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PUBLICATIONS OF THE SCOTTISH COUNCIL FOR RESEARCH IN EDUCATION

III

CURRICULUM
FOR PUPILS OF TWELVE TO FIFTEEN YEARS
(Advanced Division)

CURRICULUM
FOR PUPILS OF TWELVE TO FIFTEEN YEARS
(Advanced Division)

Scottish Council for
Research in Education

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PREFACE

It was with some hesitation that the Research Council undertook an investigation into the nature of the curriculum for post-primary pupils in non-secondary courses, since it realised that it was going some little way out of its province. The importance and urgency of the problem nevertheless demanded that the Council, containing as it did representatives of almost all the educational bodies interested, should forthwith make the investigation and publish the results.

The special Committee appointed for the purpose decided that an inquiry should be instituted to determine what the various educational subjects could contribute to the education of the pupils of the age in question, and to this end the Committee nominated Panels composed of experts in the various subjects and of those conversant with school conditions. To guide these Panels in their deliberations, and to facilitate the co-ordination of their findings, the recently published literature on the subject was reviewed, and a preamble in the following terms was prepared and circulated to the members of all the Panels:—

Preamble Issued to Panels.

1. The curriculum should concern itself with pupils who have completed the Primary School Course and are pursuing a three years' or four years' Post-primary Course.

2. The school education of the majority of these pupils (apart from possible attendance at Continuation Classes) will cease at the termination of these Courses. Their life needs should therefore be kept in view.
3. In many cases the present Post-primary curriculum and methods of instruction have failed to stimulate the interest of pupils.
4. The curriculum should be planned to permit head teachers to modify the course of instruction in any subject to meet the varied capacities and aptitudes of pupils.
5. Special consideration should be given to the needs and interests of girls.
6. The general aim throughout should be to create and develop interests which will continue through life.
7. The several aspects of human experience which should be kept in view are: physiological, practical, intellectual, æsthetic, religious, social, and recreational. Care must be taken, however, to recognise the integrity of the pupil's personality by the co-ordination of his interests and activities both inside and outside school.
8. Panels have been constituted on the following subjects:[1]

A. Core Subjects:

English
History
Geography
Mathematics (which may be Arithmetic only)

[1] Religion—"according to use and wont." (See, however, *Syllabus of Religious Instruction for Use in Scottish Schools*, published by the Church of Scotland Committee on the Religious Instruction of Youth, and the Educational Institute of Scotland, 1930.)

Science (Physical and Biological)
Music
Art and Craftsmanship
Physical Education (including Games)

B. Optional Subjects:

Domestic Arts and Crafts
Technical Subjects
Commercial Subjects
Rural Subjects
Languages

The Committee desires to acknowledge the eagerness with which the project was received, the readiness of the response to the invitations to join the various Panels, and the enthusiasm displayed by all in the work.

Special thanks are due to the Conveners for the highly efficient manner in which they discharged the duties devolving upon them of arranging the meetings of their Panels and of preparing their Reports.

A small editorial and revising Subcommittee was later appointed to consider, along with Conveners and representative members of the respective Panels, the reports of the Panels and arrange them for publication. It was also decided that a general Introduction, setting forth the principles determining the construction of the curriculum, should be prepared.

This Report is published by the official publishers to the Council, the University of London Press, Ltd., and additional copies may be procured through the usual trade channels. Each of the Subject Reports is to be had separately.

April, 1931.

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INTRODUCTION

It is only of late that educationists have come to regard the determination of the curriculum as one of the fundamental problems of education, and yet it is not until a decision has been reached as to what is to be taught that we can discuss intelligently the plan of the school building, the kind of equipment necessary, the form of organisation, the qualifications of the teacher, and the teaching methods to be employed. Still more weighty is the consideration that upon our findings regarding the curriculum depends much of our national efficiency and well-being.[1]

The importance of the issues involved has led to various experiments in curriculum-making. As a reaction from the workings of a rigid curriculum there is the project method, which abolishes the predetermined curriculum comprising independent subjects, and seeks to provide the pupils with opportunities for the exercise of initiative by developing their schoolroom activities from their interests. Apparently more systematic is the attempt to determine the minimum essentials, to make the requirements of the community the criterion in the determination of what is to be taught. This solution of the problem, while of value in seeking to relieve the curriculum of much that is merely a heritage from the past, has its apparent simplicity of approach somewhat

[1] *Cf.* T. H. Briggs, *Curriculum Problems*, p. 1.

discounted by the fact that facility in many routine activities of adult life is easily gained without any preparatory training in school. It is very apparent that in any solution of the problem many considerations must be taken into account, and that these must be coordinated by our conception of the ultimate purpose of education.

Our concern here is with the curriculum of pupils of twelve to fifteen years of age who, on reaching fifteen, are not proceeding to further day-school education. The occasion of the Report was the announcement of the Government's intention to raise the school-leaving age to fifteen. In drawing up the Report, the Committee have taken the view that existing curricula and examinations should not be allowed to prejudice the issue at this stage.

The adjustment of the curriculum for such pupils involves consideration of (1) the standard attained in their previous education, (2) variations in physical and mental capacity, (3) the duration of school life, and (4) the relation of school work to life in a modern community.

(1) *Standard attained in the Previous Education of the Pupils*

In the absence of satisfactory methods of assessment, the educational attainments of the pupils can be only vaguely estimated from such data as are available. Official data are afforded by the *Report of the Committee of Council on Education for 1929–30*,[1] under the heading

[1] Scottish Education Department: *Report of the Committee of Council on Education in Scotland for the Year 1929–30*, pp. 20–21. (London, H.M. Stationery Office, 1930. Cmd. 3565.)

For outline plan of Scottish Education see Appendix I of this Introduction.

"The Output of the Day Schools." It is summarised as follows:

> "Table VA classifies the output of the primary schools according to the pupils' attainments at the time of leaving, *i.e.* according to the extent by which they had progressed beyond, or fallen short of, the stage qualifying for enrolment in a post-primary course. It will be seen that of the 91,599 pupils who left primary schools or primary departments . . . 77,996 (a little over 85 per cent.) had either reached this stage or advanced beyond it, while 13,603 (not quite 15 per cent.) had failed to attain it.
>
> Of the qualified pupils 16,271 had followed an advanced division course for two full years or more; 19,616 for less than two but not less than one year; while 10,550 fell short of one year. In examining these figures, however, we must not forget the 31,559 pupils who were transferred to secondary departments."

The figures given here and the additional data provided in Table V (p. 58 of the above Report) enable us to present the following view of the educational status of pupils in Scottish schools at the age of leaving: [1]

Number transferred to schools conducted under Secondary School Regulations		31,559
Number who had received instruction in an Advanced Division before they left, for		
Not less than 2 sessions	16,271	
Less than 2 sessions but not less than 1	19,616	
Less than 1 session	10,550	
		46,437
Carry forward,		77,996

[1] For purposes of comparison, the distribution of all pupils, including those in special schools and classes, for a county in Scotland, is provided in Appendix II of this Introduction.

Brought forward,	77,996
Number who had not qualified for enrolment in an Advanced Division but at date of leaving were being taught in the Senior Division (of the Primary School)	13,468
Number who had not qualified for enrolment in an Advanced Division but at date of leaving were being taught in the Junior Division (of the Primary School)	135
	91,599

These figures do not include the pupils of special schools or classes for mentally or physically defective children. They nevertheless indicate that if all the pupils in the ordinary schools are to be advanced to a new type of education at the chronological age of twelve, irrespective of their previous educational progress, provision will have to be made for a few pupils with an educational age of less than eight years, and for almost 15 per cent. with an educational age of less than ten and a half years. It has been generally assumed that the educational retardation indicated here is largely preventable. The Scottish Education Department Report for 1929–30[1] states that these figures are "at first sight disappointing." It should, however, be noted that, on a conservative estimate, the number of children who, not being mentally deficient, will not attain the mental age of twelve before they reach the chronological age of fourteen is 10 per cent. Thus are left fewer than 5 per cent. whose retardation has to be accounted for on educational grounds and by causes such as special mental disabilities, ill-health, irregular attendance and frequent changes of school. For the 10 per cent.—the "non-

[1] Scottish Education Department: *Report of the Committee of Council on Education in Scotland for the Year 1929–30* (Cmd. 3565), p. 21.

qualifiable"—special provision is as necessary as for the mentally deficient, and recognition of this would prevent the hardship to these pupils involved in the attempt to qualify them.

Of the pupils transferred to Post-primary Courses over 10,000 have already been retarded by about a year, and to ignore this fact in the preparation of a curriculum is to violate the pedagogical principle that education must begin at the point at which the child has arrived, and to court failure.

(2) *Variations in Physical and Mental Capacity*

A special curriculum for pupils of twelve to fifteen is generally advocated on the ground that this period coincides with the onset of puberty, which is marked by distinct pronounced physical and mental changes. *The Report of the Consultative Committee on Differentiation of the Curriculum for Boys and Girls respectively in Secondary Schools* [1] states that "there was general agreement that distinct differences were observable in the rate of mental development of both boys and girls, and also that, from the age of about $11\frac{1}{2}$ onwards, there was a difference in the 'tempo' of development"; and the Hadow Report [2] refers to the "tide which begins to rise in the veins of youth at the age of eleven or twelve."

Even if we ignore the great variation in the onset of puberty from individual to individual and the extremely low correlation between the rates and types of growth in

[1] Board of Education: *Report of the Consultative Committee on Differentiation of the Curriculum for Boys and Girls respectively in Secondary Schools*, p. 96 (H.M. Stationery Office, 1923).

[2] Board of Education: *Report of the Consultative Committee on The Education of the Adolescent*, p. xix (H.M. Stationery Office, 1926).

physical and in mental life, the fact must still be faced that recent evidence tends to support the view that the development of the individual is in most respects a continuous and regular process, and that as a consequence any sudden or abrupt break between the Primary and Post-primary education, or between any two stages of education, is not justified on psychological grounds.[1] An investigation into the widening horizon of the pupil's experience, if adequately carried out, would possibly provide a surer basis for a new curriculum. All that modern investigation seems to demonstrate here are the extraordinary variation among pupils in grade and type of ability, and the great diversity of interests.

(3) *The Duration of School Life*

The length of school life affects curriculum construction in several respects. Pupils leaving school at fifteen are not likely to have developed fully either in mind or in body. Subjects which demand for their comprehension the powers of a mature mind must consequently be excluded. So also subjects involving a long period of preparatory training could not profitably be pursued by pupils leaving at fifteen. As a general rule, we might say that no subject should be begun between twelve and fifteen which cannot be carried to such a stage of attainment as will enable the pupil to pursue it on his own account or to make some application of it in life.

The limited duration of school life will modify also the content and mode of presentation of subjects admitted to the curriculum. The range of occupations open to

[1] See Appendix III for abstract of lecture by Dr. P. B. Ballard on "The Psychological Aspect of the Break at Eleven Years of Age."

pupils of fifteen is restricted. For instance, the higher professions are not open to such pupils, and the academic teaching which serves mainly as a training for these occupations is irrelevant to their needs. This consideration seems to indicate that for most of them a study of the ancient languages is unsuitable. There is undoubtedly a connection between the school-leaving age and future occupational groupings. This leads to a consideration of the social demands necessitated by the distribution of occupations in the community.

(4) *Relation of School Work to Life in a Modern Community*

The dependence of the school on society is more fully recognised in recent curriculum construction than heretofore. The requirements of society are (1) common, and (2) specific. Society requires of every member of the community certain minimum essentials, *e.g.* the ability to comprehend and use simple oral, written, and printed language, to handle small sums of money, to know the common British weights and measures, to handle simple tools and perform simple household duties. It is now further expected that the school will send its pupils into life with a certain degree of physical fitness, of skill in the manipulation of ordinary mechanical appliances, with a certain knowledge of the duties and responsibilities of citizenship, a standard of conduct approved by the community, and an awakened religious sense. His education should not appear to the pupil to be irrelevant to, or divorced from, the actualities of life. The Primary School may be held responsible for the knowledge and skill essential for, and common to, the later studies: the further education in its turn, having satisfied the common needs of social life, should avail itself of the interest of the pupils in their wider industrial and commercial environment and in their possible future vocations. Our task is to provide a "practical secondary" education, with such emphasis on the practical activities as our present secondary courses place on the academic subjects.

The extent of our problem, concerned as it is with the various types of course demanded by the community's needs, can be determined only when we have at our disposal an occupational analysis of the population. This is fortunately available in the census returns, and is set forth in the following tables.[1]

TABLE A.—*Occupations—Males*

Occupation Order.	Number.	Per cent. of Total.
Metal workers	280,210	18·16
Agricultural occupations	169,984	11·02
Workers in transport and communication	169,912	11·01
Mining and quarrying occupations	151,884	9·84
Commercial, financial, and insurance occupations	116,460	7·55
Workers in wood and furniture	80,860	5·24
Builders, contractors, etc.	65,223	4·23
Clerks, draughtsmen, etc.	59,487	3·85
Professional occupations[2]	42,378	2·75

[1] *Census of Scotland*, 1921. Report on the Thirteenth Decennial Census of Scotland. Vol. iii. Occupations and Industries. Table A, p. viii; Table B, p. x (Edinburgh: H.M. Stationery Office, 1924).

[2] *Census of Scotland*, 1921, vol. iii, p. 3, includes under Professional Occupations (excluding clerical staff):

Ministers, clergymen; itinerant preachers, scripture readers, mission workers, sisters of charity; church, chapel, cemetery officials; officials of religious societies; advocates, barristers; solicitors; physicians,

TABLE A.—*Occupations—Males*—continued

Occupation Order.	Number.	Per cent. of Total.
Persons employed in public administration and defence	40,085	2·60
Textile workers	36,566	2·37
Makers of foods, drinks, and tobacco	34,360	2·22
Persons engaged in personal service	31,738	2·06
Makers of textile goods	26,059	1·69
Stationary engine drivers	23,922	1·55
Fishermen	22,517	1·46
Warehousemen	21,179	1·37
Paper makers, workers, printers	19,960	1·29
Painters and decorators	18,022	1·17
Electric apparatus makers, electricians	16,014	1·04
Workers in chemical processes	9,594	0·62
Persons employed in gas, water, electricity undertakings	8,584	0·56
Makers of bricks, pottery, glass	7,943	0·51
Persons employed in entertainments and sport	6,296	0·41
Workers in skins and leather	4,598	0·30
Makers of watches, clocks, etc.	3,121	0·20
Workers in precious metals	1,056	0·07
Workers in non-metalliferous mine and quarry products	962	0·06
Workers in other materials	5,786	0·37
Workers in mixed and undefined materials	23,672	1·53
Other and undefined workers	44,745	2·90
Total occupied	1,543,177	100·00

surgeons, registered medical practitioners; dentists; veterinary surgeons; midwives; sick nurses; mental attendants; subordinate medical service (including masseurs, bonesetters, and herbalists); teachers; consultant engineers; architects; ship designers, ship surveyors, naval architects; chartered and incorporated accountants; analytical and research chemists, assayers, metallurgists; laboratory attendants; articled clerks and pupils and other professional students; other persons engaged in scientific pursuits; authors, editors, journalists, publicists; librarians (not booksellers); political association officials; industrial and trade association officials; social welfare workers; painters, sculptors, engravers (artists); other professional occupations.

Table B.—*Occupations—Females*[1]

Occupation Order.	Number.	Per cent. of Total.
Persons engaged in personal service	168,149	26·43
Textile workers	92,407	14·53
Commercial, financial, and insurance occupations	83,111	13·07
Clerks, draughtsmen, etc.	67,966	10·69
Makers of textile goods	53,967	8·48
Professional occupations[2]	44,970	7·07
Agricultural occupations	24,317	3·82
Makers of foods, drinks, and tobacco	22,099	3·47
Paper makers, workers, printers	16,713	2·63
Warehousemen, etc.	12,724	2·00
Workers in transport and communication	11,047	1·74
Metal workers	6,537	1·03
Persons employed in public administration and defence	6,067	0·95
Workers in wood and furniture	4,526	0·71
Mining and quarrying occupations	3,368	0·53
Makers of bricks, pottery, glass	2,894	0·45
Workers in chemical processes	2,189	0·34
Persons employed in entertainments and sports	1,873	0·30
Workers in skins and leather	1,293	0·20
Electrical apparatus makers, electricians	314	0·05
Painters and decorators	262	0·04
Workers in precious metals	199	0·03
Builders, contractors, etc.	113	0·02
Persons employed in gas, water, electricity undertakings	102	0·02
Workers in non-metalliferous mine and quarry products	100	0·02
Stationary engine drivers	97	0·02
Makers of watches, clocks, etc.	89	0·01
Fishermen	47	0·00
Workers in other materials	4,403	0·69
Workers in mixed and undefined materials	735	0·12
Other and undefined workers	3,414	0·54
Total occupied	636,092	100·00

[1] Women in remunerative employment only. Married women, aged sixteen and upwards, numbered 844,453, and of them 40,279, or 4·8 per cent., are returned as having remunerative occupation (*Census of Scotland*, 1921, vol. iii, p. x).

[2] See Note 2, p. 8.

Of the employed males in Scotland over 60 per cent. are following what may be classified as industrial occupations, 11·5 per cent. commercial, 11 per cent. rural, and only 2·75 per cent. professional.

Of females engaged in remunerative occupations one-third are employed in industrial enterprises, 26·43 per cent. in personal service, 25·7 per cent. in commercial and 7·07 per cent. in professional services. Most of this employment in the case of women lasts, however, only for a short period, owing to the large proportion who marry, and cease to be engaged in remunerative employment.[1]

[1] Age Grouping of Women

		12–	14–	16–	18–	20–	25–	30–
	Total in age group	98,946	96,527	95,291	95,130	225,851	203,876	182,936
1.	Married Women	..	..	438	4,577	54,657	102,085	116,412
			In remunerative occupations					
2.	Females unmarried	271	42,523	70,070	73,760	143,387	82,713	50,905
3.	Married Women	..	..	60	487	3,907	4,924	4,993
4.	Widows	..	..	1	16	401	1,769	3,039

		35–	45–	55–	65–	70 and over.	Not stated.	Total.
	Total in age group	336,564	273,225	189,536	66,520	102,340	391	1,967,133
1.	Married Women	233,455	183,569	102,607	25,832	20,701	120	844,453
			In remunerative occupations					
2.	Females unmarried	72,254	51,710	33,020	9,103	6,316	60	636,092
3.	Married Women	10,965	9,320	4,503	805	308	7	40,279
4.	Widows	8,282	10,952	11,196	4,291	3,484	12	43,443

Census of Scotland, 1921, vol. iii: 1. Table 4, p. 131; 2. Table 2, p. 51; 3. Table 4, p. 131; 4. Table 7, p. 173.

Vocational interests and immediate economic prospects should consequently not dominate the adolescent girl's education to the exclusion of some training in Homecraft, which makes a strong appeal to most girls at this period, and which would help to meet the demand of the community for an improved standard of home life.

The main point to be noted regarding these figures, in the case of both men and women, is the small percentage engaged in professional services. It is an interesting commentary on our Scottish system that our present highly organised secondary education is directed almost exclusively to preparation for professions engaging only 2·75 per cent. of the male population and 7 per cent. of the female population in employment. The redirection of a large number of Post-primary pupils into more practical courses would doubtless be to the advantage of the pupils and in the interests of national efficiency and economy.[1]

In presenting the Reports the aim of the Research Council is not so much to prescribe uniform courses of study as to place at the disposal of those concerned material from which they may fashion curricula to meet the needs of particular pupils. It will be at once apparent that the time demands of the various Panels are irreconcilable in their entirety, and that suitable selections will require to be made for different pupils and in different districts. A glance at the Reports will show that the authors have been more concerned with the needs and aptitudes of pupils

[1] Cf. *Report of the Committee of Council on Education in Scotland for the Year 1929–30* (Cmd. 3565), p. 18: "We do not regard it as satisfactory that only 5 per cent. of the candidates [for the Day School Higher] took domestic, 10 per cent. commercial, and 8 per cent. technical subjects."

than with the importance of their subjects as contributory to the stock of human knowledge. The Committee believe that the replacement of the more academic treatment of the subjects, still too commonly presented, by the new material furnished in the Reports, would of itself, and without any further change in organisation, render the education of Advanced Division pupils more profitable than it has been in the past. This is, however, but half of the story. The Committee is unanimously of opinion that interest in a subject should be the dominating factor in planning the curriculum for adolescent pupils, and that to compel any such to continue the study of a subject from which he is deriving little or no profit is to frustrate development of character. This may demand that for some or many of the pupils a substantial part of the school day should be devoted to practical activities, even although this should mean the complete abandonment of some of the traditional compulsory subjects in their orthodox form. To such pupils the appeal of the traditional subjects will lie largely in the assistance they give to the satisfaction of some practical need or immediate interest.

We must not, however, in avoiding the more academic treatment of the subjects, fall into the opposite error of assuming that all the interests of pupils are exhausted by some one practical course, or that the only development of a subject which a pupil should be allowed to pursue is the practical, more especially since at present many pupils are led to select the Advanced Division course in preference to the Secondary by the economic position of their parents and not by lack of ability. These pupils must not be denied, through the emphasis we lay on the practical, the opportunity of acquiring a theoretical interest in a subject. It is, indeed, the privilege of the teacher to reveal the intellectual implications, even of a practical subject, to his pupils, to make its logical structure a challenge to them, and to indicate the developments of it which can be studied for their own sake without regard to practical outcome or economic advantage. The complete subordination of everything to an immediate interest which is unrelated to all other knowledge and experience leads not to freedom, but to intellectual anarchy and practical inefficiency.[1]

To present, however, the formal aspect of a subject alone, because it appeals to the teacher, was part of his training, and is "good for" the pupils, and to impose it upon those who are incapable of recognising its significance, is to sacrifice their happiness and well-being to a merely traditional conception of culture.

The demands of curricula so conceived can be met only by a degree of individualisation of instruction which is still far from being recognised or, when recognised, is not practised, such a degree in fact as will make uniform external examination impossible. These examinations, imposed either nationally or locally, would undoubtedly stereotype both the content of instruction and the methods of the teacher at a juncture when variety of course and experiment in technique are the important factors.

It is obvious that the conception of education indicated in this Report involves a changed attitude to the assess-

[1] *Cf.* John Dewey, "How Much Freedom in New Schools," *The New Republic*, 9th July 1930.

ment of progress or attainment. It will not, however, be beyond the wit of the teacher, and indeed it is his duty, to furnish to parents and others interested, by means of a Leaving Letter[1] or otherwise, information regarding pupils when they come to leave school.

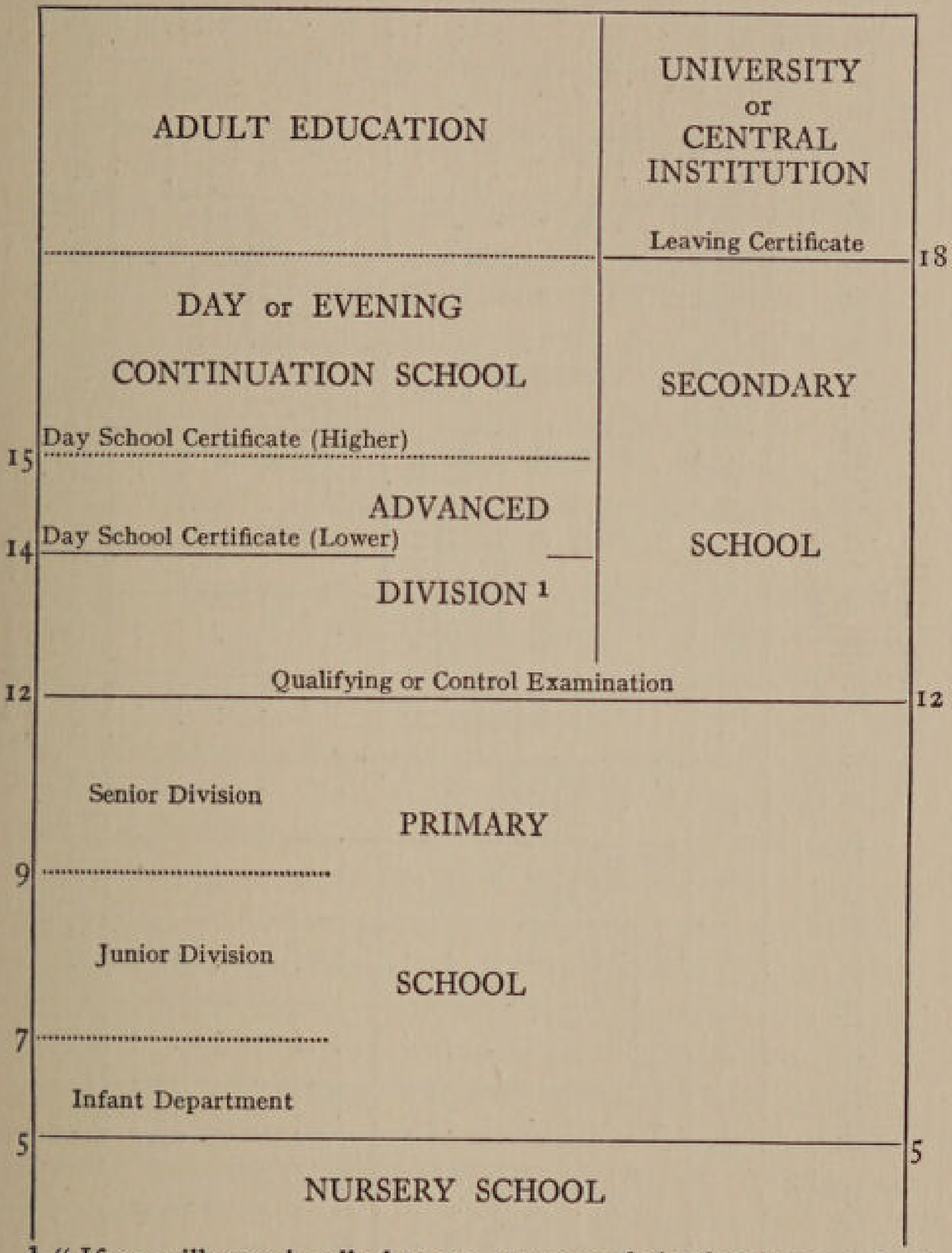
The aim of our curriculum must be to direct and develop the main interests of the pupils—interest in physical well-being; in language as a means of social intercourse and as a reservoir of social culture; in the records of human achievement; in the world as the home of man, as a source of wonder and as ministering to his needs; in all forms of art; in human conduct; and in religious devotion. The vocational interest is also awakening in pupils of twelve to fifteen, but it is only one of many and must not be allowed to dominate their education to the exclusion of the others. In fact, if Day Continuation Schools are introduced, the argument for the development of the vocational interest will lose much of its force.

We must not, however, regard the school subjects of to-day, with their sharply defined spheres and their present content, as coinciding with and satisfying all the interests of pupils, nor must we assume that all these interests are exhausted in curricular activities. Many are best provided for by debating societies, dramatic clubs, wireless societies, photographic societies, libraries—school, municipal, and county—by sports clubs and rambling clubs. The more the school avails itself of these during the years in question, the easier will be the transition to adult societies of the same type, and the

[1] City of Liverpool Education Committee: *Report on Secondary Education in Liverpool*, by Michael E. Sadler, pp. 143–4 (London, 1914).

more lasting are the interests themselves likely to be. The Advanced Division School should aim at being not only a social centre for pupils during their Post-primary Course, but should also seek to serve as such during their after-school life.

APPENDIX I
SCOTTISH SYSTEM



[1] "If, as will occasionally happen, a wrong choice has been made, it should be possible for individuals to pass from one to the other without too violent a break of gauge. But it would be a grave mistake to allow the interests of the great mass of non-Secondary pupils to be sacrificed for the sake of a few exceptions."—Scottish Education Department, *Circular No.* 44, p. 4.

APPENDIX II

AGE CLASS DISTRIBUTION OF ALL PUPILS IN THE SCHOOLS OF A TYPICAL SCOTTISH COUNTY[1]

	5−	5+	6+	7+	8+	9+	10+	11+	12+	13+	14+	15+	16+	17+	18+	Total.
Infants Lower	897	4161	880	97	9	6	1	1	..	..	1	..	..	..	..	6053
Infants Higher	..	800	3896	1309	154	25	8	5	3	..	3	..	..	..	..	6203
Juniors Class 1	..	3	779	3465	1308	165	42	13	7	6	3	2	..	..	..	5793
Juniors Class 2	..	..	19	1082	3635	906	208	70	26	11	4	2	..	..	..	5963
Seniors Class 3	..	..	..	26	1166	2484	1081	333	96	43	7	1	..	..	..	5237
Seniors Class 4	..	..	..	..	84	828	2296	1243	407	109	10	..	..	..	..	4977
Seniors Class 5	..	..	..	..	4	74	878	2251	1310	681	43	11	1	..	..	5253
Post-primary 1	..	..	..	..	..	1	39	845	2222	1423	132	7	..	..	..	4669
,, ,, 2	..	..	..	..	..	..	1	53	725	2042	407	84	7	..	..	3319
,, ,, 3	..	..	..	..	..	..	..	2	86	623	444	157	30	..	..	1342
,, ,, 4	..	..	..	..	..	..	..	..	14	38	101	192	97	21	5	468
,, ,, 5	..	..	..	..	..	..	..	..	..	20	26	77	126	65	23	337
,, ,, 6	..	..	..	..	..	..	..	..	..	..	..	3	31	57	36	127
Totals .	897	4964	5574	5979	6360	4489	4554	4816	4896	4996	1181	536	292	143	64	49741

[1] As at August 1928.

APPENDIX III

THE PSYCHOLOGICAL ASPECT OF THE BREAK AT ELEVEN YEARS OF AGE [1]

By P. B. Ballard, M.A., D.Litt.

It would be idle to pretend that the new type of school organisation owes its origin to psychology; idle to pretend that the selection of eleven and not ten or twelve as the age for a general transfer of children from primary schools to schools for higher education is based on psychological grounds. There are abundant reasons—good, sound, practical reasons—why we should regard primary education as ending at eleven years of age, and it is our business to inquire whether such a scheme has any sort of psychological sanction.

The main purpose of those who founded the elementary school system was the removal of illiteracy from the labouring poor. They regarded the teaching of the three R's as the chief, if not the sole, task of the elementary school, and they did not contemplate a school life extending beyond the age of eleven or twelve. It is true that no school worthy of the name could limit its work to so narrow an objective. And as a fact no school did. The subjects multiplied, and the age of leaving gradually rose. But expansion of this kind did not receive much encouragement from headquarters. It was felt that primary education should be an education in fundamentals. And indeed it was found by actual experience that boys and girls in England could, as a general rule, master the three rudimentary subjects by the age of eleven. If our language were phonetically spelled, as the Italian or the Welsh languages, reading and

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[1] An address given to the British Psychological Society (Education Section) at the Seventeenth Annual Conference of Educational Associations, held at University College, London, January 1929. Reprinted by kind permission of the author from the *Report of the Seventeenth Annual Conference of Educational Associations.*

writing could be acquired by the age of nine or ten; and if, instead of our cumbersome system of coinage and of weights and measures, we had a decimal system, the fundamental rules in arithmetic could also be mastered before the age of eleven. That precise age is indicated, therefore, not so much by any essential quality in the human mind as by certain accidental features of our inherited culture.

Is there any psychological crisis at the age of eleven ?—any arrest or acceleration in mental development ? Taking the mind as a whole, and taking the child population as a whole, we may say quite definitely that there is not. Intellectual development in children has been measured and recorded with the greatest care within the last twenty years. Mental tests of various kinds have been extensively applied all over the civilised world. And when the curve of development has been traced it has always been found of the same nature. It is smooth and continuous. There is no break anywhere; no plateau, no steep ascent, no sudden change of direction. It is not only true of mental development but of physical development as well. The increase in the height or weight of a child for advancing years shows no stoppage at any stage between birth and maturity. There is a slight acceleration in the rate for height in the spring and in the rate for weight in the autumn, so that those curves show a slight undulation, but there is no sudden change at the age of eleven. It must be borne in mind, however, that these remarks hold good of massed numbers only. It is only when the results of a large number of measurements are pooled that a smooth curve is obtained. The smaller the group, the more irregular the curve. When the development of one particular child is measured, whether that development is mental or physical, it is almost invariably found that progress is intermittent. It proceeds by leaps and bounds. The curve of development exhibits a rhythm which is irregular and is different in almost every child that is examined. It is not possible, therefore, to assert that there is never a psychological crisis at eleven, but that there is no universal crisis at eleven.

The Hadow Report is called *The Education of the Adolescent*, and implies, though it does not definitely assert, that adolescence begins at eleven. As a matter of fact it begins about fourteen—with boys at any rate. With girls it begins earlier; but with neither boys nor girls does it begin as early as eleven. Adolescence is marked by certain physiological changes, and the mental characteristics of adolescence are supposed to be conditioned by those changes. There is, however, in modern times a growing belief that the psychical phenomena precede the physiological phenomena; and that the signs of awakening adulthood appear in the mind at as early a period as eleven years of age. What is the nature of this awakening? Thirty years ago, before the advent of modern mental tests, it was generally believed that there was at the onset of puberty a rapid expansion of the mind. The intellect became keener, the emotions stronger and deeper. The intelligence curve was supposed to rise swiftly at about the age of fourteen. Modern research, however, shows that no such rise takes place. Whatever intellectual change there is partakes of the nature of horizontal rather than vertical development. It is a development of interests and of specific abilities rather than of general ability. This accords with the view that the access of energy that comes with adolescence is mainly emotional, and that the intellectual effects are secondary and derivative.

It should further be pointed out that any scheme of organisation based on the advent of adolescence would necessitate the "break" for girls occurring at least two years before the break for boys.

Making, however, due allowance for the difference between boys and girls, we cannot fail to note the emergence of new instincts and new interests at about the age of eleven; or, if not their emergence, their gradual reinforcement—the herd instinct, for instance. It seems to be the general opinion of schoolmasters that it is difficult to get children under eleven to engage in organised games with any degree of zest. The "gang" or "team" spirit begins to be prominent about eleven. So with the instinct for collecting—if it is an instinct.

There are good grounds for thinking that children's interest in reasoning, as distinct from their capacity to reason, begins to show itself about the age of eleven. It is a curious fact that Binet's five absurdity tests, simple and obvious though they are, baffle the bulk of children under ten years of age. Yet an examination of Burt's Reasoning Scale indicates that there is no marked increase in reasoning capacity at that stage. My belief is (a belief partly based on my experience in trying to teach children Euclid in days gone by) that with adolescence comes not so much an enhanced capacity to reason as an interest in rational as distinct from empirical explanations.

In the realm of feeling the new *régime* finds abundant justification. Nothing fails like failure. When the older children in the elementary school see some of their comrades promoted to secondary schools and others to central schools, while they themselves are left behind in the same old school, it is difficult for them to avoid feeling disappointed; difficult to escape a slight feeling of incompetence and failure. And the worst thing that can enter a pupil's mind is discouragement. The new *régime* prevents that calamity. It affords a fresh stimulus to study, and in promoting self-respect and self-confidence it contributes towards forming a character well fitted to cope with the difficulties of life.

Let us now consider what sort of a person the child of eleven is. If we visit a large school and collect all the children of eleven years of age we shall be surprised at their diversity. Not only are they of different sizes, but they have probably come from every class in the school. Judging from the statistics given in Dr. Burt's book, *Educational Abilities*, about 29 per cent. of children of eleven are in Standard IV, 30 per cent. in Standard V, 24 per cent. above Standard V, and 17 per cent. below Standard IV. The range of mental ages or of anatomical ages is almost as great. When, therefore, there is a clean cut at eleven years of age, the children transferred form a very heterogeneous group. This fact has so deeply impressed certain educationists that they have given no support to the new movement. And it must be admitted that unless the fact of heterogeneity is recognised it will go far towards nullifying the solid advantages of the new scheme. The suggestion has been made that mental age be substituted for chronological age in the transfer to higher schools. If this proposal were adopted, many of the pupils would never pass beyond the primary school, and the moral benefit of the new *régime* would be missed. Moreover, calendar age is the only kind of age recognised by law, and it is the only kind which is not open to dispute. Legally a child begins school at a fixed calendar age and leaves school at a fixed calendar age. We cannot judiciously insert between these two extremes a psychological age.

Although birthday age is the best basis for transfer from school to school, it would be a serious blunder to regard birthday age as the best basis for classification within the school. A wise classification is based upon a number of considerations of which chronological age is certainly one, but one that is subservient to mental age, scholastic age, and specific interests.

In brief, psychology, as I understand it, gives its approval to the break at eleven, but the approval has a caveat attached.

I

ENGLISH

ENGLISH

To teach English to pupils of any age is to help them to satisfy one of their most urgent needs, the need to understand others and to be understood by them. For pupils of the age-group twelve to fifteen with their increasing consciousness of the other fellow, the ability to listen and read intelligently and the ability to communicate their thoughts and feelings to others are the most important intellectual faculties which the teacher can assist in developing.

Whatever misgiving the teacher may feel when he enters upon the English lesson will be due almost wholly to his uncertainty regarding what he is called upon to teach. Teachers are unfortunate in that the school subject called English has not so far assumed the form of a completely organised body of doctrine whose content is generally known or recognised.

The primary division of the subject into Composition and Reading is a necessary one: language enables us both to communicate what is in our own minds and to become aware of what is in the minds of others. These two kinds of effort, however, are so related that practice in the one makes for efficiency in the other. Every endeavour we make to understand helps us to make ourselves understood: to succeed in making ourselves comprehensible is to learn how to comprehend others.

COMPOSITION

The immediate object of the teaching of Composition is to train pupils to speak and write so that the audience addressed may know exactly what is in their minds at the moment of utterance. The teaching, therefore, must throw into relief (I) the Thing to be said (let us call it the Intention), and (II) the Communication of it.

I. The Intention

If "the thing to be said" is to appear worth saying to those who listen, the speaker must fulfil two elementary conditions—he must have something to say, and he must be more or less eager to say it. These conditions suggest a useful classification of the difficulties which confront the pupil when he enters upon the business of composition.

A. *Difficulties of the Subject-matter.*

It is a hard but alluring occupation to make bricks without clay. If the pupil has nothing to say, he is very likely to say it, and at length. We had better make sure, therefore, that pupils at all times know, or are made to know, exactly what they propose to say before they begin. To do this may in the extreme case involve that the teacher shall prescribe not only the theme, but also the material for its development. The governing principle is that the subject-matter should always lie well within the range of the pupil's actual or possible experience at the moment of composition. He must be given a real chance to speak clearly and relevantly, whatever his natural ability may be. Compositions which demand profuse corrections should never have been set: pupils, like their elders, learn far more from success than from failure.

In his selection of themes for written composition it may help the teacher to remember that the average adult seldom has occasion to write anything that might be called an essay. Now and again he is called upon to write a report, less frequently notes or a digest. For the most part his efforts in written composition are confined to the writing of letters. It cannot be said that there is much anticipation of the needs of later years in most school composition courses, at least for the ninety-and-nine who do not enter the professions.

A classification of themes suitable for composition exercises in Advanced Divisions is here offered in the hope that teachers may find it useful. Most of the themes can be prescribed for oral or written composition at will. An attempt has been made to grade them roughly in ascending order of difficulty.

CLASSIFIED LIST OF COMPOSITION THEMES

(*a*) Material supplied ready-made so that the pupil's mind may be left free to arrange and express it.

(1) *Interpreting pictures, picture-series, plans, and diagrams.*—This is probably the most effective means of training children to tell stories and describe scenes. It is

unfortunate that so many of the pictures available lack unity, and so force an interpretation which is just one thing after another. Pictures from which descriptions are to be written should always have a focus of interest. The abler pupils may find it possible to construct a story from a single picture, but that picture should represent a denouement or a crisis. For general use in story-telling, picture-series are best. The ideal picture-series would be an adaptation of what is known as the " silent film."

(2) *Dramatisation of a story.*—For beginners and weaker pupils this should be always an oral exercise, and dramatic action should be demanded. The moving pictures have made children astonishingly expert at posturing and at " registering " the simpler emotions.

(3) *Transforming given indirect speech into dialogue or conversation.*

(4) *Retelling a sequence of events as seen by various observers.*

(5) *Retelling the same story in ways demanded by varying circumstances.*—An illustrative example: Jimmy saw his chum Bob knocked down by a motor car and taken to hospital although not seriously hurt. Bob had been struck by the right-hand mudguard of the car which overtook him just as he was about to step off the street on to the pavement.

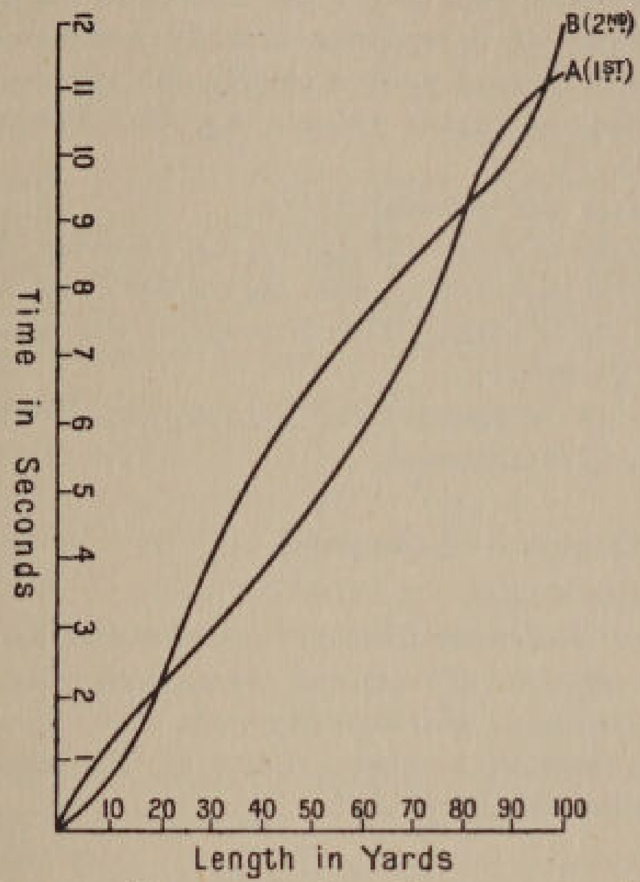
Exercises: Write (1) what you imagine the policeman wrote in his notebook after interviewing Jimmy and the driver; (2) in dialogue form the telephone conversation between Jimmy and Bob's mother half an hour later; (3) the letter which Jimmy posted that evening to a common friend.

(6) *Recasting sequences of ideas in a new and prescribed order.*—An illustrative example: Beginning a story anywhere, say at the end. "Poor Fido was a sick and sorrowful dog. He had lost his bone in the water. . . ."

(7) *Retelling a story read or heard, or telling a story of which the outlines are given.*—This is the least satisfactory of all exercises in narrative.

(8) *Records of doings in the class-rooms—e.g.* descriptions of experiments, mathematical problem stories. By "mathematical problem stories" is meant nothing more formidable than this:

Story of a School Championship Sprint



(9) *Paraphrase and interpretation of passages spoken or read.*

(10) *Exercises in expanding matter presented in condensed form.*

(11) *Exercises in summarising matter.*—This may be made a very trying exercise. It is an important one in view of the demands of adult experience.

(*b*) Material sought out by the pupil under guidance.

(1) *Letter-writing*—occasion and recipient specified.

(2) *Technical descriptions* ("what it is" and "how it works"), *with illustrative diagrams.*

(3) *Descriptions of processes, e.g.* the making of butter.

(4) *Instructional and constructional descriptions* ("what to do" and "how to make it").

(5) *Completion of a story already told in part.*

(6) *Descriptions of scenes actually observed.*—In the description of a scene, sufficient unity will be secured if the scene is taken as observed from a definite view-point with definite accompaniments of time and season.
(7) *Descriptions of same scene viewed under different conditions* (*e.g.* the mediæval castle, the ruin of to-day).
(8) *Descriptions of experiences actually undergone.*—Unity in these will depend upon a clearly conceived denouement.
(9) *Descriptions of known persons, e.g.* Our Doctor, The Lady Next Door.
(10) *Biographies and autobiographies.*
(11) *Descriptions of imagined figures, e.g.* Summer, Avarice, Care.
(12) *Community story-telling, with the teacher as editor.*
(13) *The making of notes.*—This is amongst the most valuable of school exercises.
(14) *Writing up a theme from newspapers, libraries, or other sources of information.*

(*c*) Material invented by the pupil.

(1) *Original tales.*
(2) *Contributions to class and school magazines.*
(3) *Descriptions of imagined experiences.*
(4) *Descriptions of imagined scenes.*
(5) *Argumentative compositions of the type,* "What *I* think about. . . ."

A classification of composition themes which does not profess to be complete and yet includes some thirty varieties is bound to provoke questions in the minds of teachers regarding the time to be allotted to the subject, the relative importance of the categories, and the division of time and effort between oral and written composition. Our views on these matters are here given:

1. *Time to be given to Composition.*—Composition should be assigned at least two-fifths of the total time given to English.
2. "*Original*" *Compositions.*—For nearly all the exer-

cises of the majority of the pupils and for the majority of the exercises even of the oldest and ablest, the themes should be chosen from amongst those suggested under headings (*a*) and (*b*). The prestige of "original" compositions amongst teachers is still too high. It is claimed for them that they develop and reveal initiative and personality. They cannot be said to do so inevitably. Many pupils who "have ideas," and a very respectable competence in the expression of them, fail to do much in the way of invented story or imaginative description. The pupils who succeed in being interesting often do so by mere chance or by the display of a certain naïveté which would offend if it were displayed by older people. Anyone who has read many of the original stories of children must have been struck by their likeness to one another.

We cannot assess the value of such performances by reference to any objective standard or to any standard at all which the pupil is bound to acknowledge, unless it be the teacher's known preferences. If the pupil can never really know why praise is given or withheld, he is in some danger of becoming a prig or the owner of a grievance.

Nevertheless it is a good practice to give pupils the reins now and then, even although corrections and marks do not follow upon such adventures.

3. *Length of the Written Exercises.*—Most of the written exercises should be short, of, say, half a dozen sentences. Full-dress compositions extending to a page or two should be rare, say six per year.

4. *Oral and Written Composition.*—It is still unfortunately necessary to plead for the giving of far

more consideration to the claims of oral composition in post-primary courses. It is still more necessary to plead for the systematic training of older pupils in the technique of oral expression. Oral composition is an art in itself with its own sanctioned forms of sentence-structure, its permitted phrases and ellipses, its choice of words apt to the immediate situation and audience. In the course of a lifetime all of us talk far more than we write; and yet most of us write much better than we talk. The lack of quality in the ordinary conversation of all classes of people is a challenge which the teacher must meet.

For all pupils in post-primary courses, therefore, oral expression should be the subject of organised exercises, never as an oral version of written composition, but for its own sake and as having its own special usages. Such exercises, while designed primarily to give character and cogency to oral speech, are certain to have important reactions upon written composition —increased fluency of expression, more direct approach to the end proposed, fewer irrelevances, clearer arrangement of ideas. Lastly, on all occasions for authentic oral composition, the audience is actually present to keep the speaker awake and alert.

B. *Difficulties of Sustained Interest or Spontaneity.*

Pupils must be taught early that their compositions fail in a fundamental respect if they do not awaken and maintain interest in the person who reads or hears them. To engage interest, however, we must ourselves be interested. The themes chosen for composition must therefore be capable of exciting a continuous interest in the mind of the pupil (1) by making definite demands on his experience however scanty that may be, and (2) by permitting or requiring a constant shifting of the interest throughout.

How far should we go in leaving the choice of theme or the manner of treatment to the pupil himself? It might seem on first thought that he would find greatest interest in working out a theme of his own selection, but this is seldom the case. Most pupils respond best to the stimulus of an exercise prescribed for them, provided that it makes real demands on their experience, and has its objective, length, audience, and method of treatment specified or agreed upon.

II. The Communication of the Intention

Let us assume that the material for his composition is at the pupil's disposal. How best may we help him to present it in due form and order?

General Principles

1. *The Use of a Plan.*—The use of a skeleton or plan may be an embarrassment in rare cases, but, for the majority of the pupils in the age-group twelve to fifteen, it is a principal means of success. It may be devised either wholly by the pupil, or by the pupil under guidance. So devised it is certain, by easing the strain on his memory, to set the pupil free to develop each paragraph as a unit in a connected series.
2. *Descriptive Headings.*—Every composition, even the very short ones, should be provided with a title or descriptive heading. Indeed, good reason can be shown for the employment and formal display of sub-titles in longer school compositions. The systematic use of titles and sub-titles impresses

upon the pupil the need for unity, completeness, and relevance.

3. *The Introduction and the Conclusion.*—The first and the last paragraphs carry an added weight as introducing and concluding the composition. They therefore demand special attention. There are introductions which might introduce anything, and conclusions which conclude nothing. Valuable corrective practice can be given to the pupil by setting him to write the opening paragraph or the concluding paragraph of an uncompleted composition.

4. *The Audience.*—The act of composition involves at least two persons—the speaker and the person addressed. It follows that both the thing to be communicated and the nature of the audience should determine the form of the presentation. Pupils are too often left to address in their compositions an audience quite unspecified, or but vaguely apprehended. The worst conceivable audience for a child to address is the world at large, or an omniscient and indulgent teacher who is willing to read orderliness into the child's incoherence. A pupil soliloquises—at least on paper—with extreme difficulty. He expresses himself with more assurance, and therefore more coherently, when he is conscious of an audience of known character, especially if it is immediately before him and present to his bodily vision. The example of the great story-tellers and the literary essayists whose audience is Everyman should not be followed in the class-room.

An imagined audience is not necessarily less stimulating than an actual one. However, if teachers care to do so, they may easily arrange for a variety of audiences which are actual and known to the pupil. Class-mates and members of other classes may be nominated by the teacher to receive and criticise the writings of the pupils on all sorts of themes—descriptions of a game actually played, accounts of experiences shared by author and recipient, challenges and replies, what happened to-day in our class-room, hobbies, a book read, a thing made. Class and inter-class debates may be held with a jury of neutrals (not the teacher) awarding points. The dramatisation of known and not too complex narrative provides a well-defined audience in the character addressed, and a more vaguely apprehended audience in the listeners. In the class-room we are too apt to forget that it is social intercourse which provides the occasion for speech and determines its form.

Specific Exercises

If the pupil is to say readily and efficiently what he wishes to say, he must satisfy certain conditions—

(A) He must use words and idioms "correctly," *i.e.*, in their generally accepted sense.

(B) He must display these so as to disclose the sequences of ideas in his mind.

(C) He must use no more and no fewer words than he needs.

(D) He must not take too long over the job.

The main teaching problem is thus to isolate the difficulties of (A) vocabulary, (B) coherence of expression, (C) economy of expression, and (D) fluency or flexibility of speech.

(A) *Difficulties of the Working Vocabulary.*

By a pupil's working vocabulary is meant the words (and idioms) which he actually employs in speaking and writing. It is recruited from the words he hears and reads. As he advances in years and experience new needs put an increasing strain upon the stock of words which has so far served his purpose. Simultaneously his reading vocabulary is expanding to place new words at his disposal: the new demands are met from new resources. But the extension of a working vocabulary is never merely an affair of imitation. Even if the pupil, pen in hand and paper before him, had at his disposal by a supreme effort of memory all the words he had ever read or heard, he would still have to select the word appropriate to the occasion and reject all others. This is creation, not mimicry.

What the teacher can do to help the pupil to extend his working vocabulary is thus made clear. No exertion of skill or industry by the teacher can spare the pupil the responsibility of choosing the right word. He cannot "create intelligence"; but he can provide the occasions for its exercise. His business is to see (1) that the stock of words from which selection has to be made is adequate, and (2) that occasions for their employment are provided of increasing variety and complexity. The composition exercises of the pupils will normally provide the occasions for the display of the working vocabulary; but its extension may be accelerated and its content clarified by exercises specially designed to thrust upon the pupils the necessity of deliberate choice. Illustrative examples of such exercises are given below. Two principles have gone to their making—

1. The words and idioms from which choice has to be made are related as correlatives, rough synonyms, or associated expressions capable of

being ranged under one head (this to force a real choice).

2. The sentences when completed show the words selected in a context which demands their employment.

ILLUSTRATIVE EXERCISES

Extension of Working Vocabulary

(*a*) *Substantives, Adjectives, Verbs, Adverbs.*

Exercise 1*a*.—From this list of words—green, violet, blue, purple, olive, grey, rosy, crimson, yellow, orange—choose one to complete each of the following sentences:—

1. His face was .... with cold.
2. His face was .... with shame.
3. His face was .... with fear.
4. His face was .... with health.
5. His face was .... with wrath.

Exercise 1*b*.—From the five options within brackets given in each sentence score out the four which do not fit in with the rest of the sentence.

1. At the sight of Mary's new hat Clara became green with (anger, hatred, dislike, envy, resentment).
2. Knowing that it did not matter how he acted he did not trouble to conceal his (laziness, contentment, indifference, happiness, confidence).
3. (Sadness, fear, contentment, caution, confidence) drove him like a spur.
4. He had too much (charity, faith, love, self-respect, self-love) to do a mean thing.
5. He had too much (charity, faith, love, self-respect, self-love) to do a generous thing.

Exercise 1*c*.—Here is a list of verbs—loitered, trudged, strolled, reeled, hobbled, retreated, paced, withdrew, meandered, lurched, marched, ambled, limped, crawled, toiled, plodded, stumbled, sauntered, staggered. Choosing from this list, write down on the dotted lines the verbs whose meaning allows them to be used.

1. He .... steadily.
2. He .... aimlessly.
3. He .... cautiously.
4. He .... painfully.
5. He .... awkwardly.

(*b*) *Idioms, etc.*

Exercise 2a.—Complete each of the following statements by using with suitable modifications one of these expressions—to begin at the wrong end, to put one's foot in it, to have too many irons in the fire, to lose one's balance, to quarrel with one's own bread and butter, to lock the stable when the horse is stolen—

1. He could have done with an eight-day week; he had ....
2. "Let me introduce Miss Thomson, one of my very oldest friends," said Mr Smith. He had ....
3. He wore ties so expensive that he had to go every day without breakfast. Surely a case of ....
4. His success was too rapid for him. He ....
5. He woke with his bedroom ablaze. Instantly he snuffed the candle. Some men can be relied on to ....
6. He took good care that his manager beat him on the last green. He was not the man to ....

Exercise 2b.—(In this type of exercise, the problem is to distribute a certain number of related expressions amongst the same number of sentences, using each expression once only. Here the pupil proceeds by way of elimination. For example, the word "visage" in the exercise below must be reserved for the last sentence because of its sound.) Use each of the words —mien, visage, looks, air, glance, profile, countenance, appearance, gaze, features—once only to complete the following sentences:—

1. His .... spoke of wealth and power.
2. As the knight rode round the lists his .... was haughty.
3. His .... was that of an artisan.
4. As she passed the prisoner she threw at him a .... of pity.

5. His .... was fixed upon vacancy.
6. Her dress was as plain as her ....
7. The open .... of the youth told of his frankness.
8. Do you wish your photograph taken full-face or in ....?
9. Everywhere he was met with unfriendly ....
10. The harsh .... of the jailer accorded well with his occupation.

(B) *Difficulty of Coherent Expression.*

Every composition attempted by the pupil is, amongst other things, a discipline in the use of coherent expression. Can we supplement and intensify that discipline by isolating the difficulty of coherence and dealing with it alone through exercises constructed for the purpose? Analysis quickly yields an answer. It is only by our use of language, eked out in oral speech by gesture and voice inflection, that the progression of thought in our minds is revealed to others. The sequence of the ideas in that progression is disclosed (1) by the order in which words and phrases occur in the sentence, and (2) by sentence connectives.

1. *Coherence within the Sentence.*—A sentence may take the form of an assertion, a command, a question, or an exclamation. In each form of sentence there is a normal order of the elements composing it. In the assertive sentence the normal order is—subject, verb, object(s), complement, adverbial extension(s). In the other types of sentence the subject and the predicate are normally inverted. When the normal order is departed from, the words or phrases displaced acquire an additional significance from their new contiguities. In the following sentences the displacement of the word or phrase has given it

a new emphasis—the most common effect, but not the only, of abnormal arrangements.

(1) Slowly and sadly we laid him down.
(2) The boy, O where was he?
(3) There, but for the grace of God, go I.
(4) A horse, a horse, my kingdom for a horse!
(5) Can a man by searching find out God?

Emphasis is only one of the added significances acquired by words from abnormal proximities. It would be improper, however, to proceed further with the analysis in a document which is a report and not a manual. The analysis has gone sufficiently far to achieve its purpose which was to indicate the nature and organisation of the exercises to be prescribed. These should (*a*) train the pupils in the ready observance of the normal order, and (*b*) exhibit the results of legitimate departure from it.

There are certain words and usages whose loose employment is so embarrassing to listener or reader that they should be accorded the honour of special treatment. Of this sort are—

Words—*also* (the wrong use of *also* as a conjunction in such sentences as, "She purchased some tea and sugar, also bacon and eggs"); *and* (the wrong use or omission of *and* in enumerations, *e.g.* "The table was of oak, carried a plant and one or two vases"); *as* ((*a*) the wrong use of *as* in "equally as," (*b*) the only safe use of *as to* is to give emphasis to a word which is brought forward to the beginning of a sentence, *e.g.* "As to Jones, who can say what he will do?", (*c*) *as if* and *as though* should be followed by the past subjunctive, not the present indicative); *because* (the wrong use of *because* in "The reason is because . . . " or "The reason why . . . is because . . ."); *between* ((*a*) "Between you and I," (*b*) not so obviously wrong are—"Between each stroke," "The choice is between you or me"); *both* (children should be taught to practise a complete symmetry when using *both . . . and*, *either . . . or*, *neither . . . nor*: for instance, "In both Edinburgh and Glasgow" is correct, "Both in Edinburgh and Glasgow" should be regarded as incorrect); *but* ((*a*) the conjunctional use of *but* in such expressions as "Whence all but he had fled" should be accepted as sanctioned by use, (*b*) beware of the careless use of *but that*, *but what*, especially in the expression "No doubt but that," (*c*) make the employment of the redundancy *but . . . however* a penal offence); *compound connectives* (some of the most noxious of these are—*in reference to*, *in so much that*, *in the case of*, *in the instance of*, *in the matter of*, *in the neighbourhood of*, *in the region of*, *of the character of*, *of the nature of*, *with reference to*, *as to*: these are seldom used in oral speech, but young people believe their use in written composition to be a particularly effective disguise for slovenly and disorderly thought, therefore the prescription for them is total prohibition); *however* (its placing in the sentence, too early or too late); *like* (forbid conjunctional use); *than* (improper uses of *like* and *than* mainly follow attempt to compare things which are not comparable).

USAGES—Absolute constructions; ellipses; enumerations; participial usages; parentheses; position of prepositions (always before substantive?); pronouns.

2. *Coherence in Sentence Series.*—Sentence connectives are of two kinds (*a*) explicit, when transitional ex-

pressions are used; and (*b*) implicit, when the nature of the thought connection is left to be inferred.

(*a*) *Explicit Linkages.*—These include conjunctional usages and "repetitive" connectives. By the latter are meant expressions of all sorts which link sentences by repeating, normally with variation, expressions previously employed. Their use is perhaps in need of illustration. The following passage employs only repetitive connectives and rounds off the paragraph by linking the last sentence with the first—a trick worth noting.

"I have seen a boat of castaways in the Mexican Gulf, not far from the Haulover. There were four of them, all dying of thirst, in a boat without oars. All about that boat was a jostling company, hundreds of them. The sea was thick with the monsters. Beating up to them against the wind we could smell them. I tell you it was a bad sight, that company about the boat. We had a steady convoy back to the ship, though we piked them in the snout by the score. As we hoisted up those thirsty ones, the grey shapes rose half out of the water at them. When I think of that boat near the Haulover, I am little minded to leap into the water to try to save anyone."

(*b*) *Implicit Linkages.*—There are cases in which the sequence of thought cannot be revealed by expressed connectives. It is not that the connectives are suppressed as being superfluous. There is no ellipsis in

Sigh no more, ladies, sigh no more;
Men were deceivers ever.

The sustained use of the implicit sentence linkage is comparatively rare, being confined almost wholly to occasions in which

(1) Emotion is disruptive, as in the soliloquy,

"O that this too, too solid flesh would melt."

(An extreme employment of it from *The Duchess of Malfi*—
"Cover her face; mine eyes dazzle; she died young.'")

(2) The style is impressionist or analytical, as in—

"I drew the curtains. The street was deserted. Nothing to be heard but the steady patter of rain on the window. Another wet day, and my holiday more than half over."

(3) The sentences give particular instances or illustrations of a generalisation which comes at the beginning or end of the sequence, as in—

"The storm had done its work thoroughly. In the hamlet the debris of fences and outhouses was being collected by the owners. Over the fields were scattered the grain crops which the day before had stood in ricks. Across the roads lay the wreckage of trees. The haughs near the river were lakes. From further up the valley came news that the old bridge had collapsed."

The analysis just completed should suggest to teachers the sort of exercises to be set in this department of the syllabus—

Rewrite a story, beginning at the middle or the end.

Rewrite a description, having put yourself at a fresh viewpoint. (The purpose of both these exercises is to force the employment of new connectives.)

From a given plan, describe a room, the " lay out " of a garden, the disposal of troops on a battlefield, etc.

Describe an incident or view, using repetitive connectives.

Transform explicit linkages into implicit, e.g.—

Explicit—As Sir Roger is landlord to the whole congregation, he will suffer nobody to sleep in church besides himself.

Implicit—Sir Roger will suffer nobody to sleep in church besides himself. Landlords have their privileges.

Transform implicit linkages into explicit (e.g.—Trace the logical procession of thought in *Bruce at Bannockburn* from the first stages to the rhetorical climax, " Let us do or die ").

Write a short exegesis of a given generalisation (*e.g.* Write a composition of at least half a dozen sentences with this as the last—"The winter is over and gone and the time of the singing of birds is come "; or with this as the first—" Johnny seems at last to be acquiring some sense ").

For a treatment of Punctuation see Appendix I.

(C) *Difficulty of the word too many and the word too few.*

Good English is efficient English, English which just meets the needs of the occasion and no more. The efficiency of any instrument can be measured by reference to the purpose for which it was designed. When it does more than it is designed to do it is as embarrassing to its user as when it does less. The word too many is as disconcerting as the word too few. Every writer or speaker is under obligation never to employ one trick of the trade which is gratuitous or beyond the needs of the case. On the other hand, a preference for simple expression is no more a virtue than a preference for a particular colour, say green: one must be just as simple as the occasion will permit.

Efficiency of expression, *i.e.* its fitness to attain ascertainable ends, may be appraised by an exercise of the reason; and it may also be sought and more or less adequately achieved. In their games, hobbies, and school-work children are constantly faced with the problem of ways and means, and find much pleasure and some excitement in its solution.

> There be some sports are painful, and their labour
> Delight in them sets off.

The history of a child's mental development is one of adjusting means to attain desired ends. No doubt the perception of what the occasion demands in words is ultimately an affair of "gumption," and, since the audience must be taken into account, compels some exercise of the social sense. In this matter, however, the teacher need not play the part of anxious but helpless spectator. Once again the great work is his of providing and controlling the material on which natural endowment may best exercise itself.

Many children in Advanced Divisions are at an age when they are shy of words; but when they are seriously concerned to do justice to an occasion, they are just as likely to use too many words as to use too few. The teacher, however, should at first be chary about pruning hard back the too luxuriant growths, for the tree may cease to sprout. Indeed, he might safely accept anything but vain repetition.

When the teacher comes to the business of inventing exercises in adequacy of expression, his task is the fairly easy one of deciding which occasions are most likely to force upon the pupils the need for appropriateness and economy. Therefore, he must always see to it that the audience is clearly specified and that, because of their value as agents of economy, a generous allotment of effort is awarded to the employment of the commoner figures of speech, simile, metaphor, and personification.

Suggestions for Exercises in Adequacy of Speech

Letter-writing—occasion and recipient specified.

Advertisements, Posters—their wording and their display or format (on occasion there should be collaboration with the teacher of Art).

Christmas and Birthday Greetings—to Aunt Meg, Aunt Margaret, Uncle Bob, Uncle Robert.

Newspaper contents bills, headings, captions.

Telegrams.

The unclassifiable occasions which call obviously for a special effort in appropriate selection.

Example.—Here is a list of greetings you may use when you meet friends or are introduced by them to strangers—

1. Good evening!
2. How do you do?
3. It's a fine day.
4. What a stranger!
5. I am very pleased to make your acquaintance.
6. How glad I am to see you!
7. Speak of angels and they appear!
8. I hope you are well.
9. You are looking ever so much better than I expected.
10. The pleasure is also mine.

Choose the most fitting of these expressions for you to employ in each of the cases given below—

You go to the station to welcome a great chum.

Scene, a country road. You are on tramp and you pass an old labourer on his way home for supper.

A friend who has been dangerously ill is out for his first turn in the fresh air; you meet him.

You are introduced by a friend to a stranger who at once says that he is glad to meet you.

You bump into a friend about whom you have just been talking.

(D) *Difficulty of Readiness or Fluency.*

Under this heading may be discussed the expedients which the teacher should adopt in his attempt to get his pupils to make a beginning and, having begun, to go on. All exercises in composition will tend to increase fluency, especially the oral exercises, for conference maketh a ready man. But even if the pupil is not gravelled for lack of matter and has a fair working vocabulary, he may still find the instruments of speech come slowly and awkwardly to hand. As a remedy there is nothing to equal practice in saying the same thing, or roughly the same thing, in various ways. The idea underlying the exercises is that flexibility of speech leads immediately to fluency of speech.

Exercises in Flexibility of Speech

1. *Recasting sentences*, e.g.:
   As he passed through the crowd, nobody spoke.
   He passed through the crowd amidst silence.
2. *Recasting sentence sequences.*
3. *Transformations*:
   Active into passive.
   Interrogative into categorical (How much longer must I wait?—Come at once).
   Negative into positive (Give thy thoughts no tongue—Be silent).
   Literal into figures (The ship was out of control—The ship staggered, lurched, etc.).
   Direct into indirect.
   Rhetorical question into statement.
   Abstract into concrete.

READING

I. Principles Governing the Selection of Subject-matter

The basic principle to be observed in the choice of Reading Matter is, obviously, that the matter selected should be capable of arousing and maintaining interest so that pupils may read or be helped to read with some degree of pleasure. But when teachers ask themselves what particular books or extracts young people of twelve to fifteen should be set to read and what relative importance should be assigned to the various types of available material, they should remember that the problem confronting them is very strictly defined. Its solution is governed by the needs and interests of the adolescent and nearly adolescent, who are in process of discovering that they are merely units in a community and must adjust their way of life with some consideration of the rights and feelings of other people.

For this reason the reading course should be very deliberately designed to provide exercise for the sympathies as well as for the intellect. Indeed, since so much of the work in the general curriculum of the schools is a discipline in comprehending what someone else knows and thinks, it seems reasonable to contend that the larger part of the course in English reading should be chosen to ensure a discipline in understanding the feelings and motives that underlie the conduct of others. Imaginative literature must, therefore, hold a prominent place in the reading course, since it dictates and controls the emotional experiences of the reader.

Teachers may frankly acknowledge that the discipline of daily intercourse with others in the home, in the playground, and in the street provides a culture for pupils which strikes far more deeply than any to be got from books. The teacher need not demit office on that account. The emotional experiences he seeks to provoke through the reading of imaginative literature differ from those which life compels not so much in vividness as in quality. They enlarge the discipline of life by supplementing, refining, and correcting it. It follows that, in the selection of imaginative literature for the pupil's reading, the determining consideration should be, not the literary reputation of the work, but its power to induce the desired experiences in adolescents. In setting himself so deliberately to excite sympathies the teacher assumes a heavy responsibility, and he must see to it that the experiences he seeks to induce are worthy and possible.

In the literary narrative, as not always in life or ever in narrative of the baser sort, motives and actions are seen in intelligible relationship. To the literary lyric the emotional response of the undistracted reader is *always* worthy. Laughter and tears may degrade almost as readily as they exalt. But, induced by the literary artist, they become a discipline, purifying and ennobling. The only safe presentation of humour and pathos is to be found in imaginative literature.

While imaginative literature (for the most part the presentation of fictitious experience in prose or verse) should have chief place in the course, provision should also be made for the study of records of actual experience and achievement or descriptions of real things, real life, and real people. It is true that the challenge of the objective world is partly met by the syllabus of instruction in other subjects. But the course in English should include incidental readings on a variety of topics drawn from actual experience of the type that stimulates imaginative sympathy. A training should also be provided in the use of reference books such as almanacks, encyclopædias, bibliographies, catalogues, gazetteers.

While all reading matter should be capable of stimulating interest, it should also be calculated to make some demand upon pupils for effort and concentration. The extent of this demand will naturally be less where the material is designed for home reading than where it is chosen for class-work. But in no case should the reading matter descend so far in form and content that no effort at all is demanded from the reader. It is not the business of the teacher to find out and prescribe for reading what his public wants; he may be more concerned to check and destroy certain appetites. His intervention need not impair interest or enterprise; it is more likely to excite them. Pupils are not necessarily more interested in easy reading than they are in reading which requires perceptible and conscious effort. The reward of that effort should be in satisfaction with its results, and in the creation of fresh desires demanding new satisfactions. Thus interest is created, thus sane preferences are established. It is a good policy, therefore, to arrange the reading course so that the subject-matter is just a little beyond the pupils' ready comprehension.

The teacher must obviously consider the difficulties of language. These must not be excessive; for constantly occurring difficulties of vocabulary are fatal to the maintenance of interest. The most serious difficulties of comprehension, however, are the result of the adolescent's uncertainties regarding the mental attitudes, the behaviour, the emotions, and the motives of older people. He must be allowed time to grow. Above all, the young reader must not be barred from the experience of discovering greatness for himself. Anything like a deliberate attempt to force the appetite for great literature is sure to weaken it. In all cases the first reading should be done with reasonable speed, and without over-insistence on details of verbal meaning. Further, to prevent unreasonable demands on the pupils' capacity for active interest, the teacher should not hesitate to omit passages which they cannot read or be helped to read with pleasurable comprehension.

It is clear, also, that if interest is to be maintained, the reading course should offer an abundant variety of matter. For class-reading, especially with younger pupils, anthologies of prose and verse should provide a staple diet to be supplemented by dramas, short stories, and longer narrative poems. Long prose narratives are more suitable for home reading.

There are difficulties of the Time-table's making. It is impossible to ignore the effect of broken interest produced by interrupted reading. But this difficulty can be met by a judicious distribution of the reading material between the class-room and the home, and by the occasional running together of periods. It is bad organisation to let the gong determine the point at which reading for the day shall be broken off. So also it is bad organisation to apportion certain kinds of reading to certain periods in the week. A work once begun should monopolise the reading periods until it is finished.

It has been suggested that the capacity to stimulate interest is the first essential in the reading matter, but it must be added that the content of the Reading Scheme as a whole should be so chosen that, at the end of the Three-years' Course, the pupils will have acquired some store of general knowledge of men and things, and will have undergone some real discipline of thought, feeling, and imagination through the medium of their literary contacts.

To sum up—

1. All reading matter must be interesting or capable of being made interesting to the pupils to whom it is presented.
2. The chief stimulus to interest lies in the stirring of healthy sympathies and the satisfaction of real curiosities.
3. This stimulus may be found both in imaginative literature and in records of real experience.
4. Reading matter must not make intellectual or imaginative or linguistic demands beyond the possible capacities of the pupils.
5. Reading matter should demand some effort from the pupils—as much as is compatible with the survival of interest.
6. Good school anthologies of prose or verse should be the main material for class-reading.
7. Teachers should not hesitate to omit at their discretion.
8. The scheme should be designed to provide a discipline of thought, feeling, and imagination.

II. Suggestions for the Choice of Reading Matter in Post-primary (Advanced Division) Courses

The following suggestions are to be considered in the light of the section headed "The Selection of Subject-matter." It is, of course, impossible to devise a scheme which will be suitable for all types of pupil. Part of the material suggested is suitable for Home or Silent Reading, part for Class-work, and part might serve both purposes. The decision is for the individual teacher to make in view of the peculiar needs and capacities of his pupils.

N.B.
1. Material for Home Reading is to be found chiefly, though not exclusively, in Sections I and II of the selections for each year.
2. The material named under each heading is of varying difficulty. What suits a good first-year class might quite possibly suit a weak second-year class, and so on. The teacher must decide.
3. The selections are meant to be *typical*, not exhaustive.
4. It must be clearly understood that the following lists are not intended to form a syllabus of reading for a Three-years' Course, but merely to suggest material from which such a syllabus might be chosen.

PROSE READING

First Year

I. *Tales of Action, Adventure, and Wonder :*
Hereward the Wake (abridged), Treasure Island, Kidnapped, Water Babies, Huckleberry Finn, Rip van Winkle,

Alice in Wonderland, Tales of a Grandfather (selections), The Cloister and the Hearth (selections), Martin Rattler, Last of the Mohicans (abridged), King Solomon's Mines, Gulliver's Travels (selections), Robinson Crusoe (selections), Arabian Nights (selections), a Henty or Herbert Strang story, Swiss Family Robinson, Coral Island, Twenty Thousand Leagues under the Sea, a Talbot Baines Reede book, Winnie the Pooh, Helen's Babies, an E. Nesbit book, Pilgrim's Progress (selections), Tales from the Bible, a Collection of Short Stories.

II. *Myth and Legend :*

The Heroes, Norse Legends, Lang's Fairy Books, Hans Andersen (selections), Tanglewood Tales, Green Magic, Silver Magic, Fairies and Chimneys, Grimm (selections), The Rose and the Ring.

III. *Nature Books (Animal Stories, etc.) :*

Just So Stories, The Wind in the Willows, Bevis (Jeffries), Black Beauty, School of the Woods (W. J. Long), Uncle Remus, Dr Doolittle books, Old Silver Grizzle and Raggie Lug (Thompson Seton), a Collection of Nature Stories.

IV. *Records of Real Achievement, Experience, and Observation : (History, Travel, Exploration, Scientific Discovery, Mechanical and Natural Processes)—*

Escapes and Hurried Journeys, Extracts from Bible in Spain, Scott's Last Expedition, Man Eaters of Tsavo (selections), a Handicraft book, a Book of Miscellaneous Extracts.

Second Year

I. *Tales of Action, Adventure, and Wonder :*

Westward Ho! (abridged), Jungle Books, Midshipman Easy or Peter Simple, Two Years before the Mast, Daft Days, King of the Golden River, Black Arrow, Oliver Twist (abridged), Ivanhoe or Talisman (abridged), The Flight of the Heron, The Sea-Hawk, Ben Hur (Wallace), Uncle Tom's Cabin, Deerslayer (abridged), Little Women, a Henty book, Don Quixote (selections), What Katie Did, a Mrs Ewing book, a Collection of Short Stories.

II. *Myth and Legend :*

The Heroes, Arthurian and Norse Legends, Lang's Fairy Books, Hans Andersen, etc.

III. *History, Biography, Travel, Exploration, Natural History, etc.:*

Lost Secrets, Johnson's Birds and Animals, Thompson Seton's Wild Animal Ways, Collections of Traveller's Tales, a Book of Miscellaneous Extracts.

Third Year

I. *Novels and Romances :*

Tale of Two Cities or David Copperfield or Great Expectations, Lorna Doone, Legend of Montrose or Heart of Midlothian, Silas Marner, Typhoon, First Men in the Moon, Spendid Spur, Rob Roy, Kim, Tom Brown's Schooldays, Tom Sawyer, Tower of London, White Company or Micah Clarke, The Golden Age, Prester John, A Gentleman of France, Captains Courageous, Tom Brown, White Fang or Call of the Wild, Allan Quatermain, Prisoner of Zenda, Three Musketeers, Rebecca of Sunnybrook Farm, Handy Andy.

II. *Short Stories :*

Conan Doyle, Bret Harte, O. Henry, Mary Wilkins, Stevenson, Scott (*e.g.* Wandering Willie's Tale), Dickens, Jacobs, Kipling, Wells, Aumonier, Quiller-Couch, Blackwood, Mrs Oliphant, etc., a Collection of Short Stories.

III. *History, Biography, Travel, etc. :*

Jeffries' Wood Magic or Gamekeeper at Home, Hudson's Book of a Naturalist or Far Away and Long Ago, Roberts' In the Morning of Time, The Cruise of the Cachalot, Collections of Miscellaneous Extracts.

IV. *Essays and Sketches :*

Addison, Goldsmith, Lamb, Stevenson, Alpha of the Plough, Barry Pain, E. V. Lucas, Belloc, Lynd, K. Graham, A. A. Milne.

Note.—1. In the case of Short Stories, Myth and Legend, De scriptions of Nature, Travel or Discovery, History and Biography, Essays and Sketches, Collections or Anthologies should be freely used. Several admirable books of this type are available.

2. The reading might with profit be supplemented by interesting newspaper articles of reasonably good literary quality.

VERSE AND DRAMA

First Year

I. *Narrative Verse*, *e.g.*, Ballads, John Gilpin, Ancient Mariner, Macaulay's Lays, Pied Piper of Hamelin.

II. *Lyrical Verse* without adult sophistication. Numerous good anthologies are to be had of mixed lyrical and narrative verse.

III. *Drama.*—A collection of simple plays or dramatised stories may be found suitable.

Second Year

I. *Narrative Verse*, *e.g.*, Marmion or The Lay of the Last Minstrel (judiciously cut). An anthology of mixed narrative and lyrical verse.

II. *Lyrical Verse*—from anthology.

III. *Drama.*—Selected scenes from Midsummer Night's Dream or Merchant of Venice. A collection of short prose plays.

Third Year

I. *Narrative Verse*, *e.g.* Sohrab and Rustum, Michael, Morte d'Arthur. An anthology of mixed narrative and lyrical verse.

II. *Lyrical Verse*—from anthology.

III. *Drama*—Midsummer Night's Dream, Merchant of Venice, Julius Cæsar (with a good class). A collection of short prose plays.

III. Communication of the Subject-matter or Comprehension

As in the teaching of Composition, so in the teaching of Reading, it is both convenient and possible for the teacher to consider the subject-matter and the communication of it separately. What the pupil may get of knowledge or gratification from books and oral speech will depend in the first instance on his power to grasp what the author is saying. Exercises in the art of ready comprehension should, therefore, accompany the study of texts at all stages, and should for younger and backward pupils occupy a fair portion of the time allotted to reading. The teacher might find the material for these exercises in the general reading of the class, but two considerations of great practical moment intervene to disqualify that as the only or the normal practice: (1) no limited course of general reading would be certain or even likely to furnish all the exercises desirable, or present these in the most convenient form; and (2) to hold up the reading so that the pupil may study particular usages is to enfeeble both understanding and interest. The curriculum should, therefore, provide for short organised exercises designed to meet the difficulties pupils are likely to encounter in their effort to understand what they hear or read.

(A) *Difficulties of the Reading Vocabulary.*

Here the words and phrases presented for treatment should be assigned a context or association which enforces their meaning.

The exercises suggested are—

1. Discrimination of words easily confused.
2. Use of the dictionary.
3. Classification of words according to meaning.

   Examples.—Classify into six groups the following nouns:—

   Gulf, wave, burn, firth, waterfall, morass, stream, loch, swell, estuary, rill, fen, cascade, rivulet, lagoon, mere, lake, billow, fiord, tarn, cove, brook, ripple, pond, creek, surf, ditch, bight, bog, torrent, linn, runnel, sound, quagmire, cataract, rapids, strait, slough, breaker, beck.

4. Compiling lists of words under one heading.

   Examples.—

   Ships—Ironclad, dreadnought, cruiser, destroyer, submarine.

   Frigate, brig, schooner, sloop, cutter, yacht, yawl, ketch, smack, lugger, bark, lighter.

   Liner, merchantman, slaver, steamer, collier, whaler, coaster, clipper.

   Bireme, galleon, junk, praam, dhow, sampan.

   Motor-boat, pinnace, launch, shallop, gig, dinghy, wherry, coble, punt, kedge, catamaran, coracle, gondola, canoe, raft, ferry.

   Verbs meaning "to move quickly"—

   Trip, speed, haste, hasten, scramble, dart, skim, sprint, race, scuttle, scurry, scorch, scamper, post, run, trot, gallop, amble, bound, lope, bounce, bolt, flit, rush, hurry.

   Classify the following adjectives under the heads chief, useful, suitable, unspoiled—

   Sound, appropriate, genuine, helpful, prominent, apt, principal, fresh, serviceable, fit, outstanding, unimpaired, meet, main, advantageous, seemly, profitable, leading, sterling, beneficial.

These exercises should be of the community type, the individual pupils and the teacher himself contributing to the common stock of words.

5. Associating substantives with appropriate adjectives, verbs with substantives, verbs with adverbs.

   Example.—Associate these adverbs—lightly, steadily, cautiously, swiftly, proudly, aimlessly—with the appropriate verbs in the following list:—

   Pass, flit, glide, roll, wander, trek, ramble, roam, rove, stroll, trip, stray, prowl, saunter, march, step, pace, promenade, trudge, stalk, stride, strut, tramp.

6. Providing words with "opposites."
7. Some study of etymology. See Appendix II.

(B) *Difficulty of Orderly Interpretation.*

Types of exercises—

1. *Order within the sentence.*
   (*a*) The effects of departure from the normal order, especially emphasis and sentence linkages.
   (*b*) Some study of Grammar. See Appendix III.
2. *Sentence Connectives.*
   (*a*) In a given passage of prose or verse, mark the linking expressions where these exist. (The absence of markings should indicate implicit linkages.)
   (*b*) Name the linkages employed in any passage—conjunctional, repetitive, implicit.
   (*c*) Arrange the events mentioned in a narrative passage in strictly chronological order.
   (*d*) "Place" connectives. From a specification in prose or verse, make a plan or a picture. (The drawing of the picture might now and then be made the occasion for inviting the collaboration of the teacher of Art.)

(C) *Difficulty of Complete Comprehension.*

Comprehension is an art, dexterity in which is to be attained by practice and training. The ability of the pupil to perceive all the author's intention and to read into it nothing of his own depends, to a large extent, upon his experience of the ways of authors. To accompany class reading and home reading and as ancillary to these, the teacher should, therefore, devise a series of exercises, short, graded, and varied, whose aim is to train pupils in the ready analysis of subject-matter and recombination of the elements. A very simple example of this kind of exercise—

> "Some days later while passing by the village green he saw her enter a garden gate."

The constituents of the sentence are $\left\{ \right.$

1. Some days later
2. While passing by the village green
3. He
4. Saw
5. Her
6. Enter a garden gate.

Recombine the elements, with the necessary changes of expression, in the following order:—

6	5	4	3	1	2
1	5	4	3	6	2
3	2	1	4	5	6
2	5	4	3	1	6

We may assume as an axiom that no one can attain to complete comprehension without some critical perception on his part of the means employed by the author to unfold his intention. This is the only department of literary criticism with which children should ever be asked to concern themselves. They are often quite unable to pass judgment on the merits of the author's subject-matter, but they are certainly capable of assessing in some degree the efficiency of the means he adopts to communicate it. Teachers who hesitate to ask their charges to analyse the thoughts and sensations they experience in the course of reading a great work need have no misgivings in examining with them the instruments the author has used to achieve his purpose. This is not to emaciate, degrade, or disrupt worthy experience, but to make it possible.

The teacher should, therefore, in the course of the reading lessons seize the opportunity occasionally, but not too often, to ask such important questions as these—Why these words and not others? Why this particular modification of rhythm, rhyme, or tempo? Why these repetitions? Why archaic usages? Why this figure? Why simple, why ornate expression? How justify or condemn a particular employment of alliteration, onomatopœia, or assonance? Why this arrangement of words?

Here falls to be discussed the important matter of the allocation of time and emphasis to oral and to silent reading. These are not rivals but complementary. Very clearly, readings in drama and in lyric must be oral. Just as clearly must some prose be read orally if the ear is to be trained to detect prose rhythms. Some, if not all, of the oral readings must be made the occasions for speech training, the minimum essentials of which are (1) training in the pronunciation, enunciation, and articulation of vowels, consonants, and syllables and (2) training in the modulations, cadences, and modifications of tempo which give an added significance to the spoken word. No attempt, however, should be made to eliminate undegraded local intonations.

For a monograph on Speech Training, see Appendix IV.

The reading should be silent when the object is (1) to thrust upon individual pupils the duty of getting certain information (a form of elementary research), (2) to develop speed in reading, and (3) to train pupils in habits of independent study. If the readings are accompanied by reports of some kind, there can be little question of their value as a preparation for the experiences of adult life.

For a treatment of Silent Reading, see Appendix V.

(D) *Flexibility of Mind.*

To achieve a ready adjustability of mind in reading is obviously much the same effort as to achieve flexibility of expression in composition. The exercises in this section of the course should therefore involve the use of alternative methods of expressing the same thing—active and passive, interrogative and categorical, negative and positive, figurative and literal, direct and indirect, concrete and abstract.

APPENDIX I

PUNCTUATION

The aim of punctuation is to clarify written expression through the use of conventional signs. These signs have not been produced as a logically developed system, but are an evolution through the practice of successive generations of printers, who have, within certain limits, fixed their values and settled their usages. Outside those limits, however, a writer is still free to express his intention in an individual manner, using such stops or combinations of stops as seem to display the coherence of his thoughts in a more effective way than others.

Classification of the Signs.—Punctuation marks thus fall into two main divisions: (A) formal or fixed signs, and (B) functional signs.

(A) Formal signs are those stops which can be inserted mechanically by rule, their usage being fixed by convention. They are:

The Query mark	?
The Exclamation mark	!
Quotation marks	“ ” and ‘ ’

(B) Functional signs are those stops whose use is not rigidly determined by printers' convention, but amongst which the writer makes discriminating choice, according as one or another seems to suit the particular occasion. They are:

The Period	.
The Colon	:
The Semicolon	;
The Comma	,
The Dash	—

(C) A third category, intermediate between the formal and functional stops, displays some of the features of both. These are the parenthetical stops:

Double Dashes	— —
Semi-lunes	( )
Brackets	[ ]

This classification suggests a natural approach to the work of teaching punctuation.

(A) THE FORMAL STOPS.—The use of these being a mere matter of rule, pupils should be exercised in them till their practice becomes automatic. Special attention should be paid to the following points:

1. The direct and the indirect question.
2. Quotations within quotations.
3. Interrupted quotations.
4. Quotation marks as a substitute for italics.

(B) THE FUNCTIONAL STOPS.—In using these stops a writer definitely intends to add significance to the written word; and because of this individuality general usage is not uniform. Still, a writer's intention is not communicated unless it reaches the reader's perception, and hence in teaching punctuation for a pupil's own use we must attempt to define the functions which these stops perform.

The feature they possess in common is that they indicate a suspension or an eddy in the direct flow of thought, such as a speaker might indicate by some modification of his delivery.

In speech there are four possible devices significant to this end, two of intonation and two of tempo. They are rising pitch and falling pitch, prolongation of a pause, and prolongation of a sound. These may be used either singly or in combination—to the great enrichment of our spoken language. But the criterion of the spoken expression is of little use in determining the punctuation of the written word. Many of the pauses made in speech cannot be represented by stops in writing without violent disruption of ideas that are logically inseparable; and, to deal with such pauses as must be represented, we have only the five symbols —the period, the colon, the semicolon, the comma, and the dash.

The true functions of these stops can be best appreciated by a consideration of their essential attributes.

1. The period is the definite sentence mark.

2. Their order of precedence is: period, colon, semicolon, comma. To this group also belongs the dash, a stop of indeterminate value which may on occasions be substituted for any of the others, with a suggestion of incompleteness or suspense of thought.

This settles the problem of "interior" punctuation—the pointing-off of a phrase within a phrase. The less can never include the greater, so that colons cannot appear inside a passage defined by commas. Where this principle would be violated the parenthetical marks are called in to legitimatise the intrusion.

To these may be added two propositions of less certain acceptance:

3. Punctuation, being ancillary to clearness of expression, should be kept at a minimum. Gratuitous punctuation is misleading: still the premonitory value of a stop is as important as its conclusive effect.

4. A co-ordinating conjunction tends to reduce the value of the stop required—comma for semicolon, etc., no point at all where otherwise we would use a comma.

The Period and the Sentence.—That the period marks the completeness of a statement ("conclusive" use) may seem straightforward enough to an adult, but in teaching young or dull pupils stress should rather be laid on the "premonitory" effect of the period. It may be of more consequence to them that the period stands as a signpost at the beginning of the next sentence, intimating that a fresh start is about to be made. We may turn this to good account in teaching not only sentence-structure but also paragraphing. Opening an additional statement involves opening a new sentence. Opening a fresh topic involves opening a new paragraph.

Kinds of Sentences.—Unless a pupil can recognise the various kinds of sentence he will have trouble in punctuating those in which several principal clauses occur. The most useful classification of sentences for our purpose is a fourfold one.

1. *Simple Sentence.*—Simple predication about a simple subject.
2. *Complex Sentence.*—The same as type 1, but with a clause or clauses in subordination.
3. *Compound Sentence.*—This should be understood as one in which either the subject or the predicate is compound, *e.g.*,

   (*a*) An Englishman, a Scotsman, and an Irishman, who had never seen an aeroplane, were out shooting.

   (Compound Subject.)

   (*b*) He spluttered, coughed, and gasped, when he came to the surface.

   (Compound Predicate.)

This interpretation of the term "compound sentence" throws into prominence the question of "concords" and the powerful elucidative effect of the comma correctly used. Note how the meaning of sentence (*a*) is changed when the comma is omitted after "Irishman."

4. "*Group-sentence.*"—This is a congeries of statements which, though virtually independent sentences in that they are not in grammatical subordination, yet form elements of one massed idea. These sub-sentences are pointed off not by periods but by stops of lower rank—colon, semicolon, or comma.[1]

Substitutes for the Period within the group-sentence—the Colon and Semicolon.—The teacher will find it impossible to avoid the treatment of group-sentences, for brighter and older pupils will insist on using those other "more distinguished" stops which they meet so frequently in their reading. They will introduce colons and semicolons, merely as "elegant variations" of the period. Modern practice is somewhat unsettled in the use of the colon and the semicolon. The following principles, however, are both logical and in harmony with the studied practice of careful writers.

Group-sentences may be divided into the classes of "double-statement groups" and "many-statement groups." Those containing only two principal propositions may be called "dithetical" sentences, those containing more than two "polythetical."[2]

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[1] Common as the device of the group-sentence is in literary English, its use by younger pupils should be discouraged. They meet enough of difficulty in manipulating the period and the comma, without having their minds confused with the colon and the semicolon. All group-sentences can be rewritten as a series of simple, complex, or compound sentences.

[2] This classification of sentences at once solves the major difficulties of discriminating the uses of the comma, the colon, and the semicolon between principal clauses in a single sentence. It may be stressed again that weaker pupils need not be asked to use these stops at all. The sentence can always be resolved into its component parts, each of which is treated as an independent sentence.

It is certain that no artificial scheme of punctuation could win acceptance against the common sense and practice of careful writers, but these suggestions are put forward as a simple formulation of the principles that actually underlie the great mass of literary writing. The mere accumulation of "jargon" terms, which may add an additional

"*Dithetical*" *Group-sentences.*—The two sub-sentences in the "group" must either have different subjects, or refer (either in the same or in equivalent terms) to the same subject. The colon, being the stop of greater power, is employed to mark the greater disjunction, viz., the change of subject; while the semicolon is used when the subjects are virtually the same. These stops may be "scaled down" to a stop of lower value when a connective word is used, and when the predications are short.

Examples :

(*a*) Same subject.

John was very tired; he had been awake all night.

John was very tired, but he decided to get up.

(Stop reduced.)

Sir Roger would suffer no one to sleep in church besides himself; he believed in upholding the privileges of landowners.

A foolish woman is clamorous; she is simple, and knoweth nothing.

(*b*) Different subjects.

Sir Roger would suffer no one to sleep in church besides himself: landlords have their privileges.

I am afraid he is going to be ill: he looks too pale.

I am afraid he is going to be ill; for he looks too pale.

(Stop reduced.)

He felt faint, so they loosened his collar.

(Stop reduced.)

The fear of the Lord is to hate evil: pride, and arrogancy, and the evil way, and the froward mouth, do I hate.

A wise son maketh a glad father: but a foolish son despiseth his mother. (This is the Biblical punctuation. The colon was not reduced before "but," which shows disjunction rather than connection. Modern usage demands the semicolon.)

---

and needless load to the pupil's memory, is to be strongly deprecated, and the neologisms "dithetical" and "polythetical" are employed with reluctance, and only because the suggested new classes of sentences require names of some sort, if only for reference, and the terms chosen really describe their essential nature.

"*Polythetical*" *Group-sentences.*—When a "group" contains several sub-sentences, one of these is logically the dominant clause even although the others are not grammatically subordinated to it. Orderly arrangement requires this dominant statement to come either at the beginning or at the end of the group—usually at the beginning. Hence the logical and customary punctuation is as follows:

(*a*) When the dominant statement comes first, the other sub-sentences, which are either illustrative, elucidative, or additive, are mutually separated by semicolons, because the stop of greater power, the colon, must introduce the list or enumeration, *e.g.*: The fortunes of the prodigal had now reached a low ebb: he had not a penny in his pocket; his clothes were in rags; all his fine furniture had been seized to pay his debts; his friends of yesterday knew him no more.

(*b*) When a succession of sub-sentences leads up to a general synoptic statement, the mind demands a pause to allow it to recapitulate the items. Hence the dash is commonly employed before the concluding, dominant, sub-sentence, *e.g.*: The eastern horizon grew from grey to russet; the lark trilled upwards to the clouds; the dogs turned themselves and sniffed the air—the day had begun.

> The cock may craw, the day may daw'—
> But aye we'll taste the barley bree.

(Punctuation reduced because the propositions are short.)

Further functional usages of Colon and Semicolon.

Besides standing as substitutes for a period in group-sentences, the colon and semicolon are used as comma-substitutes in order to separate phrases, in a manner analogous with their use as period-substitutes. Thus:

> The hands in Rembrandt's pictures are as wonderful portraits as the faces: none of your slim Van Dyck elegancies, which have done duty at the cuffs of so many doublets; but each man with a hand for himself, as with a face for himself.

The Comma.—It is possible to dispense with commas by modelling the sentences so that each flows directly from start to finish. But, apart from the need for variety in sentence-structure, a writer sometimes wishes to amplify, or modify, or hold back for the sake of subordination or emphasis, certain ideas and their expression. Hence arise frequent breaches in the continuum of the thought. Such hold-ups or eddies are indicated by commas.

1. *Suspensive Use.*—Interpolations, balancing phrases (like "however"), nominatives of address, additive appositional phrases (like "Mr Brown, a baker, . . .", but "Brown the baker . . .").
2. *Enumerative Use.*—Between words and phrases standing in parallel relationship (nouns, adjectives, verbs, adverbs). The insertion of a conjunction does not dispense with the necessity for a comma except when the elements in the enumeration are just two in number, linked by a conjunction.
3. *Grammatical Use.*—Clauses as such are not indicated by commas except (*a*) when they are principal clauses whose punctuation has been "reduced" as already described; (*b*) when subordinate clauses are so far separated from the word on which they "depend" that ambiguity might arise or a false lead might be given through their attraction to another dominant.
4. *Excessive Use of Commas.*—Departure from the normal order of words should not be indicated by commas unless ambiguity is caused by their omission. No system of punctuation should be taught that bases itself on the natural pauses of speech-phrasing. Such a practice gives rise to over-punctuation; for in speech, practically every noun offers a "balancing-point" for the voice. In fact, in reading aloud we can make it a rule to pause (1) at the functional stops and (2) on all the nouns, except occasionally those followed by "of."

(C) Parenthesis Marks.—

The Double Dash.
Semi-lunes.
Brackets.

These signs are partly structural like the formal stops, and partly organic like the functional stops. They mark interpolated phrases and clauses. But the comma also marks interpolations. The difference is that the parenthetical signs emphasise the intrusive nature of the expression they embrace.

Pupils may appreciate the distinction between double dashes and semi-lunes, as they are to-day most effectively used, by observing the following principles.

1. The *double dash*, by an extension of the suspensive power of the single dash, indicates an additive comment or a supplementary (not explanatory) fact, *e.g.*:—

> So far as I know,—and I have excellent opportunities of forming an opinion,—his work has never since been equalled.
>
> (Commas are usually, but incorrectly, omitted.)

2. *Semi-lunes* emphatically isolate the embraced expression from the main sentence.

(*a*) They enclose a necessary explanation, which may be omitted on second reading, *e.g.*:—

> The wallet contained a scalpel, a rugine (a surgeon's rasp), several pairs of forceps, and a meat-saw

or

(*b*) They indicate that the embraced statement is logically out of its proper place, or logically subordinate to, though grammatically independent of, the main statement, *e.g.*:—

> (1) Stepping softly along, (I should have mentioned he had taken off his boots), he came within a few feet of the sleeper.
>
> (2) He laid a knife, a corkscrew, and a watch, (these were the simple contents of his pocket), on the table, and left the room.

3. *Brackets* are purely formal signs, and have no value for school pupils; but their legitimate use in books should be understood, viz.—to signalise an interpolation thrust by an editor or copyist into a text quoted from another source.

Sequence of Stops.—When two or more punctuation signs fall at the same place, their arrangement requires some attention. Coincidences of this kind are common wherever quotation marks or parentheses are employed. Practice should be given in the punctuation of such sentences as—

> Have you seen my "Cæsar"?
> He asked, "Have you seen my 'Cæsar'?"
> "Did you call, 'Help!'?" (This is a model for avoidance.)

With regard to the use of commas, etc., in conjunction with parentheses it should be noted that the presence or absence of the comma or other sign is conditioned by the punctuation which the sentence would require if the parenthetical expression were omitted.

Punctuation Exercises and Tests.—What a pupil does not understand he cannot punctuate, for functional punctuation is based on "intention." Consequently all exercises in which a pupil is given an arid desert of uncapitalised and undivided text for punctuation are bad. They teach nothing, and they test merely his ability to solve a certain kind of puzzle.

Suggestions:—

1. Punctuation exercises should be founded on material read aloud in proper intelligible fashion, with *all* the speech-pauses strongly marked.
2. If printed originals are "set," all those speech-pauses should be indicated by vertical lines. The duty of determining where *not* to insert a stop is as important as the choice of the right stop in the right place.
3. Passages involving the use of colons or semicolons should not be set except to provide specific training in the use of these stops, and even then only to advanced pupils.
4. The main bulk of the work should be on the formal stops, and on the period and comma. Till pupils are old enough to be able to use the others with a true sense of function, their use should be forbidden. With adults they are often a mere "camouflage" for slovenly expression.

APPENDIX II

ETYMOLOGY

Such attention as is given to Etymology will have for its objects to stimulate the pupil's interest in words, to help him to a readier sense of their meaning in its simplest terms, and, by presenting in association words that have common elements, to make easier the remembering of meanings.

Systematic work will be concerned mainly with derivatives from Latin and Greek. It is useful, however, to show the relationship between quite simple native words, even though the meaning is already known—*bind, band, bond, bundle*; *break—breach*; *cold—chill*; *drive—drift*. It is scarcely worth while to dwell on native affixes; their force has been already absorbed. Compounds may now and again be analysed; with some pupils, for example, it may not be superfluous to analyse even so simple a word as *breakfast*.

The Latin prefixes and a few of the Greek should be done as thoroughly as possible. (Suffixes are less important; they should be noted, however, where there is danger of confusion as in *credulous—credible*, or where they are used to build up scientific terms that fall within the pupil's range—*molecule, bronchitis*.) The prefixes should be taken along with the roots to which they are attached. Consideration of *repel, propel, impel, compel, expel, dispel*, not only fixes the meaning of the root but throws into relief the differing effects of the prefixes. (Where, as in this case, the derivatives are from the Present stem, the related words from the Past Participle stem should be added—*pulse, repulse, compulsory*, etc. The connection is not always evident to the pupil who has never conjugated a Latin verb. *Solve* should suggest *solution*; *retain, retention*; *tangent, contact*.) Similar association should be set up among derivatives from other parts of speech. Round *ped-*, for example, will be grouped *pedal, pedestrian, pedestal, biped, quadruped, centipede*. The pupil who is doing French will remember the root more easily if he associates the French derivative.

The systematic lessons should cover a considerable number of the commoner and more fruitful Latin and Greek roots. Much may also be done incidentally in the course of class reading. Excursions may be made, without distraction from the main purpose, to consider expressions of which the meaning is made clearer by derivation. "*To plumb the depths . . .*"—reference to *plumbum* would not only light up the phrase but also connect the sailor's craft with the mason's and the carpenter's and the plumber's, and give the clue to the meaning of *plumb, off the plumb, plumb-line, plumb-rule.* On favourable occasions the list could be extended to include *plunge* and *plummet.* Again, though little can be done systematically in tracing the development of meaning, some notice must be taken of development in reading the Bible or Shakespeare. "They that are *whole* have no need of a physician." "Let our just *censures attend* the true *event.*"

Yet the main concern is with current meaning and, as a rule, where the connection of current meaning with the root is long and circuitous, there is little to be gained by making the connection. In considering derivation, Advanced Division pupils have a limited aim. For them Etymology should be a key in the hand rather than a burden on the back. The derivatives from *manus* would include such words as *manual, manuscript, manacles*, but might well stop short of *manure* and *manage.* The root is of little use unless it is plainly alive and operative in the word. It is so, as a rule, in the array of scientific terms with which, whether in Mathematics or Chemistry or Physics or Geography, the pupil has to make acquaintance on his promotion to the Advanced Division. Teachers of Science should give clues to the meaning of the terms they employ and particularly of elements that are frequently compounded.

The work done in elementary Etymology should produce more than an addition to vocabulary. It should also suggest an attitude to words and a method of tackling them, and it should result in a freer and more intelligent use of the Dictionary.

APPENDIX III

GRAMMAR

It is scarcely necessary in Scottish schools to stress the importance of Grammar. It may be necessary rather to suggest that more should not be expected of Grammar than it is fitted to give. The pupil's difficulties, both in interpretation and in composition, are due more to meagreness and haziness of vocabulary than to obscurity of structure, and the knowledge of Grammar will not by itself enable a boy to read intelligently or write well. At the same time Grammar has a contribution to make. The study of Grammar should help a boy to realise that expression is articulated, that the words in a sentence are not like peas in a bag, independent and equally important units, that they have a significant order and significant groupings, differing functions and relations. There is a considerable value, too, in the typical grammatical exercises, which all involve some process of analysis —the breaking up of a complete whole, the examination of the parts and of their relation to each other and to the whole. While the immediate object is the analysis of the grammatical structure of a passage, one would expect, at least as a by-product, a clearer apprehension of the meaning. To that extent the exercise is a direct aid to comprehension. The effects on composition should be seen in the intelligent elimination of formal errors, a negative but not unimportant result.

By the time the pupil has passed into the Advanced Division he has probably mastered all that he needs of English Accidence. The formation of the plural and of the genitive case of nouns will demand little more than accuracy in spelling. Gender, grammatical gender, has little meaning as an aspect of the noun; it does arise in the pronoun, but so obviously that it may be quickly dismissed. The declension of the pronoun should be revised, were it only to clarify, in association with illustrative sentences and phrases, the important idea of case. The verb also should be revised (again with illustrative sentences) until the distinctions of tenses, of active and passive, transitive and intransitive, finite and non-finite, are appreciated with some precision. Mood is less important, and backward pupils should ignore the subjunctive.

In English Grammar, however, Form is less important than Function. A word like "round" may without any change of form be used as a noun or an adjective or a verb or an adverb or a preposition. Whether it is a noun or a verb, etc., can be determined only by the part it plays in its group. For that reason the approach should be not from the single word to the sentence but from the sentence to the word, by way of the phrase where it occurs. In the hierarchy observable among the parts of speech the grading is determined by the rôle of the word in the sentence. The primacy belongs to nouns (with pronouns) and verbs, which alone are essential to the sentence. The broad underlying distinction is that between persons and things on the one hand and actions and situations on the other. When we analyse further and regard separately from the thing its defining feature or quality, and from the action its attendant circumstances (of time, place, etc.), we form new classes, adjectives, and adverbs. The preposition is on a different plane; its general function is to combine with the substantive to form phrases which themselves belong to classes already established, adjectives and adverbs. Conjunctions represent not so much new elements as the links between existing elements, taking their colouring from the nature of the transition from the one element to the other. Interjections scarcely fall within the range of the articulated expression of which Grammar takes account.

The clear recognition of difference of function is very important. Once the boy has learned to classify a word not by its appearance but by the part it plays, he will without difficulty recognise, say, an adjective-equivalent, when he meets one, whether it take the form of another part of speech or a phrase or a clause. (A *garden* flower. A *flower* garden. The *Trade Disputes* Bill. The *L.M.S.* Railway. *John's* books. A child *in the full health* | *of his mind* will put *his* hand flat on the *summer* turf, feel it, and give a little shiver *of private glee* at the elastic firmness *of the globe*. The joy *of an Adam* | *new to the garden* | *and just looking round* is brought by the normal child to the things *that he does* as well as to those *that he sees*.)

The essential parts of syntax (as of Accidence) are already familiar to the pupil. The great rule of Concord is simple in its application in English. Guidance may be needed when the subject is compound, especially when the parts of the subject are connected by "either . . . or," "neither . . . nor." The pupil should make sure that the reference of pronouns to the nouns they represent is clear, and avoid such a mistake as "one of the best books that has appeared this autumn." In the absence of inflection the reference of the participle may give trouble. ("Arriving at the station, the last train had gone.") Attention should be drawn to the commoner ellipses, as in clauses of comparison or the omission of the relative object. The conversion of direct into reported speech will raise the problem of sequence of tenses.

A word or two may be said about parsing. The main need here is to cut out the dead wood. As a rule, all that is essential in parsing is to name the part of speech and state briefly the most important grammatical relation—of noun to verb or preposition, of adjective to noun, of verb to its subject. The conscientiousness which insists on accounting grammatically for every word is really misplaced. Often it is more profitable to deal not with the single word at all but with the group which contains it. The nominative absolute construction, for example, may be treated in that way, at least by young or backward children.

The order of treatment in these notes, the consideration first of single words and their functions, must not mislead: the most important unit in Grammar is not the single word or the phrase but the sentence, and the fundamental distinction is that of subject and predicate. The analysis may be usefully carried further. The predicate, in particular, may be subdivided to show separately the indispensable finite verb, the object and the adverbs (where these occur); and sometimes, at the risk of having too many pigeon-holes, qualifying adjectives are separated from the substantives in subject or object. This degree of detail is not always advisable. It may sometimes be necessary as a preparation for the analysis of the complex sentence, in which a clause may replace the substantive (in subject or object), or the qualifying adjective or the adverb. Where the verb is one of "Incomplete Predication," the complement is often shown as a separate element : with young or slow children it would be better not to subdivide the predicate of such sentences.

The pupil should soon be able to deal with simple sentences, whether they exhibit the normal order of words or a deviation from the normal order. As his powers of analysis develop, the complex sentence will offer him better scope. Here he should train himself to recognise quickly what is primary and what is subordinate and fix the former firmly in his mind before he attends to the latter. That is the method that the adult, too, adopts in a similar situation. When he cannot take in the whole sentence at a glance, he traces the course of its main stream first and then goes back to explore the tributaries. The boy's way is necessarily more formal. We expect him not only to recognise but to name the tributaries, and to indicate clearly the points at which they attach themselves to the main current. The day will come when he can dispense with the scaffolding of Grammar, but even then he will be the better of having once used it.

As for method, the simplest is the best as long as it serves the purpose. Much of the work will be done orally, and it is usually sufficient to write the sentence on the board, underline the principal clause, bracket off the subordinates, and indicate their reference by arrows. The teacher will not regard his work as finished when he has formally analysed. His ultimate purpose is to elucidate the meaning of the sentence as a whole by fixing attention successively on the parts and noting their import and connections. The pupils should not be put out if they make the discovery that sometimes the most significant part of a sentence is found in what is grammatically a subordinate clause. Through the discovery they may come to appreciate the distinction between grammatical analysis and logical.

Stress has been laid in these notes on analysis as the characteristic grammatical exercise. It is assumed, however, that the corresponding synthetic exercise will not be neglected, the exercise of weaving together separate but related statements. The one process throws light on the other. Some training in the use of participles and subordinate clauses is of great value, particularly to those pupils who bark ingenuously in short simple sentences, all of the same pattern and either unlinked or loosely strung together.

Rhetorical Analysis.

The scope of purely grammatical analysis is limited to the sentence. But it might be a mistake to finish here. Any power of analysis that has been developed—any ability to distinguish the more significant from the less, the trunk from the branches—should be extended to the paragraph. There is a difference of method, but there is no change of aim: the aim is still the determination of what is primary and what subordinate and of the contribution made by the successive parts to the treatment of the whole. An example may illustrate what is meant.

> "It happened one day, about noon, going towards my boat, I was exceedingly surprised with the print of a man's naked foot on the shore, which was very plain to be seen in the sand. I stood like one thunderstruck, or as if I had seen an apparition. I listened, I looked round me, I could hear nothing, nor see anything. I went up to a rising ground, to look further. I went up the shore, and down the shore, but it was all one; I could see no other impression but that one. I went to it again to see if there were any more, and to observe if it might not be my fancy; but there was no room for that, for there was exactly the very print of a foot—toes, heel, and every part of a foot. How it came thither I knew not, nor could in the least imagine. But after innumerable fluttering thoughts, like a man perfectly confused and out of myself, I came home to my fortification, not feeling, as we say, the ground I went on, but terrified to the last degree, looking behind me at every two or three steps, mistaking every bush and tree, and fancying every stump at a distance to be a man; nor is it possible to describe how many various shapes affrighted imagination represented things to me in, how many wild ideas were found every moment in my fancy, and what strange, unaccountable whimsies came into my thoughts by the way."

Analysis will reveal the following stages—(1) the discovery of the footprint; (2) Crusoe's astonishment and alarm; (3) his attempts to account for the footprint; (4) the failure of the attempts; (5) Crusoe's confusion and terror. Regarding (3) and (4) as subordinate and observing that (2) and (5) differ only in degree, we may extract the essence of the paragraph in some such way as this—Crusoe, discovering a footprint on the shore, was greatly puzzled and alarmed.

Such analysis does not, of course, exhaust the significance of the paragraph. It gives the bones only. But it is useful in interpretation as well as in composition to "let the bones show."

From such exercises the pupil will discover for himself that while paragraphs are built to many patterns, all good paragraphs have two things in common—namely, unity and unbroken sequence of their parts.

The crown of the analytic exercise is the analysis of a complete composition. The composition chosen should be of suitable dimensions, and the plan of it should not be too subtle or obscure. Poetry need not be excluded. In other sections of his work the pupil may have opportunities of examining the composition of a picture or of a piece of music or the plan of a building or of a machine. From the combined experience he may get some idea, however dim, of composition in general, of a unity based on relation, proportion, coherence, and order.

APPENDIX IV

SPEECH TRAINING

Some training in correct speech should be given to all pupils in post-primary schools. Correct speech has a definite social and commercial value. In addition it has an æsthetic value, and enhances the beauty of Language and Literature. The standard to be aimed at is simply one which will be acceptable to any educated Scot. Its chief characteristics are clearness and an absence of slovenly and inaccurate pronunciation.

The pupils of the Advanced Division are of an age when instruments other than mere imitation can be brought to bear on the problem. They can be taught the symbols of the international phonetic alphabet, a copy of which should be in view in the class-room to be used occasionally as the modulator is used in the music lesson. They can even be taught in a simple way the physiology of the vocal organs and the relations of organic positions to sounds; and this knowledge can be successfully applied not only to the elimination of individual defects like the lisp and the burr, but to the correction of endemic imperfections of speech of the kind described below.

Northern English as spoken by educated Scots differs from

Southern English partly in certain scarcely definable qualities of stress and intonation, partly in trilling the "r," which in Southern English has sunk in most positions to a vocal murmur, and in retaining the pure vowels, "ae, ee, o," which in Southern English are now diphthongised. There is no reason why Northern English should ape Southern English in any of these things. What is wanted is pure vowels, crisp consonants, and distinct syllables—*i.e.* good pronunciation, enunciation, and articulation on the phonetic basis natural to Northern English.

Differences in stress and intonation distinguish not only Southern English from Northern English, but the several Scots dialects from each other. When not exaggerated these local peculiarities are not incompatible with clear and beautiful speech. But there are certain defects of enunciation and pronunciation which are endemic in certain areas and must be corrected. Thus in the Highland and Norse areas there is a tendency to unvoice consonants, especially continuants, to say *Chew*, *cham*, *chelly* for *Jew*, *jam*, *jelly* or *plack*, *pread*, *ped* for *black*, *bread*, *bed*. In the Northern Scots area, from the Tay to the Moray Firth, the "au" vowel has been lost, and is replaced by the broad "ah," so that *laud* and *lad* are indistinguishable except perhaps in quantity. In addition Northern Scots quite often fail to distinguish long and short "o," e.g. *road*, *rod*; and the same condition extends in Banff and Aberdeen to long and short "e," e.g. *taste*, *test*, while in these counties also the diphthong "ai" is generally replaced by "ei," e.g. *Bible* becomes *Beible*. The besetting faults of the Midland Scottish area on the other hand are—

(*a*) the glottal stop—*wa'er* for *water*;
(*b*) the unrounded or modified "u"—*tü* for *two*;
(*c*) "chr" for "thr"—*chree* for *three*;
(*d*) the nasal "l."

The quantity of "u" presents difficulties in every area; *fool* and *full* are indistinguishable. No less widespread is the blunting of the short "i," so that *milk* approaches *mulk*.

Imitative exercises in Speech Training may be graded from singing through recitation and reading of verse to recitation and reading of prose, and so to speaking. The success of such exercises is measured by the extent to which the purity and distinctness acquired in singing and recitation are carried over into the ordinary speaking voice. At the advanced division stage, as has been said, these imitative exercises can be supplemented by phonetic drill.

The difficulties of Speech Training will vary from school to school and from district to district. In nearly every district the influence of the home and of the street is against the teacher, but he will have to discover his problem for himself. The teacher should make a list of local speech defects and work steadily towards their elimination. He might point out to his pupils that the correction of slovenly speech is not an evidence of snobbery, and that in learning to speak good English they are not disparaging their native Scottish tongue. It is important in this connection that a teacher should help his pupils to distinguish between good and debased Scots.

The teacher should insist on clear speaking at all times, whether the pupil is reading, speaking in debate, acting in a play, or, more often, answering a question in class. It is obvious that the teacher must himself set the standard for his pupils. He should speak clearly, and should be able to read prose and verse with taste, feeling, and understanding. The gramophone might be used as an aid, and as school broadcasting becomes more general, pupils might listen with profit to such good models as are available.

APPENDIX V

SILENT READING

Training for Speed.—It is evident that an increased speed in reading (without sacrifice of comprehension) will make for an economy of time in all subjects. A complete study of the diagnosis of deficiencies and of remedial exercises cannot be given here, but, generally, it has been found that speed in reading can be accelerated—

(*a*) by suppression of elementary muscular movement of the vocal organs, such as those movements of the lips often noticed in unpractised readers when reading to themselves;[1]

(*b*) by giving timed exercises in reading fairly easy matter, so that the "perception span" may be increased, *i.e.*, so that the pupil may be able to see a larger "eyeful."

These exercises may take the following forms:—

1. The pupil may read for a given time and then answer questions prepared by the teacher.
2. He may read for one minute and then tell the gist of what he has read.
3. A question may be set and he may be asked to find the answer to it as quickly as possible.
4. Several questions may be set which involve the reading of a certain number of words or lines, and the time required by each pupil to produce the answers may be noted.

In all such exercises the teacher should begin with short periods,—four or five periods of one minute each. The co-operation of the pupil should be secured by interesting him in his own progress, getting him to keep a record of the times taken by him in successive exercises, and to exhibit these in the form of a graph.

Training in Comprehension through Silent Reading.—Definite exercises should be set for—

1. The noting of details.
2. The drawing of conclusions.
3. The extraction of the general topic of a paragraph.
4. The discovery of the main topic of a longer extract, *e.g.*, a chapter.
5. The finding of specific information from given sources.

The first and second type of exercise provide practice in Intensive Reading, the third and fourth in Less Intensive

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[1] It is not suggested that any attempt should be made to suppress that "Inner Speech" which is a *necessary accompaniment* of the silent reading of all verse and prose in which the appreciation of sound, not less than of sense, is a condition of complete comprehension.

Reading, and the fifth in Selective Reading. "Some books are to be read only in parts; others to be read, but not curiously; and some few to be read wholly and with diligence and attention."

Intensive Reading.—Although collections of graded extracts for this systematic drill would be most suitable, the skilful teacher of silent reading will be able to make use of most books or "readers" to train the pupils to attend to details and to understand their implications.

Books of the "How to Do It" and "How to Make It" type will provide exercise in the comprehension of directions. Books describing processes of manufacture are valuable for the exercise they give in the following of consecutive steps, as are also written instructions on how to solve arithmetical problems which depend for their solution mostly on the pupils' ability to read. Other exercises of this type may be supplied by written instructions on how to attend to injuries (First Aid) and on how to carry out an operation in Practical Geometry. The pupils, of course, should actually carry out these instructions, and the test of the reading is the execution. For all such training, books of an informative and expository nature will provide most suitable material.

As the factor of memory is not to enter into the exercises, the books should be in the hands of the pupils when questions are answered or instructions are carried out. For instance, if the subject of the reading is the tying of knots, it is obvious that the instructions and the diagrams should be visible when the attempts are made to tie the knots.

While drill in intensive reading can be effectively given in this manner, abundant material for similar exercises may be found in the ordinary class text-books.

Less Intensive Reading.—The practice of reading all books intensively is to be condemned. One book, to be read thoroughly, must be read in detail; in other cases thorough reading may mean much less intensive study. Reading that has for its object the comprehension of *general drift or significance* should be liberally practised. But, in the first year, if the general topic of a paragraph is to be found, the paragraph should be so chosen that the topic is fairly evident. A reading of the paragraph, either under *time-control* or *without limit of time*, followed by the question, "What is the topic of the paragraph?" should be a regular exercise, and the teacher should bear in mind the object of the lesson and refuse to descend to details. The paragraph may be isolated or it may be one of a series which together form a chapter or an essay. Where the chapter or the essay is a manageable unit it should be considered first as a whole and the general topic found. Then the paragraphs may be taken individually. A variation may be introduced by giving the topic of one paragraph and setting the pupils to find the paragraph of which it is the topic. [With some narrative chapters, an adequate reading has been done if the pupils can give the general topic and answer a few general questions on the actions of the characters.]

Other suitable exercises are—

1. Writing titles for paragraphs.
2. Re-arranging in their proper sequence a disarranged list of the topics of the paragraphs.

Selective Reading.—When the pupils reach the age of fourteen they may be given a definite training in selecting or "skimming." In Selective Reading, the passage from which information is to be extracted may be a paragraph, a chapter, or a whole book, and the questions to be answered may be stated explicitly by the teacher or determined by the pupil from a general question. When the passage is short, it will generally be found advisable that the pupil should read to find an answer to a definite question framed by the teacher and capable of being answered in a word or a sentence. As the pupils gain in speed on reading and power of comprehension, the passages studied may be increased in length so that the extraction of the information required may offer greater difficulties and tax the selective ability more fully. For instance, the pupil may be asked to read a chapter for the purpose of describing in words or making a sketch of a certain well-marked character. The decisions as to the suitability of selected material are left to the pupil. Further, before he can make use of it, the pupil must organise the material he has gathered.

This tasting is a tool of study, and the pupil should not leave school without becoming familiar with it. He should learn how to use titles, chapter headings, summaries, indexes, tables of contents and illustrations, how to make useful tools of encyclopædias, dictionaries, almanacks, and all sorts of books of reference, how to find speedily the gist of articles in newspapers and magazines, how to skim over and discard the useless and how to find the essential.

A typical exercise might be as follows:—

The pupil is to write a composition on "Paper." He will have to consult History Books, Geography Books, Encyclopædias, and other books of reference. He selects from each book in turn, skims over what is foreign to his purpose, makes notes of what is relevant, and organises his material for use.

All this, to be done efficiently, requires—

1. Speed in silent reading;
2. Power of comprehension;
3. Selective ability;
4. Organising ability;
5. A knowledge of how to study.

II
HISTORY

HISTORY

The conditions of modern society demand that, as a preparation for the enjoyment of the rights and the performance of the duties of citizenship, both boys and girls leaving school should have a real interest in the life of the community, and should have a clear, if elementary, idea of the present as the "growing point" of the past.

We are of the opinion that these results can be achieved through a study of History, and that a suitably planned course of History ought to be included in every type of curriculum designed for pupils aged twelve to fifteen years.

We, therefore, make the following suggestions:—

A. 1. The common element in all courses should be a study of the main changes and movements in the development of Western civilisation.

  (*a*) This involves selection: the guiding principle in selection of material should be significance for the present.

  (*b*) The common element should be adapted to meet varying conditions.

2. In the earlier periods the History of our island should be introduced mainly to illustrate large-scale movements.

3. In the more recent periods British History should receive more detailed treatment, examples from Scottish sources, where appropriate, being chosen.

4. The Third Year should be devoted to a study of the last 150 years: it is essential that pupils should have some knowledge of the modern world.

   During the Third Year, one lesson per week should be allotted to a consideration and discussion of current events; an attempt should be made to give these, as far as possible, their historical setting.

5. The social and economic aspects of History should be stressed.
6. It is desirable that contact be established between the locality and the general historical field: but "Local" History and "Applied" History (sometimes termed "Civics") should be woven into the texture of the course, and should not be considered as separate "subjects."

B. 1. A judicious use of the biographical method (especially when "representative" men and women are chosen) is of great value at this stage, and should lead to an appreciation of the part played by personality in the direction of affairs.

2. Hitherto there has been over-emphasis on "dates" and tables of "causes and results." It is, however, of importance to convey a general impression of time sequence. A minimum number of "time-pegs" should be selected for committal to memory, and each class should build up a time chart during the course.
3. Individual work and group work should be encouraged.

   (*a*) Debates; elections afford opportunities of realising what is meant by "government by discussion."

(*b*) "Lecturettes" by pupils, followed by discussion, are a useful means of persuading different members of a class to work up different aspects of a topic.

(*c*) Each pupil should keep some sort of historical "scrap book."

4. Visits, under competent supervision, to museums, castles, abbeys, etc. should be undertaken where conditions are favourable.

C. A "History Headquarters" should be provided, wherever possible, in each school. Here should be kept and rendered easy of access, pictures (photographic rather than imaginative), maps, reproductions of documents, and other illustrative material.

(*a*) There should also be a library containing books for consultation by the pupil. A screen for use with an epidiascope or a lantern would be a welcome addition to the apparatus.

(*b*) Education Committees might form a central collection of such material (renewed and brought up to date from time to time) which could be lent to schools as required.

D. Three 45-minute periods per week are essential; four such periods are desirable.

Note.—No cognisance has been taken of any examination. We feel very strongly that any test (written or oral) the pupil may have to meet at the end of a Three Years' Course should concentrate on Modern History, and that questions should be so framed as to test the candidate's knowledge of development from earlier times rather than to test his knowledge of detail of the remote past.

The following syllabus contains teaching material which seems capable of treatment on the lines suggested—regard being had to the necessity for selection:—

(*a*) It is assumed that there are approximately thirty-seven teaching weeks in each session.

(*b*) Correlation with Geography is of great importance.

First Year

I. Days before History.
  Food-gathering: domestication of animals: adoption of agriculture: use of tools: rudiments of social organisation.

II. Ancient Civilisations.
  Egypt, Assyria, Babylonia, Palestine: development of food-production, crafts, writing, laws, religion, government.

III. Early traders and colonisers.
  Crete: Phœnicia.

IV. The Greeks and their contribution to Western civilisation.
  How the Greeks defended Europe: development of literature, science, art: Alexander the Great: spread of Greek language and of Greek ideas.

V. The Romans and their contribution to Western civilisation.
  Rise and expansion of Rome: struggle with Carthage (Hannibal): Julius Cæsar: extent of Roman Empire: development of roads, peace, law: spread of Christianity: Constantine.

VI. Roman Britain.

VII. Break-up of Roman Empire.
Barbarian invasions—especially invasions of English tribes into Roman Britain: life in an Anglo-Saxon village.

VIII. (*a*) Development of Christianity.
Gregory the Great: St Columba: St Augustine.
(*b*) Rise of Islam: Mohammed.

IX. The Emperor Charlemagne.

X. The Northmen.
The extent of their ravages: their settlements in England and in Scotland: King Alfred: settlement of Northmen in France: Norman conquest of England: Norman penetration of Scotland under David I.

XI. Feudalism: duties of lord and vassal.

XII. (*a*) Development of the Church.
(i) Monastic orders—life in an abbey.
(ii) A new ideal, the friars—St Francis.
(*b*) The Crusades: chivalry.

Second Year

I. Growth of towns and trades in medieval Europe.

Medieval commerce (necessity for spices) Growth of towns: guilds: rise of the Commons as a political force.	Reference to Scotland.

II. War of Scottish Independence.
Franco-Scottish Alliance.

III. Medieval agriculture—life on the manor.
Black Death: Peasants' Revolt.

IV. Joan of Arc and the French War.

V. Medieval building.
- The cathedral, the castle, the guildhall, the cottage.

VI. The beginnings of the modern world.
- (*a*) Revival of learning.
- (*b*) Maritime discoveries.
  - Britain's new position.
- (*c*) Development of science.
- (*d*) The New Monarchy.
  - *E.g.* James IV: Henry VIII.
- (*e*) Changes in religion.
  - Reformation: Counter-Reformation: Thirty Years' War.
- (*f*) Struggle with Spain.
  - Rise of Holland and England as sea-powers.

VII. King and Parliament.
- (*a*) Tudors.
- (*b*) Constitutional struggle under the Stewarts.
- (*c*) Scotland's struggle to remain Presbyterian.

VIII. Foundations of Empire.
- (*a*) Trading companies: Pilgrim Fathers: Virginia: Maryland, etc.
- (*b*) Scottish Schemes: Darien—Union of 1707.

IX. France and Europe.
- (*a*) William of Orange $\left.\begin{array}{l}\\ \\ \end{array}\right\}$ Louis XIV.
- (*b*) Marlborough—The '15.
  - Walpole and Cabinet Government.
- (*c*) War of Austrian Succession—The '45.
- (*d*) Seven Years' War.
  - Clive: Wolfe: Elder Pitt.

X. American Independence.
- George Washington.

Third Year

I. John Wesley: religious revival.

II. Agricultural Revolution.
Reference to Scotland: *e.g.* Lord Kames.

III. Industrial Revolution.
Reference to Scotland: *e.g.* Watt, Mushet, Tennent, Bell, Macadam, Rennie.

IV. French Revolution—Napoleon, Nelson, Wellington.
Reference to Scotland: Thomas Muir.

V. Changes in Britain.
(*a*) Political reform.
(*b*) Local government reform.
(*c*) Education.
(*d*) Factory Act.
(*e*) Changes in economic policy.

VI. Growth of Nationalism.
(*a*) S. America.
(*b*) Greece: Balkans.
(*c*) Belgium.
(*d*) Unification of Italy (Mazzini, Garibaldi, Cavour).
(*e*) Unification of Germany (Bismarck).

VII. Civil War in America (Abraham Lincoln).

VIII. Scramble for Africa.
France, Belgium, Italy, Germany, Gt. Britain.

IX. Europe and Asia.
(*a*) Near East.
(*b*) India and Further India.
(*c*) Siberia.
(*d*) Changes in China and Japan.

X. Development of British Empire.

- (*a*) Canada (Lord Durham).
- (*b*) Australia.
- (*c*) New Zealand.
- (*d*) South Africa.
- (*e*) Ireland.

XI. Inventions and progress of scientific knowledge.

XII. Britain before the Great War.

Development of administration: great government departments.
Development of local government: County Councils.
Trade Unionism.
Workmen's Compensation Acts.
National Health and Insurance.
Old Age Pensions.
Education.

XIII. The Great War.

XIV. The League of Nations.

XV. Ten Years after the Armistice.

Suggested "Time-Pegs"

First Year	Second Year	Third Year
B.C.	A.D.	A.D.
c. 4000. Great Pyramid of Gizeh.	1314. Bannockburn.	1765. Watt's steam engine.
c. 2130. Beginning of Khammurabi's reign.	1431. Death of Joan of Arc.	1789. Outbreak of French Revolution.
c. 1010. Beginning of David's reign (Israel).	1453. End of Hundred Years' War. Capture of Constantinople.	1815. Waterloo.
c. 490. Marathon.	1492. First voyage of Columbus to America.	1832. Great Reform Act.
323. Death of Alexander the Great.	1561. Scottish Reformation Parliament.	1838. People's Charter published.
216. Battle of Cannae.	1588. Defeat of the Armada.	1846. Corn Laws abolished.
44. Assassination of Julius Cæsar.	1600. The East India Company.	1859. Darwin's "Origin of Species."
A.D. 326. Founding of Constantinople.	1620. The Pilgrim Fathers.	1862. Lincoln's first Emancipation Proclamation.
410. Alaric takes Rome.	1643. Solemn League and Covenant.	1869. Opening of Suez Canal.
597. Death of St Columba. Coming of St Augustine.	1651. Navigation Act.	1872. Scottish Education Act.
622. The Hegira.	1679. { Drumclog. Bothwell Bridge.	1878. Factories and Workshops Act.
800. Charlemagne crowned Emperor.	1689. The Revolution.	1888. Local Government Act.
871–901. Alfred's reign.	1707. Union of English and Scottish Parliaments.	1897. Public Health (Scotland) Act.
		1911. National Insurance Act.
1066. Norman Conquest.	1759. Quiberon Bay. Capture of Quebec. Minden.	1914–18. The Great War.
1095–1270. The Crusades.	1776. Declaration of Independence.	1919–20. The Peace of Versailles. First meeting of the League of Nations.

III

GEOGRAPHY

GEOGRAPHY

Introductory.—Geography has many features which commend it to an important place in the curriculum of Advanced Division Courses. It presents actual problems of everyday life. It shows the conditioning factors of such problems, and it supplies the links of explanation. It offers examples of life and work in regions with similar problems, similar "controls," and similar solutions, and, where the regions are dissimilar, it emphasises the necessity for that inter-exchange of commodities upon which the world of to-day depends. It considers the world as one whole where widely-flung lands and their peoples have each their different contributions to make, and where all men must act and react on one another in ever-increasing measure. And in the schoolroom this subject of Geography, thus founded on principles of interdependence and unity, becomes itself a co-ordinating subject with the special appeal that its problems are concrete and fundamental. It has been styled the *liaison* subject in the school curriculum, and this, we believe, is essentially true.

Geography is the study of the interaction between man and his environment. It studies the relations between man and his various and varied activities on the one hand and the physical environment on the other. Different environments present different problems and different opportunities, and man reacts or responds differently to these, solving the problems and taking advantage of the opportunities. In its widest sense Geography is the study of reactions or responses. On the physical conditions of place—area, relief, drainage, climate, and soil—and on the effect of these on plants and animals, on access to mineral resources, and on the type and availability of transport depend man's responses as these are expressed in the kind of food he needs, in the nature of his clothing and shelter, in his occupations, in his use of sources of power, in his modes of communication, in his trade and commerce, and in his health and sports.

The physical conditions are to be studied not for their own sake but for their interaction with the activities of man. In other words, the study of the links of causal connection between the elements of the physical environment and man's work in its very widest sense is the true task of Geography.

For the sake of convenience it is possible, then, to recognise a twofold division of the wide subject of Geography—Physical Geography, or the study of the environmental factors, and Human Geography, or the study of the effect or influence of these on man and his work. Strictly, there should nevertheless be but one standpoint, Human Geography, for even in Physical Geography the conditions are to be treated not from the purely descriptive but from the relational standpoint. The mere facts of geology, meteorology, biology, economics do not constitute data in Human Geography, though the geographer must select freely from such subjects. To him the study of the effect of relief as it at present exists is more important than the study of the denuding and upbuilding processes; and the broad climatic conditioning factors are more to him than the actual meteorological data.

With this important reservation that Geography is a unity, and that division into certain aspects is made merely for the sake of convenience, we may regard the following as the content of Geography:—

(*a*) The interpretation of the physical conditions of the world (position, area, relief). Under this will be studied the variety of physical features strictly in relation to man's activities.

(*b*) Climatic factors as these affect (1) the type and distribution of vegetation and of animal life; (2) man's occupations, health, sports.

(*c*) Economic Geography proper (with emphasis on modern developments), *e.g.* mineral, animal, and vegetable products, occupations, transportation, trade routes, ports, commerce, trade centres, distribution of population.

(*d*) Historical Geography in its simplest elements—tales of travel and discovery, the opening of trade routes.

In the working out of this scheme, maps, diagrams, and all forms of illustrative matter should play an important part. In this connection it is essential that the pupils should know how to make geographical observations and how to record these correctly. The graphs, diagrams, and maps which they construct to demonstrate or to elucidate the various aspects that arise should not be mere reproductions, but should be based, as far as possible, on actual work in the field, or on official documents and statistics. Such work, apart from the immediate material gain, will provide the pupils with an admirable training in the discovery and recording of geographical facts, and in independent working—an experience which will undoubtedly stand them in good stead when they go out to the larger world beyond the schoolroom.

The Aim in the Teaching of Geography in the Advanced Divisions

(1) *Practical and Intellectual.*—To equip the pupil with such geographical knowledge as he will find necessary for the proper appreciation of the facts of daily life, more especially in his reading of newspapers, periodicals, and books.

(2) *Social and Economic.*—To enable the pupil to take an intelligent and sympathetic interest in social and economic problems, and in the development of international understanding and goodwill. From a study of the interdependence of different parts of the Home Area and the Home Country he will come to recognise the close relations which exist between the industrial nations and the food and raw-material producing countries of the world, as well as the methods and means by which exchange is effected. Geography is essential for a proper understanding of the modern nexus of economic relations. Through it the pupil may realise the truth of the fact that the economic progress and well-being of communities depend upon (*a*) the conditions and resources of the physical environment, and (*b*) the degree to which man has been able to utilise the opportunities afforded by these natural conditions and resources.

(3) *Recreational and Æsthetic.*—To contribute to the future citizen's enjoyment of the physical world around him. One of the features of modern times is the increasing amount of leisure. This is the direct counterpart of specialisation and the use of machinery in industry. Geography enables men and women to make a good and true use of leisure; it fosters a love of travel; it incul-

cates a desire to know more about other lands and peoples; it stirs the spirit of inquiry about the workings of physical forces; it aids in rediscovering the beauties of scenery.

Notes on this Aim

(1) No area presents every type of problem in the interaction of environment and activity, but certain regions present certain problems more clearly than others. On this depends what is termed Regional Geography. Careful selection is necessary in any attempt at a world survey.

(2) Even within the study of any particular area or region a critical selection of facts and an orderly presentation of matter are necessary. In every case stress should be laid on the interplay of causal factors.

(3) Geography teaching is often ineffective through lack of a definite aim. While each lesson should have a more or less immediate aim or objective, *e.g.* a knowledge of the descriptive geography of any particular land, it should also subserve a more general aim or objective, which should be constantly present in the mind of the teacher. This idea of the twofold aim should be distinguishable in all lessons, otherwise they will fail to be co-ordinated into a satisfactory geographical scheme.

(4) To develop this aim in accordance with the hopes which found expression in the institution of Advanced Division Courses, the selection of the materials for study in Geography should be determined to a large extent by interest—the interests of the pupils and the social and general economic interests of the times. It is on this account that, while the varying and varied aspects of place-conditions have not been

neglected here, special stress has been laid upon man's reaction to these conditions. The materials which this aspect of the subject offers, and the nature of the problems which it sets, will form an admirable link between the school and later life and work. They will afford valuable means of developing and guiding the sympathies and mental powers of the pupils, which will lead to the establishment of that basis of a well-balanced outlook and enable them to fill with credit their future place as citizens of their country and of the world.

In the determination of the place of Geography in the school curriculum at this stage, two further questions—the time to be devoted to the subject, and the qualification of the teacher—must be considered.

With reference to the former, we are unanimously of opinion that three periods of forty minutes each per week are essential, and in certain cases this might be increased with advantage.

Regarding the latter, we urge upon Education Committees and others concerned the necessity for securing adequately qualified teachers for the work of Geography in Advanced Divisions. Subjects in the school are very much what teachers make them, and we feel that this subject has suffered, and is still suffering, from the fact that many teachers who have practically no qualification, and, in many cases, little interest in the subject, are engaged in teaching it. We put forward the plea at this time all the more strongly because of the many opportunities at present afforded to teachers actually in service of gaining the necessary qualification without undue hardship.

SCHEME.

Home Region

In Geography the study of the Home Region is fundamental. By beginning at home the pupils readily appreciate the reality of the subject, for they are brought into direct contact with its actualities and the important interrelations which exist between them. In its study they thus gain an intimate knowledge of the working of geographic principles in particular cases which they can examine, and the information thus acquired becomes an essential basis of comparison, and a constant standard of judgment, when dealing with more remote regions.

In Scotland, the characteristics of Home Regions may vary considerably, and attention is first directed to a classification of settlements under which all possible Home Regions may be grouped. The order of procedure is as follows:—

A. *Nature and Distribution of Settlements*

(*a*) Regions of dense population—close agglomerations of urban centres engaged in varied industry.

(*b*) Regions of relatively considerable population engaged in the exploitation of land or sea, *e.g.* mining, etc., and/or agriculture, etc. Such regions are organised upon a commercial urban centre which may also be engaged in manufactures.

(*c*) Regions of sparse population.

(*d*) Regions of very sparse population.

Metropolitan centres may be classified under (*a*) or (*b*).

B. *Investigation of the Causes affecting such Distribution of Population*

The main factor in the determination of the distribution of people in any particular region is the nature and availability of work. Under (*a*) manufacturing industries of many kinds are considered from such standpoints as: location; raw materials—their nature and availability; power—nature and distribution, changes in character and results; the social and economic aspects in foundation and development. Under (*b*) where work is chiefly dependent upon the exploitation of the land or sea, stress is laid upon physical conditions—relief, structure, climate, soil. In this connection two main interrelations are considered: (1) the conditions of place and man's work, and (2) the interdependence of industries, *e.g.* mining and agriculture. In (*c*) and (*d*) the existing social and economic conditions in relation to the physical facts of environment are reviewed as in (*b*).

In working out this scheme, investigations will be carried on in the field with the aid of topographical maps, sketch-maps, and diagrams. Climatic conditions will be determined by observation and by comparison with Daily Weather Reports, etc. For industrial and commercial aspects, data will be derived from newspapers, trade journals, and the *Statesman's Year Book*, etc. Visits to workshops and factories will be arranged wherever possible.

C. *Work and the Products of Work*

In (*a*) manufactures—iron and steel goods, chemical products, textiles, foodstuffs—predominate, and consideration is given to characteristic products peculiar to specific areas, as well as to some of the methods employed in production. Social conditions, etc., are borne in mind, and geographical questions involved in town and regional planning considered.

In (*b*) such occupations as mining, quarrying, farming (arable, pastoral, dairy), forestry, and fishing are included, and the nature of the products discussed. Local problems such as the development of new types of crops, land reclamation, or afforestation may, on occasion, be discussed with profit. Manufactures of various kinds, and the relation of these to the products of land occupations, are also considered.

No hard-and-fast line of demarcation can be drawn between (*b*) and (*c*), as many occupations and products are common to both. In (*c*), however, conditions are not so favourable, and opportunities for work are more restricted; for example, in higher regions exploitation of land is usually carried on in the form of pastoral occupations or forestry. Minerals are also frequently obtained in such areas.

In (*d*) little or no work is possible.

D. *The Exchange of Products*

In these days few regions are self-sufficient, and exchange of products is a necessity. Thus the manufactured goods of (*a*) may be sent to (*b*), (*c*), or (*d*), or abroad, while the food products or raw materials of (*b*), (*c*), and (*d*) may be sent to (*a*) or consumed or manufactured within the area, *e.g.* the coal produced in (*b*) may be transported to the purely manufacturing areas (*a*), or it may be utilised in neighbouring industries. It may also be exported. Thus the facts of exchange are reviewed in the light of actual relations existing between areas of production and areas of consumption.

E. *Transport of Products*

Conditions determining transport: relief and routes—roads, railways, rivers, canals, the sea, the air.

F. *The Market or Trade Centre*

Factors of site and general situation determining the importance of towns.

Application of this Method of Treatment to a Particular Home Region—the Devon Valley to Alloa with the Ochils Area

A. *Nature and Distribution of Settlements*

This region does not include an area of dense population with close agglomerations of urban centres engaged in varied industry (*a*). Areas of considerable population engaged in the exploitation of land- or sea-resources and in manufactures (*b*) are, however, represented in this region, for example, round Alloa; as well as areas of the type (*c*) and (*d*), where land labour of a specific nature is carried on to some extent.

B. *Investigation of the Causes affecting such Distribution of Population*

Work.—Under (*b*) the main occupations of the people are coal-mining, quarrying for road metal, manufacturing woollens, brewing and distilling, making of pottery, glass-blowing, agriculture, and forestry. The locations of these are determined, and the factors influencing their nature and distribution are noted. For example, in considering the nature of farming, whether pastoral, arable, or dairy, attention is directed to the character of the relief and soil of the region—the presence of alluvial fans and plains, the Ochils, their structure and appearance. Rivers and their work are specially considered. Attention is also directed to climatic factors, temperature and rainfall, in relation to configuration and wind direction. These are considered mainly from an observational point of view, and their importance, together with that of the soil, is examined in relation to definite methods of agriculture, including rotations, and characteristic crops found in the neighbourhood.

The interdependence of industries within the area is also discussed, for example, glass-blowing and the presence of local sand and coal, and the need for bottles in brewing; brewing and distilling and the growing of cereals; the rearing of sheep and the woollen industry. In such cases, however, care must be taken to distinguish factors historically important in industrial development but not at present dominant or even active, *e.g.* the actual source of sand used in glass-works and grain used in breweries will be examined. The distribution of coal is also of importance in supplying power for local industries and for export.

In (*c*), with its sparse population, agriculture, with the growing of such crops as oats, leguminous crops, root crops, and grasses, is the most important occupation. In certain districts forestry is also carried on.

In the barren or relatively barren areas of the Ochils represented in (*d*), sheep-rearing is carried on. In both these areas [(*c*) and (*d*)] the physical facts are treated mainly in relation to possible occupations as in (*b*).

C. *The Products of Work*

This is a varied region with diverse products. These may be classified under (1) food, (2) raw materials, (3) manufactured goods. From the land occupations of (*b*), (*c*), (*d*) are obtained oats, barley, potatoes, etc., as well as butter, cheese, milk, wool, and coal. These are used as food or are the raw materials of industry. Woollen goods, beer, pottery of various kinds, etc., are also produced.

D. *The Exchange of Products*

From the fact of the interdependence of industries, the necessity for exchange is readily appreciated. In (*b*), for example, many people are engaged in coal-mining and in manufactures, while others in (*b*), (*c*), or (*d*) till the ground or rear sheep on the hills. Each group produces materials which the others require, and so exchange within the area is carried on. (See p. 11, paragraph D.) The proportion of local wool actually manufactured locally, and the relation this has to the total quantity used in the factories, will be examined to show the varied necessities for external trade.

E. *Transport of Products*

Communications and transport are considered in relation to (1) the natural features of the region, (2) the areas of production and consumption, (3) ports, local or distant.

The natural features not only determine the direction of the routes to a great extent, but in many cases also the means of communication utilised. In this particular region the general direction of roads, now becoming much more important by reason of the development of motor traffic in industry and trade, is east—west rather than from north to south, owing to the presence of the Ochils obstacle. Railways, also, in linking up producing and consuming areas tend to follow the lines of least resistance. This region also affords good examples of the value of easy access to the sea in the development of commerce. Moreover, in the study of external trade, by considering what the region requires in the way of imports from the port or ports, or what it can supply as exports, many valuable points of contact may be established between the Home and other regions at home and abroad.

F. *Distribution of Population—the Situation of Towns and Villages*

In this area the towns and villages in the main are grouped along three definite lines:

(1) Where the Ochils merge on the plain, *e.g.* Menstrie, Alva, Tillicoultry, Dollar.

(2) In the centre of the plain, *e.g.* Tullibody, Collyland, Sauchie, Fishcross, Devonside, etc.

(3) On the Forth, Alloa, the port.

In the first group woollen manufactures and brewing predominate. In the second, land occupations and mining are mainly carried on, while Alloa, besides being the port, manufactures yarns, beer, glass, earthenware, etc.

The Home Land

In outlining the subject-matter to be considered in a treatment of Scotland suited to Advanced Divisions it is presumed that the pupils at this stage have already made acquaintance with this country to a greater or less degree in the Primary School. They have at least been introduced to the orographical map of Scotland and are able to interpret it sufficiently well to discern the general nature and distribution of low land, hill land, or mountain land. This map may therefore be made a starting-point, and the pupils' first task will be to locate their Home Region on this map of the Home Land. From this map also they will be able to verify whether their local area is high land, hill land, or low land, a fact which they have already considered from observational investigation. If the Home Region is high land, then the first treatment will be of the Highlands as a whole, but if it is low land then the Lowlands in general will be treated first.

At this stage the study of the Home Region has already made it clear that distribution of people depends on the amount and character of the work which it is possible to carry on, and that this work is, in turn, determined in great measure by such factors as relief of land, nature of soil, character of climate, and so forth. These fundamental conditions of place and their interrelations, as well as the nature and measure of the response which man has been able to make to them, have been discussed in the study of the Home Region, and the facts thus acquired and the conclusions thus determined are brought to the study of the larger area now under review.

The Highlands.—If this area is the Highlands of Scotland, the pupils, from a knowledge of their own local conditions, will readily appreciate the general sparsity of population over the bleak moors and mountains, while, in the valleys and relatively restricted low lands, which accompany these, more people will be found. Here, then, the distribution of population varies because opportunities for work vary. Sheep-rearing, cattle-rearing, dairying, tilling the ground in the valleys, forestry, quarrying, and fishing predominate, while the wild grandeur and beauty of the region attract the visitor and make catering a profitable occupation. The occupations are thus mainly the exploitation of land and sea, and as such are greatly influenced by climatic conditions. Here, just as in the Home Region, the pupils will be brought into contact with winds, rainfall, and temperature, which are treated, as before, not for their own sake, but for the influence which they have upon man's work.

From the character of the occupations the study passes to the marketable products. These are varied and relatively small in amount and are in the main primary, *e.g.* cattle, dairy produce, for arable activity is mainly organised in relation to live stock, and fish. Manufactures, though limited, are nevertheless also found. In considering these, attention is directed to the practical absence of coal, the possibilities of hydro-electric power, the available raw materials, and the nature and limitation of products. Transport difficulties are discussed and the direction of routes is indicated.

This study of routes affords opportunities for co-ordinating the facts of relief, *e.g.* the position and direction of river valleys and through valleys, etc., in relation to internal trade.

In conclusion, the main geographic facts of this region may be systematised and summarised in a consideration of the position and nature of human settlements. These are conspicuous for their small size, peripheral distribution, and sparsity, and for the most part are found in glens or in littoral situations, where in many cases the poor resources of the land may be amplified by those from the sea.

The Central Lowlands.—In passing from a Home Region of a lowland nature to a treatment of the Lowlands of Scotland the same general order of treatment of facts may be observed. In this case, however, the associations and interests of the pupils may probably cause manufacturing industries within the area to be first considered. In their Home Region they have been introduced to the local industries. They have considered the factors in their origin and development, and they have realised the inter-dependence of trades and the necessity for inter-exchange. This exchange may now be utilised to introduce them more completely to the regions beyond their local area which produce the materials of exchange. For example, they thus come into contact with the coal-producing areas of the counties of Lanark, Ayr, Fife, Stirling, etc. The position and relative importance of these coal-mining areas, and the uses to which the coal is put, *e.g.* as a source of power in manufactures at home and abroad, are then discussed. The complementary value of the Highlands as producers of exportable hydro-electric power to supplement coal in the Lowlands, and the extent to which coal can be replaced, will also be considered. The other basic industries—iron- and steel-working and shipbuilding—naturally follow, together with the chemical and derived industries—soap-, glass-, and paper-making, rubber-working, etc.; and the textile group—wool, cotton, silk. All these are represented in the Central Lowlands, and each industry has, or has had, in origin or development some particular impetus which may have been geographic in character and which may be worthy of consideration.

But the nature of the relief and soil and the character of the climate offer further opportunities to man in this region, and agriculture is also important. This importance is increased by the easily available markets which are found in the neighbouring industrial areas, and the consequence is that the farming here is mainly organised to produce food materials which are not easily or satisfactorily importable.

The varied products and their transport are then considered. By road, rail, and waterway, exchange of commodities within the area is easy, because (1) distances are not great, and (2) the natural features of relief offer no great obstacles to communication. At the same time, the open doors to the sea afford special facilities for trading with foreign countries. In this region, therefore, with its opportunities for varied labour, the great bulk of the people of Scotland have always found a home, and here there is a considerable density of population. Further, in this area the largest towns of the country are found, and in their nature these are indicative that industry and trade are here pre-eminent, for they are either manufacturing centres, or centres of exchange—often ports, or both.

The Southern Hill Lands.—With such a region as the Southern Uplands of Scotland, where the exploitation of land resources is the main occupation of the people, a suitable means of approach and treatment may be found in considering in particular the influence of place-conditions on man's work and distribution. This would entail a consideration of such topics as: the three sub-regions of the Uplands; nature and extent of hill land; climate—wetter west, drier east; types of vegetation;

pastoral occupations; the position and character of valleys and plains, their use to man in agriculture and in facilitating communication; types of agriculture—arable- and dairy-farming; products—food and raw materials; markets; what the region can supply to manufacturing industry—power, raw materials; woollen industry of the Tweed Valley and its characteristic products; transport of commodities; distribution of people; character and situation of towns—manufacturing centres, market-towns, rural settlements, ports.

The pupils have now been introduced to the larger area—Highlands, or Central Lowlands, or Southern Uplands—in which their own Home Region is included. At the same time many points of contact have been established in the course of study between this area and the other two major regions, mainly through trade considerations, and the further development of these areas may now be satisfactorily undertaken along the lines suggested above.

At this point it may be emphasised that throughout this study, as elsewhere, no great stress is laid upon topographical features as such, and that the learning of lists of products or names of towns for mere repetition is neither necessary nor educative. Only those physical aspects which have a bearing upon man's work, as aiding or retarding his forward march in progress, should be dealt with; and in the study of towns the name is important mainly as a means of distinguishing one settlement of organised and co-ordinated human effort from another, and should be treated as such.

England, Wales, Ireland

Of these countries no exhaustive study is possible or expected in the first year of the Advanced Division. Only the main and outstanding facts are essential, for not only will the British Isles receive fuller treatment at later stages, but constant references to conditions prevailing at home, especially in industry and trade, will be made in considering the trade and commerce of foreign lands.

In general, the treatment of England, Wales, and Ireland will be based on a broad division of these countries into areas resembling the regions distinguished in Scotland, and the general line of study will be, as before, through people and work to place and place-conditions.

England and Wales.—For England and Wales the main materials of study may be summarised thus:—

The distribution of people to-day as compared with what it was, say, a century ago; changes in the relative importance of particular regions at different times, with some reasons; the development of coal and its application to industry; Britain still in the Coal Age; position of coal-fields, and their accessibility in regard to manufacturing areas and export; other great industries, their position, available power, raw materials, destination of products; routes and means of communication in relation to land relief and markets; agriculture in England and Wales—distribution and types of agriculture as influenced by relief, soil, and climate—products of agriculture, dependence of other industries upon agriculture; commerce—world-wide interests of Britain, and the geographic and economic factors which make these possible; purchasing power—manufactures and coal; purchases—food and raw materials mainly.

Finally, Scotland and England might well be considered as complementary components of a unit, and the questions, how far they are self-sufficing and how their resources may be most profitably utilised, discussed.

Ireland.—In Ireland there is a sparse population, and a comparison of the country in this respect with the Southern Uplands or the Northern Highlands of Scotland may serve as a suitable introduction. In both these regions it was determined that the population was, in the main, rural and scattered, though larger settlements, where manufactures were carried on, were not entirely absent. Such also is the case with Ireland.

There are wide areas in the north-west, centre, and south of Ireland where the density of population averages only about a hundred persons per square mile, but this figure is considerably increased in the north-eastern district and around Dublin. It is in these latter areas also that towns with a population of over ten thousand are mainly found.

For such distribution the character of the occupations is mainly responsible. For the most part Ireland is an agricultural country, but the types of farming and the nature of the products often differ in different regions. Such variations, as has been pointed out in regard to Scotland, are due to several main causes, such as relief of land, nature of soil, climatic conditions, and access to markets for particular products. The general character of land labour in the metamorphic region of Donegal, for example, differs from that carried on in the Central Plain, just as the barren moors of Donegal differ in structure and soil from the wide stretches of the Plain, which may be fertile or infertile, cultivated or uncultivated, as the case may be.

A treatment of land occupations—their nature and distribution, as influenced by conditions of place, will thus form a first and important subject of consideration in the study of Ireland. From the character of possible work, whether it be the rearing of animals—horses, pigs, cattle, or sheep—or the tilling of the ground and the growing of crops, such as potatoes, beet, flax, or cereals, the characteristic products—milk, butter, eggs, bacon, flax, etc.—may be determined.

The necessity for marketing these commodities leads to a consideration of the manufacturing areas of the country with their greater populations. These are treated as before, but, in this case, special stress is laid on their situations in the north-east and east of the country generally, where greater opportunities for obtaining the necessary power are afforded, and where markets are more numerous. Reference should also be made to the development of hydro-electric power and the possibilities in its application to agricultural or manufacturing industry.

North America

In their study of the British Isles the pupils have already been brought into contact with North America mainly through trade interests. A more formal introduction may now be made by referring to some of the early voyages of discovery, and by a brief consideration of the location and nature of the early settlements of European peoples in this land. The work of pioneers, also, in opening up the country will be considered, especially in relation to the influence of relief, rivers, and climate upon exploration and colonisation.

Distribution of People.—As in the case of the Home Land, a basis of treatment is found in a consideration of the distribution of the people. North America ranks third in size and third in density of population among the continents, but, while its area is approximately half that of Asia, its population is only one-sixth. Further, while its area is approximately two and a half times that of Europe, its population is only one-third. As a whole, therefore, this continent is not densely populated, but the distribution is by no means uniform, and the location of areas showing marked variations should be carefully noted on a density of population map. In this connection the main facts to be noted are:—

1. Practically all the continent north of 50° N. Lat. has a density of less than two per square mile—the area so included embracing most of Canada except the Lower St Lawrence and the Great Lakes Region.

2. In the United States to the west of 100° W. Long., a very large tract has also less than two per square mile.

3. The area of greatest density lies east of 100° W. Long. and south of 50° N. Lat. Within this region the areas of greatest density are the North-Eastern Atlantic States where two-thirds of the total population of the continent are found.

Distribution of Population and the Utilisation of Resources.—The map showing the distribution of people may now be interpreted in terms of work, and, as such, may be regarded as a resource-utilisation map, for there is a close inter-relation between the distribution of population and the nature and importance of resources, and the degree to which they have been utilised.

Work and the Products of Work.—A consideration of the utilisation of resources in North America will follow two main lines:

1. The utilisation of natural resources in the production of food, raw materials, and power.

2. The utilisation of raw materials and power in manufacturing industry.

With regard to (1) North America has great natural resources and the immediate exploitation of these affords occupations of the following type: hunting; fishing; forestry; agriculture—pastoral, dairy, arable; fruit-growing; and mining. In considering these occupations and their characteristic products, attention is directed to such natural resource-utilisation areas as: the Arctic lands with their reindeer grazing and fur collecting; the forest lands with their timber and timber products; the dry grass-lands with pastoral occupations; the arable lands where crops which do not demand very high temperatures but which require a fair amount of rain can be cultivated, where temperate fruits can be grown, and where dairy-farming can be carried on; the sub-tropical and tropical lands with fruit-growing and the cultivation of rice, sugar, cotton, and tobacco. Special attention will be given to the wheat, maize, and cotton belts, and to the hog, cattle, and sheep areas. The Newfoundland Banks, and the rivers and inlets of the western Canadian coast in particular, will be considered in relation to fishing. In this connection, also, the great coalfields, the regions where iron ores are mined, and the areas where oil wells are found will be considered, and the close association of these with the density of population will be noted.

In the determination of these natural resource-utilisation areas, attention is directed to the influence of relief, climate, and soil upon their distribution and products. With regard to relief, an orographical map is used to show the main structural features—the three main divisions of the Western Cordillera, the Eastern Highlands, the interior plains, the coastal plains, the northern peneplain. The variations in climate are then considered in relation to this relief and in conjunction with the extent in latitude, nearness to sea, direction of winds, etc. Data relative to temperature and rainfall conditions are utilised to show how regions differ in the seasonal distribution of these factors, for on seasonal rather than on annual conditions does agriculture in its various forms depend.

With regard to (2) the great industrial centres, in relation to raw materials and power, will be carefully noted, and more especially those which find their nuclei in Chicago, Cincinnati, Pittsburg, Cleveland, Toronto, Philadelphia, Boston, and New York. One of the world's main industrial regions comprises the Upper Mississippi basin, the Great Lakes region, the Ohio basin, and the area of the Northern Appalachians stretching to the Atlantic. The position which this area, in particular, occupies among the great manufacturing regions of the world, as well as its characteristic products, will be discussed.

Exchange of Products: Markets.—A study of this continent affords ample opportunities for an appreciation of the necessity for exchange and of the various means by which this exchange may be effected. Raw products have to be brought to collecting centres and from these distributed either to distant lands or to nearer manufacturing regions. So, too, the products, especially foodstuffs, of one area with its special climate are sent to another where such products cannot be grown, *e.g.* the fruits of California reach the north-eastern industrial centres. Further, manufactured goods are sent from the industrial regions where power is available, or ores may occur, to regions less fortunately situated at home or abroad.

There is thus internal trade, and this is treated by considering the nature of the commodities carried, the character of the routes utilised—river, lake, canal, road, and railway—and the position of trade centres such as Winnipeg, Toronto, Montreal, Duluth, Chicago, St Paul, St Louis, New Orleans, New York on these routes.

In connection with external trade, the countries with which this trade is largely carried on, and the facilities for such trade by such gateways as the St Lawrence Estuary and the Great Lakes System, the Hudson-Mohawk Gap, the Gulf of Mexico, the Mississippi, and the Californian Golden Gate, are considered. The position and importance of the main ports associated with these doors to the sea, or otherwise situated—Montreal, New York, Portland, Boston, Philadelphia, Baltimore, Galveston, New Orleans, San Francisco, Seattle, Vancouver, etc.—are also discussed.

SUMMARY OF COURSE OF STUDY

First Year: Home Area, British Isles, North America

The main materials of study in these regions and the general lines of treatment have been outlined in the foregoing pages. In grouping the British Isles with North America, and Europe with South America and Africa, etc., in particular years, an attempt is made to develop an adequate conception of the economic unity of the world. Between the older and newer lands of the world there must be reciprocal relations, for each has much to give to the other. The newer, and to some extent undeveloped, lands offer outlets for the surplus populations of the older, while they may supply food and raw materials and receive manufactured goods in return.

Second Year: Europe, South America, Africa

In a study of Europe consideration is first given to the continent as a whole, when such aspects as extent of territory and diversity of features are treated. In this diversity special attention is given to the situation and age of the mountain framework; the ancient and often relatively low northerly "core"; the marginal southern belt of high and narrow Alps; the intermediate broken blocks, with coal on margins and minerals within, framed in industrial areas of large population; the plains as "tissue" extending between the mountains; plains rising gently from sea-level; piedmont plains; mountain plains of small extent (*e.g.* Plain of Vienna); undulating areas of low relief; Swiss "Plain"; the resulting variety of coasts. Latitude, altitude, and distance from the sea in relation to main climatic aspects, and resultant types of vegetation, are also discussed.

The European countries are studied, each in comparison with Great Britain and the United States of America, and in relation to the structure of the continent. For example, the presence of coal and other minerals, the nature of industry, the character of trade requirements, and the direction of trade routes are treated in relation to factors of relief. Distance from the sea is related to the place in international trade, the ease of exploitation of resources, and economic development; while the fertility of regions and the nature of the crops grown are considered in relation to soil, altitude, and slope. An essential point of comparison is density of population and its variations.

This and the nature of productions and trade should be based not on textbook statements, but on actual statistics such as are found in summary form in the *Statesman's Year Book.* From these, actual sketch maps of density of population, for example, should be made. The U.S.A. Year-Books of Mining and Agriculture give useful and more detailed information of European countries; and the American Atlases of the World's Agriculture and of the World's Mining should be regarded as essential authorities.

Each country should also have its own treatment as a differentiated unit, *e.g.*

France—variety of topography and resources as wide as that of the Continent; variety of resources leading to commercial independence and seen in even distribution of population; intimate contact with the sea in a peninsular situation.

Switzerland—part mountain and part plain; the interest of the boundaries; the mountains, including large areas of arable land in broad longitudinal valleys, are not more than 50 per cent. useless; forests; special conditions of industry; water power (in relation also to transport); nature and location of industries. Inland situation across vital western communications; importance of transverse valleys and "narrowness" of the mountain ridges.

Austria in contrast with Switzerland; another mountain inland state with same varieties of territory but less-compelling situation in relation to transverse routes, and a downhill direction towards the east.

Peninsular countries of the Mediterranean; narrowness of Italy and penetration of sea influence of all types; bulk of Spain and its isolation; fragmentation of the Balkan Peninsula, etc., etc.

Third Year: Asia and Australasia

Sufficient time should be available towards the close of the third year's course for some consideration of the world as a whole. The pupil already knows that trade is world-wide, for he has seen in the Home Region the produce of other countries and the sending abroad of "home" products; he has also had experience of various forms of transport. Moreover, the movement outwards of people to other lands (emigration) is another point of contact with the world at large. In his examination of other countries he has noted differences of climate, peoples, and products, and his attention may be directed to economic relations between Britain and other lands; he has noted lands that are included in the British Empire, and the extension and variety of British (as of French, Dutch, Japanese, and other) territories may be usefully summarised; he has studied "linkages" between Britain and other countries, and these may be co-ordinated by considering important routes by sea or on land. Other topics that may be considered are the distribution of the English people, the world's races, great religions, social and political life in other lands, and "questions" such as the League of Nations and World Federation.

IV

MATHEMATICS

MATHEMATICS

Arithmetic

The aim of a course in Arithmetic is to give facility in the use of numbers and a clear understanding of the fact that the great variety of possible examples can be grouped under a few fundamental principles. With this end in view, problems and illustrations should be taken from business, industry, and science. For example, it is difficult for pupils to grasp the significance of a rate; but if questions of speed, interest, price, weight, and volume—to mention only a few illustrations of variation of value of two related variables—are taken up, not so much for their intrinsic worth as for examples of a general principle, pupils gradually acquire power to understand and use "rate" in whatever application it may occur.

While it is essential that they should get practice and acquire fair speed in the four fundamental operations, pupils should not be drilled into expertness in any particular application to business or trade. Such drilling impedes progress to more advanced work, weakening instead of cultivating adaptability and power to meet new circumstances.

The course should include:—

(i) Addition, subtraction, multiplication, division, with their application to the usual tables of length, etc.

(ii) Fractions, vulgar and decimal.
(iii) Proportion.
(iv) Application of logarithms to simple calculations.

For convenience of consideration, work in Arithmetic may be regarded as having two aspects:—

(1) Skill in using the above processes, and
(2) Ability to decide when to use them.

While considerable manipulative skill has been acquired in the Primary School, nevertheless further practice is essential at every stage, for accuracy in mechanical operations is a prime necessity. Ability to read with intelligent comprehension is essential in problematic Arithmetic. Frequently, however, inability to solve a problem is due to lack of knowledge of the social, business, or scientific facts involved. When, for example, a pupil is unable to proceed with a question on rates, taxes, bankruptcy, insurance payments, profits, or trade discounts, it is probably not because he is unable to do the necessary figuring, but rather because he does not understand the meaning of the terms or the relationship of the numbers as used in commerce.

Applied Arithmetic should arise out of the pupils' study and general knowledge. Work on length, area, and volume should be based on workshop and garden practice, and should extend to such numbers as are met in the study of such subjects as astronomy, physics, and geography. In every branch of Arithmetic, examples can be got from the pupil's own experience, observation, or general reading, *e.g.* measuring and costing articles made in the school workshop, calculating yield of fields, finding from a sample, or otherwise, the weight of wood in a tree-trunk, or estimating results in relation to food and cooking. The study of data drawn from his own observations or from reports drawn from various sources —civic, commercial, industrial, geographical—intelligible to the pupil, will provide suitable material for the study of averages and statistics (including graphical representation).

At every stage rough estimating should be the practice. Degree of accuracy, approximate methods, and the influence of particular factors and errors on the final results are to be discussed as examples present themselves. Attention should be given to the interpretation of the results in relation to the subject-matter of the problem. In order to allow more extensive practice in method, pupils should be required occasionally to outline the procedure without doing the figuring.

For weak pupils the minimum is given by the application of (i), (ii), (iii) to the simplest affairs of everyday life.

Algebra

The aim in the teaching of Algebra is to generalise Arithmetic by means of a language of symbols, thus enabling processes and methods to be represented apart from particular applications. But opportunity should be taken to give life to the study of Algebra by introducing illustrations from various sources. Methods of procedure in applied Arithmetic can be shown by using algebraic symbols, and formulæ so stated can be used for other calculations of a like nature. Thus Arithmetic and Algebra are brought together, and examples for both can be got from Geometry. Examples for practice in manipulation of symbols—multiplication, division, brackets, fractions, factors—should not in general involve greater difficulty than would arise in the solution of problems likely to be met. Pupils who take pleasure in such manipulation, should, however, be given opportunities for practice.

The Scheme should include:—

Formula: its meaning and use.
Function: variable, constant.
Directional meaning of + and —.
Equation: ability to handle an equation as it may arise in a formula of irregular appearance.
Graphs: meaning of common values where two graphs intersect. Idea of continuous change and of rate.
Logarithms: as examples of indices, not studied theoretically but as used in ordinary calculations.
Progressions: treated simply so as to give the idea of a series of related numbers. Illustrations may be taken from money gathering interest, sinking funds, etc.

Geometry

In studying Geometry, pupils should learn outstanding facts either interesting in themselves or otherwise important, and also the essentials of valid mathematical proof, viz., a chain of reasoning following a clear understanding and statement of data, and of what it is proposed to prove or to do.

The following general principles should be adopted:—

(1) To assume as much as possible as opposed to Euclid's aim to assume as little as possible, *e.g.*, two sides of a triangle greater than the third; equality of vertically opposite angles; equality of angles at the base of an isosceles triangle.

(2) To give less importance to the solving of deductions than is traditional. It is at least doubtful whether failure to solve deductions is a proof that knowledge has not been properly apprehended. The demand that all pupils should show this ability produces in many undue strain and a dislike for the subject.

(3) To give interplay for inductive and deductive methods.

A scheme should be sufficiently flexible to suit different natural aptitudes, and to give opportunity for individual or group work. It should include geometrical drawing and cardboard modelling, and the study of:—

Solids, surfaces, lines, and points.
Angles and parallel lines.
The triangle and quadrilateral.
Loci.
The circle—principal properties.
Similar triangles—elementary properties.

Trigonometry

Some time should be devoted to the study of:—

(1) Measurement of angles, and
(2) The trigonometrical ratios with simple applications.

Note.—Books of general information should be available, so that pupils may learn to search for values required in given problems. Such books will include: trade handbooks, annual returns of imports, exports, products (from industry and agriculture), yields of taxes, prices, etc., books giving weights and measures in which various commodities are marketed, tables containing relationship between weights and volumes of different materials, and the conversion factors employed when changing units, etc.

Time.—We are of opinion that $5\frac{1}{2}$ hours per week should be allotted to Mathematics (including Arithmetic). If in certain courses in which Mathematics is deemed subsidiary, it is found impossible to give more than 4 hours per week, then Geometry should be confined to "Practical Geometry," and Trigonometry omitted. To co-ordinate the various branches of the subject more closely, the mathematical periods should not be rigidly apportioned on the time-table.

V

SCIENCE (PHYSICAL AND BIOLOGICAL)

SCIENCE

Introductory.—Science was introduced as a definite subject of the school curriculum about fifty years ago. Received at first with indifference and sometimes with active hostility, it has now reached its present position, where it forms an integral part of the curriculum of every properly organised school. The claims for its inclusion in the curriculum are analogous to those of other subjects—English, History, Geography, Languages. These subjects "are part of the equipment and preparation for life which we expect the school to give to its pupils so that they may play their part in the community as intelligent citizens, able to give efficient service, to appreciate and enjoy the beauty and wonder of the world in which they live, and to take delight in the wealth of culture in its many forms left to them by past generations."[1] Science takes its place side by side with these subjects as an essential element in a liberal education: "It affords a knowledge of certain facts and laws and an insight into methods and data peculiar to the domain of science which should be provided for every pupil."[2]

Science has a distinct practical value. We live in a scientific age. Recent developments in flying, in "wireless" and telephony, in the application of electricity to the lighting of houses and streets and to the

[1] J. Brown, *Teaching Science in Schools*, p. 3.
[2] *Ibid.*

driving of machinery, in the use of the internal combustion engine, and in medical science, hygiene, food production, and the welfare of mankind generally, render it essential that all boys and girls should have such an introduction to science as will provide them with an intelligent and appreciative outlook upon life.

The reasons which have led to the introduction of Science into the school curriculum determine to a large extent the nature and subject-matter of the Science Course. Science is taught because a general education is not complete if it does not include some knowledge of natural phenomena, of the physical laws and properties of matter, and of the application of scientific principles met with in everyday life.

The Science Course should not be planned on the assumption that pupils intend to pursue a career in which a special knowledge of some branch of the subject is essential. The vast majority of pupils will leave school at fifteen years of age, and the aim should be to include "a good general science course on broad humanistic lines which will be of value to all the pupils as a part of a sound liberal education." [1]

The scheme outlined in the following pages is intended for boys and girls from twelve to fifteen years of age. It is very comprehensive, and is not laid down as a hard-and-fast course to be followed in its entirety, but rather as a suggestive scheme indicating the spirit in which the subject should be taught, while leaving the teacher freedom to select and to elaborate those parts of the subject which have a local interest or which make a special appeal to the type of pupil under instruction.

[1] *Op. cit.*, p. 11.

It is thus elastic enough to allow teachers to select suitable matter for girls taking a domestic science course and it may also be adapted to pupils of slow development.

We are definitely of opinion that Biology should form part of the science instruction in all schools. This part of the scheme is meant to be a guide to what may be usefully taught in the subject. The aim has been to acquaint the pupil with broad biological principles and not merely to present collections of facts. The subject should not be regarded as a series of nature-study lessons. Technical phrases must necessarily be introduced, but these should be restricted to a minimum. It is important that the subject-matter should be based on observation and experiment.

Much of the study can be carried out with the help of a hand lens, while most of the material may be easily obtained throughout the year from garden, countryside, or shops. School aquaria and museums should be established wherever possible, and visits should be paid to Museums and Botanic and Zoological Gardens where these are conveniently situated. Excursions for the collection of plants and animals should be a regular feature of the school time-table.

In short, this part of the syllabus is intended to arouse an interest in living things, to exhibit the wealth and variety of organisms, to bring the pupil to realise the intensity of the struggle for existence, and to illustrate the numerous ways in which plants and animals "answer back" to the limitations of their environment.

A fairly detailed treatment of the sections on Astronomy, Geology, and Biology is presented in the appended scheme. Notes are, however, added to the sections on

Physics and Chemistry to indicate the extent to which these subjects are to be studied.

The time required for Science is a minimum of six periods per week, of which two should be devoted to Biology. This allocation of time need not entail the provision of more laboratory accommodation. For many years far too much formal and exacting experimental work has been required of pupils in science, with the result that the curriculum has been so circumscribed that pupils leave school at the end of a three years' course with little interest in, and often blind to, the wonders of the world in which they live, their natural curiosity unsatisfied, the development of plants and animals and the romance of the march of modern scientific discovery a sealed book to them.

When experimental work in Science was introduced into the schools the pendulum swung from the position where no such work was undertaken to the extreme position where nothing else was attempted and where the only aspects studied were those which lent themselves to precise measurement and quantitative manipulation. In this phase the broad humanising influence of the study of Science tended to be lost, and the time has come to redress the balance and recast the schemes, and, while granting due recognition to the claims of practical work, give pupils "a general knowledge of scientific principles and achievements in as wide a field as possible." [1]

[1] *Op. cit.*, p. 24.

SCHEME

First Year

Elementary Chemistry and Physics (Three Terms)

The three states of matter.
Simple illustrative experiments on Expansion of Solids, Liquids, and Gases.
Principle and use of thermometer—melting- and boiling-points.
Distillation—purification of a liquid and separation of a mixture of liquids.
Solution and crystallisation—purification of a solid and separation of a mixture of solids.
Diffusion of gases and solutions.

The Atmosphere.—Rusting of iron—active part of air. Combustion—Phosphorus, Magnesium, etc.

Work of Priestley, Lavoisier, etc.
Action of heat on substances to yield Oxygen.
Preparation and properties of Oxygen and Nitrogen.
Oxides.

From a consideration of the above experiments—

(*a*) distinguish physical and chemical changes ;
(*b*) define Elements, Compounds, and Mixtures.

Air Pressure.—Illustrative experiments using air and water pumps.

Head of liquid—simple barometer and its use.
Effect of pressure on boiling-point of a liquid.
Effect of pressure on gas—spring of the air.

Transfer of Heat:—Experiments illustrating the three processes.

Conduction, Convection, Radiation—applications.

Elementary Astronomy (First Term):

Ancient and modern views of Solar System—Copernicus, Galileo, etc.

The Sun—a star—distances in light years. Planetary system—relative positions, sizes, etc.

The Earth—rotation and revolution. Measure of time—day and night. Year (seasons).

The Moon—the month. Phases.

Eclipses of Sun and Moon.

Tides.

Elementary Geology (Second Term):

The Earth cooling from a hot gaseous state—solid crust—rocks—(*a*) igneous ; (*b*) sedimentary.

Earth movements—folding, landslide, volcano.

Weathering of rocks—water and carbon dioxide—solvent action. Rivers. Frost. Climate changes.

Soil.—Examination and separation of top-soil and sub-soil.

Clay, sand, grit, humus.

Properties of clay and sand with reference to the passage of air and water (springs). Effect of adding lime to clay.

Humus—leaf mould.

Peat—moorland—necessity for ditches.

Biology (Third Term):

Signs of Spring.—Reawakening of plant and animal life. Opening of buds. Lengthening of day. Increase in warmth of sun as affecting plant and animal life. Return of migrants.

A Simple Plant.—A complete plant to be examined to show root, stem, leaf, flower, and fruit.

(Note.—The functions of the various parts will be found as the result of experiments later in the course.)

Parts of a Flower.—A simple flower to be examined, and, as far as possible, the function of each part to be determined.

Visits of insects to flowers to get pollen and honey.

Insects.—Structure and life-history of an insect, *e.g.* butterfly or bee.

Relationship of insects to flowers. This will bring out ideas of pollination and how the flower is adapted for it.

Growth and Locomotion.—Development of Tadpole from an egg. External structure of a Fish to note how adapted for life in water.

(Whenever possible aquaria should be kept and general observations made on the movements and habits of animals.)

Earthworm.—External structure of an Earthworm to see how fitted for life in the soil.

Habitats of Animals.—An insect in the air ; a fish in water ; a frog, in water and on land; and an earthworm under the earth have now been studied.

On such lines as these it should be possible to show how various animals are adapted to cope with their environment and the struggle of fellows and foes.

Second Year

Chemistry and Physics (Three Terms)

Chemistry: Water.—Burning of a candle and ordinary combustibles—products, water and carbon dioxide.

Water an oxide—reduction by metals to form hydrogen.

Action of metals on the common acids.

Preparation and properties of hydrogen.

Composition of water.

Chalk.—Examination of chalk, marble, etc.—formation.
Preparation and examination of quicklime, slaked lime, and lime water.
Loss of weight when chalk is heated.
Preparation and properties of carbon dioxide.
Hard and soft waters. Builders' materials.

Physics.—(Each part of the subject to be introduced by considering common machines, physical phenomena, etc., and showing the necessity for establishing relation between forces, law of moments, principle of work, etc.)
Forces—equilibrium, moments.
Centre of gravity — density and principle of Archimedes.
Revision of fluid pressure.
Machines—levers, pulleys, wheel and axle, screw-jack.
Simple ideas of friction—lubrication.
Simple ideas of energy—heat, light, etc., as forms of energy.

Heat.—Revision of first year's work.
Heat a quantity—Specific Heat, Latent Heat.
Applications. Formation of water vapour.
Water vapour in atmosphere.

Biology (*First Term*):
Biology of Autumn.—Shortening of day.
Lowering of temperature.
Decreased activities of plants and animals.
Bird migration.

Fertilisation.—Recall lesson on insects carrying away pollen. Various other methods of carrying pollen. What happens to the pollen? Lead on to Fertilisation, which should be simply brought out as the result of observation and experiment on a simple flower. (Pollen grains and development of pollen tube should be shown under microscope, if possible.)

Fruits and their Dispersal.—Formation of simple fruits.
Dispersal of fruits, by (1) wind; (2) water; (3) animals; (4) explosive mechanisms.
How each kind is adapted for dispersal.

Seed Structure.—Structure of a Broad Bean.
Conditions necessary for germination and growth.

Biology of Winter.—Behaviour of plants in winter—

1. Fall of leaf in deciduous trees. Fate of the fallen leaves.
2. Behaviour of evergreens.
3. Storage of food in underground parts, *e.g.* bulb, corm, stem, and root storage.
4. Production of seeds in annual plants.
   Bulbs should be planted in fibre in school, and pupils encouraged also to do this at home.

Behaviour of animals in winter—

1. Migration.
2. Hibernation.
3. Food storage and partial sleep, *e.g.* squirrel.
4. Change of colour.
5. Production of eggs.
6. Making the best of it.

Biology (Second Term):

Study of the Soil.—Revision of first year's work.

Kinds.—(1) Sandy; (2) clayey; (3) chalky; (4) humus soils. Their origin, advantages, and disadvantages from the point of view of plant growth. An ideal soil.

Analysis.—Mechanical separation of soils. Holding capacity of various soils. Estimate amount of water, organic and inorganic materials, in various soils. Experiment to show that soils contain dissolved salts.

Gardening and Farming Operations.—Improvement of soils.

The Root.—Simple structure of a root. Root hairs. Kinds of root, *i.e.* tap and fibrous.

Osmosis and Root Pressure.—To be demonstrated.

Movement.—Response of the root to (1) gravity; (2) moisture; (3) light.

Transpiration.—Path of water up a stem to be shown. Value of water to a plant. Turgidity and wilting.

Cell Structure and Tissue.—Show under microscope a transverse section of any dicotyledon stem and of a tadpole to get simple idea of cellular structure and grouping of cells for particular work.

Respiration of Plants.—Meaning.

Show that roots, flowers, leaves, buds, and stems all breathe. Epidermis of leaf under microscope—stomata.

Respiration of Animals.—

1. Lungs.
2. Gills.
3. Cutaneous respiration.

Biology (Third Term):

Plant Feeding—Work of the Leaf.—Sources of carbon dioxide in the atmosphere and what becomes of it.

Making of Starch.—Test for starch.

Decolorise a leaf and show that starch is present.

Building up of starch by the plant. Conditions necessary for making of starch in the plant.

Stimuli and Movement.—Effect of heat and light on stems and leaves.

Climbing plants. Necessity for, and modes of climbing.

Transport and Storage of Food.—Where the food is taken. Food storage in root, stem, bulb, and seed.

Show presence of starch in all these.

Animal Feeding.—How animals obtain food.

Foods.—Value of foods.

Simple classification of foods. Food inter-relationships between plants and animals.

Flowers.—Pupils should be encouraged to collect flowers and note their adaptations to their habitats, and a special study made of (say) Sweet Pea, Wallflower, and Deadnettle.

THIRD YEAR

Chemistry and Physics (*Three Terms*)

Chemistry: Examination of carbonates in general, including washing-soda and baking-soda.

A simple study of some commercial processes, especially those associated with local industry, *e.g.* production of coal-gas, extraction of metals from ores, etc.

Some simple tests for the identification of the more common substances.

Characteristics of Foodstuffs and Textile Fabrics.

Physics: (These branches to be treated simply with illustrative experiments.)

Light.—Sources of light—velocity.
Reflection—mirrors.
Refraction—water, glass, lenses, prisms.
Optical instruments—camera, eye, spectacles, etc.
Colour—rainbow.

Sound.—Sources—transmission.
Velocity of sound.
Stringed and wind instruments.
Musical notes and noises.
Pitch—intensity—resonance.
The musical scale.

Magnetism.—Lodestone, artificial magnets.
Induction.
Terrestrial magnetism.
Mariner's compass.

Electricity.—Simple cell, use of accumulator and dry cell.
Conductors and insulators.
Effects of current—(*a*) heating and lighting; (*b*) chemical; (*c*) magnetic.
Electric bell, electro-magnets, motor and dynamo.

Biology (First Term):

Differences between Living and Non-living.—

1. Movement.
2. Respiration.
3. Nutrition.
4. Growth.
5. Irritability.
6. Reproduction and Death.

Differences between Plants and Animals.—From the plants and animals studied it should be possible to elicit the differences between plants and animals.

Classification.—Simple division of Animal Kingdom in regard to the main classes of Vertebrates and Invertebrates.

Amœba.—Study of Amœba under microscope. Asexual reproduction.

Salmon.—Life-history of the Salmon to show growth, metamorphosis, and change of habitat.

Eel.—Story of the Eel and its migration.

Bird Adaptation.—How a bird is fitted to live in the air.

Eggs.—Function, shape, colour.

Biology (Second Term):

Mammals.—Study of a Mammal, *e.g.* Rabbit, in conjunction with human body and its systems.

(*a*) Skeleton.
Knowledge of main parts of human skeleton.
Experiment to find percentage of organic and inorganic matter in bone, and the use of each.

(*b*) Digestion. Teeth and the alimentary canal. Simple experiments to be performed.

(*c*) Circulation and absorption.
Human blood to be shown under the microscope.

(*d*) Respiration.

(*e*) Parental care. Comparison with other animals.

Elementary Hygiene.—Impurities in the air and food and the necessity for clean, healthy living.

Nervous System.—Simple consideration of the brain and spinal cord and telegraphic system of the body.

Special Sense Organ.—The human eye.

During this term plant study should deal with irregular methods of feeding, *i.e.*—

Study of an insectivorous plant.
Study of a partial parasite, *e.g.* Mistletoe.
Study of a complete parasite, its characteristics and effect on host. Nodules on roots of Pea family.

(In rural areas Rotation of Crops may be usefully taken up here.)

Refer also to animal parasites.

Biology (Third Term):

Plant Ecology.—Elementary study of the relationship of plants to their environment and how they adapt themselves.

Growth Factors.—Effect on plant growth of—

1. Temperature.
2. Light.
3. Moisture.
4. Prevailing winds.
5. Soil.
6. Man.

Plants of Dry and Wet Areas.—Characteristics and adaptations of plants of dry areas.

Characteristics and adaptations of plants of wet areas.

Further Flower Study.—Further study of special flowers. Pupils should be able to recognise a few natural orders, *e.g.*—

Recognition of Families.—Buttercup family.
Wallflower.
Primrose family
Pea family.
Lily family.

Evolution.—Overcrowding and the Struggle for Existence.

How plants and animals survive.

Along these lines simple ideas of Heredity and Evolution may be discussed.

NOTES ON SCIENCE SCHEME

First Year

Elementary Chemistry and Physics:

Examine Bunsen Burner to understand how it "works."

$$\text{Ice} \underset{\text{cool}}{\overset{\text{heat}}{\rightleftarrows}} \text{water} \underset{\text{cool}}{\overset{\text{heat}}{\rightleftarrows}} \text{steam.}$$

Other examples, *e.g.* sulphur in test-tube.

Three States of Matter. — Solid, Liquid, Gaseous. Examples.

Effect of Heat on Solids.—(1) Ring and ball ; (2) compound bar ; (3) experiment to show force exerted during expansion and contraction.

Idea of the extent of expansion, *e.g.* 10 yards iron expands $\frac{1}{2}$ inch when heated from ice temperature to steam temperature.

Application—railways, bridges, etc.

Effect of Heat on Liquids.—Expansion flask with water.
Series of expansion flasks with different liquids.

Effect of Heat on Gases.—Expansion flask.

The Thermometer.—An example of an expansion flask—

Its use. (1) The temperature of air, water, body, etc.

(2) The temperature at which ice and wax melt.

(3) The temperature at which water boils.

Convey the idea of Latent Heat (general).

Find effect on Temperature of adding (*a*) sand or insoluble matter ; (*b*) salt or soluble matter.

Find the boiling-point of Methylated Spirit—Liebig's Condenser—*Distillation.*

Pupils distil salt water, dirty water, etc.

Separation of a mixture of liquids—application in industry.

Solution.—Common salt in water—saturated solution—crystals.

Soluble and insoluble substances—purify a solid, *e.g.* rock salt.

Crystallisation.

Other solvents—applications.

Solution of liquids and gases in liquids.

Rusting of Iron.—Increase in weight (use of balance).

Approximately one-fifth of air by volume used up.

No rusting in (*a*) dry air ; (*b*) water free from air.

Applications—Use of desiccator, of oil, of paint, etc.

Burning of Magnesium (and other metals).—Increase in weight.

Burning of Phosphorus.—Approximately one-fifth of air by volume used up.

Air made up mainly of (*a*) Oxygen—one-fifth (approximately) by volume—active ; (*b*) Nitrogen —four-fifths (approximately) by volume—inert.

Action of heat on Mercuric Oxide, Potassium Chlorate alone and with Manganese Dioxide.

Preparation and Properties of Oxygen.—Oxides—Carbon Dioxide—its presence in atmosphere.

Acid and alkaline solutions.

Work of Priestley, Scheele, Lavoisier.

Preparation and Properties of Nitrogen from the air by the removal of Oxygen.

From previous experiments distinguish—

(*a*) Types of changes (1) Chemical; (2) Physical. Give some everyday examples.

(*b*) Elements, compounds, mixtures—examples.

Air Pressure.—A number of simple experiments to show that air exerts pressure.

Head of liquid—balancing columns.

Experiment to measure pressure of atmosphere—simple barometer—Torricelli.

Use of Aneroid Barometer in mountaineering, aviation, and mining.

Experiment to measure pressure of gas supply using U-tube.

Pop-gun, bicycle pumps, etc., bottle with tube to water tap, etc., to show that "as the volume of gas increases, its pressure decreases, and *vice versa.*"

Effect of pressure on boiling-point of water—application—cooking.

Transfer of Heat.—Poker in fire, etc.

(*a*) Similar rods of different material. (*b*) Rods of same material but different diameter.	Held in Bunsen flame.

Good and bad conductors—application.

Water a bad conductor—convection currents of water and air—ventilation, etc.

Radiation of heat from fire, sun, etc.

Hot-water system of heating.

Thermos flask.

Second Year

Chemistry:

Water.—Burning a candle, or coal-gas, in confined space. (1) Moisture ; (2) Carbon Dioxide.

Collect the moisture, show it is water by means of its boiling-point and the $CuSO_4$ test.

Water formed by combustion contains oxygen.

Reduction of water by Mg, Fe Action of Na and K on water	Gas liberated—hydrogen.

Action of metals on the common acids—hydrogen from the acid, but not *always*.
Preparation and properties of hydrogen.
Diffusion of gases, balloons.
Water formed by hydrogen burning.
Electrolysis of water.

Chalk.—Examination of chalk and quicklime.
Percentage quicklime from chalk.
Marble and sea-shells, etc., treated similarly.
Action of acids on these substances.
Carbon dioxide.
Preparation and properties of carbon dioxide.
Action of CO_2 on lime.
Applications—builders' materials and formation of stalactites.
Hardness of water.

Physics:

(Note.—The various principles involved in the following portion of the scheme are much better examined by using larger masses than is customary.

The experiments on density, specific gravity, floating and immersed bodies should be carried out with large stones, blocks of wood, pound weights, etc., using suitable spring balances with large vessels for containing the fluid. Quite reliable numerical results are obtained by such means, and in the absence of the usual experimental detail the general conclusions to be drawn are much more obvious to the pupil.

Experiments on the measurement of Quantity of Heat, Specific Heat, and Latent Heat should be carried out with lumps of metal, *e.g.* half-pound weights of iron, brass, etc., and with copper cans of a capacity about one litre.

A steadily burning Bunsen can be regarded as supplying heat at a uniform rate. For use in country districts there are oil burners on the market which adequately serve the same purpose.)

Forces.—Forces classified as pulling, pushing or twisting.

Forces cause, stop, or change motion.

Forces balanced by other forces, *e.g.* tug-of-war, hanging weight, etc.—tension, etc.—equilibrium.

Measurement of Force.—Rubber or spiral spring—spring balance.

Turning Power of Forces.—See-saw (adjustment of heavy and light weight by trial and error).

Experiment to find relation between weights and distances.

Moment of a Force.—Other illustrations.

Uniform rod suspended horizontally from two spring balances.
Non-uniform rod suspended horizontally from two spring balances. } Note difference.

Find balancing point in the latter case—test by Law of Moments.

Centre of Gravity.—Find weight of body—steelyard.

Experimental method of finding position of Centre of Gravity.

Stability.

Weights of equal-sized cubes or cylinders of the same and of different materials—idea of Mass and of Density.

Weights of equal volumes of different liquids (using burette).

Water—the standard for density—relative density.

Volume and density of an irregular solid (volume by displacement).

Fluid Pressure.—Revision of first year's work.

Swimming, floating, cork released from bottom of liquid column, sinking body, etc. — *upward thrust of liquid.*

Ship leaking—*sideways thrust.*

Experiments to show that a liquid exerts a force in all directions and the force increases with the depth (divers).

Head of liquid—siphon, water supply, building of reservoirs, etc.

Similarly buoyancy in gases—balloons.

Illustration in laboratory—volume and density of irregular solid by principle of Archimedes.

Floating body—relation between weight of body and weight of water displaced — hydrometer —relative density of liquids.

Application—tonnage of a ship—Plimsoll line.

Machines.—Examples—purpose—

(1) Raising heavy weight by small force.
(2) Applying force at more convenient position.
(3) Transmission of power.

From above discussion select an order of treatment—

e.g. Experiment to measure the advantage in the use of lever (moments)—types of levers—examples.

Experiment to measure the advantage in the use of wheel and axle—examples—capstan, bicycle, mangle, etc.

Use of fixed pulley to change direction of force.

Experiment to find advantage in use of single movable pulley.

Application — use of pulley-block, crane, etc. Similarly, use of inclined plane and screw-jack, etc.

N.B. (1) In these machines the small force moves through a greater distance than the large force.

(2) More work "put into" than "got out of" the machine.

Friction.—Difficulty in pulling cart on road, beach, etc. Difficulty in walking on frozen roads, etc.

Experiment.—Use spring balance to pull a block of wood along different surfaces, *e.g.* floor, table, glass—note differences. Force used here is not overcoming weight of body (vertically downwards) but acting against friction.

The friction depends on the surface (rough or smooth) and on pressure between the surfaces.

Work must be done in machines to overcome friction—heat generated—and necessity for lubrication (use of ball-bearings).

Consider a "frictionless world" to show important part friction plays, *e.g.* in walking, etc.

Sand on rails in frost.

Brakes and screws, etc.

In above, pupils acquire a general idea both of machines doing work, and work being done on machines. The idea can be extended by reference to windmills, waterwheels, etc., so that a body falling or moving is capable of doing work—Energy.

Some work was used up in overcoming the friction of parts of the machine and heat was produced—Heat a form of Energy.

Simple illustrations from steam engine, etc.

Transformation of Energy—other illustrations in Light, Electricity, Biology, etc.

Heat:

Revision of first year's work. Cooling water below 4° C.

Peculiar behaviour of water. Effect on aquatic life.

Experiment.—Into equal weights of cold water at same temperature pour—

(*a*) Unequal weights of hot water at same temperature ;

(*b*) Equal weights of hot water at different temperatures ;

(*c*) Equal weights of different substances at same temperature ;

and note resulting temperatures of the mixtures.[1]

The heating effect depends upon weight, temperature, and material.

Unit of Heat, Calorie, B.Th.U., Therm.

Experiment.—To find quantity of heat given out by 1 gram of different substances cooling through 1 centigrade degree, *e.g.* turpentine, glass or aluminium, copper or brass, lead, hence the idea of *Specific Heat.*

Application—Hot-water system of heating.

General idea of *Latent Heat* already noted in first year.

Experiments on Latent Heat, using ether, ammonia, etc.

Principle of refrigerators, ice-making, etc.

Experiment.—Calibration of Bunsen Burner—number of calories supplied per minute by bunsen.

Experiment.—Find *roughly* the Latent Heat of steam.

[1] See note on p. 158.

Experiment.—Find *roughly* the Latent Heat of fusion of ice (quantity of ice adjusted to cause fall in temperature from 20° C. to 5° C.). *Omit* corrections for cooling of vessel.

Freezing, and thawing.
Expansion of water on freezing—
Burst pipes, soil, rocks, etc.
Evaporation and Condensation—
Water, vapour in atmosphere—dew, fog, etc.

Third Year

Chemistry:

Revision of chemistry of chalk.
Examination of soda ash, washing-soda, baking-soda.
Examination of other carbonates (by different members of class)—general properties of carbonates.
Destructive distillation of coal and wood—

Products (1) Inflammable gas.
(2) Watery liquid.
(3) Tarry liquid.
(4) Solid residue.
} General examination of these and an indication of their uses.

Same process on large scale—gasworks (visit).
Some attention should be given to industrial development of some of the by-products, *e.g.* coal tar—dyes, perfumes, etc., and ammonium sulphate as a fertiliser—importance of nitrogen—synthetic ammonia process.
The same experiments of distillation with—

(*a*) Parts of plants
(*b*) Foodstuffs
(*c*) Horn, hoof, hair
} to show similarity of composition—carbon cycle.

Metals.—Not found in pure state—as ores, *e.g* oxides, carbonates, or sulphides, along with other metals and clay.

Examination of samples of ores and use of blow-pipe and charcoal block in the identification of such samples.

Similar process on manufacturing scale—

e.g. Roasting ore to get oxide.
Reduction of oxide with coke—blast furnace.
Purification of metals by electrolysis.

A few metals may be considered—

e.g. Iron—Pig iron—properties and use.
Wrought iron—properties and use.
Steel—properties and use.
Steel alloys—nickel, manganese, etc.

Similarly copper—brasses and bronzes—uses.
Aluminium—thermite—uses.
Clay—mainly an aluminium salt—porcelain, etc.
Sand—quartz, etc.—an oxide—heat sand with soda ash on platinum wire—glassy bead—sodium silicate (water glass)—glass manufacture.

Foodstuffs and Textile Fabrics.—The examination of the various foodstuffs and textile fabrics provides work of the greatest interest to the pupils, especially to girls.

Examination of Foodstuffs.—Simple experiments to illustrate the properties of starch, dextrin, the sugars, and cellulose—use of iodine to distinguish dextrin and starch. Simple experiments to illustrate the process of fermentation—action of saliva and yeast. Use of micro-scope to distinguish the characteristic forms of starch grains as found in the potato, wheat, maize, rice, tapioca, sago—hence examination of flour from various sources —water-absorbing capacity of flour—gluten content.

Detection of impurities in flour and other foodstuffs. Action of baking-soda, cream of tartar, and baking-powder.

Functions of Food.—General composition—starch, protein. Food as a fuel—relative advantages of various foods. Milk. Micro-organisms—very simple experiments to illustrate behaviour of moulds and common bacteria leading to causes of putrefaction, thence to action of disinfectants, deodorants, antiseptics, and preservatives. Sterilisation.

Textile Fabrics.—Use of microscope to study characteristic forms of the various animal and vegetable fibres—cotton, flax, linen, hemp, jute, wool. The knowledge acquired should be applied to the examination of specimens of different kinds of cloth.

Physics:

Light:

Light and darkness—luminous and non-luminous bodies.
Objects seen by direct or reflected light.
Sun—source of light.
Light radiated in straight lines.
Velocity of light.

Reflection of Light from a Plane Mirror:

Type of Image—direct experiments, not drawings, to show type of image formed by—

(*a*) Plane mirror—erect, same size, same distance, laterally inverted.
(*b*) Convex mirror—erect, diminished (use in motors, etc.).
(*c*) Concave mirror—inverted or erect, according to position.

Refraction.—Coin in water, Stick in water—explain by diagram.

Reading print direct and through thick glass.

Total internal reflection—round-bottom flask half full of water.

Objects viewed through a prism.

Application—Lighting underground passages.
Periscopes.
Mirage.

Objects viewed through (*a*) convex, (*b*) concave lens.

Application in Instruments.—

Camera.
Eye, spectacles.
Magnifying-glass.
Principle of telescope, microscope, field-glasses.
Optical lantern, and cinematograph.

Composite Character of White Light.—

Blurred image in a lens.
Newton's work—spectrum.

Sound:

Sound provides ample material for experiments and demonstrations certain to create interest in the minds of boys and girls. There is no necessity to use much mathematics.

The following is a brief synopsis of a suggested course in Sound:

Sound associated with movement; silence with perfect stillness; the ear—a special organ of the body for the identification of sound.

Sound created by a sudden movement; an explosion; a burst paper bag, etc.; an extra pressure created; transmitted; windows broken during gun-fire, etc.

This extra pressure is very small in case of ordinary sounds; pressure gauges useless; sensitive flames required; experiments with sensitive flames.

Sounds: Musical and Other.—Former created by regular succession of pulses; strips of steel held in vice; teeth of saw; hand-saw; circular saw; toothed wheel on rotating spindle; syren (or devil whistle); lead up to pitch.

Pitch.—Tuning-fork with stiff bristle fastened to one prong held against revolving smoked gramophone plate, or falling glass plate; approximate measurements may be made with gramophone.

Pitch and Loudness.—Loudness evidently due to magnitude of movement; illustrate with fork.

Transmission of Sound. — Obviously transmitted through air, also through solids; string telephone, or long length of railings in park; submarine signalling; earth signalling; plumber listening for leakage in water-pipe.

Does not travel through vacuum; experiment with toy bell in flask exhausted of air.

Velocity of Sound.—Observations on distant gun-fire; on distant railway engine whistle.

Method of Transmission.—Illustration of two boats on motionless sea; speaker in large hall; no mass movement of air from speaker to audience; waves.

Experiment.—Long $\frac{1}{4}$-inch rubber cord, about 12 to 15 feet, one end fastened; jerk other end up and down; note pulse travelling; send series of pulses; note wave form; specially note nodes; simple ideas of wave motion; and obvious relation that must exist between n, number of pulses, and l, wave-length; $v=nl$.

Resonance.—Introduce by example of heavy pendulum set in motion by properly timed taps. Columns of air in tubes. Tuning-fork and water in long tubes —use a burette.

Experiment.—Find velocity of sound in air.
A series of test-tubes in stand; hence use of resonance box in musical instruments.

Stretched Wires.—Simple sonometer experiments, leading up to violin, etc.

Musical Instruments.—Simple lessons on the various types; methods of producing the vibration and the resonance.

The Ear.—Observe the power of analysis; of distinguishing the various instruments or vocalists even when producing same pitch; contrast with eye.

Two Sounds together.—Two equal forks on resonance box, or two singing flames. With forks, load a prong of one; with singing flames, glass tubes two feet long, one inch diameter; paper collar on one.

Observe *beats;* then observe two distinct notes; discord evidently produced by *beats;* analogy of flickering light.

Combination of Sounds.—On blackboard draw wave form, then same form of half wave-length; then draw result of adding both. Note result is also wave form; physical parallel; one sound two or more notes; harmonics. Idea that the presence or absence of these harmonics may explain quality of note. Intervals; rates of frequencies; pitch.

The Simple Musical Chords.—The octave; no possible discordant harmonics, hence octave perfect accord or consonance. The fifth almost as good; also fourth; then the third. Start with note (say) frequency 200 ; write down harmonics 200, 400, 600, 800, 1000, 1200. We get notes 200, 250, 300, 400 ; so we get d, m, s of frequencies in ratio 24 : 30 : 36. Build same chord on soh, and with same ratios we get s : t : r. Build same chord on fah, the fourth ; we get f : l : d—and so get

d : r : m : f : s : l : t : d with ratios
24 27 30 32 36 40 45 48.

Various Sounds.—Sounds of country; town; insects; birds; telephone; etc. Methods of production.

VI

MUSIC

MUSIC

Introductory.—We are not primarily concerned with the pupil whose intention is to make Music his profession. His study of Music in school is governed by the regulations for the Leaving Certificate. But if Music is to be a real educational factor in the life of the average pupil who leaves school at the age of fifteen, it must not be regarded as a purely recreational subject—it is that incidentally—but must be placed on a level with other subjects in the school curriculum. To this end three things are essential : (1) that the time allotted to the subject should be three periods per week, each period being forty minutes; (2) that, except for choral work, classes should be of normal size ; (3) that Post-primary instruction in Music should be in the hands of specialist teachers.

Qualifications of Teachers.—Every Primary school teacher should be brought to realise that the teaching of Music in the Primary School is the foundation of successful higher work thereafter. Until the general standard of training of teachers in Music is raised, the staff of a school should, so far as practicable, be organised to secure that every child is taught by a teacher with a special qualification in the subject.

Rhythmic Training, etc.—Teaching of rhythm by bodily movements associated at all points with the notation of this rhythm should be regarded as an essential part of adequate elementary musical training.

To secure good singing there must be effective speech training, which need not be given by specialist music teachers alone.

Opportunity should be taken when it arises to correlate Music with such other subjects as Literature, History, Geography.

Segregation of Pupils.—Boys and girls of age twelve to fifteen should be taught separately.

Boys' Voices at the Adolescent Period.—In the past considerable difficulty has existed in deciding what should be the form of musical training with boys at the stage when their voices are changing. Many schools have adopted the line of least resistance and have cut off the boys entirely from singing and even from any form of music-making.

This is, in our opinion, a grave mistake. Boys are using their voices without control in the streets or on the football fields, and this is far more likely to do permanent damage than a singing lesson where correct vocal habits are being taught.

As a result of a good deal of observation, it may be said that the change in the boy's voice is gradual and not an abrupt break, and that, during the whole of the changing period, the voice is deepening until it reaches its manhood's compass. Boys should consequently be encouraged to sing during the time of the change, but care must be taken that they do not strain their voices either by singing too loudly or by trying to exceed the very limited compass which their voices have at this period. A certain amount of part-singing is feasible and advisable if the foregoing provisos are observed. The provision of suitable material is a task worthy of the attention of young British composers.

Aim of Course.—The average pupil of approximately twelve years of age should be able to read at sight a simple diatonic melody, involving scale passages, the simple pulse division, and to write from ear in the staff-notation symbols the rhythm of a phrase played or sung.

With the afore-mentioned knowledge, the pupil of twelve years should proceed to study chromatic intervals, staff sight-reading involving chromatic intervals, time difficulties, keys from key signatures (this would involve scale construction both major and minor), and two- and three-part reading. Ear-work would introduce chromatics, length of phrase would be extended, and whole melodies would be used as exercises. Songs would be taught by ear, from modulator, or read from copies (staff), and would be unison, two-, three-, and four-part. A scheme of work including well-known overtures, extracts from symphonies, etc., should be prepared and followed. These can be studied by means of gramophone, wireless, attendance at orchestral concerts and operas, piano illustrations, and songs.

Attainments Expected.—At the end of three or four years—

(*a*) Pupils should be ready and anxious to continue choral work after their school life is over. This desire is not produced by unison singing, however much it is enjoyed in school life, but by being thoroughly efficient in part-singing. For many country children, choral singing is the chief means of hearing or producing harmony.

(*b*) They should be able to take their places in choirs and, generally, participate in the musical life of their district. To produce this desirable result it is necessary that boys should have regular and systematic sight-reading from both treble and bass clefs, if they have had previous instruction in sight-reading ; if not, a thorough grounding in sol-fa notation is much more useful, and all that can be taught really effectively in the time.

(*c*) Pupils so trained should have a discriminating taste in music which will reject the poor or definitely bad music offered in later life. During his school life the pupil should have an opportunity for hearing a number of the Lutenist Ayres, the songs of Purcell, the arias of Handel and Bach, the *lieder* of Schubert, Brahms, etc., and good modern songs specially adapted for school use. Several lessons a term should be devoted to listening to music other than choral, by means of piano illustrations, gramophone records, radio, etc., with the teacher's explanation of the same.

Equipment.—Each Post-primary Department should contain a well-equipped Music-room, which should possess, in addition to a good piano, a stock of music, a gramophone, and a supply of records.

School Orchestra.—The School Orchestra can play an important part in the musical life of any school. This may be begun in a very modest way with one or two violins and piano, or piano and harmonium. There is now available a plentiful supply of good and well-graded music for junior string orchestras.

Practice in ensemble-playing is now possible at quite an early stage, and undoubtedly the sight of young players taking part in school functions or in the annual concert encourages others to take up the study of an instrument.

VII

ART AND CRAFTSMANSHIP

ART AND CRAFTSMANSHIP

Introductory.—In the days of the home crafts, the home itself provided valuable practical training. The bench and the loom were part of the child's everyday environment. He saw clay taken from the pit and fashioned into vessels; dyes extracted from bark and vegetables, and much besides in the general exploitation of natural resources. The influence of this environment developed initiative, inventiveness, and resourcefulness, at the same time balancing and augmenting the training received in school. The youth of to-day, brought up in densely populated areas, often in tenement homes, away from contact with nature, and with less educative recreations, is much less fortunate in his environment. While he has contacts with machines and the products of mechanisation, his opportunities for investigating and understanding these are negligible. Construction is confined to factories. These do not open their doors to satisfy his curiosity, and the facilities in the home for any form of benchwork are, as a rule, very limited.

The cumulative effect of these changes has developed to such an extent, that educationists must seriously try to restore the balance in education and interest that was formerly provided by the home. This may perhaps more particularly apply to such an aspect of the curriculum as Art and Craftsmanship.

To assume that indifferent mental powers are sufficient for practical education is a grievous mistake. As in every other subject, the standard of attainment will be governed by the intellectual capacity. At the same time, it will be admitted that handwork possesses a peculiar value, which has associated it with the duller type of child for educational purposes. The pupil who may be incapable of expressing himself through a literary medium gains immeasurably through the interest which accompanies handwork. He understands the concrete form of its presentation. He gains through the discipline of its demands for accuracy. His self-respect is restored when he discovers there is something he can accomplish. In his case, it is the educational value rather than the technical accomplishment that we look to, both in Art and in Crafts, and in the case of both, the issues are much wider than the purely æsthetic or decorative. It may be the saving of a boy's soul literally if he feels that he can make something, however slight may be the performance. Decoration comes afterwards, as a further development of the pupil's personality.

The relatively small proportion of pupils taking a practical course suggests that there is perhaps a bias amongst teachers and parents towards educating for the professions and commerce. To some extent the teacher's own training may be a contributing influence, whilst in many instances the parents' judgment does not appear to be helpful. At the same time it must be conceded that both are concerned about the pupil's future. Commerce and the professions offer more definite prospects of a successful future. This points to the necessity for making industry more attractive, and opens up important considerations in which employers are largely concerned.

Utility of Art.—In addition to the acquisition of technical skill in various media and the development of appreciation, it should be the affair of the school to make clear the fact that Art is not restricted to pictures and sculpture, but is an element of practical utility, wide in its influence, entering into and enriching even the common things of everyday life.

There is abundant proof of the value of Art. In the various stages required in the manufacture of any well-conceived article, the design, the product itself, and the marketing—which includes advertising and selling—Art is a determining factor. Nor does its value end there; it implies the possession of taste in the purchaser. This taste will be appealed to by the evidence of thought which Art has added to the usefulness of the article. The addition also conveys a sense of pleasure, and brings to the purchaser a joy of possession.

The Æsthetic Aspect.—While it will of course be readily admitted that all are not equally gifted æsthetically, it is believed that all normal individuals possess in some degree a capacity for appreciating beauty which can be developed. Even the pupil with no special executive skill in Art may gain much by associating in the Art room with those who are producing fine work. By such contact, something of the interest which makes for understanding and appreciation is readily communicated. Such pupils may in after life attain positions of influence in industry, in educational affairs, or in public life, in which, if they lack æsthetic development, they may prove a danger to the community. For instance, such individuals not infrequently hold positions in industry which place them between the designer or craftsman and the public, and while they themselves have no Art training or appreciation, they are invariably quite confident that they know exactly what the public wants; hence the present difficulty in raising the standard of Design in Industry.

In the educational category, those who may occupy influential positions may become the means of depriving others of the opportunities for such development.

The reference also to those who may, without Art training, attain to influential positions in public life is not too strongly stated. They do constitute a danger, and by their indifference to natural and architectural beauty, may be the means of permanently disfiguring a countryside or a city.

Aim.—When considering the content of a Course of Study it is desirable to formulate an aim, and for general guidance this might be stated as follows:—

To develop in the pupil a consciousness of beauty, the habit of acquiring and expressing knowledge in form and colour, and the practice of critical judgment in æsthetic products; to stimulate the creative impulse to Art, and improve construction by inculcating the idea that beauty and fitness for purpose are inseparable.

Content.—The methods employed to attain this objective should embrace the study of the Arts and Crafts of the past, modern methods, and actual participation in creative work embracing both handicraft and graphic expression. The permeating influence of Art in life, its obvious contacts with commerce, literature, music, the drama, etc., should have its corollary in the life of the school through a collaboration of the teachers of all subjects, particularly History, English Literature, and

Classics, among which so many significant and inter-related ideas occur. Under a collaborated scheme for the entire school, for example, the apportionment of certain developments in History and related movements in Art and Literature might receive extended treatment under Art Appreciation. Again, the needlework of the girls, the woodwork of the boys, might be brought with Art and Crafts into one group of allied subjects, which would receive a block grant of time, to be allocated in accordance with a scheme providing for the general needs of all, and the particular needs of pupils possessing natural aptitudes for Art and Crafts.

Education and General Needs of Pupils.—In preparing schemes, the importance of education in relation to the general needs of the pupils should be considered. In this respect, the value of initiative and the simplicity of apparatus for Crafts should be borne in mind, so that the continued leisure-time practice of a Craft might not be handicapped or made impossible through want of machinery.

Primary School Training.—Before proceeding to make recommendations in connection with the teaching of Art and Handicraft for pupils from twelve to fifteen years of age, we must point out that it is not possible to consider this section of the curriculum entirely by itself. We can only proceed by assuming that a certain standard of attainment has been reached in the Primary School. Should we, for example, agree to recommend any basic Crafts, it might be necessary to make the pupil familiar with these in a simple form in the Primary School, and to suggest the extent to which this could be carried out there.

The difficulty of arriving at an approximation of the general standard of attainment in Art and Crafts is affected by

(a) *Environmental conditions of the school.*

The work done in rural schools will, as a rule, differ in character, though not necessarily in standard, from that carried out in urban or suburban schools. Differences in standard may, however, be expected between the work of the poor school and that in which the home conditions are favourable.

(b) *The aptitude for and training in Art of the Primary School Teacher.*

In some primary schools the experiment has been tried with marked success of detailing a teacher with a special aptitude for the subject as Art Teacher for the school, and this is to be highly recommended.

Teaching Conditions in Primary Schools.—This hardly goes far enough, however. Difficulties of apparatus, lighting, etc.—very real handicaps—would be considerably lessened and efficiency increased were a room set aside for Art as in Advanced Division and Secondary Schools. This need not necessarily mean additional cost, as the special room could be utilised for general subjects when not required for Art.

Visiting Art Teachers.—In other schools, visiting specialist teachers have been introduced with varying degrees of success. The most successful experiment of this kind is probably that in which the specialist acts in an advisory capacity, demonstrating, helping, and advising the class teacher. Where the visiting specialist teacher is tied to time-table demands, the conditions are often far from favourable. Through visiting a number of schools each week, taking the Art lessons in ordinary class rooms, hampered by large classes and the lack of apparatus, much of the value of his experience and special abilities is lost. Here again a room set aside and equipped for Art would be of advantage.

Training of Teachers.—While Drawing is on the whole well taught, the introduction of Handicrafts to schools is hampered, and the benefits of the fuller scope for self-expression and balance which these bring to Education are curtailed, through an insufficiency of teachers with a Crafts training.

Under wise supervision, or where guided by a teacher with some knowledge of Craftwork, the results have been most gratifying; but for the average non-specialist teacher Craftwork presents manifold problems not previously studied, the chief of which is probably Design. While teachers interested in Crafts have always had facilities for instruction, the training in Art of the non-specialist teacher has, in the majority of cases, followed the traditional lines of Drawing in black and white and in colour. Within recent years somewhat fuller courses have been organised to meet the extension of Craftwork in schools; but in the training of the future teacher (Articles 55, 37B, 39, and Chap. VI. of Regulations for the Training of Teachers in Scotland) the necessity exists for making Craftwork and Design obligatory.

It is important also that the Specialist Art Teacher should have an understanding of the work done, and of the capacities of pupils, at the different stages throughout Primary and Advanced Division Courses. For this purpose, increased opportunities for practice in such schools might well be provided during the teacher's training period.

(c) *Excessively large classes for Craftwork.*

This problem is recognised by some authorities as is indicated in their endeavours to find a solution. In one area, for instance, one or two schools having an Infants' Department find it expedient to utilise the resources of the Infant School. Needlework is carried out in the vacated Infant Rooms in the afternoon under the Infants' Teachers. It is thus found possible to reduce to reasonable dimensions the classes in needlework, and the relief occasioned by the withdrawal of the girls from the senior rooms results in greatly improved conditions for the boys' classes in Handicrafts, such as weaving, basketry, etc.

Craftwork for Girls.—It is regrettable that no arrangement has been devised by which girls could participate in some forms of Craftwork. The simplest way would be to expand the Art expression of their needlework; but some form of Craftwork, particularly weaving, could with advantage be made available for the girls.

Assumption of Pupils' Capacity at End of Primary School Course.—Allowing for such differences as exist, we should assume that at the end of his Primary Course the pupil will have acquired:—

(1) Facility in the use of media such as the pencil for general drawing and tone work, and pastels for colour work.

(2) Ability to represent with fair accuracy flat and cylindrical forms in tone, and also to have made a beginning in drawing box shapes.

(3) Facility in illustration of original and other ideas (imaginative drawing).

(4) An elementary knowledge of design gained mainly in the practice of some simple craft or crafts.
(5) A knowledge of the scope of Art obtained by brief talks on buildings, pictures, and Art objects generally.
(6) An awakening of appreciation.

ART

The change in name from "Drawing" to "Art" has a significance which is perhaps not generally recognised. Within the last half-century the subject has changed and grown most remarkably both in character and in scope, probably the most notable development being due to a realisation of the value of self-expression in education, and the suitability of Art as a means to this end. In some schools, however, Art instruction still consists almost entirely of drawing and painting in black and white and colour of natural forms and fashioned objects, to the serious neglect of creative work. This is not in the best interests of the pupils.

While there is considerable value in realistic representation, and the need for it has been admitted, we must recognise the fact that the pupil (or artist) contributes less of himself, and the spectator has to bring less to its understanding, than is the case with imaginative work, hence the satisfaction of the prosaic mind with realism.

Representational Drawing is undoubtedly suited for school work, in that it is less affected by interruption. The train of thought is more easily linked up from lesson to lesson than is that concerned with Design, etc., and further, it lends itself admirably to the compiling of full and orderly portfolios for presentation.

With creative work, on the contrary, there is the probability that unless the pupil has followed a systematic course of instruction throughout his earlier years, the standard of attainment will at first be disappointing, and scarcely seem to justify either the time and effort expended or the inclusion of the work in the portfolio.

While this may be so, the educational value of work which exercises the inventive powers cannot be overlooked, nor the fact that practice and guidance are necessary for the full development of even the gifted individual, be he writer, artist, craftsman, or athlete.

The essential elements upon which schemes will be based are indicated in the following outline:—

I. *Representational Work:*

- (*a*) Representation in outline, tone, and colour of natural and fashioned objects, singly or in groups.
- (*b*) Representation of original and other ideas, pictorially and decoratively, by pencil, pen, and wash drawings; cut-paper designs; etc.
- (*c*) Memory drawing of objects and incidents from everyday life.

II. *Design:*

- (*a*) Designing of patterns—borders, diapers, friezes, etc.
- (*b*) Designing of stencil and lino-block decorations, monograms, posters, etc.
- (*c*) Designing applied decorations for leather, embroidery, bookcovers, wood, etc.
- (*d*) Designing of complete articles, as in the case of Crafts—woodwork, metalwork, weaving pottery, etc.
- (*e*) Lettering.

III. *Appreciation:*

(*a*) Study of examples of (1) the Arts of every-day life—pottery, furniture, textiles, etc., and (2) architecture, painting, and sculpture.

It is recommended that facsimile reproductions of great Art should be added to the school equipment or made available under a loan or circulating scheme, and that the study of such examples should be supplemented by visits to Art Galleries.

(*b*) By means of demonstration lessons pupils should be made familiar with the materials and processes employed in various forms of Art expression less suitable for general school practice, such as etching, mezzotinting, oil-painting, etc.

(*c*) Practice in the mounting and hanging of drawings, prints, etc., and consideration of appropriate framing.

(*d*) Ideas of home furnishing and decoration.

In Art we must ask ourselves—

(1) Would the broadening out of the basis due to the additional attention devoted to Design and Crafts compensate for the lowering of the standard of Representational Drawing which would almost inevitably follow?

Without additional time, extended practice in Design and Crafts would adversely affect the standard of Representational Drawing. Compensation for this, however, would be found in the development of a fuller appreciation and increased power in Design.

(2) If the ability to draw deteriorates, will not the standard of Design be lowered?

There is a danger of this. There would, however, appear to be sufficient reason for a compromise. Drawing in the usual sense of the term is not always necessary. There have been brilliant Craftsmen who in this way would not be regarded as draughtsmen; but in their case, power resulted from a special aptitude and years of intimate contact with the materials of their craft. Unquestionably the practice of Crafts and the design involved in such would develop ability in designing, while the contact with materials would affect the essential character of a design. But without a power in Drawing the pupil would certainly suffer from a handicap. The proper compromise would be to retain Representational Drawing to such a degree as would preserve a balance between the training and discipline it assures, and the freer self-expression which would be fostered through Creative Design.

Expression of Ideas.—The approach to Design in the Primary School is through Craftwork. In weaving, for instance, the Design is developed on the loom, but it is not suggested that the same practice should be followed throughout. For much of the advanced work the advisability of having a planned design to work from is obvious. Without this the teacher as well as the pupil would be seriously handicapped, and while it need not always be carried out on paper, the visualised conception should be recorded. It is with this power to visualise and develop the design, whether it be on paper or on the material of the Craft, that Drawing is most closely concerned. The power to draw undoubtedly facilitates the recording of ideas. This takes us back to our desire to retain a degree of Representational Drawing. It is deplorable to find a person with good ideas, but with language inadequate for their expression. Drawing is the designer's language. Pupils should have reasonable opportunities for acquiring it; and it will be apparent that this can only be achieved under a reasonable allotment of time.

With regard to the formal Drawing lesson, it is hardly possible to over-emphasise the need for considered judgment on the part of the teacher in the setting up of the object or group to be drawn. His trained faculty of æsthetic judgment should be constantly active with a view to the development of a refined taste in the pupil, and the strengthening of his innate love of the beautiful. Ugly and uninteresting material should on no account be employed, an incentive being invaluable. Ordinarily there is no difficulty in securing the pupils' interest in a Drawing lesson, but where the effort involved becomes more mathematical in character, as for example in the study of some principle of construction or law of perspective, a lack of enthusiasm is sometimes noticeable. Here the judicious presentation of the subject may mean all the difference between apathy and interest.

Instruction should lead to recognition of the need for and value of selection and arrangement, not only in the designing of a drawing, painting, or decoration, but also in the affairs of everyday life, as for example in the planning of a room, a shop window, a building, etc. Artistic power of this type will undoubtedly be of consequence to pupils whose Art studies will cease, in the majority of cases, at fifteen years of age.

The brightening of school class rooms with plants, flowers, and pictures, through the combined efforts of teachers and pupils, which has been a feature of recent years—especially in the primary schools—is most commendable. Much may be done also by Education Committees. By means of carefully considered schemes of interior colouring, the school itself should be utilised to stimulate the pupils' appreciation of colour. In its decoration the dignity of restraint should also be demonstrated. Whether the decoration be achieved by means of pictures or other forms of Art expression, the sense of irritation and unrest created by overcrowded walls, etc.—a fault only too common in our homes—should be avoided. In this respect it is desirable that, in every way consistent with its purpose, the Art room should be æsthetically correct. It should have ample floor area, with cupboard accommodation provided in an ante-room, so that the walls may be left free for the hanging of pictures. In short, its arrangements should reflect the attitude to life which Art education seeks to develop

All these details of organisation relate themselves to a thorough grasp of the educational aim. It may be helpful, therefore, to emphasise this anew by stating that teachers should recognise the extent to which a love of beauty may influence the pupils' entire outlook.

CRAFTS

While certain of the Crafts have been dealt with elsewhere in this Report, it is felt that the closeness of the contact of the following with Art make their inclusion here advisable:—

1. Woodwork and metalwork.
2. Needlecraft, including embroidery.
3. Leatherwork.
4. Bookbinding.
5. Printing, block prints, stencils, etc.
6. Pottery.
7. Weaving.

It is recognised that the teacher's predilection for particular Crafts will naturally affect the schemes of work in individual schools, and that the industries of the district in which the school is situated may also influence the work. For instance, schools in an area that produces printed materials, such as linoleum or fabrics, may expend more effort on the study of printing processes than do schools where furniture, carpet-weaving or pottery, etc. are the main productions.

It might be assumed that work thus influenced by industry will tend to become vocational. Such, however, is by no means the case. The development of creative power (through Design) will be the aim throughout. Art enters into all industries, and this contact of education with the world of affairs will stimulate educational interest, for which the products of industry will become works of reference.

Notes on the Teaching of Crafts.—To ensure successful teaching it is necessary that classes be small. We should suggest a maximum of twenty pupils. Even with that number it will be difficult when the pupils are being introduced to a new Craft.

The possibility of developing Crafts in a direction which may become too strictly utilitarian should be guarded against by the practice of other forms of Art expression, which provide for the desire to create something more exclusively for its interest and beauty.

Wood and Metalwork

Reference has already been made to the necessity for dealing with wood and metalwork.

Educational developments through these media have brought extensions which direct attention to the value of Design. Future developments appear likely to place even greater stress upon this need, both in constructional and applied design. This trend—already quite marked in certain schools—is seeking a fuller expression through wood and metal, and such Crafts as bookbinding, seat-weaving, basketry, and upholstery, etc. For the latter Crafts, even where subsequent decoration in the Art room is necessary, workshop facilities are essential for the constructional stages of the work.

Whether arising from a mistaken aim or from systems of instruction, there is undoubtedly a very real danger of work in the Manual room becoming formal and standardised. The weight of tradition in the Crafts concerned gives an emphasis to the idea of production.

It is evident that while tool manipulations have great educational value, these are after all the means to an end, the end being intellectual development.

Instruction in the use of tools is an essential in Manual Training; but if the aim is solely to produce dexterity in tool manipulation, then valuable as it is, the pupil's activity tends to become mainly mechanical effort. Handwork should afford training by, not in, the use of tools, and aim at developing the powers of conceiving, reasoning, and constructing in wood. The three should be inseparable. Construction without conception, or *vice versa*, is limited in its usefulness.

Teachers should not be bound down by any hard-and-fast course of instruction, and with this all who have experience of the work will agree. Yet all must have some course which shall form the backbone of the system, and as experience is gained, such system will be extended or modified to suit any special requirements.

The practice of claiming the services of scholars during the handwork periods for the making of school furniture, or for any odd job that may crop up in school, should be discouraged, as such interruptions have a retarding and disturbing influence. When, however, a subject seeks illustration through handwork—to demonstrate the principles of an engine for instance—a correlation of interests most desirable in education is at once apparent. Correlation of this nature should be sought after and welcomed.

When we speak of Manual Training, it must be remembered that the term comprises more than practical subjects. Drawing demands a certain proportion of the time.

In this connection, a closer scrutiny of the methods of presentation might be advisable. The method of approach—the planning of essentials to fit the purpose of the object, proper proportions and form, adaptations, and the final criticism—must receive due consideration.

A weakness in much of the Design in both the Art and the Manual work arises from the fact that the departments do not have a sufficiently close contact. Design is vital to Craft work, and the proof of its worth as design is found in its suitability when practically applied. Many of the models to be made in the Manual room form suitable objects for constructional design, or decoration, and some for both. These designs and decorative effects might very well be prepared during the Art lesson after the problems have been discussed by the two teachers concerned.

Further, it should be possible in wood and metal-work as in Art to allow experimental periods when the pupils would be afforded complete freedom for self-expression. Every effort should be made to cultivate the pupil's resourcefulness. Pupils should be encouraged to make the most of the tools and materials that are at hand, improvising methods and contriving substitutes for anything they lack. The value of this power to adapt means to an end can scarcely be over-estimated.

Needlecraft

It is most undesirable to dissociate and divorce *Plain* from *Art Needlework*; the two ideas should be merged, overlap, and run concurrently, preferably in conjunction with Drawing and Design. The "plainest" garment should be an "artistic" production, otherwise from an educational point of view it is worthless. There are endless artistic possibilities with simple stitches—tacking, running, darning, chain-back, blanket-stitching, and herring-boning. These form the foundations of all embroidery stitches. The cuttings and oddments from garments can thus be utilised in a vast variety of ways, including appliqué, allowing wide scope for initiative and resourcefulness on the part of the child, and endless opportunity for artistic adaptation.

Simplicity being the keynote of daintiness, a simple garment, artistically finished, is of far greater educational value to the child than the heavy, solid, unattractive garments that hitherto have been too frequently associated with School Needlework.

Perhaps it is unnecessary to stress the fact that very fine work is undesirable from every point of view. Regular and even stitches are essential, but ultra-fine work, making exacting demands on sight, time, and patience, is old-fashioned, tedious, and strongly to be condemned.

Coloured materials (cottons and coloured threads, mercerised cottons and wools) should be much more lavishly used in every class. These are more attractive and stimulating to the child, and are less trying to the eyes than white work. The pupil's interest will thus be more easily awakened and directed.

In every case the finished article should be visualised as a whole from the outset, and the decoration thereof should take its proper place in the original design.

Throughout the Needlework Course an aim should be to develop taste and appreciation, and right-seeing and choosing in all things, especially in the common articles of daily use. If this is effective, it will secure the extension of this influence to the home.

In addition, we might note that the ability to design, draft, cut out, and make something pleasing to herself and others, will enable the pupil to discriminate between good and bad craftsmanship, and thus affect her whole outlook in after life.

Leatherwork

The Craft of Leatherwork, one of the oldest crafts in existence, with associations that carry the mind back to prehistoric man, has many features to recommend its practice in schools. The materials are light, clean, and easily handled. From the outset the pupil has the pleasure and inspiration of creating something useful as well as artistic, and of practising a Craft that is to-day enjoying a notable revival. His inventive and constructive faculties will be called upon, while taste and habits of accuracy and method will be developed in realising his conception in concrete form. Further, leather and the processes of its decoration are closely associated with such Crafts as Bookbinding and Upholstery, which, together with Leatherwork, are peculiarly suitable as Home Crafts.

From the economic point of view Leatherwork is of value, in that it may be practised with equal benefit by both boys and girls; and while flat-topped tables are desirable, the work may be carried out in the ordinary class room. Improved processes of tanning, etc. have made available a wide range of fine quality leathers, moderate in price. The necessary tools are few in number, hygienic, strongly made, and inexpensive, and require little storage accommodation.

Schemes in Leatherwork might include:

(1) Appliqué decoration on flat shapes—bookmarks, table mats, calendars, etc.
(2) Punched and stamped decorations.
(3) Cutting out and thonging of simple articles—small purse, egg-cosy, pencil-case, etc.

(4) Tooling a monogram or other decoration, staining and thonging of calf-skin—scissors' case, address-book cover, season-ticket holder, etc.

(5) Tooling, lining, staining, and thonging with more involved construction—grip purses with gussets and back straps or fitted with pockets, tobacco pouches, sporrans, and pocket-books with two simple pockets, etc.

Bookbinding

Associated exclusively with books—the traditional vehicles of learning—Bookbinding is closely related to the Arts and Crafts of Writing, Illumination, Block-printing, Stencilling, and Leatherwork, and provides scope for progressive study and practice throughout the whole of a pupil's school life.

The Craft is suitable for both sexes, and when conjoined with other Crafts, opens up possibilities for team-work, as for instance in the production of Class and School Magazines and illustrated writings, etc.

Work on the constructional side of the Craft would be carried out in the school workshop under the Manual teacher, and apart from the special tools necessary for the practice of Bookbinding, much of the apparatus required could be made in the school workshop.

Collaboration between the Manual and Art teachers should under ordinary circumstances be considered essential. The Manual teacher would be responsible for the sewing, building-up, and binding, while the decoration for the covered book, whether in the form of block-cuts or stencils for a canvas cover, or inlaying, tooling or blind-tooling for leather, would be designed and possibly executed in the Art room.

This close correlation could, through the subject-matter of a book, be extended to include other school subjects. In this respect Bookbinding as an educational Craft closely approaches the ideal.

The history of Bookbinding is a history of the human race, as from a very early period man has left records of his existence and interests in the form of carvings, hieroglyphics or inscriptions on stone, horn, iron, leather, etc. While Bookbinding, however, was already an established Craft in the sixth century, it is a comparatively new Craft in schools, and for this reason it has been deemed advisable to include in the Report suggestions upon which schemes of work may be based.

Preparatory Work

Where a class has had little previous experience of Handwork, it may be advisable to do some preparatory work in cardboard before proceeding to Bookbinding proper. In this way the necessary practice is given in the use of simple tools, and in manipulating some of the materials used in Bookbinding. A few of the following examples might be attempted:—

Square Mat. Edges bound with cloth; surfaces covered with covering paper showing $\frac{1}{8}$-in. margins.

Memo Card. Back lining paper turned over on face side $\frac{1}{2}$-in. with mitred corners; front of drawing paper showing $\frac{1}{8}$-in. margins.

Writing Pad. Front covering paper turned over and mitred on back; cloth corners hemmed on exposed edge; back showing $\frac{1}{8}$-in. margins.

Diary Case. Covered entirely with coloured linen mitred inside, and with $\frac{1}{2}$-in. space for hinge; linen hinge on inside, with lining paper showing $\frac{1}{16}$-in. margins.

Notebook. One section notebook with stiff Manilla covers sewn through three holes and cut "flush" to fit diary case.

Book Covers. Jotter size with cloth hinge and corners; outside paper showing suitable margins on hinge and corners, lining papers showing $\frac{1}{16}$-in. margins.

Portfolio. In three pieces with cloth hinges, suitable covering and lining papers, and tapes for fastening.

Pupils should select materials, suggest construction, and arrange colour schemes.

Outline Scheme

NOTEBOOK TYPES — SEWN ON TAPES. (*a*) *Cut Flush.*	Sizes to suit, say, four sections plain white, each of six leaves; thin boards, covered linen.
(*b*) *Cut Flush and Over.* School Notebooks. Address Books. Memo Books, etc.	Good quality plain or ruled paper; end papers; medium boards, edges sprinkled; covered linen and paper or whole linen. Stencil design on front.
SPECIAL TYPES — SEWN ON CORDS. (*a*) Autograph Albums.	Sections of good quality tinted papers; matched end papers; covers flexible or stiff in half or whole binding. Design on covers in stencil, blind tooling, or tooled with simple design in gold or silver foil.
(*b*) Sketch Books.	Sections of good quality drawing paper; end papers, edges sprinkled; stiff projecting boards; cloth binding. Design in stencil or lino-cut.
(*c*) "Stick on" and "Slip in" Photo Albums with specially treated backs.	Selected thick tinted papers; matched end papers; special clamped back with spaced leaves to allow for photo space; boards clamped, hinged, and projecting or plain; covered linen. Design in stencil or lino-cut.

CASE BINDING. (*Book with hollow back.*)	Pupil provides old or new book, or book in monthly parts, to be taken apart, repaired if necessary, and rebound. Covered linen quarter, or half binding. Design to include title and author.
PERMANENT BINDING FOR GOOD BOOK — PREFERABLY IN WHOLE LEATHER. (*Back flexible or hollow.*)	Book provided by pupil, or if possible sheets obtained from printer ready for folding. Single leaves and plates guarded; zigzag end papers; sewing, common or flexible; boards laced; edges trimmed, or cut; back kept fairly flat; headbands worked on. Design can be modelled, blind tooled, coloured in enamel or foil, and must include title and author either worked on, or in good lettering.

N.B.—Edges of books treated to suit tastes.

Printing Crafts

Printing has played a very important part in the advancement of the human race from primitive to civilised times.

The three principal kinds of printing are:—

Raised Surface, *i.e.* block (wood, metal, etc.).
Flat Surface, *i.e.* lithography (stone, zinc).
Intaglio or hollow, *i.e.* engraving (copper, zinc, steel, etc.).

Raised Surface.—A design drawn on a flat surface of wood, with the unwanted parts of the design cut away to a lower level so that the colour can be rolled, brushed, or padded on the raised part and then impressed on some other material and repeated as often as desired, is the idea underlying many of the printing industries of modern times—linoleum, wallpaper, cretonne. Process block of modern times, line, half-tone, and three-colour are merely mechanical elaborations of the same idea.

Lithography is possible by the antagonism of oil and water on a special kind of limestone or a specially prepared zinc plate. When the inked roller is passed over the stone or plate the ink adheres only to the portions drawn with an ink composed of fat on the stone or plate.

Engraving, *Etching*, *Aquatinting*, *Mezzotinting*, *etc.* are forms of intaglio printing. The design is cut or bitten into a flat polished surface of metal, then filled with ink, and an impression or cast taken upon paper by pressure.

Printing from linoleum is a very simple craft, requiring few tools, a sharp penknife for cutting design, an ink-roller or a large stencil brush for inking, a book-press or a cardboard frame of the same thickness as the linoleum for printing by rubbing. Ink may be prepared by dissolving (not too liquid) a few water-colour cakes of lamp black or any other colours with the addition of a little glycerine or syrup. Printer's ink is easily obtained, but a paraffin rag is required to clean the block. V or parting tools for cutting design, dog's-leg tools for cutting away background, may be purchased at a small cost.

Pattern designs in black and white or in a few colours can be quickly designed, cut, and printed in the following method: A piece of linoleum 3 in. × 3 in. divided into nine squares and with the lines cut with the V tools and with a different unit cut in each square, if printed 16 times and the printed units cut apart with scissors and each of a kind assembled together and arranged and pasted on paper, the result will be nine different patterns of 4 in. × 4 in.

As each unit is capable of being used in many different ways of repetition the pupil can discover the full possibilities of the unit and will produce many different arrangements. Two, three, or more blocks for other colours can be made to suit each unit in a similar way. Larger units in two or more colours can be used for printing patterns on paper or cloth. Pictorial compositions can be produced in one or more colours.

If a linoleum block is mounted on wood to the height (over all) equal to the diameter of a shilling it will be type high and may be passed over to be used in publication work of the school magazine kind.

The work of the pupil who is weak with pencil and paint becomes interesting and decorative, a means of expression, and a source of pleasure and pride to him.

Stencilling and its opposite, Cut-paper, are Crafts of a kind allied to Printing, and are of assistance as preparatory training for Printing Crafts.

Modelling and Pottery

The related arts of Clay Modelling and Pottery are of special value in constructive education.

From the earliest times the plasticity of clay has been of fascination to the craftsman owing to the remarkable ease with which its form can be manipulated or the surface decorated or embellished.

The art of Modelling is closely related to the realistic arts of sculpture or architecture, and of wood and stone carving, whilst its application to Pottery, by the convenient use of the same material, gives it a utilitarian value of the greatest importance.

Both Modelling and Pottery have great traditions as being stimulative in the history of races and peoples, indeed in the history of mankind. They have the additional value of being wrought in a material by which the pupil obtains a command of form, by a study and analysis in three dimensions, which is of importance as a further stimulus to develop the pupil's sense and appreciation of form, of proportion, of the relationship of parts, of adequate and suitable decoration, and generally to assist in developing in the pupil a power of critical judgment, whilst the free plasticity of clay encourages the inventive and creative faculties in illustration.

This particular Craft is suitable for both boys and girls, and apart from its own value, should also recommend itself to Head Masters, from the fact that instruction can be given to both sexes at the same time with consequent facility in the arranging of time-tables. It also commends itself as a craft which can be practised by the pupil after he leaves school.

The complete form of the craft of Modelling and Pottery demands a kiln for firing. As this is not generally available, a difficulty presents itself. This difficulty could be overcome in the larger schools or the new advanced division central schools, where a gas or oil pottery kiln might be installed.

In the rural districts a centre could be equipped for this purpose, so that pupils from outlying schools could be instructed in the process of firing the ware. With the rapid development of Rural Institutes and their interest in Arts and Crafts, the fact that pupils had a knowledge of Modelling and Pottery might well stimulate these societies into making provision for more advanced instruction and practice.

The craft might include:—

Free modelling in the round (developed from the infant and junior class work).
Modelling for illustration and imaginative work generally.
Hand modelling of pots, vases, trays, etc.
Hand modelling with incised decoration.
Hand modelling with coloured decoration.
Simple casting.
Slip moulding with painted decoration, using under-glaze colours.
Firing biscuit ware. Decoration — glazing and firing.
Majolica.
Incised decoration and illustration on plaster—tiles, plaques, etc., colouring.
Clay impressions of the same, colouring, glazing, and firing.
Carving in low relief on plaster bodies.
Turning.

Spinning and Weaving

The Spinning and Weaving of wool, and to a less extent of flax, formerly played a large part in the lives of Scottish children. They were employed at home assisting with the Spinning, and the hand-loom found a place in many cottages. Obviously this afforded an excellent practical training, and gave the children a first-hand experience in a craft closely related to the needs of life and linked up with history and tradition through many successive generations of resourceful and intelligent craftsmen.

Whatever commercial advantages the modern power-loom may have brought to us, it is remarkable that in the assessment of quality "Homespun" and "Hand-woven" are generally accepted as indicating what is best.

While this may favourably dispose us towards Weaving, it is its exceptional suitability as an educational school-craft which commends it, especially in the primary school, as there it can be practised from easy forms with coloured wools on hand-made cardboard looms in the top Infants' class, and, concurrently with raffia and cane-weaving, graded to suit the capacity of the children up to the Senior Division.

The facility and experience which will thus be acquired by pupils commends it for consideration as one of the crafts to be adopted in the post-primary schools for further development there. This could be done on small individual braiding, table, bead, and larger rug looms, or by means of "Tablet" weaving. Interest could also be extended to the school workshop through "Seat Weaving" on stool frames made by the boys, which could be done with rush, cane, sea-grass, and cord.

Where conditions permit, the processes of Spinning and Dyeing might be added in the post-primary school.

From its initial stages the craft is creative and largely self-corrective.

Time

The minimum time for the scheme outlined above is four periods per school week throughout the three years of the Advanced Division.

VIII

PHYSICAL EDUCATION (INCLUDING GAMES AND ATHLETIC SPORTS)

PHYSICAL EDUCATION (INCLUDING GAMES AND ATHLETIC SPORTS)

Introductory.—Any curriculum for pupils at the post-qualifying stage of school life which does not make provision for ample opportunities for physical education must be considered to be unscientific, and no course of study for the post-qualifying scholar can be regarded as satisfactory which fails to observe (*a*) the order of physiological and psychological maturity, *i.e.* the determination of educational advancement by the laws of growth; and (*b*) the physical basis of mental and moral development. The child must be regarded as an organic unity, and every effort should be made to foster physical fitness on which, no less than on book knowledge, depends success in life. Much of the time now given to verbal instruction might with advantage be devoted to physical training activities without detriment to the general education of the child.

If it were not for the persistence in some quarters of the influence of the old and now deservedly discarded distinction between mind and body, the term "physical" education would be abandoned, and much of the confusion of thought regarding physical education would not arise. Physical education is, after all, an aspect of the larger problem of education in general, and any system of education which divorces the physical from the intellectual or moral side of human life is defective and unsound.

The Object of Physical Education

The object of physical education is not so much to counteract the effects of sedentary school life as to meet an educational necessity. Physical education offers to the curriculum a definite contribution of educational value. It seeks to promote the harmonious and efficient development of the body in order that it may serve the will. For some years past the value of motor training has been recognised, and there has been an increase in the motor elements incorporated in the regular work of the school in connection with manual and domestic training, gardening, etc. Physical training strives to develop those fundamental bases of neuro-muscular control upon which may be built the special forms of motor skill.

Physical training activities must be learnt; therefore there must be an exercise of the intellect. The primary process is centred in mastering the co-ordinations of the larger muscle-groups and in adjusting these co-ordinations to the situation of the moment. The rapidity and the accuracy of the adjustments are conspicuous in well-conducted gymnastics and in team games. In these adjustments there are alertness of attention, quickness of thought to sum up the situation to be met, as well as judgment and response.

The value of physical education in character training bulks large, because many of the physical activities used are of such a form and kind as to arouse the most fundamental powers and emotions in human nature. To illustrate: the exercises of the gymnasium or playing field are all self-testing activities, and exercise the deeper inborn tendencies which lead to a mastering of the large neuro-muscular mechanisms of the body.

Team games, such as football, hockey, basket-ball, etc., are particularly essential as a means of physical education, for they satisfy the self-testing, competitive, and co-operative impulse of pubescent and adolescent years. Such games, if properly controlled, constitute an educational force for moral and social training, the possibilities of which are not yet sufficiently realised. To "play the game," to accept victory with modesty and defeat with good temper, and to appreciate the good qualities of opponents are experiences of educational value that will bear fruit in many relations of life. All this applies to girls as well as to boys, although, on physiological grounds, the elements of keen competition in the case of girls require careful control.

Consideration of the Means of Physical Education

To some the content of physical education may seem less serious and dignified than that of the Humanities, science, commerce, or industry, but it may at any particular time, and will in the long run, be as important as any of them. Further, it may be agreed that the more technical and specialised forms of abilities in education depend for present and future well-being upon all that is logical and justified in physical education. Therefore in considering the school curriculum there should be sought (1) an adequate motor education from which there will naturally result health and vigour if the work has been hygienic; and (2) an adequate expression of self which, with proper guidance and leadership, will be productive of a desirable personality. To achieve these there must be an extension of opportunities for a variety of physical activities. Daily periods—40 to 45 minutes—should be devoted to some form of physical training. These periods should be additional to the time that may be required for instruction in the fields of biology, physiology, or hygiene.

A consideration of the physiological and psychological changes that take place within the organism during the outset of pubescence and adolescence, as well as the widening differences between boys and girls in these respects, should be primary factors impressing a distinctive character on the training of each of the sexes. The physical education of boys and girls of post-qualifying classes should accordingly be in the hands of specialist teachers of physical training—men and women respectively.

Scope of Physical Education

The scope of a sound scheme of physical education for pupils of these ages embraces (1) the provision of a healthy school environment; (2) the practice of gymnastics and dancing, games and athletics, swimming, etc.; (3) instruction in personal and community hygiene; (4) the inculcation of ideals of physical efficiency.

(1) *School Environment.*—A favourable environment for the natural processes of growth embraces not merely the acknowledged factors of air, sunlight, and cleanliness, but spaces and incentives for abundance of spontaneous and organised play; opportunities for social and emotional expression are also vital elements.

The children of the school constitute a social environment for one another which plays a large part in their physical and moral development. The amount of social restraint necessary in schoolrooms doubtless has deep-seated physical and moral consequences. At present the minimum our knowledge permits us to demand is that periods of relaxation be not infrequent, and that teachers and others be induced to provide opportunities for the occasional expression of social life on a natural basis. Under the best conceptions of school discipline, and especially where athletics, dancing, swimming, and out-of-door activities enter into the programme of the school, it is probable that the social life thus engendered results in improved moral as well as physical growth.

The effects of school on home environment may under progressive educational conditions be very marked. The more the school assumes the responsibility of diagnosing the physical and moral conditions of children, the more will unfavourable home conditions come into view, and by various means of instruction it can aid in improving such home conditions. By a broad progressive policy of physical education the school may save the child from much of the unfavourable environmental conditions of the home and the street.

Not only should the school seek to preserve about the child a favourable environment for natural expression, but it should also, within limits, have a regard to other things which make for the child's better physical well-being. Much of this can be brought about by instruction in hygiene, especially in matters of personal appearance and cleanliness.

(2) *The Practice of Gymnastics and Dancing, Games and Athletics, Swimming.*—A practical scheme of physical

education for pupils of these ages (12–15 years) should include a variety of physical activities with the kind and amount of exercise proportioned to the capacities of the pupils. Gymnastics and dancing, games and athletics, and swimming should all be included; only by so doing can there arise a really humanistic physical training analogous to the training of the mind in a broad, truly liberal, and non-professional and non-vocational curriculum. These activities—gymnastics, games, and swimming—are completely exhaustive, but are instanced to indicate the range of desirable activities. The work in the gymnasium, field, or playground should have a broad appeal, and aim at more comprehensive results than "physical drill." The activities of the gymnasium should be directed to the acquiring of good posture, finely controlled movement, economy of effort, and a sense of rhythm. The programme on the field or in the playground should provide the fullest opportunity for expression of self in wholesome play, directed by teachers who will guide, stimulate, check, and admonish as the case warrants.

(a) *Gymnastics.*—Apart from physical training there is little in school life that offers guidance to the development of the larger and more fundamental neuro-muscular co-ordinations. Hand and eye training is provided, but this is directed mainly to the development of the accessory neuro-muscular mechanisms. It has been assumed that in so far as the larger fundamental movements are concerned, the pupil will get sufficient training through play and games. To a certain extent he does. But here he is likely to follow trends and habits already acquired, to be restricted by them as well as by the particular activities associated with the games played. Unless such activities are abundant and very varied in character, the number and degree of co-ordinations so acquired will be limited and the range of motor adaptation will be greatly restricted. Furthermore, the motor control resulting from games is largely objective and unconscious; it makes use mainly of reflex co-ordinations already acquired, following the lines of least resistance, and does not tend to diversification except in so far as the activities involved are diverse. Gymnastics, on the contrary, are particularly effective for the development of subjective and deliberate motor control. They require conscious attention to the movement and to the posture of the body as a whole, or of its parts. The movements are predetermined, and their execution represents effort to conform to more or less clearly defined standards. They are often more extensive in range and more sharply defined than would be required in ordinary activities, but are nevertheless capable of being applied to the accomplishment of some objective purpose. In this predetermined clearly defined character lies the distinct effectiveness of gymnastics as a means of subjective and deliberate motor training. The practice of gymnastics makes possible the development of latent powers of co-ordination which might otherwise remain dormant, and the perfecting of existing but vague co-ordinations until they become assured, well adjusted, and finally automatic.

As a means of physical training it is possible that gymnastics have been used too exclusively in the past; it may nevertheless be contended that their value has not been sufficiently recognised. The main function of gymnastics is orthogenic in the sense of body and health building, in fostering good posture and correct physical action, and in developing motor adaptability. Further, it must be recognised that by procedure and methods suited to schools—methods as regards grading, progression, interest, and incentive—gymnastics are capable of exerting a permanent influence on the development of personality.

Gymnastics have the value of securing a large amount of exercise in limited time and space, and, having regard to our climate, which militates to a great extent against out-of-door exercise, we contend that this form of physical activity should be more widely developed.

The results to be aimed at by gymnastic exercises can best be secured by a scheme of training based upon the Swedish system of educational gymnastics. The system is built upon sound principles of anatomy, physiology, and psychology, but for school purposes it is necessary that it should be applied by those who have received an appropriate training and are familiar with this particular field of its application. A gymnasium adequately equipped with apparatus is necessary for the purpose of obtaining a regulated and progressive training. Moreover, the exercises on apparatus constitute an integral part of an indivisible whole; the psychological influence of apparatus work must also be given its full value.

In regard to gymnasia and their equipment, the recommendations contained in the Scottish Education Department's "Planning and Fitting-up of Schools, 1925," do not seem to us to be adequate to the requirements of classes of 40 pupils. After careful consideration, and taking into account the desirability of conducting the gymnastic lesson according to the "team" system, we recommend that the minimum size of a gymnasium, exclusive of dressing rooms, etc., should be 60 feet by 30 feet, and that the minimum quantity of fixed apparatus should comprise the following: 40 sections of wall bars (20 sections placed on each long side of the gymnasium), 4 sets of double beams, 10 climbing ropes; of movable apparatus: 8 benches, 1 vaulting horse, 1 vaulting box, 2 vaulting bucks, 2 sets jumping stands, 4 mats. The number of gymnasia required for a school depends on the number of classes in the school and the time devoted to gymnastics. Where possible, spray baths should form part of the gymnasium building.

The question of personal equipment for the gymnastic lesson is a difficult one in the poorer schools. Many children in such schools are debarred from the full benefits of gymnastic training on account of inability to provide suitable shoes. We therefore strongly appeal to the appropriate authorities to take such steps as may be necessary in order to make the provision, free of charge, of gymnastic shoes for necessitous pupils a matter of "approved expenditure."

Suitable clothing is indeed essential to the successful conduct of the exercises of physical training. For boys, the removal of jackets, waistcoats, and collars, and the provision of belts and gymnastic shoes are usually all that is necessary. For girls, a tunic, dark knickers, and gymnastic shoes are probably most suitable. By the co-operation of those members of the school staff who are responsible for the instruction of girls in needlework, it should be possible for each girl to be provided with a tunic.[1]

[1] See under "Domestic Arts and Crafts."

(b) *Dancing.*—Dancing should be encouraged. It affords an opportunity for rhythmic expression and seeks to employ that opportunity in a way that is interesting and satisfying. Whatever type of dancing is decided upon—Country, Æsthetic, Character, etc.—it is necessary to consider the bents and capacities of the pupils. Simple dances accurately performed with appropriate expression should be the aim rather than intricate steps which require much teaching. The character of each dance should be kept in mind, and a right interpretation of its spirit aimed at. If this is done, dancing may be truly educational.

(c) *Organised Games.*—While it is of first importance that facilities should be provided for all children to express themselves in spontaneous play, it is also desirable that much in the way of physical education be obtained by means of directed and organised games. Spontaneous and unorganised play may develop the bully and coward, especially where adult control is slack and feeble; whereas systematic organised play minimises these defects, and impresses the ideals taught by organisation and co-operation. In play the child is the unit of force. His self-control lies in execution as well as in inhibition. He is concerned with self-expression rather than with self-repression. Play then relates itself to the truest conception of education, the development of the power of the individual to act as a self-directed unit in the community.

The time has come when games and athletics in schools should be organised and conducted as an educational project and not as an "extra" for a representative team. Games are misused if they prepare for individual or team championships only, but are rightly used where there is room for the activity of the weak as well as the strong, and where something can be done by everybody.

No attempt is here made to defend games. That games are important and valuable to the school is acknowledged to-day; the desire at this point is to state the opinion that "games" organisation in schools should include all normal pupils. Inter-school matches by representative teams form a useful and legitimate part of a physical training scheme only when they spring from a school organisation which includes all pupils, and are regarded as a means of establishing a healthy rivalry between schools with more or less equal opportunities. They are useful also as a means of developing a wider social consciousness. When, however, the attention given to such games is at the expense of children who are not likely to find a place in the school team they cannot be regarded as a legitimate or desirable part of the physical training scheme. Moreover, when affected by social stimulation, it is found, for example, that competitive games involving groups become so highly specialised and strenuous that supervision and direction are necessary. Physical details demand attention. Prolonged matches are wearisome; full-time play at football, hockey and other strenuous games on a full-sized pitch is considered an excessive strain for boys and girls. There should be some modification of adult standards in the period of play and size of pitch to meet the immaturity of the young and growing organism.

While in the majority of schools it is possible for pupils of the primary grades to play games in the school playground, the ordinary playground does not offer sufficient scope for pupils of post-qualifying classes. For the practice of games involving team organisation, which is the type of game specially desirable for these pupils, a playing pitch is essential. We consequently urge the responsible authorities to take this into sympathetic consideration when selecting sites for schools for post-qualifying pupils. Further, a close co-operation between the Education Committees and the Parks Departments of Corporations and County Councils is necessary in order that the public facilities administered by the latter may be utilised in the best interests of the physical education of school children.

Schemes for organised games in some of the poorer schools, we understand, have failed to become operative owing to the fact that payment of transport between school and playing field would be regarded as illegal expenditure. It is extremely desirable that steps be taken to remove this restriction, and that the cost of transport of children to and from the playing field be regarded as permissible expenditure.

(d) *Swimming.*—Among the forms of physical exercise which are possible under the more or less congested conditions in industrial areas swimming during pubescent and adolescent years necessarily occupies a high place. It is one of the best forms of physical exercise in its effect upon the body, while the cleansing and moral effects of free contact with cold water are not inconsiderable in strengthening a spirit of hardihood. A recent report of the Ministry of Health on the "Purification of Water of Swimming Baths" calls attention to the fact that "a large amount of pollution in swimming baths is derived from the costumes of bathers." "Towels have shown a bacterial contamination greater than that of costumes." The report recommends that costumes as well as towels be sterilised after use. The responsible authorities might consider the propriety of providing suitable costumes as well as towels for bathers, also adequate plant in each establishment for washing and sterilising them.

Any system of bathing should be so linked to the use of public facilities that pupils do not lose the habit of bathing during adolescence when the majority of them have left school.

Experience has shown that class teaching is impossible in cases where an instructor is quite untrained in handling groups of children, and yet the group method is essential if swimming is to form part of the physical training scheme. There need be no real difficulty in the provision of competent instruction. All expert teachers of physical education—men and women—are qualified to teach swimming, and during the summer months at least, in those areas in which public facilities are available, boys and girls should go to the baths in relays once a week to receive instruction in swimming and life-saving. Training in methods of rescue and resuscitation has a real mental and moral value, and emphasises the principle of mutual helpfulness.

If children are given adequate facilities for washing themselves clean either at school or at the public baths, they can be trained in habits of cleanliness which can be established by practice. One of the strongest reasons in favour of including swimming in a scheme of physical education is that it provides an opportunity for the physical training teacher to educate pupils in such matters.

Gymnastics, games, and swimming are all forms of physical activities that are now well beyond the experimental stage, and each forms an integral part of a well-rounded scheme. In all of them it will be noted that there is a considerable amount of social element involved, and there is every reason to believe that the conservation of this social element is an important feature in realising the best interests of physical education.

(3) *Personal and Social Hygiene.*—Recent years have seen a widespread interest in developing as a part of the school curriculum such instruction as would minister to the knowledge aspect of healthy living and physical efficiency. The instruction given has not always realised its full purpose. Frequently it has no connection with the actualities of the lives of the pupils, but has concerned itself with matters beyond their comprehension Instruction should grow out of practice and should be related to health rather than to facts of physiology and anatomy. To some extent instruction in hygiene may be correlated with nature study, biology, and domestic science, yet it should chiefly assemble information regarding the art of preserving a sound and effective body. Practical instruction regarding cleanliness, personal contagion, fresh air and exercise, the care of the sense organs and the body generally, all these are topics which should be dealt with not only during instruction in hygiene but also in talks, illustrations, lectures, etc., until those responsible for education are assured that each pupil has at least been as well informe'd as is possible within the limits of his comprehension and of his ability to apply the knowledge acquired.

Since it is generally recognised that the preservation of health and the increase of power are as much social as individual matters, instruction in hygiene and the development of physical ideals should take account of social conditions. Children should receive instruction as to the meaning of community sanitation and the means and methods employed. Public effort in dealing with disease, in isolating and stamping out sources of infection, and in prophylaxis should all be made as clear as possible. The connection of this form of instruction with that in the social field, which looks to clean streets, the disposal of garbage and refuse, and the provision of baths and recreation grounds is obvious. And throughout it all, instruction must be supplemented by the utilisation of the means which will produce motives of sanitary living and service, that is, ideals of social service and co-operation. The physical training teacher should work on a definite syllabus of health teaching. In the selection of topics of instruction due consideration must be given to the age, sex, and home conditions of the pupils.

All phases of physical education in post-qualifying courses should be in the hands of qualified teachers of physical training, who would meet their pupils in the gymnasium, in the playing field, in the baths, and at lessons in hygiene. The Scottish Education Department, in its report on Physical Education,[1] expressed the view that this is "a highly commendable arrangement."

(4) *Ideals of Physical Efficiency.*—The practice of the various activities included in physical education affords unique opportunities for the inculcation of ideals and enthusiasm. It may not only serve to promote the

[1] Scottish Education Department, *Second Quinquennial Report on Physical Education* (1923).

ideals of strength, efficiency, and health, but also amongst the older pupils it prompts inquiry as to conduct and regimen. Again, the practice of these activities provides excellent opportunities for the inculcation of high standards of honour, and may engender a sense of appreciation for fine form and fine conduct. In all this, physical education may invoke the aid of other aspects of the curriculum. History, literature, art, religion are all rich in material that could be, and should be, utilised to inspire youth to practical ideals of physical and moral dignity. If physical education is to be anything more than a formal and artificial adjunct to school life, its spirit must pervade the entire curriculum.

Physically Subnormal Children—Remedial Gymnastics

Steadily growing interest in the value of remedial gymnastics is being focussed upon the necessity for such work in connection with school children. Medical Officers are now increasingly becoming aware of the great value of this work. Unquestionably the need for treatment exists, as is all too plainly shown by the extent of physical deficiencies and faulty postures revealed by special examinations and general observation. To render any scheme of physical education truly effective some provision must be made whereby pupils requiring more specialised work can be grouped and given exercises adapted to their particular needs.

A certain amount of attention has been directed to this matter in some city areas, where centres for the treatment of spinal curvature and other forms of malposture have been established; yet the facilities for such treatment are generally inadequate. The wider dispersion of sparser units of population has had its effect in the country areas, where little or nothing appears to have been done; hence the question arises as to the means and methods of organisation and the kind of treatment to be provided.

The means of prevention is to be found in the abolition of unsatisfactory home conditions and of malnutrition, with their concomitants, but this matter cannot be further discussed here.

The majority of skeletal deformities among school children consist of spinal deviations of a mild degree and are not dangerous to the individual in practical life. Nevertheless they constitute a real handicap and prevent the individual from attaining full power and development; it is also a fact that some of these skeletal defects develop into more or less severe deformities, and unfortunately it cannot be said with absolute certainty which are liable to do so. Consequently all cases should, if possible, be subject to treatment. This is important from another point of view besides that of school hygiene. In the same way that, in general, well-built bodies betoken good parentage and sound nurture, so skeletal deformities are, in general, a sign that parentage and nurture, considered from the physical standpoint, are not as they should be.

If the general physical nurture of our pupils is considered from the point of view of these deformities, it is essential in the first place to promote and maintain an adequate scheme of physical education in all schools. Swedish gymnastics contain a large variety of corrective exercises suitable for the treatment of spinal deformities;

in fact, most of the mild cases require no other treatment than posture training by Swedish gymnastics. The question arises: How can treatment be arranged for those children who are in need of it?

Practically all cases of skeletal deformities may be divided into two main groups, one group consisting of those deformities which require a radical orthopædic treatment (surgery, redressive apparatus, spinal jackets, etc.)—such cases may be called "advanced"; another group consisting of minor deviations may be called "mild." The opinion has been expressed that school authorities should give treatment to the mild cases only, while the advanced cases should be sent to hospitals or resident institutions for treatment. Viewed from the strict orthopædic standpoint, this would appear to be the most satisfactory arrangement. The problem is not without difficulties, and requires the development of a plan of organisation. The following suggestions may not completely fulfil the orthopædic ideal but are considered to be practicable:—

1. The provision of an adequate and comprehensive scheme of physical education in all educational areas.
2. The establishment of remedial gymnastic centres for the treatment of mild cases of deformities.
3. The setting up of a close co-operation between the Physical Training Department and the School Medical Department in order to ensure the operation of an effective scheme of observation, examination, and treatment of mild cases.
4. The provision of hospital and institutional treatment for advanced cases.

With regard to the physical education of pupils who are not quite fit physically but who are not suffering from any definite physical defect requiring remedial gymnastics, or any condition requiring medical treatment, we strongly suggest that a special curriculum is very necessary inasmuch as periods of rest as well as of study and exercise are required if satisfactory results are to be obtained. It would appear that there is a fair percentage of pupils in this category—a fact well known to most Medical Officers.

The selection of pupils for this modified curriculum, requiring in many cases additional time for physical education in the broad meaning of the term, should be in the hands of the School Medical Officers, and it might be necessary, in order to make workable groups, to recruit similar pupils from other age groups than the Advanced Division group. The particular type of pupil here mentioned is the one who is generally deemed suitable for education in an open-air school.

The claims of pupils in this category could possibly be met by the establishment of "Holiday Schools." Some Committees have already made such provision "The 'Holiday School' is intended primarily to meet the needs of those children who after some illness recover so slowly that their attendance, if resumed at an ordinary school, would be very irregular. Their weakness is obviously of so temporary a nature that admission to a Special School is unnecessary. Rest, however, and careful feeding effect a wonderful change, and during their stay in the Holiday School their lessons are not neglected. . . ."[1]

[1] Annual Report, Education Authority of Glasgow, 1928–29.

The Administration of Physical Education

Unquestionably the logical solution of the problems of physical education in the broad sense demands that in each area there should be a department which should assume large direction in matters of physical education. It will easily be seen that much of the work of physical education involves fields of operation and investigation which hardly fall within the scope of medical practice on the one hand, or of general teaching on the other. Such a department should be part of the school administrative system for the area, and its chief executive head should possess appropriate qualifications and experience of physical training and its application to all school conditions.

IX

DOMESTIC ARTS AND CRAFTS

DOMESTIC ARTS AND CRAFTS

Introductory.—In the past history of all post-primary curricula Domestic Arts and Crafts have always had insufficient time allotted to them on the weekly time-table, and in consequence teaching methods have been forced to be concerned mainly with manipulative skill, acquired almost wholly by imitation and repetition, as an end in itself. We believe that in these days when crafts have justified themselves in the educational world as one of the paths to wisdom, and their value as a means of helping individuals to live fuller lives is being more widely recognised, Domestic Arts and Crafts ought to be given such a status in the new curricula as will ensure for them a realisation of their great possibilities. They have an inherent challenging interest for the adolescent girl, and possess peculiar advantages in awakening her imagination to a vision of Homemaking as it affects both herself and the community.

In a course in which Domestic Arts and Crafts are the only addition to the group of fundamental subjects taken by all pupils, eight periods (six hours) weekly is the *minimum* time which should be given to the group of subjects in the first year, ten periods in the second year, and in the final year twelve periods, together with an additional allowance of at least two weeks' intensive training in an inhabited house under the supervision of the teacher of Housewifery In the first and second years, five of the eight periods ($3\frac{3}{4}$ hours) should be given to Needlecraft, while six periods would be required for this subject in the third year.

Where girls undertake an optional subject in addition to Domestic Arts and Crafts, they should have the same course in Cookery, Laundry, and Housewifery as the pupils of the first group have, and consequently they will require the same time for the work. We, however, recommend that for such pupils Needlecraft should rank as their main subject, under Arts and Crafts, and that four periods (3 hours) should be given weekly in all three years. Under this arrangement, while it would not be practicable for these pupils to attempt the advanced Needlecraft of the specialised course, it would still be possible to do work worthy of the craft.

COOKERY, LAUNDRY, HOUSEWIFERY

In the First Year, three periods ($2\frac{1}{4}$ hours) should be given to Cookery and Simple Housecraft. At this stage we strongly deprecate any continuance of the common practice of allowing only two periods to a lesson in Cookery. In a lesson of one and a half hours the teacher has time to concentrate only on deft manipulation of the materials, and the more valuable part of the teaching, that based on sound educational principles, is neglected. The intelligent appreciation of the reasons for certain processes is even more important than the acquisition of skill, but under the two-period system that side of the subject is constantly sacrificed.

For the first six weeks the time should be devoted to Simple Housecraft in the school kitchen to teach the use, care, and cleaning of general household equipment. Thereafter the pupil should have simple lessons in cookery, designed to illustrate the principles of boiling, stewing, frying, roasting, steaming, baking, etc. The educational worth of teaching food values and chemical composition of food at this stage is questioned, as the necessary foundations have not been laid, but discussions on variety in food and on the cost of various simple foods are recommended as being within the comprehension of the average girl of twelve.

In the Second Year, Laundry work is commenced. Here we recommend that wherever it is practicable the Cookery and Laundry lessons should be given together in five continuous periods. Such an arrangement will bring an element of reality into Laundry work which it has hitherto lacked in the minds of girls, and it will also permit of certain processes in both subjects being carried to proper completion by the pupils, a very real difficulty hitherto. Laundry work in this second year should concern itself with basic principles, *e.g.* the softening of hard water, the source and production of materials. By the end of the session the pupils ought to be familiar with the treatment of household and personal materials in everyday use. The Cookery for the second year should provide practice in more advanced work than the first year's course, and it should include particular classes of cookery, *e.g.* breakfast dishes, supper dishes, invalid cookery. Food values should be introduced during this session.

In the Third Year, Housewifery will naturally be added to the combined subjects Cookery and Laundry. It is desirable that Housewifery lessons should be carried out under real conditions in an inhabited house simply and artistically furnished. The usual household appliances should be provided—various types of carpet sweepers, including examples of the electrically driven, and the pupil should be initiated into the construction and manipulation of these; a telephone should be installed, as well as all forms of electrical apparatus usually met with in the modern home. Where that is impossible, existing rooms, even in the school building, might temporarily be converted into living room and bedrooms, but without such association with the experience of actual life the subject is so divorced from reality that its educational value is worthless. It is not too much to claim that a real Housewifery Course, where there has been an opportunity for intensive training with a period of residence, lays a sound foundation for good citizenship. The girl thereby acquires a good standard of personal and household hygiene and a love of order and beauty, while she is also being strengthened in initiative and self-reliance and encouraged in habits of thoughtfulness. Unless in small schools in isolated areas, a period of intensive training with at least two weeks' residence in the Centre should be given during the Third Year.

The Cookery lesson will naturally proceed at this stage to the arrangement of meals, their cooking, serving, and relative cost, very simple diets, foods in season, the making of jams and jellies. In Laundry work there should be further practice in the treatment of ordinary personal and household materials (arranged in the form of a small family wash where this is practicable), and in the mending of the different articles before and after washing; these lessons would naturally be correlated with the Needlecraft lesson. During this year the treatment of delicate and fashionable fabrics should be undertaken, also simple dyeing and dry cleaning. Some time should also be given to the subject of common bleaches and soap powders—their use and abuse.

NEEDLECRAFT

Before discussing Needlecraft in Post-primary Courses we feel that it is necessary to indicate our view of the attainments of girls in this subject when they leave the Primary School. In the first place, we should like to stress the importance of good methods of workmanship. Rhythm of movement is essential to the production of good stitchery, and that can be obtained only by the correct handling of the material and tools, the thimble, needle, and thread. At the end of the Primary Course pupils should be familiar with the following processes: tacking (equal and unequal), running, hemming, top-sewing, gathering, back-stitching, chain-stitching, and blanket stitch, applied both in the making of simple garments and in their decoration. Pupils should also have some knowledge of building up a pattern by paper-folding or other method, and should individually have cut out patterns on paper. They should have had their constructive power developed by being consistently left to do their own fixing.

In knitting we again emphasise the importance of the correct manipulation of the knitting needles. Much practice in casting on and casting off, chain edge, purl and plain, knitting with four needles, narrowing and decreasing is essential.

If Needlecraft is to provide that scope for the development of constructive power and artistic feeling of which it is capable, we are of opinion that two-period lessons are desirable at this stage. Two lessons of one and a half hours each are of much greater value to the pupil in this subject than three lessons of one hour. Where accommodation permits, a special room which can be properly equipped should be allotted to Needlecraft.

"Art Needlework" should not be considered as a craft by itself. The plainest garment can be an artistic production, and all Needlecraft should furnish an æsthetic training. The encouragement given in recent years to produce more numerous garments in accordance with current styles is welcomed in so far as it has stimulated interest, and impressed on the minds of pupils the practical reality of their Needlework lessons.

At the very commencement of post-primary work every girl should be taught the threading and working of hand and treadle sewing-machines. Sewing by hand gives beautiful results which can be achieved in no other way, but for much ordinary work the machine is a more efficient, as well as a quicker tool, and no girl should leave school without a working knowledge of the sewing-machine. In post-primary classes the machine should be used for most long seams, and in the First Year the girls should apply their new knowledge to the making of a simple magyar nightdress and a gymnastic costume.[1] The artistic decoration of the nightdress affords an opportunity for correlation with the teaching of the Art Department. Appliqué work can be introduced very satisfactorily at this stage. Systematic mending, which requires a considerable amount of manipulative skill,

[1] See under "Physical Education."

should be taught throughout the whole course, and during the first year as much time as possible should be given to darning and its practical application. In knitting, the girls should be trained to work independently and from printed directions, therefore no definite periods of the Needlecraft time should be set apart for knitting lessons even in the first-year class, where the minimum requirement from every girl should be a pair of socks.

In the Second Year, the machine work will be finer, and will be applied to the making of a simple frock and knickers for the pupil herself. Wide scope is allowed in these garments for decoration, either in stitchery or in appliqué work. Darning should be continued and applied to modern hosiery fabrics, and calico and print patching should be undertaken. The pupils should be left a free choice in knitting, but every girl must produce at least one knitted article as part of her year's work.

In the Third Year, the pupils should make a frock (unlined) of a more difficult type and showing more decoration. In cases where no garment already made by a pupil has given practice in making an opening or in working buttonholes, a princess petticoat showing a back opening with buttons and buttonholes is suggested. Flannel patching, darning in linen, the grafting of a toe, and Swiss darning should be accomplished during this year. The pupils should again choose their own knitting, but with the limitation that plain socks or stockings are ruled out. It is understood that in all post-primary work the pupils must cut out their own patterns, calculate the quantities and cost of the materials, and fix as well as sew the garments, otherwise they are denied opportunities of planning and construction, and lack the sense of confidence and power which such responsibility brings. Discussion of materials used for the making of garments should be encouraged to train the pupils' judgment as to the relative qualities and properties of various fabrics. Pupils must also be allowed to express their own personality in decorating their garments. Initiative and resourcefulness should be encouraged through the use of remnants from garments for the manufacture of small household articles. Wide scope for artistic decoration and skilful blending of colour is thereby given. The desire for pretty things is universal among girls, and the Needlecraft Course can be used as a means of training taste and judgment to a true conception of beauty as a matter of suitable construction, good workmanship, and harmonious decoration.

At this stage we wish to make a short reference to the pupils who leave the Primary School at an early age, and who consequently have longer than the usual three years in a Post-primary Course. Provision should be made for utilising profitably this extra period (from three months to one year, according to the particular pupil); even where the extended period is only a few months, the Course in Domestic Arts and Crafts should provide some new interest. In Cookery, more advanced work (*e.g.* simple decoration) should be attempted, and where the facilities permit, the pupil might be allowed to specialise in that branch of Cookery which makes most appeal to her. In Laundry it should be possible to experiment with dyes and materials, while Housewifery and Needlecraft might very well be combined towards the manufacture, decoration, and repair of household furnishings and accessories. Simple Woodwork or Upholstery could also be added. In this way the spirit of investigation would be aroused and quickened, and the pupils would be saved from wasting their final months of compulsory school attendance on a stale repetition of work already mastered.

In conclusion we express the view that in addition to the provision of a sound practical training a course in Domestic Arts and Crafts, rightly presented, affords as much scope, as is usually claimed for the traditional academic subjects, in the development of the intellectual and emotional powers of the intelligent adolescent girl.

X

TECHNICAL SUBJECTS

TECHNICAL SUBJECTS

Introductory.—This is a Three Years' Post-primary Technical Course which includes Handwork, Technical Drawing, and Mechanics.

If we assume forty periods per school week, and that eight periods are devoted to the proposed course, a suitable allocation of periods would be:—

	1st Year.	*2nd Year.*	*3rd Year.*
Handwork . .	4	4	4
Technical Drawing .	4	2	2
Mechanics . .	..	2	2

The value of *Handwork* is now universally appreciated. Its absorbing interest, high educational value, and corrective qualities render its inclusion in any curriculum for boys essential.

The aim of the *Technical Drawing* scheme is to train boys to produce reasonably good drawings and, what is equally important but much more difficult, to think in three dimensions. The scheme is presented with the intention of arousing the boy's interest. This was often very difficult when the subject consisted largely of abstract problems on points, lines, and oblique planes.

The subject of *Mechanics* appeals to all boys who wish to understand their toys, and to appreciate what they read in the press and in their favourite periodicals about the aeroplane, the racing car, the speed-boat, record-breaking liners, and giant locomotives. It is also most important that the future citizen should have some knowledge of the subject, as trades and industries have become more mechanical and machines have invaded our homes.

One of the aims of this scheme is to give an introduction to some of the fundamental principles of Mechanics. As a school subject it should be of interest and value to boys in the Post-primary Course, for it is treated by experiment and calculation, and it is linked with Technical Drawing and Handwork. The problems also contain interesting applications of simple mathematics, such as should be welcomed for general use.

The schemes should not be considered as definite courses, but as suggested lines of development which may be followed, curtailed, or amplified as equipment and circumstances permit. They have this merit that they have been evolved and tested in actual use, and found to give highly satisfactory results.

HANDWORK

We recommend that the term "Handwork" should be adopted to designate that phase of the Technical Course which is carried out mainly at specially equipped benches.

Although Handwork is being discussed here as an integral part of a Post-primary Technical Course, its educational value is such that it should be an essential part of any well-balanced system of education. Whether it is regarded from the viewpoint of a subject or a method in education, Handwork affords unique opportunities for training in co-ordination of hand and eye, in self-expression, self-reliance, and appreciation of skill.

In view of the great diversity of schemes which must be devised to suit local conditions, it has been deemed inadvisable to give a detailed scheme for a Three Years' Course. In its place the general content of the course has been suggested, supplemented by a list of suitable projects. It is believed that in this way the teacher will enjoy a freedom of action which will enable him to develop a scheme suited to the environment of his school, while at the same time the general standard of attainment expected from the pupil at the end of the course is implied.

In surveying a complete course it is well to keep in mind several factors which limit Handwork projects, *e.g.* the tools to be used, suitable media, and the physical development of the pupils.

In the very early stages of the course the projects should be selected by the teacher, and should be of such a type that pupils must use and acquire dexterity in the manipulation of common bench tools. Generally speaking, wood is the most suitable medium for this purpose. Particularly during this early period it is agreed that all exercises when completed should possess some intrinsic value, even although extreme accuracy has not been attained by the pupils. For example, practice in making joints seems out of place at this stage.

It may be assumed that throughout the whole Three Years' Course the majority of projects will involve the use of wood, either alone or in combination with other media; and it will become the duty of the teacher to make certain that, before the end of the course, each pupil has had an opportunity of attempting all the commoner methods of joining wood and determining where and how to use nails, screws, or glue.

It is also suggested that exercises will be attempted involving simple metal-working operations, which will include soft soldering, wired-edge work, surface filing, riveting, and simple forge work.

Although only wood and metal have been mentioned, there is no intention of excluding any suitable medium.

Where facilities exist for wood turning, every advantage should be taken of this added interest.

Throughout the course there should be discussion and instruction in regard to the properties, the peculiarities, the source of supply, and the distribution of the various materials used.

As Handwork lends itself readily to the project method in education, there are great possibilities in allowing the pupils a freedom in the choice of project to be attempted. In this connection it is well to keep in mind the large number and variety of suitable exercises which may be obtained from domestic, industrial, and technical sources.

Again co-operation among the several departments of a school is always advantageous, and pupils can derive enormous educational advantage by helpful co-operation. For example, exercises can be devised to illustrate problems in physical, electrical, chemical, or engineering science. The value of design in all forms of Handwork should be fully realised. It embraces considerations of materials and tools—their possibilities and limitations as affecting form, construction, and decoration, and its worth as design is relative to the fitness of the article for its purpose. Evidence of thought in form as well as construction should be apparent in all work carried out, and opportunity should be given the pupil to express some of his own ideas in his work. In this way the educational value is enhanced, interest increased, and appreciation developed.

Throughout the course in Post-primary Handwork it should be kept in mind that each project should be designed to serve a definite purpose, and thus the finish of the article must be considered. In many cases it will be necessary to apply a suitable protective or preservative, such as varnish, stain, or wax polish.

Drawing.—Except in the very early stages, drawings of the exercises should be made before the problem is attempted practically. At the same time, it is advisable that periodically throughout the course working drawings should be made from dimensioned free-hand sketches as well as from pictorial views, such as are now common in periodicals widely read by boys.

Training in ability to interpret and construct from working drawings must be an essential part of the course.

The Problems.—In formulating problems for construction certain conditions should be fulfilled. The problems should be presented in sufficient variety to sustain interest and attention; have close connection with other school studies; show good design in construction and form; afford ample opportunity for self-expression; and be within the powers of the boy to accomplish successfully.

Such problems might be selected from the following sources:—

1. Home Interests.

(a) *Wood, and Wood and Metal.* Key label, pencil sharpener, pot stick, straight edge, rule, thread and wool winder, window wedge, teapot stand, match holder, hot-plate stand, paper knife, photo frame, watch stand, tooth-brush rack, pipe rack, tumbler holder, inkstand, nail box, soap box, salt box, knife, fork, and spoon box, soap and sponge box, blotter, letter rack, news-paper rack, account file, pin tray, toilet tray, coat and trouser hanger, trouser stretcher and press, tie press, towel roller, book rack, stationery rack, boot rack, egg stand, egg holder, cutting board, bread board, colanders, box bank, collar box, tea box, casket, attaché case, music case, glove box, tool box, cake stand, tea tray, candle-stick holder, foot stool, stool, plant stool, plant table, window table, card table, mantel book-shelf, combined book and stationery rack, bookcase, revolving bookcase, writing desk, smoker's cabinet, medicine cabinet, music cabinet, music stool, etc.

(b) *Wire.* Chain, egg switch, egg lifter, egg boiler, toasting fork, paper file, toilet fitment, silk winder, tumbler holder, potato masher, tweezers, card holder, test-tube grip, tea and coffee strainer, spoon with wire handle, candle and lamp shades, flower-vase stand, soap and sponge rack, toast rack, hanging plant holder, wall-plate holder, cake cooler, potato-chip basket, fish boiling tray, etc.

(c) *Tin Plate.* Match-box cover, letter rack, toothbrush rack, small tray, biscuit cutter (various shapes), grater, bank, taper holder (various shapes), birds' drinking trough, birds' bath, milk can, pint measure, filler, scoop, dust pan, oil can, cake tin with false bottom, fish slice, loaf tin, fancyboxes, candlestick holder, vegetable strainer, soap and sponge holders, etc.

(d) *Constructive Repoussé Work in Brass, Copper, or Aluminium Sheet.*	Initial plates, name plates, finger plates, serviette rings, small trays—square, oblong, round, and shaped; various box shapes—cigarette box, tea box, jewel boxes; blotters, inkstands, small fern pots, flower pots, table lamps, photo frames, mirror frames, flower vases, sconces, plaques, muffin stands, spoons, decorative shapes for application to wooden objects, straps, hinges, etc.
(e) *Forge and Vice Work in Iron and Steel.*	Cutting, forging, and shaping steel punches for Repoussé Work; hot-iron stand, skewers, poker, coal tongs, small shovel, spring paper clip, iron hinges and fittings of various kinds. *Tools*—Bradawl, screw driver, try-square, marking gauge, mitre block, bevel, cold chisel, nail set, rivet set, calipers, centre punch, flux tray, soldering iron, trowel, paint scraper, wood scraper, small thumb cramps. *Hammered Decorative Iron Work*—Door knocker, letter-box plate, hinges, kerbs, iron holder, coal box, etc.
2. GARDEN AND RURAL INTERESTS. (a) *Wood, and Wood and Metal.*	Seed markers, plant stick, measuring rod, dibble, seed protector, seed and bulb trays, line winder, wooden rakes, drill marker, potato setter, layering stick, ladder, steps, vermin traps, sprays, riddle, forcing frames, cold frames, potting stick, besom, hammer or axe shafts, flower staging, turf beater, dolly peg, boiler lid, strainer, boiler stick, clothes pegs, clothes poles, bucket rest, garden roller out of oil drum filled with cement, wooden bolt for door or gate, wooden spring latch, wheelbarrow, hen coop, fowl pen, trap nest, egg boxes, incubators and foster mothers, garden basket, milking stools, tree protector, wicket gate, field gate, stile, feeding troughs, potato masher, hammock sling, hay rack, manger,

hurdle and fencing, portable garden tent, bee hive with accessories, dog kennel, dovecot, swing, small bridges.

Rustic Work—Fern baskets, table, seat, arches for flowers, trellis work, shelter, tool shed, weather vane, rain gauge, etc.

(b) *Forge and Vice Work in Iron and Steel.* Wire borders, seed markers, ceiling hooks, hold fasts, tub handles, box handles, cinder or path rakes, hoes, garden trowel, hand fork, gate hinges and latches, hooks and eyes, staples, shelf brackets, door bolt, special gate fasteners, fire shovel.

Cart Fittings—Trace hooks, shaft, staples, cart steps, back hinges, etc.

(c) *Rope and String Work.* Knots—overhand, Flemish, sailors, weavers, fisherman's, lash; crowning, jar sling; splicing—eye splice, cut splice; grommet, guy roop and strainer, halter, rope ladder.

Rough Mat Making and Netting—Oval mat, coco mat, woven mat; pea net, hammock, etc.

3. Games and Sports, Hobbies and Pets. *Wood, Iron, Tin, Steel.* Table tennis, bagatelle, ring game, ball game, parlour quoits, blow football, croquet mallets and hoops, chess or draught board, rounder bat, cricket bat and stumps, hockey stick, golf clubs, cat and bat, bow and arrows, targets, single sticks, basket ball, nine pins; fishing rod, gaff, landing net, casts; boats and yachts; display cases or cabinets for birds' eggs, stamps, butterflies, coins; dog kennel, rabbit hutch, bantam pen, bird cage, aquarium, camera, house for white mice; camping tent, camp stool, camp bed, pegs, frying pan, boiling pan, tripod, screen, drinking tin, etc.

4. Toys. Boomer, trick block, various puzzles, building blocks, boomerang, tumbling clowns, acrobatic clowns, swinging parrot, spinning tops, boxing puppets, jumping kangaroo, doll's house and

furniture, Noah's ark and animals, scooter, kites, aeroplanes, barrow and spade, jointed dog, waggon, paddle boat, rocking horse, motor car, etc.

5. Special Group Work and Work having a Bearing on Local Industries.	Simple looms, pit cage, ventilating fans, pumps; simple pattern-making and casting in lead; punts, canoes, boats, yachts, and certain parts of ship construction; sheds, shelters, summer-houses, and simple examples in house construction; types of fishing nets, creels, boxes, sails; simple printing press and accessories; Norman castle showing moat, drawbridge, portcullis, etc.; theatre; Roman camp; illustration of two- and four-stroke internal combustion engines, turbine, steam engine; simple bridges; problems of cities—sewage disposal, water supply, lighting, etc.
6. Objects Involving Scientific Principles.	Lever balance, spring balance, dynamometer, lever apparatus, bell-crank lever, leaning cylinder, inclined plane, wedge, pulley frame, magic cylinder, sandmill, windmill, windlass, capstan, hoist, suction pump, cigarette delivery box, pop gun, glove stretchers, pantograph, roof truss, crane, bridge, turbine, steam engine, spectrum, spinning top, hydrometer, clinometer, helicopter, camera, camera obscura, periscope, kaleidoscope, syphon, spray, water wheel, pelton wheel, fountain, water-clock, megaphone, whistles, siren, thermometer, barometer, sextant, shadow clock, blowpipe, heat-bow, hot-air spiral, monochord, one-string fiddle, chimes, gong, dulcitone, ukelele, protractor, liquid measures, rain and wind gauges, rangefinders, steam launch, etc. *Electrical*—Buzzer, bell, induction coil, telephone, telegraph, morse key, battery, night lights, wireless sets, galvanometer, compass, simple electric motors and dynamos, etc.

7. Turning in Wood. Rulers, feet for boxes, etc.; pot stick, glove-finger stretcher, darner, file handle, chisel handle, rolling pin, potato masher, dumb bells, Indian clubs, stool, mallet, tray handles, umbrella handles and knobs, candlesticks, match holders, clock case, lamp stands, cake stands, inkstands, egg cups, finials, taper holders, napkin rings, needle case, boxes, vases, card trays, plates, mirror frames, photo frames, ash trays, various shaped bowls, etc.

TECHNICAL DRAWING

First Year

Plane Geometry

To familiarise the pupil with the properties of the common Plane Figures and to gain experience with rule and protractor, it is suggested that models in cardboard of these Plane Figures be given to each pupil to measure the lengths of the sides and sizes of angles. These with name of figure should be tabulated. The figures might be studied in the following order:—

(*a*) Equilateral Triangle, (*b*) Isosceles Triangle, (*c*) Scalene Triangle, (*d*) Square, (*e*) Rectangle, (*f*) Rhombus, (*g*) Rhomboid, (*h*) Regular Hexagon, (*i*) Regular Octagon.

These should be drawn later after some experience has been gained in the manipulation of the drawing instruments.

Suggested Exercises.—

(*a*) Bisecting lines of various lengths.
(*b*) Bisecting angles of various sizes.

(*c*) Drawing parallel lines at a given distance apart.

(*d*) Drawing perpendiculars with Tee Square and Set Square, or with two Set Squares.

(*e*) Dividing a line into a number of equal parts.

(*f*) Dividing a circle into 4, 8, 6, and 12 equal parts.

All figures should be lettered with block letters, and their titles printed.

Solid Geometry

Orthographic Projection.—A model of the three co-ordinate planes should be made in paper or preferably in cardboard by each boy, so that he can clearly see the ground lines which he is to draw on his paper.

It would be advantageous if the lettering of the ground lines were the same in all districts, and the following is suggested where the second elevation is drawn in line with and to the left of the plan:—

OX pointing to the right.
OY pointing to the front.
OZ pointing upward.

Give names of the three planes and the meaning of plan, elevation, and end view. At first the position of the end view should always be in line with the elevation, but later this may be varied by drawing the end view in line with plan.

Draw three views of a rectangular block of wood in simplest position. Letter the top right-hand front corner only (a, a_1, a_2) and write down its distance above H.P. in front of V.P., and to the right of 2nd V.P.

A due proportion of time should be spent in an endeavour to get the boy to read his drawing and think in three dimensions. He might be asked to show (1) height, (2) length, (3) breadth, (4) back, (5) front, (6) various specified corners in all the three views. This procedure should be repeated with all solids.

Pictorial Projection.—A pictorial projection of an object gives a much better conception to the untrained mind than can be derived by an examination of three rectangular views. It is, therefore, recommended that this form of projection should be freely used.

Exercises might be given in—

(*a*) Drawing three views from a pictorial view.
(*b*) Drawing a pictorial view from three views.
(*c*) Sketching a dimensioned pictorial view and then drawing three views.

Developments.—In order that the boy may be able to make his own models in paper he should develop all the geometrical solids which he draws.

Suggested Objects—

(1) Block of wood.
(2) Triangular prism axis parallel to H.P. and V.P.
(3) Hexagonal " " " "
(4) Cylinder " " " "
Introduce here the chain-dotted centre line.
(5) Cone standing on H.P.
(6) Small objects made in wood from which own dimensions are taken.
(7) The square pyramid.
(8) The hexagonal pyramid.

Before the pyramids can be developed the subject of true lengths of lines should be discussed and some construction given.

System of Lettering.—An edge or line should be called A, B; its elevation lettered a_1, b_1, its plan ab; and its 2nd elevation a_2b_2.

Second Year

Plane Geometry

Drawing tangent to a circle from a point

(*a*) On the circumference.
(*b*) Outside the circumference.

Drawing an arc of a circle of given radius to touch two lines at right angles.

Drawing an arc of a circle to touch two lines when angle is not right.

Drawing a circle to touch a straight line and a circle.

These curves (fillets) occur in mouldings and rolled joists, some of which should be drawn.

Solid Geometry

By way of revisal draw three views of some common object in the room. Indicate a point on object by a point in the three views and write down its position from the three planes.

Discuss again height, length, and breadth.

Draw new elevations of selected objects.

Draw new plans of selected objects.

Examples should be graded, starting with straight-line objects, surfaces all flush, then objects standing on a pedestal, and finally curved surfaces.

Simple sections of straight-line geometrical solids, giving the true shapes of sections and developments wherever possible.

Simple section of some familiar object.

To illustrate the lay-out of a working drawing or partial section drawing, draw three views of a hollow cylinder standing on a square slab, one half of each view to be in section. Dimension completely, assume different materials, and use correct section lining.

Draw three partial-section views of the gland of a stuffing box, or other similar object.

Third Year

Plane Geometry

Construction for ellipse, parabola, and cycloid. Some exercises on the loci of points on simple mechanisms, *e.g.* a point on a connecting rod, Watt's parallel motion.

Construction of plain scales, special attention being paid to the numbering.

Solid Geometry

More advanced work in sections and developments, using the cylinder and the cone.

Suitable exercises are:—

(1) Cylinder standing on H.P., and cut by a plane inclined to H.P.

Drawing new plan to get true form of section.

(2) Cylinder lying on H.P., axis parallel to V.P. and cut by

(*a*) A plane inclined to H.P. or
(*b*) A plane inclined to V.P.

Drawing for (*a*) the plan of section and a new plan to get true form of section, and for (*b*) the elevation of section, and a new elevation to get true form of section.

(3) Cone standing on H.P. and cut by planes to give

(*a*) An ellipse.
(*b*) A parabola.
(*c*) A hyperbola.

True shapes of the conic sections should be found by drawing auxiliary views.

The development of the part of cylinder or cone on one side of the cutting plane should be drawn.

Draw three views of a hexagonal nut to fit, say a 3-inch bolt. A new plan of this makes an excellent exercise.

Construction and development of the helix, with examples.

Additional applications of auxiliary views—

(1) Solids inclined to H.P.
(2) Solids inclined to V.P.
(3) Sections of (1) and (2).
(4) True shapes of surfaces like truncated pyramids and sloping roofs pierced by square and round openings.

Examples from building construction—

(*a*) Brick bonds and courses.
(*b*) Outline diagrams and names of various forms of roofs.

Instruments and Drawing Materials.—Drawing boards —½ Imperial size (23 in. × 16 in.). The 3-ply board is excellent.

Tee Squares—½ Imperial size, made of pearwood, the blade to be screwed on top of head to enable set squares to slide over head.

Set Squares—Made of pearwood, 45°, 6-in. side; 60°, one 8-in. side.

Compasses—The type with needle-point and receptacle for piece of hard lead should be used.

Rule—12 in., showing $\frac{1}{10}$ths, $\frac{1}{12}$ths, $\frac{1}{16}$ths, and millimetres.

Protractor—The semi-circular type made of celluloid or brass.

Pencils—H.H. for drawing. H.B. for writing, lettering, and sketching.

Rubber—A good soft variety.

Paper—A good quality cartridge paper. $\frac{1}{4}$ Imperial (15 in. $\times$ 11 in.), or $\frac{1}{8}$ Imperial (11 in. $\times$ $7\frac{1}{2}$ in.) for First and Second Years, and $\frac{1}{2}$ Imperial (22 in. $\times$ 15 in.) for Third Year.

Envelope—It is assumed that pupils should make the necessary envelopes for preservation and retention of drawings.

Notebook—Sketching should be done in a squared-paper exercise book, inch and one-tenths.

MECHANICS

Preliminary Ideas of Force.—Simple illustrations of force, *e.g.* a weight of say 4 lb. is held in the hand. This requires the exertion of a force of 4 lb.

Suspend a weight from a string, and discuss the tension (force) in string.

Study the effect of force on elastic cords and helical springs.

The Simple Lever and Moments of Forces.—By using a uniform rod, pivoted at its centre and having a weight suspended on either side of the pivot, introduce the idea of:

(1) Clockwise and anticlockwise turning.
(2) The moment of force about a point.

Adjust positions of the two weights to get equilibrium, and find that

(3) Clockwise moment=anticlockwise moment.

Repeat the above with several weights on each side of pivot, and find that

(4) Sum of clockwise moments=sum of anticlockwise moments.

This is the "Principle of Moments."

At first Moment of a Force might be defined to be Weight × Length of Arm, but later corrected to Force × Perpendicular Distance.

A large number of numerical examples should be given here with the fulcrum in various positions.

The Bell-crank Lever.—By experiment and calculation find the force applied at end of one arm to balance a weight suspended from end of other arm, the forces to be perpendicular to the arms.

Levers acted on by Inclined Forces.—By experiment and calculation find the balancing force. When calculating the result, the lever should be drawn to scale on paper, the perpendiculars to the forces carefully drawn, and their lengths measured.

Additional Experiments on Levers.—

(1) Find weight of an object of, say, 12 lb. with a rod and a spring balance reading to, say, a maximum of 4 lb.

(2) Suspend the ends of a loaded beam by means of spring balances, and find the supporting forces (end reactions).

The above to be checked by calculation.

Technical Terms which are Expressed in Pounds per Square Inch.—

(1) Builders express the weight of their flooring and roofing material as, say, 40 lb. per sq. ft. Using

this or similar data, what weight would be required to cover an area of, say, 20 ft. by 80 ft.?

(2) Engineers say their steam, gas, and petrol vapour have a pressure of, say, 40 lb. per sq. in. What force would this represent on a piston of diameter of 10 in.?

(3) Civil engineers talk about the intensity of load (stress) in tons per square inch in a rod when it supports a load. What is that stress if you are given the load and section of rod?

Introduce stresses in bars of rectangular, circular, tee, angle, and other sections which have been drawn in the Technical Drawing Class.

Work and Machines.—Before starting the study of machines the measurement and definition of work should be thoroughly explained by a number of examples of the following three types:—

(*a*) Work done in lifting bodies.
(*b*) Work done in drawing bodies along the horizontal, expressing friction in pounds per ton.
(*c*) Work done on an engine-piston, given bore and stroke and intensity of pressure.

Then define a machine as a contrivance, at one point of which a small force, called the Effort, is applied and moves through a large distance. This moves a large force, called the Load, through a small distance.

Measure the displacement ratio (velocity ratio) of some of the following machines by direct measurement and by calculation from the sizes of parts of machine (*e.g.*) :—

(*a*) Simple windlass.
(*b*) Screw jack.

(*c*) Worm and wheel.
(*d*) Some arrangement of pulleys.
(*e*) Crab winch (later).

Explain and measure, if possible, the "gear" of a bicycle.

Mechanical Advantage.—On one of the above machines place a load, and find the effort to raise it. Using the displacement ratio, find the Work done *by* the Effort and the Work done *on* the Load. Why are they different?

Discuss friction as reason for "lost work," and show how it is not altogether a bad thing, as in certain machines the operative may leave the handle and the load will not run back. The term Efficiency can now be defined as

$$\frac{\text{Work done on Load}}{\text{Work supplied by Effort}}.$$

Friction.—It has been found that friction causes waste of work.

To find something more definite about friction between plane surfaces—

(*a*) In regard to area of surfaces in contact.
(*b*) In regard to pressure between surfaces.
(*c*) In regard to condition of different surfaces.

Show how to get a Friction Constant (coefficient of friction), expressing the state of roughness of the surfaces.

Explain how the constant can be found by tilting the plane until the slider just slips down.

The Parallelogram and Triangle of Forces.—A force has (1) magnitude, (2) direction, and (3) sense, *i.e.* acts one way or the other along the direction mentioned. A line with an arrow-head on it may therefore represent a force.

The Addition of Forces.—Resultant and Equilibrant by the Parallelogram of Forces by drawing and by experiment.

The Triangle of Forces.—A piece of cardboard or plywood is suspended from two strings passing over pulleys and supporting different weights. From another point of plywood a third string supports a weight. Transfer the directions of the three strings to paper placed behind the plywood, and show they pass through the same point. Draw lines parallel to the three forces, and a triangle is formed. This demonstrates that if three forces keep a body at rest, they must pass through the same point, etc.

It will be instructive now to go back to the bell-crank lever, and show how the "Triangle of Forces" can be used not only to find the force required, but also the reaction at the fulcrum. It can also be proved now that the Friction Constant$=\frac{\text{Height}}{\text{Base}}$ (Angle of Repose Method). Experiments on tension in cords, forces in tie and jib of crane, the inclined plane without friction, etc.

All experimental work should be checked by drawing.

Centre of Gravity.—The subject might be introduced by balancing a non-uniform rod on a straight edge. The weight of the rod must act through the straight edge, or there would be a turning moment in one direction. Now define the Centre of Gravity as the point through which the weight may be regarded as acting. Apply the same method to find C.G. of geometrical figures in cardboard or plywood, taking straight edge in two directions. Some girder and rail sections should also be chosen.

Now drill three holes in the plywood and suspend the plate from a nail through each hole in turn, having a plumb-bob hanging in front. The C.G. will be the point of intersection of the three lines behind the string of the plumb-bob. Check some of the simpler cases by taking moments of areas.

Test by balancing on a pin-point.

Speed.—Conversion from miles per hour to feet per second. Constant speed and average speed. Speed of a man's hand at end of a handle or speed of a crank pin. Given diameter of wheel of a car or locomotive and speed of rotation of wheel in revolutions per minute, find speed of car in miles per hour.

Displacement ratio of shafts connected by belts, friction drive, or toothed gearing.

Horse-power.—Show how to calculate Horse-power:—

(*a*) To raise loads or pump water in a given time through a given height.
(*b*) To draw a train of given weight at a given speed along a level track, given the friction constant.
(*c*) For a steam or petrol engine, given bore, stroke, speed, and intensity of pressure.

Graphs.—Employ graphs where possible, stating the scales used, *e.g.*:—

(*a*) Load and Effort.
(*b*) Load and Efficiency (machine experiment).
(*c*) Friction and Normal Pressure (friction experiment).
(*d*) Force and Distance. Find average height by "mid-ordinate" method. This gives average force. Multiply by length of diagram. This gives work done, if scales are correctly used.

XI

COMMERCIAL SUBJECTS

COMMERCIAL SUBJECTS

Introductory.—The more general institution of Three Years' Post-primary Courses in Scottish Day Schools should furnish opportunity for a wide development of courses in Commercial subjects.

The experience of Commercial teachers agrees in making *Book-keeping* the main centre of attention and of effort throughout the three years. A knowledge of this subject is a valuable asset not only for the pupil who intends to enter some form of business life, but for every person who wishes to take an intelligent interest in the affairs of the community in which he or she is placed. In the process of learning Book-keeping much insight is gained into the whole fabric of Commerce and industry, and the subject, therefore, has a valuable bearing on citizenship. It was doubtless for this reason among others that Locke, "would advise all Gentlemen to learn perfectly Merchants' Accompts."

A minor, but by no means negligible, advantage of this subject is that it supplies a useful corrective to the tendency towards slovenly writing, which frequently sets in with the need for note-taking and fast jotting in the classes beyond the primary stage of education.

Shorthand is a logical development of the power to write already acquired in the Primary School. In any sphere of life, the ability to set down, at the rate of speech, a record of what is heard or thought is too valuable an acquisition to be lightly esteemed. But the school value of the subject does not begin or end with this acquisition, valuable as it is. By a system of Shorthand which is not merely planned to jot down swift contractions, but which is evolved upon logical and intelligent principles, much valuable training in his own language can be given to the pupil. Accurate pronunciation and attention to phrasing are a vital part of this training. The pupil's vocabulary is enriched by live contact with the spoken and written language of everyday life. Finally, no small æsthetic enjoyment is afforded to the pupil by the flowing curves and pleasing parallelism of the swiftly written matter.

Type-writing is perhaps not quite so essential a part of a Commercial education. Yet in these days, when a neat letter or document is much oftener produced in type than in the well-nigh obsolete "copper-plate" handwriting of a former era, even the mechanical ability to produce such a piece of work, with its high standard of speed and legibility, is a very desirable attainment. In Type-writing, however, as in Shorthand, the mere achievement of speed is not to be regarded as the aim of a Day School Course so much as the attainment of neatness, correctness, and pleasing and consistent arrangement. It is found that girls particularly, as a result of a careful training in Type-writing, acquire a valuable sense of harmony and neatness.

The Distribution of Time over the three years will vary with the nature of the school curriculum in general; but it is strongly recommended that, where possible, the time allotted to Commercial work should be *progressive*, say for instance 5, 7, and 9 (or more) periods in the respective years. The Department's requirement of eighteen periods distributed over the course must be regarded as an irreducible minimum. As a general rule, Shorthand should not be started much before the later months of the First Year's Course, and Type-writing may profitably be postponed till the final year. One practical result of this is to utilise to the fullest degree the popularity of the subject at a period in school life when many pupils—especially those in a final compulsory session—tend to feel their routine subjects "stale," but respond eagerly to a new and fascinating exercise.

Commercial Arithmetic may be regarded as having two main functions in a Three Years' Course,—firstly to relieve the Book-keeping lessons of the heavier calculations, leaving the pupil so much the more free to assimilate the logic of Book-keeping, and secondly to cover such calculations in general as a lad or girl in business or in trade is likely to encounter.

A simple programme of *Commercial Practice* (or Business Procedure) will round off the course.

The whole provides a course of study well suited for a three years' spell of work—complete in itself, yet opening up new interests for a lifetime, replete with possibilities of training, and useful in any sphere or any calling, although eminently so for the pupil who will further develop the various subjects in their practical application.

BOOK-KEEPING

There appears to be some cleavage of opinion as to the best method of approach to Book-keeping by Double Entry. All are agreed that the old use of the

Journal as a channel through which all items must pass should be discarded. But, while one set of experienced teachers favours the plan of beginning with the Preliminary Books (Sales, Purchases, and Cash Books) after only a short survey of Ledger Accounts, and working from these to the Ledger, another set prefers to begin by devoting considerable attention to simple Ledger Accounts (Goods, Cash, and Personal), regarding the Subsidiary Books as a natural development in complexity from these. This difference in method, however, affects only the first year or so of the course, as the pupil must by the end of that time, or very soon afterwards, have a clear conception of both leading ideas—that of the centralisation of facts in the ledger, and that of devolution into detailed accounts or detailed books (*e.g.* Petty Cash, Returns, Bills, and the various subdivisions of Profit and Loss).

First Year

Approach A.	*Approach B.*
Necessity for, and purpose of, Book-keeping.	Necessity for, and purpose of, Book-keeping.
Review of Books required.	Principles of Double Entry.
General idea of Dr. and Cr., and Theory of Double Entry through simple Ledger Accounts.	The Ledger: three kinds of accounts, Real, Personal, Nominal. (Simple Examples.)
Day or Sales Book.	Cash Book (Separate Book with Cash and Bank Columns).
Invoice or Purchases Book.	Trial Balance using (*a*) totals, (*b*) balances.
Cash Book (*a*) with two columns; (*b*) with three columns, Discount, Bank, Cash.	Sales and Purchases Books as development of Goods Accounts.
Posting to Ledger.	
Goods Account, and Profit and Loss Account.	
Trial Balance.	

(If possible, proceed to simple Balance-sheet.)

Second Year

Summary revisal of First Year's work, reconciling the two methods of approach.

The Subsidiary Books (Cash Book, 3 Columns: Purchases Book: Sales Book: Returns Outward and Inward: Petty Cash Book).

The Ledger: Posting from Subsidiary Books. Subdivision of "Goods."

The Journal: Opening entries and miscellaneous items.

Trial Balance: Trading Account: Profit and Loss Account: Balance-sheet.

Third Year

Revisal of previous work, adding Imprest System for Petty Cash: Bills Payable and Bills Receivable. The Journal (opening and closing entries: adjustments).

Interest on Capital: Depreciation: Expenses due and prepaid.

Trial Balance: Final Accounts from Trial Balance: Trading and Profit and Loss Accounts.

Easy Partnership and Division of Profits.

(*Optional.*—Reserves for Bad Debts, etc. Simple types of Accounts for Clubs, Hospitals, etc. Receipts and Payments Account. Income and Expenditure Account.)

COMMERCIAL ARITHMETIC

The following programme represents the work which ought to be covered in this subject. Much of it, or in some cases all of it, may be overtaken in the ordinary Arithmetic classes, but the Commercial teacher should make it his business to see that it is done either there or by himself, according to the nature of the School Time-table. Again, according to the distribution of the total time devoted to Commercial subjects, the present programme may be spread over the three years, or postponed till the final year. In the latter case, the three divisions below may be taken in the three terms of the session.

So far as possible, arithmetical operations should be performed mentally, and written work should be as brief as possible.

Throughout the course, discreet use should be made of the Ready Reckoner.

I. Long and cross-tots.
Revisal, and practical appreciation, of common Weights and Measures.
Four rules of Decimals with approximations.
Decimalisation of British Money.
Proportion (on unitary and fractional methods).
Simple Interest: Profit and Loss as Percentage of Buying and Selling Prices.
(*Optional.*—Simple Practice.)

II. Metric System of Weights and Measures.
Decimalisation of British Weights and Measures.
Compound Proportion. Proportional Division. Averages.
Simple Interest: Principal, Rate, Time.
Rates and Taxes.
(*Optional.*—Compound Practice.)

III. Currencies and Coinage of Britain, the chief Continental Countries, U.S.A., Canada, India. Par Values and Rates of Exchange. Income Tax. Bankruptcy. Discount, Commission and Brokerage. Stocks and Shares. Compound Interest (usual school method).

While the foregoing includes practically all the Arithmetic ancillary to ordinary office work, it is advisable that the following items, if not covered in the mathematical work of the pupils, or in a practical course, should be attempted in addition:—

I. Area of Square and Rectangle, with applications.

II. Derivation of Square and Cubic Measure from Linear, Square Root, Area of Circle, and Ring.
Mensuration of Cube, Cylinder, Cone, Pyramid.

III. Compound Interest by Logarithms. Cube and Cube Root by Logarithms. Mensuration of Sphere.

COMMERCIAL PRACTICE

According to the distribution of time, this programme may be spread over the course, or postponed till the Third Year.

I. Simple Retail Transactions, involving Invoices: Methods of Payment (cash, cheque, postal order, money order): Receipts.
Writing in proper form simple Business Letters.
Postal Facilities: Postages Book: Use of telegraph and telephone, condensation of matter for telegrams.
Methods of transport.
Assets: Liabilities: Credit: Capital: Gross and Net Profit.

II. Discounts (Cash and Trade): Rebates: Retailer's Bonus.
Correspondence (expanding from notes).
Forms used throughout a home transaction. Order, Advice Note, Invoice, Debit and Credit Notes: Statement of Account, Receipt. Drawing up these forms from given particulars.
Essence of a Simple Contract, *e.g.* Sale of Goods, Insurance.
Explanation of common terms connected with Property, *e.g.* Rent, Lease, Rates, Taxes, Feu-duty.
Banking: Current Account, Deposit Account, Deposit Receipt, Pay-in Slip, Overdraft, Cheques (order, bearer, crossings).

III. Correspondence: Filing inward letters and vouchers: Indexing: Copying outward letters: Methods of manifolding.
Banking: Reconciliation Statement.
Bills of Exchange (form, advantages, discounting).
Different types of Businesses: Sole Trader: Partnerships: Companies: Co-operative Societies.

TYPE-WRITING

(*a*) *Practical Work by Pupils:*

Keyboard: Correct position at machine.
Methods of fingering: Touch system.
Margins: Spacing: Capitals: Punctuation: Paragraphing.
Correspondence: Arrangement of various parts of letters: Typing on successive sheets: Envelope addressing.
Typing simple Commercial letters from pupils' shorthand notes.
Typing from simple and clearly written MS.
Care and cleaning of machine.

(*b*) *Demonstration or Instruction by Teacher:*

Instruction in the function and use of the various parts of the machine to proceed concurrently with above practical work.
Headlines: Display: Tabular Statements and Invoicing.
Remedying of slight defects in machine.
Changing ribbons: Carbon copying.
Different types of machines.

It is inadvisable at this stage (with one year's instruction) to aim generally at a speed of more than 20 words per minute.

SHORTHAND

Till the end of the Second Year of the Commercial Course, the aim in Shorthand should be the acquisition and application of the essential principles of the system adopted.

To impress these principles, sufficient reading of Shorthand and writing to Dictation should be undertaken from the earliest possible stage. The attainment of Speed should be left to the final stage, and not more than 50 to 60 words a minute should be generally expected at the end of the Third Year of the Commercial Course.

Any test in Shorthand at this stage should consist of a simple Commercial letter, and if dictated should not exceed three or four minutes in duration.

N.B.—A list of text-books for pupils and reference books for teachers, recommended by the Panel on Commercial Subjects, may be obtained free on application to the Secretary, Scottish Council for Research in Education, 47 Moray Place, Edinburgh.

XII

RURAL SUBJECTS

RURAL SUBJECTS

Introductory.—The last quarter-century has witnessed a fairly general acceptance in this country of the principle that primary education gains in vividness and reality by environmental reference. In its application to the education of the rural child the principle involves the introduction into the school curriculum of a rural bias which, it may be emphasised, is something quite distinct from vocational training. Whether the future occupation of the child should influence, in any considerable measure, the character of his education, is arguable. In any case, one is faced with the practical difficulty of uncertainty as to the pursuit which the child may eventually follow—a large proportion of rural children, for example, will be absorbed of necessity into the urban population, and there is the further consideration that education at the primary stage, in the main, must be concerned with fundamentals designed, primarily, to develop the child's personality, to beget in him an appreciation of his position in nature and in life, and to familiarise him with the materials and the tools through which he may arrive at self expression and adequately come to play his part as citizen.

It is needless to suppose that the teaching of Rural Science in the Advanced Division will be successful unless some elementary work is done systematically in the Primary School. To this end the scheme of Nature

Study should be revised when the Rural Science scheme is drawn up, so that there may be a co-ordinated system of instruction throughout the school. The teaching of Rural Science should be regarded as amplifying the existing knowledge of environment, that knowledge which has been systematically obtained by direct study of nature throughout the school years.

The rôle of rural bias in the educational scheme is perhaps sufficiently well expressed by the English Board of Education. "They (the Board) consider it of great importance that the teaching in rural schools should be associated closely with the environment of the children; for various reasons it appears desirable at the present time to emphasise afresh the principle that the education given in rural schools should be intimately related to rural conditions of life. The Board do not suggest that rural elementary schools should teach agriculture or attempt to give a vocational training. Like other schools, they should give a general education based upon environment."[1]

But the educational as opposed to the vocational aspect should never be ignored. To this end it seems advisable to shun such terms as "Agriculture," "Gardening," etc. Courses of instruction should not be too agricultural or too horticultural, but the teaching should include the principles underlying both as well as those underlying all natural processes. Although rural education should, to a large extent, be based upon local interests, it should not become parochial.

From the point of view of immediate environment and

[1] Board of Education, Education Pamphlet, No. 46, *Rural Education*, Appendix.

from that of the wider outlook, local conditions and the application of local knowledge being diverse, it is inadvisable to lay down any fixed scheme of work for all schools or for any one school in particular. It may, nevertheless, be advisable to suggest general lines of treatment along the paths of varied interest, otherwise rural education may become too narrow and circumscribed.

In any scheme of Rural Science, however, provision should be made for the practical study of environment through observation and experiment. This will involve the correct use of a piece of ground adjacent to the school and experiments in laboratory and workshop, where such are available.

The indoor work should be directly correlated with the outdoor. The underlying principles should be understood in application before they are considered in theory. It is not sufficient to carry out experiments either solely in a garden or in a laboratory. Both are necessary. Allied Manual Arts are also necessary, and should involve not only working in wood but in materials such as metal, cement (where necessary for practical purposes), raffia, etc.

Rural Science from this aspect will then be the science of everyday experience, the science which will awaken interest not only in rural environment—natural and social—but also in what underlies advancement in both natural and social life elsewhere.

The departure from the traditional primary school curriculum, in fact, implies a profound change in the scope and method of rural teaching; and to meet the situation it would appear to be necessary to envisage in a more definite manner the nature of the work which, under the new conditions, will fall to the country teacher, and to make more specific provision for his training. There would appear to be two main possibilities in this direction: The first to provide this training within the period which the prospective teacher spends at the University and the Training Centre; the second to arrange suitable supplementary courses for teachers already on the staffs of rural schools.

In suggesting a course of training that will meet the requirements of the country teacher it should be emphasised at the outset that it must be as liberal as that of his town brother. Not only must it be of a character that will avoid the possible stigma attaching to a too narrowly specialised course, but it must be such as will not debar him from transfer to the town at a later stage, should circumstances make this desirable. What should be aimed at is a course of training specially suited to rural schools but constituting a sound qualification for general teaching in all kinds of schools.

Since in the average rural school highly specialised staffing will not be possible, the rural-science teacher must be competent to take his share in the general work of the school, and his training, therefore, must be framed on broad lines. General training will be provided as hitherto by courses in such subjects as English, History, Geography, Mathematics, and Science (Chemistry and Physics); specialised training should be provided for by the introduction into the curriculum of courses having a special bearing on the rural environment, such as Biology, Geology, Agriculture (Soils, Crops, and Manures), Agricultural Chemistry, Mensuration and Surveying, Rural History and Rural Economics. It should be possible also to find time for practical training in subjects such as Horticulture, Beekeeping, Handwork, Forestry, Navigation, etc.

With reference to the alternative training referred to, the provision of supplementary courses for teachers already in country schools, it is not forgotten that Training Centres already provide numerous vacation courses for teachers, which are widely taken advantage of. These courses are admirable so far as they go, but it is suggested that the time available does not make possible the fundamental training which is essential.

The new type of education can assume many forms, and we append schemes in several subjects as suggestions of what might be attempted in adapting teaching to local areas, together with suggestions in Mathematics and Science indicating aspects of these subjects specially appropriate to a Rural Course.

MATHEMATICS

First Year.—A beginning may be made with lineal measure.

Practical application will lead to the introduction of Symbolic Arithmetic.

Measurement may lead to consideration of the straight line-direction, positive and negative, positive and negative quantity with symbolic representation, collection of similar terms (Algebra).

Idea of direction suggests the principal points of the compass. Consideration of the vertical and the horizontal in connection with the plumb rule and the spirit level supplies links with handwork and garden. A link with science may be established here by considering the lever and the balance, leading to simple equations.

After the straight line, the following may be taught: Angles at a point, right angle, use of instruments—set square, protractor, divider, compasses—testing the right angle (try square and T square)—drawing of angles, the setting out of a right angle on ground, *e.g.* a path at right angles to a given path—method of diagonal measurement—bisection of a line, an angle, drawing perpendiculars, drawing parallels, division of a straight line into any number of given equal parts, proportional division (Arithmetic).

At this stage the simple scale may be introduced.

The square—its construction, relation of sides and angles, subdivision of sides, construction of square measure table from lineal, arithmetical method of finding the area of a square, symbolic representation of the sides of a square, the idea of power, easy multiplication of like terms, square root, arithmetical problems involving the square in its application to rural environment, *e.g.* areas of plots, number of plants required for any given area, etc., with appropriate costings where applicable, construction of a rectangle, perimeter, area, multiplication by a binomial involving one variable, simple outdoor measurements drawn to scale, simple division, brackets, equations involving removal of brackets and easy fractions (Algebra).

The triangle—construction to given measurements (sides), practical exercises involving the triangle, congruency of triangles (demonstrated by imposition).

Graphical representation—plotting statistics, weather observations, etc.—averages, approximations, the keeping of simple accounts, percentages, Profit and Loss, and problems in Simple Interest.

Second Year.—The Parallelogram—drawing, properties. Area of rectangle and parallelogram compared. Problems involving area, costings, percentages. Symbolic representation.

Area of triangle compared with that of parallelogram. Problems involving area of triangle. Further exercises in drawing to scale, plans, enlargement of figures, drawing to scale from actual measurements.

The right-angled triangle—Pythagoras' Theorem, practical and theoretical; problems involved. Loci.

Simultaneous equations; problems. Graphical representations. Factorisation. Standard Identities.

Measurement of land of irregular shape; land surveyor's method; base line, offsets, cross staff, field book, plotting, simple surveys.

For the commercial side of the work the following may be included: Proportional division, Commission and Insurance, Profit and Loss, Interest. This may entail simple Book-keeping.

Third Year.—The circle—circumference, radius, diameter—finding length of circumference—finding area of circle; problems.

Chords, angles in a circle. Tangents. Inscribed and escribed circles. Factorisation, fractions, quadratic equations.

Problems; graphical work; simple logarithms.

Volumes of solids; measurements of solids; problems.

Land surveying. Use of prismatic compass, plane table.

Continuation of simple Book-keeping, Costings, etc.

Garden accounts—Profit and Loss.

SCIENCE

The following outline is presented so that what is generally designated "Experimental Science" may be correlated with the study of immediate environment and yet embody principles applicable to other general and scientific studies.

First Year.—In the initial stages some idea may be given of the Units and scientific terms,—Cm., Sq. Cm., C.C., Gm., Centigrade Degree; the conversion of measures, *e.g.* metric and chain; actual measurements in workshop, garden, field, and varied exercises on all important measures, all of which will be utilised in the Arithmetic lesson.

The teaching of the metric system is necessary for the understanding and use of apparatus. The cubic metric measure must be taught to understand the use of the Measuring Cylinder, Burette, and Pipette. Practical exercises can be given in the use of such apparatus, and correlation established with Arithmetic. Use can also be made of the metric measure in relation to rainfall—converting inches to C.C.—checked by actual measurement of rain-gauge water by means of a measuring cylinder. Exercises can also be given in the conversion of gallons to litres, etc.

The Gramme is necessary for weighing in the Balance. Practical exercises can be given in weighing such materials as soil, artificial manures, etc.

The use of the Balance requires some idea of the lever, and correlation can be established in the workshop—using tools—claw-hammer, shears, pliers, etc.; and in the garden—barrows, shears, secateurs, spade, fork, etc.

These preliminaries will lead to the actual study of science, and a beginning can be made with sedimentation, using river water, tap water, rain water, and sea water. This study of natural sedimentation—deposits of silt, sand, and other rock and vegetable materials—can be directed in two ways. Study can be made of the settling of sediment, the imposition of layers—the basis of rock formation (sedimentary)—and of filtration, its uses and employment in nature and by man.

Further study will lead to consideration of natural sediment, the study of rocks and some makers of sediment, *e.g.* the action of moving water, of wind, plants, and animals.

Before much more can be attempted, the principle of the Bunsen Burner must be taught. This will include not only the study of the ordinary laboratory Bunsen and the Lamb Laboratory Lamp—the substitute for the gas bunsen in rural districts, but also of the gas cooker, etc.

Having learned the principle and correct use of the Bunsen, the pupils can study evaporation of a filtered liquid, *e.g.* river water. From this will be learned that where filtration removes solid matter, evaporation removes dissolved matter, the residue on evaporation being merely noted. The study of natural waters will now proceed to condensation, and here rain may be studied, and also mist and dew. Use of the rain gauge may be further studied and daily readings recorded and graphed.

The condensation of water naturally leads to distillation, and the process of "clearing" natural water of sediment and soluble matter will be complete.

At this stage ideas of solution and of saturated solution can be given and crystallisation shown.

The study of water—hot and cold—will also include the expansion of water, illustrative of the simple thermometer. Expansion of mercury and of other liquids can be shown, and the principle and use of the mercury thermometer demonstrated.

This will involve the daily reading and charting of thermometer readings. Use may also be made of soil thermometers and of the Maximum and Minimum thermometer.

In dealing with the expansion of solids, account will be taken of effects of heat and cold upon rocks—heat and cold as weathering agents.

Study may now be directed to the natural effects of the various weathering agents, water, heat and cold, etc., on the two soil ingredients—sand and clay. Examination of soil under a hand lens may reveal the third and important ingredient, humus.

The study of the nature of sand and clay from the physical aspect may follow, and a simple analysis of a soil sample carried out mechanically. Subsoil may also be analysed mechanically and the results compared. This study will make use of the following: the balance, bunsen, decantation, and arithmetical processes.

Work may then be commenced on the structure of a seed—dicotyledons and monocotyledons; methods of germination; capillarity, and capillarity in the seed; simple diffusion and diffusion in the seed. The study of air may follow, *e.g.* combustion, respiration, oxygen, nitrogen, carbon dioxide, oxides, when correlation may be established by studying air and the seed, respiration of seeds. A link may also be established with oxidation of rocks. Temperatures for germination of seeds may be studied, connected with air temperatures and soil temperatures, as shown by the thermometers. Correlation may then be made with Geography—the influence of temperature on the growing of certain crops in other lands.

Study may be made of the relation of germination to depth of sowing and the importance of good seed.

Second Year.—At the beginning of the term experiments involving the pressure of the atmosphere may be attempted, leading to the barometer as, first a measure of pressure, and second, as a means of forecasting weather. Barometer readings should be taken daily, graphed, and conclusions drawn.

Syphons, pumps, syringe, poultry drinking-trough.

Experiments may now be worked to show the behaviour of water: head of water—leading to water pressure; water supply; wells; springs; percolation of water through a soil; the soil's capacity for retaining water; the water table; capillarity in a soil; the value of soil cultivation, water-logged soils, and drainage.

Further study of water will be concerned with chemical change—water as a compound. Natural waters will be studied and the influence of rock matter on water—hardness, temporary and permanent hardness of water with methods of softening. Acids and alkalis.

Experiments in the transmission of heat: conduction of heat in soil, convection—ventilation—convection with respect to soils—radiation of heat from soils, principles involved in the greenhouse ; influence of light and dull surfaces on absorption and radiation of heat, connected with light coloured and dark soils.

Plant study may deal with the independence of the young plant—roots, uses, kinds, behaviour, effect of gravity, root cap and hairs, how roots absorb moisture, osmosis, the stem and its work, development of branches, the opening of leaves, stems with special functions, stem as conductor, the structure of the leaf, leaf arrangement, how plants get rid of excess moisture, the water cycle—rain, soil, root absorption, stem, leaf, transpiration—respiration of plants—comparison in seed and animals—parts of the simple flower, simple fruits.

Experiments may be given on upthrust of water, buoyancy—cistern ball, ships, fishing nets, the heaviness of a bucket of water when taken out of a well, the hydrometer, lactometer, uses, the Principle of Archimedes, specific gravity of solids—common substances, *e.g.* milk, and various solutions.

Third Year.—Experiments may be performed in Heat Capacity of liquids and solids—comparison of heat capacities of such substances as water and paraffin, water and mercury, lead shot and sand, sand and clay.

The Calorie: Specific heat of water, of solids, such as metals, sand, clay.

Cold and Late soils, in relation to specific heat of constituents. Latent Heat—connection with temperature in the atmosphere, climate, etc.

Further study of acids and alkalis ; neutralisation ;

nature of salts. Simple qualitative analysis of the soil—tests for nitrogen (nitrates), phosphorus (phosphates), sulphur (sulphates), potash. Substances in the combustible part of the plant—testing for water (oxygen and hydrogen), nitrogen, carbon; nitrates, sulphates, phosphates, iron.

Testing for organic compounds in plants—starch, oil. How plants obtain their food.

The testing of manures—farm-yard, chemical, seaweed. Effects of lime on soil and plant.

Rotations of crops.

HORTICULTURE

Horticulture Correlated with Rural Science and Mathematics.—In many cases Rural Science has, in the past, been taught more as a self-contained subject than in conjunction with cultural operations to demonstrate the principles underlying practical work. Practical work out-of-doors which omits the scientific explanations involved, whilst infinitely better and more useful for the rural population in after-life than the opposite method, likewise fails to attain the ideal, which demands that the connections between practice and science should be adequately established and clearly demonstrated.

Horticulture Crops v. *Agriculture Crops as a Foundation for the Teaching of Rural Science.*—Whilst agriculture is the main rural occupation, there are areas, especially in small-holding localities, where commercial horticulture is very important and is extending. Both in rural and industrial areas horticulture still enlists the interest of many members of other arts and crafts ; this assertion is supported by the demand for, and attendances at, public lecture-courses. The principles underlying such aspects as soil treatment, manuring, germination, and other biological phenomena are essentially the same for agriculture as for horticulture. To discard the old school garden or horticultural crops and substitute agricultural crops would be to restrict the scope and interest of teacher and scholar alike. It would curtail the physiological, intellectual, æsthetic, recreational, and practical aspects of the whole scheme not only during the school life but afterwards.

Horticulture, during the period 1914 to 1919, augmented the home-food supply ; how large a part the old school-garden played in the teaching of this crop production will never be known. To-day horticulture plays its part in the environment and social aspects of our cities, particularly as a result of slum-clearance schemes. Many are brought into contact with nature and her teachings through the medium of work in their own gardens, more so than through the casual observations of agricultural pursuits.

A representative proportion of horticultural and agricultural crops, including arboriculture and apiculture, approaches the ideal. Arboriculture and apiculture are to be preferred, and present increased opportunities of the study and the demonstration of principles when associated with horticultural crops, including fruit and flowers.

In the past, unpractical methods were frequently devised to establish representative agricultural grain and grass plots within the restricted limits of a school garden, wrong impressions and false values being thus created. Visits to farms would, no doubt, offer greater facilities for studying many agricultural practices than the school garden.

Vegetable and fruit crops grown in the school garden afford the means of practical instruction in cultivation, serve as a basis for rural science principles, supply material for cookery classes, and even lead to economy in the provision of school meals. The floral specimens of the garden may, with advantage, provide material for drawing and painting lessons and specimens for nature study, besides catering for the teaching of æsthetic principles.

Most agricultural crops do not lend themselves readily to such purposes, nor do they give such a wide variation in types of vegetation.

SILVICULTURE

Silviculture or the growing of woods, as opposed to arboriculture or the growing of individual trees, has, since the establishment of the Forestry Commission, assumed a definite place in Scottish rural economy. The increasing activities of the Commission ensure that this branch of rural industry will grow in importance. For example, 275,000 acres have already been acquired in Scotland by the State and 50,000 acres have been afforested. State nurseries for the propagation of plants number over 40 and extend to 275 acres. The Commission has created 200 forest-workers' holdings, and the formation of these will continue, while every year from 9000 to 12,000 acres or more will be added to the plantations.

Although arboriculture may justifiably be regarded merely as a branch or an extension of horticulture, the industry of silviculture differs fundamentally both from horticulture and from agriculture, and ought, therefore, to have a place in the curriculum of rural schools, commensurate with its importance. The greater the part played by silviculture as a local industry the larger should be its place in the school curriculum of the district.

There are certain parishes in Scotland where silviculture and forestry are, or in future will be, the basic industries of the community. Such parishes will be found in the counties of Moray, Nairn, Perth, Argyll, Aberdeen, Ross, Inverness, and, to a less extent, elsewhere. In such districts the teaching of all elementary science subjects should be illustrated by practical examples which have a direct bearing upon silviculture. For example, in speaking of soils the nature of the forest soil might be demonstrated; in teaching botany, the local trees would form the main subject of study ; in teaching zoology, animals, insects, and birds harmful and useful to the forest would be dealt with ; in mechanics, the numerous and diverse forest tools might be the subject of study and demonstration ; and so on.

In such districts while it is suggested that this silvicultural bent might be given to all science subjects taught at all ages, something more would be necessary during the final school year. One or two hours a week might be allotted in that year to teaching silviculture as a special subject, as is done with apiculture, poultry-keeping, etc. The history and objects of the industry might be taught: its relationship to other industries, its importance in modern civilisation, the geography of silviculture, etc. The pupils would be advised regarding future training for and prospects in silviculture as a career.

In other parishes and counties, where silviculture is not, and is never likely to be, an important local industry, less emphasis would be laid upon silvicultural objects in teaching the basic science subjects, but these objects should never be entirely omitted. It might, however, in such places be sufficient to deal with silviculture in its purely arboricultural aspects, possibly along with horticulture, occasional use being made of trees for demonstrational purposes. A special course would not be required, but pupils would be taught to recognise the commoner trees, and, in the Handwork class, the properties and uses of the commoner timbers.

The provision of facilities for imparting some knowledge of silviculture in accordance with the above suggestions will vary according to the local requirements. Where no special instruction is necessary, silvicultural knowledge would be imparted by resident teachers, in the teaching of such subjects as Botany, Horticulture, Handwork, etc. As a rule, there will be sufficient material available in any district for simple demonstration purposes.

In districts where special instruction is advocated, this might be carried out, as in the case of apiculture, poultry-keeping, etc., through the medium of itinerant teachers specially trained in silviculture. If this could not always be justified, the services of a competent person, locally employed in silviculture, might be secured. In such districts facilities for practical work, demonstration, and the supply of material would be essential. In most of the forestry counties it should be possible for the Education Committees to arrange for such facilities from the Forestry Commission, or, through the good offices of the Royal Scottish Arboricultural Society, from local landowners. In some districts the County Councils might even acquire small areas of waste land near schools, to be used partly as a forest nursery and partly for planting work and the growing of class material. These nurseries might even be used for the production of trees to be planted as roadside trees in counties where the County Councils choose to exercise their powers in that connection. If County Councils should in future come to administer odd small areas of woodland in their districts with the intention of preserving the amenity of such districts, blocks of a few acres in extent might easily be set aside for educational purposes. In this way pupils would be able to study silviculture during the plantation and final stages, in which it differs so greatly from other industries, such as agriculture and horticulture. In such reserved areas the essential principles of silviculture could be taught in a way which is quite impossible in the school garden or nursery.

FORESTRY

First Year.—Forest Physiography.

Soil :

(*a*) Origin of Soil ; (*b*) Formation of Indigenous Soil.

Composition of Soil :

(*a*) Mineral Constituents of Soil ; (*b*) Organic Matter or Humus ; (*c*) Water ; (*d*) Gases.

Classification of Soils.

Climate :
(*a*) Heat ; (*b*) Light ; (*c*) Moisture ; (*d*) Air Currents.

Tree Species :
(*a*) Distribution ; (*b*) Classification.

Second Year.

Forest Botany :
(*a*) Identification of Species, *i.e.* Conifers—Broad Leaved ; (*b*) Natural Factors influencing growth of different species and their distribution.

The Root Structure and Functions:
(*a*) Function and types of leaves ; (*b*) Rise and Descent of the Sap.

Silviculture :
(*a*) Choice of Species ; (*b*) Choice of Methods of Afforestation, *i.e.* Sowing, Planting, Regeneration.

Third Year.

Seeding: Testing of Seed.
Forest Nursery—Permanent—Temporary.

Choice of Nursery :
(*a*) Soil ; (*b*) Exposure.

Laying out of Beds:
(*a*) Sowing ; (*b*) Management of Seedlings ; (*c*) Transplanting, Planting out, Lifting, Packing, Conveying ; (*d*) Methods of Planting; (*e*) Distance apart, Spacing.

Forest Protection :
(*a*) Some Fungoid Diseases ; (*b*) some Insect Pests.

Measurement of Timber.

HANDWORK[1]

Handwork in relation to Rural Subjects

Handwork should form part of the normal instruction of a Rural Advanced Division School. Apart from the manipulative skill that the pupils acquire in the use of tools, instruction should be given in the elementary mechanics of tools. The mechanical principles underlying the construction of models made is knowledge of a scientific character.

Handwork instruction should include the kinds, properties, and qualities of woods, seasoning, wood preservatives, the structure of wood, and products formed by chemical changes and decomposition. Similar instruction should be given regarding iron, steel, copper, brass, etc.

Handwork in rural schools should be directly related to the environment. A progressive course should stimulate the interest of the pupils by projects suggestive of rural life and economy. The actual objects made should bear a relation to the garden, the laboratory, and to home life.

Handwork instruction thus regarded should include working in wood and metal, in raffia, straw, rope, and in cement.

There are many objects of interest and use which can be made in wood. Small fittings, pieces of apparatus and tools, such as retort stands, tongs, scoops, trowels, line pins, can easily be constructed in metal. Few tools are required for the purpose.

Rough sketches should be made from specimen objects, and a correct drawing made to scale therefrom.

[1] See also under Technical Courses.

Manipulation of Rope for Farm Purposes

The manipulation of rope and cordage is a subject of practical mechanics.

Rope in one form or other is used almost daily by everyone in rural areas, but few can handle it methodically. It is indispensable about a farm, and the security of both life and property may depend on the use of rope of the proper material and construction and the rapidity and accuracy of making the knot or fastening best suited to the occasion.

A knowledge of the various plants grown for rope-making material, of their cultivation, soil and climatic requirements, the transport of the raw material to the factory, the various processes of manufacture, bring the subject into relationship with the study of Rural Science, Geography, Chemistry, and Practical Mechanics.

The making of the various knots and appliances required for farm purposes calls for thoughtful study as well as manipulative skill, and from this point of view alone the subject provides a suitable training in Handwork for Advanced Division pupils. From a utilitarian point of view its claim as a subject of school instruction in a Rural Course is indisputable.

The following examples may be cited to show the scope of the instruction and its usefulness as a training for after-school occupation in agriculture and rural industry generally:—

Uniting Ropes.

(1) *Knots.*—Overhand, Flemish, Reef or Square, Sheet Bend, Weaver, Fisherman's, Carrick Bend.

(2) *Splices.*—Short Splice, Long Splice.

Eye Knots or Loops.

(1) *At End of Rope.*—Bowline, Crabber, Fisherman's Eye, Overhand Eye, Flemish Eye, Ploughman's Eye, Eye Splice.

(2) *In Centre of Rope.*—Double Bowline, Saddler's Loop, Farmer's Loop, Dalliance Knot, Artillery Knot.

Finishing Rope Ends.—Whipping (various), Crown and Back Splice, Wall Knot.

Fastening Ropes by Hitches and Bends.

(1) *To Spars.*—Clove Hitch, Scaffold Hitch, Timber-Hitch, Killick Hitch, Fisherman's Bend.

(2) *To Rings.*—Jerk's Head, Ploughman's, Bucket, Capstan.

(3) *To Hooks and Tackle.*—Lumber, Catspaw, Spanish, and Blackwall Hitches.

Shortening Ropes by Knots and Hitches.—Sheepshanks (various), Chain Knots (various), Overhand Loop Knot, Chain Knot, Twist Knot.

Application of Knowledge of Knots, Hitches, Bends, Splicing, Whipping, etc., to Farm Uses.

For Halters.—Temporary, Universal, Guard Loop, Standard, Neck Halters, Halter Ties.

For Harness.—Reins for plough and cart, Check ropes, Drought and Tracing ropes. Rope Bridles.

For Cart—Fastening of Girdings, Hay-knot, Belly-bands.

Stack roping and weighing. Slings for sacks, barrels, cans, bales of hay, etc. Erecting and repairing sheep-nets.

Roping of animals for veterinary purposes. Roping of purchase Tackle. Rope ladders. Erection of scaffolding. Lashing of spars. Whipping handles, etc. etc.

DAIRYING

The course of instruction in Elementary Dairy Science herein outlined is intended as one of a group of Rural Science subjects, including Poultry Science and Cookery, for the first and second years of the Advanced Division of Rural Schools.

The course comprises a series of elementary lessons in Dairy Science, and is designed as a preparation for a more advanced course in the science and practice of dairying to be given in the third year of the Advanced Division and at Continuation Classes. The instruction may be undertaken in the meantime by the instructresses of the Agricultural College in a limited number of approved schools.

The subject should be taught as far as possible by means of simple experiments and practical demonstrations, and the fullest use be made of samples of milk, milk products, utensils and dairy materials generally, as teaching specimens. The lessons should also be illustrated by the aid of diagrams, charts, blackboard sketches, models, etc. The instruction should be correlated with other school subjects, such as Cookery, Arithmetic, English, Geography, etc. The pupils should make notes of the lessons in notebooks specially kept for the purpose. The classroom instruction should be supplemented by visits to farms in the vicinity of the school, where facilities are available for demonstrations in dairy work.

The following is an outline of the items to be included in the course, their sequence of study, and method of treatment :—

Properties and Composition of Milk.—Examine samples of fresh cow's milk—ascertain colour, taste, smell, weight. Demonstrate power of fresh milk to absorb taints from neighbouring substances. Effect of acid on milk—curdling.

Demonstrate by simple experiments the principal constituents of cow's milk, *i.e.* fat, casein, albumen, sugar, minerals, water. Examine and compare each of the constituents with similar substances from other sources.

Illustrate the percentage composition of average cow's milk by means of diagrams and other devices, and compare with the composition of other milks—goat, sheep, mare, etc.

Demonstrate milk as an emulsion—distinguish from a solution.

Dairy Cow and Milk Yield.—Study Nature's purpose of milk and man's purpose. Explain methods used to increase milk yield of dairy cows. Explain lactation period, and give average milk yield of a dairy cow. Show pictures of a typical dairy cow and of the principal British dairy breeds.

Dairy arithmetic—calculations of total annual milk yield of average cow—the weights of butter and cheese from a given volume of average milk, etc. etc.

Milk as a Food.—Milk as Nature's perfect food for infants and young animals—indicated by rapid growth of these when fed solely on their mother's milk—illustrate by statistics. Show diagrams comparing composition of milk with that of the animal body, also with eggs, meat, oatmeal, white bread, etc. Milk constituents wholly digestible, and hence its superiority as a food. Refer to results of experiments with city school-children from a daily ration of milk. The national importance of milk as a food—the food value of skim milk. Compare the annual consumption of milk per head of population in Britain with that in other countries—national importance of increased consumption of milk.

Effect of rennet on milk—formation of hard milk-clot in stomach, and the means to prevent this. How to use milk as food for invalids.

Demonstrate the use of milk for cooking purposes—rate of boiling—the effect of heating and boiling milk on its food constituents—"singeing" and its cause—change of taste and colour.

Examine samples of various kinds of dried and condensed milks, and commercial milk products sold for food—note principal differences of their food value with that of fresh whole milk.

The study of this part of the subject should be correlated with Cookery and Geography.

Bacteria in relation to Milk.—Simple study of bacteria—their nature and minute size, condition of life and product of growth. Why milk is a perfect food for bacteria. Demonstrate "souring" as due to bacteria. Useful and harmful bacteria—the importance of useful bacteria in dairy work; danger of harmful bacteria in milk, butter, cheese. The control of bacteria in milk by heat and cold. Atmospheric temperatures in relation to the keeping of milk.

Demonstrate use of the thermometer in regulating temperatures. Demonstrate "pasteurisation" and distinguish from boiling of milk. Sources of bacterial infection of milk—dirty cows, dirty utensils, dirty workers, dirty water, dust, flies, etc.

Clean Milk—its Production and Care.—Examine samples of "clean" milk and ordinary farm milk. Filter each through cotton-wool and note the result. Place filtered samples of each in large test tubes with cotton-wool stoppers, set aside for a few days, examine and demonstrate the result, *i.e.* filter removes "visible" dirt, but not "invisible" dirt or bacteria. Define "clean" milk in terms of bacterial content and absence of harmful bacteria.

Simple study of milk secretion—illustrate by blackboard sketches and diagram of cow's udder. Compare keeping qualities of samples of first-drawn milk and milk drawn later—necessity for rejecting first-drawn milk.

Study "Golden Rules" to be observed in the production of "clean" milk, and the principles underlying these. Demonstrate the cleaning of dairy utensils, milk vessels, bottles, jugs, etc. Distinguish between "scalding" and "sterilising," and discuss principles underlying the various operations. Study the care of milk in the home, and demonstrate simple devices for keeping "clean" milk free from contamination and in sweet condition.

To give pupils an intelligent grasp of this section of the subject, practical demonstrations on the production and handling of "clean" milk should be given by the instructress at a farm in the vicinity of the school, where the necessary facilities are available. Pupils should be encouraged to practise milking and clean milk methods at home, where there are facilities for such, and to bring samples of the milk to school for examination.

Milk Products:

1. *Cream*—average composition. Demonstrate separation by gravitation and by centrifugal methods, *i.e.* the separator. Demonstrate ripening of cream.

2. *Butter*—average composition. Give practical demonstrations in the making of butter, and study the principles underlying the various processes.

3. *Cheese*—composition of Cheddar cheese. Rennet—its source and action on milk. Give practical demonstrations in the making of whole-milk cheese, and study the principles underlying the various processes.

POULTRY SCIENCE

With a view to demonstrating the suitability of Poultry Science as a subject of instruction for post-primary pupils in rural schools, the North of Scotland College of Agriculture, with the co-operation of several County Education Authorities, commenced an experiment in the teaching of this subject in 1926 at a number of selected rural schools. In the absence of day-school teachers with qualifications in the subject, the instruction has been undertaken by the Poultry Instructresses of the College.

The experiment, which is still proceeding, has clearly shown that Poultry Science lends itself admirably to the teaching of post-primary pupils in rural schools, both on educational grounds and as a preparation for their after-school education and vocations.

In the experiment the instruction had perforce to be concluded in one complete school year, the first- and second-year pupils of the Advanced Division being combined for this purpose. The subject could, however, be spread over a longer period, if so desired. A minimum of three hours' instruction per week is required to accomplish the work in a school year.

The course was originally intended for girls, to be taken along with Dairy Science and Cookery, to form a group of subjects to be termed Rural and Domestic Science. The subject is equally suitable for boys, however, and could be similarly grouped with other Rural Science subjects in keeping with their after-school requirements.

There is an abundance of material available for the teaching of Poultry Science. Live fowls are easily obtainable from the children's homes or from farms in the vicinity, as are also the necessary anatomical specimens. Poultry-houses and appliances can be examined at neighbouring farms or in the school poultry-run ; and the principles involved in their structure and use can also be taught from models and diagrams. Most of the apparatus required for simple bench experiments and demonstrations can be made by the pupils, and the necessary chemical apparatus and reagents can be obtained at small cost.

A school poultry-pen would be required to provide live fowls of different breeds and types, appliances and other poultry material as teaching specimens, where these are not otherwise available.

The aim of Poultry Science is to give the pupils a greater interest in their school work by associating it with poultry-keeping—one of the most important subjects of economic interest in rural districts—and with the care of living creatures at their homes, and to instruct the pupils in the elementary principles of the more important operations of poultry-keeping.

Poultry are of everyday concern to most farm and village children, and no difficulty is experienced in arousing the liveliest participation in the lessons by even the dullest pupils in the class. The parents are also keenly interested in the subject, a fact which acts as an incentive both to teacher and pupils, and adds to the value of Poultry Science as a subject of school instruction.

The subject is taught in a series of lessons based on the examination and study of living fowls, anatomical specimens of the fowl and the larger wild birds, poultry-houses and appliances, poultry foods and products, models, diagrams, etc., and on the information got from the pupils as a result of their own observations on and experience with poultry at their homes. The instruction is supplemented, where necessary, by simple experiments and demonstrations, by visits to poultry-runs, etc. The pupils are taught to examine, describe, and study the specimens provided for the lessons, and to reason and find out the why and wherefore of the more important operations in the management of the domestic fowl.

The instruction is not intended as a training in Poultry-keeping any more than the teaching of Plant Husbandry in Rural Science is meant as a training in arable farming. It is a study of the elementary principles on which the successful domestication of the hen for commercial purposes is based. The instruction is educational and not occupational. The pupils are trained to systematic methods of observation on, and description of, matters connected therewith, and to reason out and record their conclusions. But the knowledge thus acquired is closely associated with the methods of practice of the poultry-yard and with poultry business generally, and its usefulness for after-school purposes is impressed on the pupils. The utility aspect of the instruction is further emphasised by encouraging the children to observe and study the methods of poultry management at their homes in the light of their school instruction. Parents usually co-operate in this kind of "home-work," and readily give their children facilities to practise some of the more interesting operations of poultry-keeping. A discussion and study in the class of this kind of "home-work," and of the principles involved, add greatly to the interest and efficacy of the instruction.

Poultry Science gives many opportunities for correlation with other branches of school instruction. The study of the subject is largely a matter of accurate observation and correct description, and so provides useful exercises in English composition. It also introduces new words and phraseology and encourages wider reading.

The origin of the various breeds of poultry, the world's Egg Trade and Markets, and the industrial and commercial phases of the world's Poultry Industry generally provide interesting lessons in Geography. The subject also provides useful exercises in measurement, drawing to scale, weighing, calculations of weights, prices, percentages, etc. etc. The study of the natural history of the domestic fowl—its external features, structure, digestive system, comparison with its jungle ancestor and wild birds of the district, incubation, common parasites, etc., brings the subject into relationship with the study of Zoology. Its relation to Cookery is self-evident, and needs no comment. The making of model poultry-houses and appliances, and the utilisation of feathers in the making of hat and dress ornaments, fishing-flies, dusters, quill-pens, etc., are examples of Handwork related to Poultry Science.

Teacher's Qualification.—To teach the subject successfully on the lines indicated above, a trained teacher with qualifications in Zoology and a special course in Poultry-keeping is necessary. Probably a six months' training in Poultry Management at one of the Agricultural College Poultry Farms would be sufficient for this purpose.

The employment of itinerant teachers with special qualifications in Poultry and Dairy Science would appear to be the most practical and economical way of extending the instruction of these subjects to post-primary pupils in rural schools.

BEEKEEPING

First Year:

Natural History.—Recognition of worker bee, drones, and queen, such elementary anatomy as the divisions of the body, the legs, wings, eyes, and sting. The food of bees—honey and pollen.

Apparatus.—The hive, frames, bee-space, quilts, smoker and subduing-cloth, veil and gloves.

Handling Bees.—Use of smoker or cloth. Importance of gentleness and slow movement.

Things seen in the Hive.—Honey-comb, Brood-comb (worker, drone, and queen). "Brood," stores (honey and pollen), caste examples.

Honey Production.—Bees working in "supers," finished honey, extraction of honey.

Second Year:

Natural History.—Development of bee from egg to perfect insect. Eyes (simple and compound), "tongue," mandibles, wing-hooks, feet, pollen-baskets, pollen-combs.

Floral parts, connection of flowers with bees, fertilisation (fruit and clover blossom). Collection of nectar, water, pollen, and propolis.

Apparatus.—Details of hive construction, sizes, bee-spaces, exclusion of dampness, ventilation, porch and alighting-board.

Handling Bees.—Influence of race, situation, and season on the temper of bees. Preparation of smoker and subduing-cloth. Practice in handling bees.

Things seen in the Hive.—Laying of the queen, growth of larvæ, bees laden with pollen and nectar, deposition and packing of pollen, young bees emerging from cells, detection of worker, drone and queen larvæ, sealing of cells (honey and brood).

Study of the Colony.—Each bee is a fraction like the leaf of a tree, the colony is the unit, and swarming is reproduction.

Phenomena of swarming, scout bees, queen-cells, meaning of "primary cluster," hiving the swarm.

Honey Production.—Preparation of "supers" for comb and extracted honey. Adding first and subsequent supers. Queen-excluder. The handling of swarms. Removal of supers, extraction of honey, and preparation of honey for marketing.

Preparation of stocks for wintering.

Third Year:

Natural History.—Classification of bee, study of related types (humble bee, solitary bee, wasp), respiration of bee, secretion of wax. Revisal of anatomy with study of body parts by means of lens or microscope.

Pollen and its function. Bees are essential for the survival of leguminous plants and of many kinds of fruit. Relation of bees to pasture and their agency in restoring nitrogen to soil. How bees are attracted to flowers (development of colour and scent).

Prevention of self-fertilisation (diœcious plants, pin- and thrum-eyed primroses).

Organ of Nassanoff (scent-organ of the bee) and its use at swarming time—to the bee and the bee-keeper.

Apparatus.—Application of physics to hive construction, effect of capillarity on roof and joints of hive. Loss of heat by conduction, convection currents, and by evaporation of moisture.

Feeders and feeding. Air-pressure in jar-feeder.

Honey Production.—"Nurse" and "surplus" bees. Swarming is disastrous, control of swarming. Size of hive and race of bee. The super-clearer. Honey-extraction and use of strainer. Honey containers.

Queen-Rearing.—Simulating queen-cell production, making nucleus stocks for the mating of queens. "Introduction" of queens. Utility of drones. Making new stocks of bees.

Bee Disease.—Symptoms and treatment of Foul Brood (American and European), of Addled Brood, Sac-brood, Dysentery, and Isle of Wight or Acarine Disease.

Moving Bees.—"Homing" in the bee, with its limits. Packing bees for transit. Sending queens and bee-samples by post. Trading in bees.

NAVIGATION

All officers of the Mercantile Marine, Steam Trawlers, and Herring Drifters must possess B.O.T. Certificates, and the standards of examination for these have been steadily rising for a number of years past. The conditions of service at sea are such that these prospective candidates have little or no time for private study, and when they have the necessary years of service and wish to qualify for any certificate they have usually to give up their berths, come ashore, and hurry through a few weeks of a concentrated course, which is more or less sheer cram work. The percentage of failures, especially among those who have had no previous instruction in the day school or cadet courses, is very high, so much so, that a prominent shipowner recently denounced the (in his opinion) needlessly high standard demanded by the B.O.T., as it was leading to a grave shortage of qualified officers in the Merchant Service. In the fishing-fleets at the more progressive centres there is no such shortage but rather a surplus, and it is not unusual to find several qualified skippers and second hands in a single crew, even acting as drivers or stokers in the engine-room. For many of these young men the future holds little or no prospect of their ever possessing a boat of their own or of acting skipper in another's boat; and yet year after year, despite the adverse conditions of the fishing industry, they come forward in considerable numbers to attend the classes in Navigation and First Aid conducted by the Education Committees. The low fees charged make it possible for almost anyone to qualify even in these times of stress and strain.

It is true that the short session and the high standard of efficiency demanded make the work of preparation for B.O.T. examinations difficult and strenuous for teachers and students alike, but this is just where a well-graded course in the Day School is of inestimable value when the subject has been taught from first principles and by experiments and not by "Rule of Thumb," as it unfortunately too often is. Some text-books are full of these Rules, which may at times serve a useful purpose if accompanied by suitable explanations as to the reasons why, but their use in school should not be encouraged.

Navigation is a mathematical subject and can be taught as such with additions from the various branches of Physics, the limits of the application of first principles and experiment being reached only when difficult formulæ requiring the use of spherical trigonometry are involved, as in the determination of longitude from an altitude of the sun. The subject should be introduced by a little Geography, the shape and size of the earth, latitude and longitude and their respective values in miles and time, also the determination of positions by latitude and longitude. Experiments with magnets and soft-iron bars lead the student to an appreciation of the use of the Mariner's Compass as a guiding instrument and of the deviation to which it is liable through magnetic influences in the earth and the ship. Rulers, compasses, and protractors should be freely used in the construction of figures, illustrating the correction of courses or bearings for variation and deviation. In time this can be dispensed with, as pupils soon acquire aptitude in solving these problems mentally or by rough sketches. Chart work makes a strong appeal, and the laying down of courses and bearings accurately requires some manipulative skill with compasses, dividers, parallel rulers, etc. Current sailing is an application of the parallelogram of forces or velocities, and presents little difficulty when treated as such. The actual construction of charts and the sailings, plane, traverse, etc., are beyond the scope of the present B.O.T. requirements for fishermen, but might be introduced, in part at least, after the pupils have a knowledge of trigonometrical ratios and the use of logarithmic tables. This knowledge also leads to an understanding of Traverse Tables which are used to solve problems on the day's work, but these problems should also be worked out practically by laying down the various corrected courses on a chart. Exercises on Reduction to Soundings can also be solved by geometrical construction and checked by Traverse Tables.

Simple experiments with mirrors to illustrate the laws of reflection, and the method of reading a vernier scale, lead to the construction and use of the Sextant. The refraction of light can be easily demonstrated by glass prisms or a trough of water, while a lesson on the seasons will explain the sun's declination—an important factor in the solution of problems in Nautical Astronomy.

Opinion differs as to how far the thirty-one Articles of the "Rule of the Road" should be studied in the day school, but the fact that B.O.T. examiners usually insist on a verbatim repetition of certain articles suggests that these might with advantage be taught in school. The Steering and Sailing Rules, especially Article 17, afford excellent exercise, and present considerable difficulties to many B.O.T. candidates when illustrated with model lights on a table, although these men have been applying them regularly at sea for years.

Concurrent with the purely nautical work there should be a course of sea crafts, including signalling, the knotting and splicing of ropes, and, where feasible, the mending of nets and basket work.

Practically every fisher lad starts his seafaring career as cook, and the institution of cookery classes in certain schools has been a great boon to the lads, and through them to the crews. Woodwork is a favourite subject with fisher lads both in day and evening schools, and is well worth the time devoted to it.

The science which would form part of a Nautical Course should be as wide as possible, somewhat on the lines of the Scottish Education Department's three years' course, and including Marine Biology; but this widening of the science could only be brought about by increasing the demonstration and reducing the individual practical work—a change from the usual custom which would not be serious in a course embracing otherwise so much work of a practical nature.

Along the lines indicated above much excellent work has been done in some day schools and continued in the evening classes. The B.O.T. are fully aware of and appreciate the great advance made in recent years in the teaching of Navigation on educational lines.

The question arises as to what benefit a student would derive from the possession of a certificate testifying to the completion of a three years' course of Navigation and allied subjects, apart from the additional knowledge and training acquired? At present the answer seems to be—no benefit. Certificates granted by certain Nautical

Schools on the completion of a somewhat similar course are recognised by the Shipping Companies and count as equivalent to six months, or thereby, of apprenticeship at sea. This is an important concession, and if certificates granted by the Department were similarly recognised it would greatly benefit students whose parents are financially unable to send their boys to these special schools.

As four or five years would elapse between the gaining of a School Certificate and the earliest age at which a student could sit a B.O.T. examination (19 years) it is almost certain that the B.O.T. would not recognise the certificate as exempting a candidate from any part of their examination. They would be more likely to raise the standard of the fishermen's examination still nearer to the level for foreign service certificates. This might be a distinct hardship in many cases, but it would tend to facilitate transference from the fishing-fleet to the higher and wider service of the Mercantile Marine.

XIII
LANGUAGES

LANGUAGES

Introductory.—It is essential that facilities for the study of one foreign language be provided for certain groups of pupils in all Advanced Divisions, and that this study be carried out on lines that will create interest from the start and pave the way for continued education in the case of pupils showing the necessary bias, for the following among other reasons :—

(*a*) The study of one foreign language completes the basis necessary for an all-round mental culture.
(*b*) It helps the mind to penetrate the value of its own thought-forms and facilitates greatly the understanding of the structure of the native tongue.
(*c*) It opens the mind to the fact that each nation attacks international problems from a different mental viewpoint.
(*d*) It develops in a very real way an understanding of the foreign land and its inhabitants, and is thus a strong influence for world-peace.
(*e*) It provides, when begun at this plastic age, a source of strength for any future language study.
(*f*) It is of great and growing importance in the development of international commerce.
(*g*) It should provide, if properly taught, a recreational outlet of great value and an incentive to foreign travel.
(*h*) Its absence would inevitably come to imply a class distinction foreign to the Scottish view of education.

Aim, Method, and Time-table Facilities.—The study should aim at power to read with ease simple examples of the foreign idiom and at mastery of the sounds and rhythm of the spoken tongue, so that it may be used accurately and followed with understanding in so far as this lies within the scope of the knowledge acquired. Some knowledge of concrete things and of the foreign country and people should be included. The method used should be such as to allow of a freer treatment than is always possible in Secondary Schools, the content of knowledge being subordinated, if necessary, to this aim. Fundamental thoroughness is an essential in so far as a properly taught first language is a source of strength for any future language study, as well as for the understanding of English. It is assumed that, in a subject for which all the background must be built up within the class-room and for which no home preparation is available, seven lessons weekly be provided and that the class should not exceed thirty in number.

General

The following pages embody the results of full discussions based upon evidence submitted by numerous teachers working in schools of varied type representing the different areas of Scotland.

Selection of Pupils for the Study of a Foreign Language.—No pupil should be deprived of the opportunity of studying one foreign language unless by proved incapacity to profit by it, as, where a non-language course has been experimented with in favour of concentration on some practical course, a serious handicap on the better pupils has been found to result at later stages.

As a preliminary to the study of a foreign tongue, an English test, including dictation, interpretation, and composition, should be adequate to assess eye-memory and the power to analyse logically simple thought-forms and ideas, and to discriminate between the true values of simple tenses. A "grammatical" test alone at the present time would be misleading owing to the varying conditions and methods of approach in the Primary School. The ideal plan would be for all pupils to enter on the study of one foreign language, the sifting out to take place after a minimum period of six weeks or one term. The practical difficulties inseparable from such a plan are admittedly great, but these might be, and indeed already are, partly overcome by the appointment of Art. 39 teachers, who are qualified in English as well as in a foreign language, so that any time-table adjustments are more easily made. The tendency to lower the age of transfer to eleven plus would allow of an introductory period in the Advanced Division schools. We are strongly in favour of such an introductory period, after which selection could be made on a basis fair to all concerned.

We are unanimously of opinion that a knowledge of the principles of elementary grammar and power to discriminate between parts of speech and to handle easy analysis are essential preliminaries to language study.

Note.—Referring to the opinions expressed by Lord Eustace Percy in *Education at the Cross-Roads*, we suggest the desirability of some school or schools conducting experiments by which two parallel classes of approximately equal ability could be taken through the course—one with and one without a foreign language—and examined each year by means of an English test of a general character to investigate the "transfer value" of such study.

The Study of Grammar.—Systematic practice of grammatical forms, including conjugations and simple agreements, is essential to the fruitful study of any language, more especially of a first foreign language. Grammar drill is indeed enjoyed at the earlier stages. Accuracy in this part of the work must be insisted on from the first for all pupils, including those in a "Reading Course," and it is assumed that a minimum quantity of basic material will be treated intensively. Grammar must be methodised to include only essential forms liable to constant repetition, and should, wherever possible, be practised with a vocabulary of concrete and familiar objects in the form of class commands and easy questions and answers. Intensive treatment of the niceties of language should, at all stages, be avoided, and language structure gradually built up by memorising and mastering language-moulds carefully chosen for their basic quality and constant usefulness. It is assumed that this method of language-building will be kept in view in all aspects of the study (oral, reading, etc.). Judgment and discrimination must be exercised as to what should be emphasised. *Much will be met with that should not be driven home.*

Oral Practice, including Dialogue, Repetition, Dramatic Exercises, and Oral Composition.—Oral work of some kind is essential at all stages. A knowledge of phonetic symbols is a valuable preliminary aid to "sound" practice, which must be thorough from the start and should be thought out so as to initiate the pupils into the rhythm of the foreign tongue. Simple songs should be taught as early as possible. Question and answer on the day's lesson should be used throughout the course, and pictures, maps, games, etc., gradually introduced. Carefully formed questions containing the framework of the answer should be resorted to, and the pupil should ask as well as answer questions. The questions should be graduated so as to build up "language-moulds." These should, later, be practised symmetrically on, *e.g.* a specified tense, then written on the blackboard, and developed into a continuous oral narrative by the pupil. Such narratives should occasionally be made the basis of written compositions. *Résumés* should not be attempted before the third year, and even then sparingly, previous preparation having been arranged for, and the better pupils only called on in the first instance. A good deal of oral work "told" to the class is useful for classes of the Advanced Division type.

The dramatic form is of the utmost value when properly used. The best method to encourage this exercise is for the pupils themselves to cast into easy dialogue suitable portions of the lesson studied (prose or verse). At a later stage similar portions could be dramatised more fully and acted by the class. If the work is allotted to several "casts" and if the members of each cast memorise individually their own portions, the time demanded is not diverted from the main scheme, but careful management is essential. The acting could be profitably attempted in the class-room with the slightest indication of costume and "properties." Dramatic and other oral work, if well handled, has a fair claim on the class-room time, and helps greatly to create a living atmosphere. If any more public performance is attempted (*e.g.* to several classes or to the school) songs or action-songs make useful and much-appreciated items.

Selection of Reading Material: (a) *Short Stories;* (b) *Longer Stories;* (c) *Complete Texts;* (d) *Periodicals.*—Generally speaking, stories of the simplest kind would form the best basis for the first year. These should be specially written for the purpose, and should contain simple and useful vocabulary, with frequent repetition. There is a great lack of books of sufficiently simple language-content not of the fairy-tale type. Simple stories of the right standard of difficulty, illustrative of foreign life or foreign countries, would be of great value. The stories chosen should not extend to more than five or six pages until the middle of the second year, when collections of longer tales could be read. These, again, should be simple in style and should contain repetitions of vocabulary and phrase. In the third year collections of longer tales or complete texts should be used, but the latter should be sufficiently short to allow of two, or even three, being covered in one year. The texts should be the work of recognised French authors. The teacher should devise means to take from time to time chapters or sections as "rapid reading," or to summarise them personally in order that the sense of progress and achievement be maintained. The text chosen should contain much "incident" and a sufficient sprinkling of dialogue. Anecdotes might occasionally be told to the class, and, where possible, be used for reproduction; little other use should be made of them. Texts should be chosen with a view to develop background and knowledge of the foreign life. Abbreviated texts might occasionally be used. Periodicals form a valuable stimulus and they help to create a living atmosphere, but these are most useful for occasional reference or as the source of topical *dictées*. We feel that no particular periodical can be recommended as especially suitable for this purpose. *More can be learned by the pupil from language well within his scope.* Texts in phonetic script should be avoided.

Verse: (a) *Quantity;* (b) *Kind;* (c) *Method.*—Rhythm should be a main consideration in determining the choice of verse, and such verse should not contain ideas beyond the pupil's comprehension. Nursery songs, action-songs, simple lyrics, short narrative, nature and patriotic poems and fables, with some modern verse if desired, would provide the material necessary, if presented in the above progressive order. Songs can be used at all stages. One or two short poems should be treated intensively and memorised each term. These poems should be *good*, and a few simple facts about the author should, if possible, go with each one. The poem chosen should first be read dramatically by the teacher, then explained and discussed for the meaning, and difficult phrases and expressions should be translated. Accurate pronunciation and rhythm must be insisted on. The lesson should include chorus-speaking by the class as a whole and also in groups. The latter method is especially to be recommended if various characters enter into the poem, in which case the parts can be taken by alternating groups, in order that each pupil may have practice in all the parts. The individual method is the final step. Some songs should be included (cf. *supra*).

Verse, as above outlined, is for intensive study.

Some teachers might choose to use a certain amount for class "reading." This is not recommended, although a poem may occasionally be read to the class by the teacher to illustrate some special point or to introduce variety.

Class-room.—It is essential that a foreign language be taught in a room allocated for this specific purpose, in order (1) that the necessary "atmosphere" be created and maintained by means of maps, pictures, post-cards, posters, books, and, where possible, a gramophone or wireless; and (2) to prevent the waste of time incurred when the material has to be moved from one room to another: a lesson frequently loses most of its value by material not being at hand when required. The room chosen should have sufficient floor-space for dramatic work of a simple kind, and must be distant from the noisy parts of the school if pronunciation is to be adequately taught. Ample blackboard space, necessary everywhere, is especially so here.

Illustrative Material.—Illustrative material is essential for a subject where little help outside of the class-room can be expected towards one of the most valuable results of the study—namely, some appreciation of a foreign nation's customs and point of view. The following list is offered suggestively, with the proviso that some at least of the items should be supplied. A gramophone is of particular value in districts where the foreigner is seldom met with.

1. Coloured pictures with printed text.
2. Railway posters (these can be obtained generally at small cost by direct application to the railways concerned).

3. Maps.
4. Pictures of typical scenes of foreign life.
5. Photographs and portraits.
6. Coloured illustrations from some current magazine, e.g. *L'Illustration.*
7. "Realien," including coins, stamps, calendars, magazine advertisements, and advertisers' pamphlets, menus, tickets, copies of *faire part*, etc.
8. Sets of post-cards and facilities for grouping them.
9. Material collected by pupils.
10. Gramophone records and gramophone (cf. *supra*).
11. Wireless.

The illustrative material should be changed at suitable intervals in order to stimulate interest.

Written Work.—The best form of written work at this stage would be a few grammar sentences, sometimes from, but more often into, the foreign tongue. *Dictées* and practice tests on work already prepared should be done in class. In the third year some continuous translation into English might be attempted and reproduction exercises from reading books.

A Foreign Correspondent.—Whilst acknowledging the value of first-hand intercourse with the foreign country, we are of opinion that little good can be achieved by this means except in the third year, and then only in special cases (*e.g.* where the two correspondents have some personal connection with each other) and with the teacher's help and supervision.

Reading Courses.—We had under review various "Reading Courses" in operation, and came to the following finding :—

> That further organised experiment along the lines of Reading Courses should be encouraged. The

aim of such courses should be (*a*) to develop in the pupil the power to read intelligently and to translate into English easy passages from the foreign language, (*b*) to give some cultural knowledge of the foreign language and people, and (*c*) to provide such introduction to commercial forms as would enable the learner to make practical use of this knowledge at a later stage with the aid of suitable books to be recommended by the teacher. Any Reading Course to warrant support must provide a language training not inferior to that of the normal course of foreign language study up to the standard of the Day School Certificate (Higher).

Other points were:—

(*a*) That good results are dependent on well-equipped language teachers being appointed to Advanced Division schools, and that a teacher qualified under Chapter V. should be in charge whenever possible.

(*b*) That the usefulness of a French student teacher is doubtful at the Advanced Division stage, even with very careful and systematic supervision and with small groups of pupils.

(*c*) That it is desirable that some Advanced Division schools should experiment with a first language other than French.

(*d*) That no class should exceed thirty in number.

GRAMMAR SCHEMES

(*French*, *German*, *Spanish*)

We offer the subjoined Grammar Schemes as suggestive merely; they show in each case a reasonable basic minimum that should, if possible, be mastered in the time allotted. The aims and methods suggested above should not be subordinated to intensive study of Grammar. The content is set out under grammatical headings and the scheme assumes no stereotyped order of study.

French

The following scheme represents the result of much evidence and of full discussion. Certain sections have, however, been starred to be treated at the teacher's discretion, in view of the varying absorption power of language classes.

First Year:—

1. Articles, definite and indefinite and their combinations: with à and de; use of du, de la, des, de, d', when equivalent to "some" or "any" ("partitive article").
2. Expressions of quantity: beaucoup de, trop de, un kilo de, une tasse de, etc.
3. Nouns and adjectives: plurals, feminines, and agreements; only very common irregularities should be noted; comparison of adjective and adverb.
4. Possessive and demonstrative adjectives.
5. Personal pronouns as subject; pronouns as object before verb; object after verb in class commands (*cf.* note 1, *infra*).
6. Simple cases of agreement of the past participle.
7. Verbs: present, imperfect and perfect tenses of avoir, être and of all the regular conjugations; the future tense to be introduced in the third term; other tenses to be noted only as translation when found in reading; drill in negative and interrogative forms; imperative as in practice; present tense and past participle of some of the commonest irregular verbs, *e.g.* aller, faire, dire, etc.

Second Year:—

1. Revision of previous work.
2. Verbs: regular in -er, -ir, -re, and those with orthographic peculiarities, *e.g.* jeter, appeler, etc.* Common irregular verbs.
3. Agreement of past participles with (*a*) être, (*b*) avoir, (*c*) reflexives ; pronoun objects before and after verb if not already overtaken in the first year.
4. Common verbs and expressions followed by infinitive (i) without preposition, (ii) with à, (iii) with de ; these should include (*a*) common modal verbs, (*b*) distinction between c'est difficile *à faire*, il est difficile *de le faire*, and (*c*) expressions of joy and sorrow.
5. French equivalents for English present and perfect tenses after "if" and "when" ; and the use of "depuis"; "whether" (=si) may be added.
6. Subjunctive*: a skeleton for subjunctive built up from 4, (*a*) and (*c*), with a few conjunctions added—this should be developed chiefly from examples met with in texts.
7. Distinction between perfect and imperfect in conversational style and between past definite and imperfect in narrative style ; this should be handled chiefly from reading material.
8. Pronouns and adjectives, possessive and interrogative.
9. Irregular comparison of common adjectives and adverbs.
10. Cardinal and ordinal numbers, and dates.

Third Year:—

1. Revision of previous work, amplifying examples.
2. Subjunctive further practised as previously outlined : craindre, avoir peur que, should be added.

Covering Notes:—

1. The object pronouns should be taught together so that me le, me la, me les, etc., form a ready rhythm. If this is not possible in the first year, the *grammatical* study of object pronouns should be transferred to the second year.
2. Cardinal numbers 1–31 should be studied as dates, 1–5 after the first week, etc., and 1–31 revised after the first month.
3. Other common grammatical points should be grouped slowly from the reader.
4. Items marked * may be held over until the next stage.

General Note.—The methods suggested above should be followed, and *typical constructions should be memorised, collected, and revised regularly throughout the Course.*

German

We have laid down here a simple minimum in view of the fact that German has been little practised as a first language, and that schemes of too ambitious a character are likely to defeat useful experiment.

First Year:—

1. Adjective declension: (*a*) with definite article; also dieser, jener, jeder and welcher; (*b*) with indefinite article; also kein and possessive adjective; (*c*) without article.
2. Noun declension: classified according to formation of plurals, well-known nouns only.
3. Pronouns from reading material only, to be grouped under: (*a*) personal; (*b*) interrogative, *e.g.*, wer? was? (also wo? wohin? woher? wie? wann?).
4. Conjugation of verbs: inseparable (separable and reflexive forms as vocabulary only); (*a*) weak conjugation including haben; (*b*) strong and mixed conjugations to be introduced by learning the three principal parts of, say, one dozen common verbs such as: gehen,

kommen, sehen, essen, trinken, bringen, nehmen, sein and werden. Intensive practice should be confined to the present and imperfect tenses (and imperative in class commands) ; (*c*) the present tense of wollen, können, müssen, should be practised as vocabulary.

5. Comparison of adjectives and adverbs as vocabulary only (to be grouped).
6. Numerals: (*a*) cardinals as vocabulary; (*b*) ordinals in dates, etc., 1–31. Also days of week, names of months.
7. Prepositions with (*a*) accusative, (*b*) dative, (*c*) accusative and dative. These to be grouped as met with in reading.
8. Construction : principal clause ; (*a*) normal order, with co-ordinating conjugations ; (*b*) inverted order.

Second Year :—

1. Revision of previous work.
2. Comparison of adjective and adverb and practice in declension.
3. Noun declension continued and developed under the same classification as in First Year, 2.
4. Pronouns : (*a*) relatives in nominative, dative, and accusative case only, genitive as vocabulary ; (*b*) interrogative, all.
5. Verbs : complete the conjugation of indicative mood as given in First Year, 4, *i.e.*, (*a*) weak conjugation ; (*b*) strong and mixed—add further common verbs to lists ; (*c*) separable and reflexive verbs in common use ; (*d*) some common impersonal verbs as vocabulary.
6. Prepositions : (a) complete the lists in First Year ; (*b*) add genitive.
7. Numerals continued ; dates ; time of day.
8. Construction : subordinate clause—subordinate order ; simple subordinate conjunctions.

Third Year :—

1. Revision of previous work.
2. Nouns : compound nouns and simple rules of gender ; word formation (prefix, root word, suffix, etc.), *e.g.*, Nahrungsmittel, Sicherheitsnadel, Aussichtspunkt, etc.
3. Adjectives and pronouns, continued practice.
4. Verbs : continued practice as above ; amplify vocabulary content ; simple examples of subjunctive.
5. Construction : simple examples of subordinate order with two verbals plus auxiliary ; learn models by heart.

General Note.—The methods suggested above should be followed, and *typical constructions should be memorised, collected, and revised regularly throughout the Course.*

Spanish

The Spanish scheme is submitted as the result of successful practical experience in what has so far been an extremely limited field. The possibility of the extension of the teaching of this important subject in view of its practical value and the increasing supply of trained teachers now available should not be lost sight of.

First Year :—

1. Articles, definite and indefinite ; *al* and *del*.
2. Adjectives : simple rules for position, inflection, and agreement ; simple examples of apocopation ; demonstratives and possessives.
3. Cardinal numbers : 1–100 ; names of days of week and months.
4. Nouns : simple rules for plurals.
5. Personal pronouns as subject and object of verbs, and after prepositions.

6. Use of preposition *a* with personal object of verb.
7. Verbs: indicative and imperative moods (with Vd. and Vds.) of tener, haber, ser, estar, and the three conjugations; present indicative and imperative (with Vd. and Vds.) of root changing verbs; present indicative and imperative of the commonest irregular verbs; uses of the imperfect and the preterite; past participles of regular and common irregular verbs; present perfect tense; negative and interrogative sentences; interrogative "whose" (de quién?); simple differences between *ser* and *estar*; use of "tener que."

Second Year:—

1. Revision of previous work.
2. Simple rules for use of definite article. The feminine article *el* and the neuter article *lo*.
3. Adjectives: exceptions to general rule for inflection.
4. Cardinal numbers to 1000.
5. Nouns: use of singular number in Spanish where plural is used in English.
6. Verb: indicative, imperative, and subjunctive of the regular verbs and the more common irregular verbs. Easy examples of verbs which require a preposition before a subordinate infinitive and those that do not; *al* and infinitive; infinitives after prepositions; uses of *haber*; use of preterite perfect tense; gerundive and progressive form of tenses; introduction to subjunctive mood: (1) after certain verbs; (2) after certain conjunctions; (3) in certain adjectival clauses; (4) after certain impersonal phrases; (5) after *sí* (conditional).

Third Year:—

1. Revision of previous work.
2. Article : rules for omission.
3. Adjective : apocopation, position and agreement; comparison ; rules for *than*.
4. Numbers : revise cardinal numbers; ordinals.
5. Nouns : exceptions to general rule in gender and number.
6. Adverbs : comparison, correlative *the . . . the* -mente ; ya ; si and sí ; difference between mucho and muy.
7. Pronouns : relative, interrogative and indefinite.
8. Prepositions : differences between *por* and *para*.
9. Conjunctions : difference between poro, mas, and sino ; y and e ; o and u.
10. Verbs : reflexive and reciprocal ; passive voice ; use of se ; irregular verbs. Subjunctive mood to be taught more extensively.

General Note.—The methods suggested above should be followed, and *typical constructions should be memorised, collected, and revised regularly throughout the Course.*

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