end of the courses, that is at about 18 years of age, many will enter productive life and thereafter have only incidental, informal contact with tertiary education. For these the courses provided must be self-sufficient; that is, they must be evaluated as, in a sense, completed wholes. Other students, however, need initial or preparatory courses which often provide knowledge useful only at a later stage; for example, vector analysis, elementary thermodynamics.

In many cases, it will be desirable to provide alternative courses and curricula for the two groups — even though many students may be unwilling to study the terminal courses which may be more useful, but have less prestige.

(ii) For the foreseeable future, in most countries, courses of the 2/2 kind will be given in a variety of different institutions with overlapping functions, e.g., technical colleges, grammar schools, technicums, lycées, gymnasiens, junior colleges, senior high schools, commercial colleges, etc. This institutional diversity complicates transfer between courses and transfer from the secondary institutions to the tertiary.

It would be wise to move as far as possible, at least within each country, towards equalization and homologation of the courses.

(iii) Employers generally, particularly in industry, are much more willing than they were to release their staffs for part-time or sandwich courses: one or two days a week or for months at a time.

This development calls for ingenuity in planning courses and curricula closely attuned to the problems encountered in the work situations.

(iv) In all countries, the secondary school system, and particularly its upper levels, is the chief instrument for the selection and allocation of students into the University and other related institutions. It is what happens here that decides who shall be allowed to proceed with full time tertiary education, what subjects they shall study, what professions they will enter.

The task of allocating talent wisely has become very difficult. The number of professions calling for tertiary education has increased enormously. The demand for special expertise in particular subjects changes very quickly (e.g., mathematics, economics). The demand for particular skills may not correspond with the inclinations and wishes of the students. The demand may be, as in England, for mathematicians and engineers but the students may prefer sociology or history, even though posts are few and hard to get.

It would be well if attention were paid to this problem. It should be possible to devise curricula which would have the effect of guiding students smoothly and gently towards specialisation in subjects which are needed in society.

(v) There is a growing movement of students across frontiers, both at the undergraduate and at the post-graduate levels — a movement welcome to all who are interested in the improvement of international understanding.
This migration would be facilitated if the secondary curricula in different countries were more alike. There is no reason why there should be differences quite as great as those which exist: after all the industrial, economic and social requirements of all high income countries have come to resemble one another closely. The attempts to establish international equivalences at the end of the secondary stage and to gain acceptance for an international baccalaureate are much to be commended.

Factors of Change

Most of the factors considered so far tend to influence the general form and shape of the secondary curricula: the subjects offered, the hours allocated, the mode of organising the material, the number of subjects taken by the students. There are, in addition, several factors which are definitely influencing the content of the courses themselves. Among these are the following:

(i) Changes in the technology of production and in the organisation of society bring into prominence fields of study previously not thought very important. A striking example is the development of computers which makes it necessary to pay attention to scales of notation, an area previously thought of as only a curiosity. Another example is that of transistors, which brings into prominence the physics of the solid state. Many of the best-known schemes for curriculum reform, like those called the “New Mathematics”, the Nuffield Schemes, the CBA scheme, etc., owe at least part of their appeal to such changes.

(ii) Changes in educational psychology, particularly in learning theory:

(a) the almost complete loss of faith in “transfer of training” has led to the abandonment of those parts of subjects which were included chiefly because of their supposed value in training students to think clearly, to observe correctly, to record accurately, etc.

(b) a more active psychology has led to a stressing of the heuristic or research element in all teaching. It is now common to include problems and projects into courses which previously would have been organised didactically along deductive lines. This too has involved a change in content.

(iii) Changes in the accepted theory of knowledge:

(a) Subjects are no longer thought of as isolated entities capable of being arranged pyramid wise or hierarchically. There is little talk of “basic subjects”, much talk about “interdisciplinary studies”. New subjects like biophysics are continually being invented. What might be called a “reticulate” theory of knowledge is coming into fashion: the whole field is seen as one, all points connected by an infinite number of threads. Sometimes these threads cross and are bunched: these are the old “subjects” themselves connected to all others.
(b) Few now believe that within each "subject" lies hidden a logic which governs its development, nor one which indicates how it should be learned. Thus, many different sequences of study are now regarded as acceptable. For example, some urge that the study of chemistry should begin with the atomic theory, others would postpone it.

This particular change opens the way to the fuller application of psychological knowledge to the planning of curricula.

(iv) Fifty years ago the tools employed by teachers consisted chiefly of books and paper, blackboard and chalk, possibly a laboratory and workshop. Now a whole panoply has been added: models made of plastic, film projectors, slide projectors, overhead projectors, tape recorders, language laboratories, learning machines, etc. This new technology greatly increases the possibility of enriching the curriculum and of including in it entirely new subjects and fields of study. Previously, teachers taught what they could with the tools they had. Now all sorts of things could be taught and at any level. The scope for real curriculum development has been greatly enlarged.

Some Problems

General, unsolved problems, of course, remain. There is room only to mention two particularly perplexing ones:—

(i) Integration

This is a favourite subject for discussion, particularly in English-speaking countries. Some writers, speaking of two separate cultures (the literary and the scientific), seem to attribute the malaise of modern societies to the fact that those trained in the humanities know no science and vice-versa. They are therefore unable to talk to each other and society falls apart.

Most probably, in the larger sense, there is little to worry about. Just as the student eats beef and sweet pudding, integrating both into his physical system, so too can he learn physics and literature, integrating both into his personality.

But in a narrower, simpler sense, much could be done. First, if students of physics need logarithms and calculus, surely the teacher of mathematics can reasonably be asked to include them in his courses. Secondly, it is a mistake to present antagonistic, irreconcilable views in different classrooms. Examples could be given of children who are taught about evolution by their teacher of biology and at the same time are taught that the Book of Genesis is absolutely true by other teachers. This is just silly and there is no excuse for it.

All that needs be said is: it would be well if those in charge of curriculum development could find a measure of agreement in their philosophy and in their psychology. And it would be highly desirable always to plan curricula as coherent wholes, looking for interrelationships and mutual support. For the rest, the learners can be left to look after their own integration.
Nevertheless, of course, there is much to be said in favour of planning at least some parts of the 15 to 18 curriculum as “integrated wholes”, such as “area studies” — provided that this is not done at the expense of gaining skills such as those involving a mastery of simple mathematics, physics, chemistry and so on, capable of very wide application in life.

(ii) Sequences

All sorts of sequences and arrangements are found across the world — and they all seem to work. Americans in the U.S.A. devote all the time allocated to science between the ages of 15 and 18 to physics in the first year, chemistry in the second, biology in the third. The English study all three subjects — if they study them at all — concurrently. By the age of 22 or 23 both lots seem to be about equal in competence. In mathematics the English, French, German, Russian, etc., sequences vary very widely indeed. But there is no proof that one sequence is better than another in developing mathematical talent.

Within decentralised systems of education, like that of England, there are big differences even between schools: orderly regularity is enforced only by the public examination system. In the centralised French system, of course, the diversity of sequences is much reduced though not eliminated.

It is probable that the Russians have paid more attention than anyone else to this problem. They have faith in the guidance that can be given to teachers by a well organised science of education. They therefore do not encourage teachers to follow their own preferences in planning their syllabuses. Instead, controlled experiments often on a large scale and careful observation of the results obtained lead them to the construction of curricula and the planning of syllabuses which have been found to work better in practice than alternative schemes. It is not at all certain that the results obtained in the USSR can be simply transferred and copied elsewhere. Nevertheless, the Russian contribution deserves very close study and could lead to significant improvements in many countries.

Conclusions

The chief determinants of curriculum development have been reviewed briefly, the discussion being restricted to the second cycle of the second level. One way of summing up in a meaningful manner is to attempt a few tentative predictions and then to draw consequences:

(i) It seems probable that within another ten or twenty years, in all high-income countries, there will be established a common or comprehensive school ending at 15 or 16 years of age. The upper secondary (2/2 level) school will then be something like a Junior College or Sixth Form College, a multi-purpose institution, organised more like a University College than like a school.
Quite probably the present technical colleges will either gradually fade away or transform themselves into Colleges of a more general kind.

(ii) Within the College, the chief general course will be the university preparatory one. It will offer to all the possibility of following a curriculum based upon:

- Physical education and sport
- The Arts, the Crafts
- Mother Tongue and Literature
- Modern Languages
- Mathematics
- Science: Physical and Biological
- Social Sciences.

All students would be expected to study all these fields, but in addition limited specialisation in some will be allowed and indeed encouraged.

(iii) Since attention will be paid to the fact that the courses are terminal for some and preparatory for others, and taking into account the importance of wise allocation among the fields of study, counselling and guidance services will be stressed.

(iv) Much attention will be devoted to part-time, day continuation and sandwich courses intended for adults, young and old, already in employment. These will lean heavily towards commerce, agriculture, electrical or building industries, mechanical and civil engineering, etc. But there will always be included an element of social and general education.

(v) Full use will be made of the new technology of teaching in order to increase diversity of offering.

It seems fairly safe to predict thus far, but no further. What has been said still leaves wide open to discussion and research an immense range of complex problems: what should be the time allocation to each major field? How should the syllabuses be planned? What opportunities should be offered to those wanting to study special fields like the classical languages? How far should specialisation be allowed? How much weight should be laid on the vocational parameter? What is the proper balance between general education and specialist or professional? How far can we rely upon the voluntary use of learning machines? And so on and so on.

What has been attempted in this paper is to state briefly and concisely some, not all, of the conditions, factors or determinants which help to shape the curriculum of secondary schools. If this analysis is sound, a conclusion of great importance emerges: namely that curriculum reform will always be restricted in scope and concerned chiefly with details of minimal importance unless the great determinants themselves change. Thus, if men's ways of earning their living change fundamentally, as they did at the time of the Industrial Revolution of the 18th and early 19th century, tremendous changes
in the structure of the school curricula will occur. Similarly, if new social classes become more powerful, that is, if the balance of power between the classes alters as it has done in all high-income countries during the last thirty or forty years, the schools will begin to teach new things in new ways. Or if there is a political revolution like that led by the Bolsheviks in Russia (1918-1920), the whole educational system is likely drastically to be transformed. But always those who are at the helm of the State, those who are the cultural and social leaders of the people, will endeavour to use the schools for the defence of what they themselves believe to be their own interest.

So let it be repeated once more, unless these deep social, economic, political, philosophical changes take place, curriculum reform will operate only in a modest manner. It is unlikely that major reforms can be put through.

Yet this in no way diminishes the importance of the curriculum reformer. The things that happen in the schools are certainly not the best that can be achieved within the present framework, and in any case there remains the possibility that intelligent reform may make the task of adjustment to the new conditions easier and smoother. It is even possible that the curriculum reformer could contribute towards the building up of a society which would be nearer than the existing one to what our hearts desire.

ORGANISATION, INTEGRATION ET CONTINUITÉ DES PROGRAMMES D’ÉTUDES (DEUXIÈME CYCLE DU SECONDE DEGRÉ)

par J. A. LAUWERYS, (Londres)

Les études comparées peuvent nous aider à identifier les facteurs qui déterminent le caractère du programme d’études. C’est surtout dans le cas du second degré que les problèmes se révèlent difficiles, car c’est au second degré que d’un côté les pressions techniques sociales et politiques sont importantes et de l’autre côté les forces conservatrices sont puissantes.

Les attitudes actuelles continuent d’être fortement influencées par le passé : ainsi subsiste toujours l’idée qu’il existe certaines matières plus importantes que d’autres — idée qui nous vient du Moyen-Âge: on voit que les principes philosophiques — même ‘faux’ — peuvent garder leur influence. De la même façon nous devons à la Renaissance — époque des nouvelles connaissances scientifiques, époque du remplacement du Latin par la langue maternelle — la conception que l’école peut servir d’instrument de régénération nationale et sociale: point de vue résumé par Comenius, dont l’œuvre montre l’importance croissante du désir de se servir des écoles pour protéger et développer les intérêts nationaux.

Le Dix-huitième Siècle offra non seulement des exemples de ces facteurs, mais aussi mit en valeur l’importance de la classe sociale (illuminée par John Locke), de la politique, de la défense de l’ordre établi, de la religion, de la moralité et de l’insécurité des systèmes d’administration.

La perspective historique montre aussi l’influence des distinctions de race et de classe. A cause des changements sociaux et économiques des dernières cinquante années, certains de ces facteurs ont été influencés et sont devenus dominants. Les conditions sociales ont abouti :

(i) au déclin de l’apprentissage et à l’augmentation du pourcentage du temps consacré aux études professionnelles par les élèves âgés de 12 à 18 ans,
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(ii) à l’importance attachée dans les écoles à la valeur des principes généraux et à la diminution des matières spécialisées en réponse au déclin dans une époque de développement technologique rapide,

(iii) à l’insistance sur le développement des pouvoirs critiques et analytiques relatif à l’impact massif et en grande partie trivial des moyens de communications aux masses,

(iv) au besoin de réforme vigoureuse des programmes pour faire face à l’afflux de jeunes gens à des niveaux de capacité intellectuelle et de motivation très différents dont beaucoup viennent d’un milieu culturel peu élevé.

Des conditions spécifiquement institutionnelles comprennent :

(i) l’emploi fréquent, dans le second cycle du second degré, des programmes alternatifs pour les étudiants qui vont commencer à gagner leur vie à 18 ans et pour ceux qui suivront des cours supérieurs,

(ii) le besoin d’adapter les programmes aux situations actuelles de travail,

(iii) l’utilité des programmes qui permettent le bon fonctionnement des systèmes sélectifs et allocatifs de l’éducation au niveau 2/2,

(iv) le besoin d’établir des équivalences internationales à la fin du niveau secondaire.

Les facteurs considérés jusqu’ici influent sur la forme générale des programmes secondaires. D’autres influent sur le contenu des cours, ce sont :

(i) les changements dans la technologie et dans l’organisation de la société,

(ii) les changements dans la psychologie pédagogique et l’adoption de méthodes heuristiques,

(iii) les changements dans la théorie reçue du savoir dans la direction d’une position plus “réticulée” et,

(iv) la prolifération de nouvelles méthodes grâce à l’expansion de la technologie pédagogique.

Les programmes d’études posent deux problèmes qui sont particulièrement difficiles à résoudre : l’intégration et les séquences. Une plus grande cohérence dans les programmes serait à souhaiter. Quant aux séquences, en dépit de vastes différences de politique entre les divers pays, il n’y a aucune évidence pour en choisir une plutôt qu’une autre. Néanmoins la politique adoptée en U.R.S.S., fondée sur des expériences contrôlées à grande échelle, mérite une attention suivie.

Les développements que l’on peut entrevoir pour l’avenir sont :

(i) l’éducation secondaire (entre 14-18 ans) dans la plupart des pays riches sera probablement donnée dans des collèges polyvalents,

(ii) dans ces collèges, un cours général préparatoire pour l’université avec spécialisation limitée sera offert,

(iii) l’importance de l’orientation sera reconnue,

(iv) des cours à mi-temps, des cours à raison d’un jour par semaine et des cours ‘sandwich’, tous de caractère essentiellement professionnel seront offerts aux adultes, et

(v) la technologie rendra possible une plus grande variété de programmes.

Parmi les difficultés qui sont toujours sujet à discussion et à investigation se trouvent les questions d’allocation du temps et celle des méthodes de prévision. Néanmoins, on peut conclure qu’à moins de profonds changements économiques, politiques ou philosophiques, la réforme du programme, toute importante qu’elle soit, aura une envergure assez limitée.