "pivot slots", and are allotted (in general) to those courses not requiring multiple sections, to a number of courses in the Basic Arts group, and to the new Science A and B in the Major-Minor Curriculum.

Please note that both Shift A and Shift B in all three years contain the pivot slots 6-10. For example, a single-section course in slot 7 is available to students in either shift. As will be observed, Year III is not completely swing-shifted, but easily can be at a later date if necessary.)

Although three hours are provided for every slot, Departments which offer courses requiring only two lecture hours are of course free to continue their present practice, selecting any two of the three hours to suit their convenience.

Although not all Honours courses appear on the timetable, Departments (particularly those where Honours classes are likely to exceed 10 or 12 students per class) are encouraged to "slot" their Honours courses.

It is no longer possible to schedule more than three hours per week for any course. Departments offering courses requiring a fourth or fifth hour per week will therefore have to make their own arrangements with their classes for programming the additional hours required. Saturday morning is left free for this purpose if needed, although it is anticipated that the proposed schedule contains sufficient free periods to accommodate within the Monday to Friday period most (if not all) of the students affected.

Finally, clearly a staff member cannot teach two courses or sections in precisely the same slot, but could teach courses or sections in different slots.

# Timetable / Slot System

## ONE HOUR PERIODS

	Monday	Tuesday	Wednesday	Thursday	Friday
8:30	1	4	2	5	3
9:10	2	5	1	1	4
10:10	3	1	4	2	5
11:30	11	14	12	15	13
12:10	12	15	13	11	14
1:10	13	11	14	12	15
2:10	21	24	22	25	23
3:10	22	25	21	21	24
4:30	23	21	24	22	25
5:10					

## ONE & HALF HOUR PERIODS

	Mon	Tues	Wed	Thurs	Fri
8:10	11	14	12	15	11
10:00	32	15	13	31	34
11:30	41	44	42	45	43
1:00	42	45	43	41	44
2:30	51	54	52	55	53
4:00	52	55	53	51	54

## TWO HOUR PERIODS

	Mon	Tues	Wed	Thurs	Fri
8:30	61	64	62	65	63
10:30					
11:30	141	144	142	145	143
1:30					
2:30	81	84	82	85	83
4:30					

## TWO HOUR PERIODS

	Mon	Tues	Wed	Thurs	Fri
9:30	72	75	73	71	74
11:30					
12:30	132	135	133	131	134
2:10					
3:10	92	95	93	91	94
5:10					

## THREE HOUR PERIODS

	Mon	Tues	Wed	Thurs	Fri
8:30	101	104	102	105	103
11:30	111	114	112	115	113
2:10	121	124	122	125	123
5:10					



	Monday	Tuesday	Wednesday	Thursday	Friday
8:30 AM	1	7	1	7	1
9:00 AM	2		2		2
9:30 AM	3	8	3	8	3
10:00 AM	4		4		4
10:30 AM	5	9	5	9	5
11:00 AM	6		6		6
11:30 AM	11	10	11	10	Meetings, etc
12:00 PM	12	12	12	12	
12:30 PM					
1:00 PM					
1:30 PM					
2:00 PM					
2:30 PM					
3:00 PM					
3:30 PM					
4:00 PM					
4:30 PM					
5:00 PM					

