

A COMMUNICATIVE APPROACH TO THE ANALYSIS OF EXTENDED MONOLOGUE DISCOURSE  
AND ITS RELEVANCE TO THE DEVELOPMENT OF TEACHING MATERIALS FOR  
ENGLISH FOR SPECIAL PURPOSES

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## A C K N O W . L E D G E M E N T S

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## SECTION ONE : Background to the Study

1.1 : This Chapter considers the need for an appropriate syllabus and materials for the teaching of English for Special Purposes (E.S.P.) to overseas students in tertiary education in Britain. It stresses the need for preliminary investigation of native speakers' use of English for special purposes and considers the advantages of conducting such an enquiry in an academic setting. It describes a specific instance of the needs of a group of students in a British university, and discusses the conclusions that were drawn from a preliminary study of the group. It explains the connection between the preliminary study and the present enquiry, and describes the gathering of suitable data in the form of recorded lectures and related research papers.

### 1.1.1 : E.S.P. in Higher Education

This enquiry stems from a longstanding concern with the difficulties faced by speakers of English as a second or foreign language who require English in order to engage in academic or professional activities. This involves the use of English for a set of special communicative purposes which the specialist must accomplish under a range of different circumstances of communication. The purposes and circumstances with which I am most familiar are those of foreign students studying for a first or higher degree in institutions where English is the medium of instruction. But a personal interest in the use of English for academic purposes is not the only reason for basing the enquiry on this particular field.

### 1.1.2 : The Need for Suitable Materials

Firstly, the bulk of teaching in English for special purposes is conducted with students and trainees in technical and educational institutions, and a scrutiny of the English used for academic purposes will be more directly relevant than findings based on, say, English in industrial organisations.

Secondly, many teachers who have been precipitated into E.S.P. teaching in the last decade are confronted with students who differ markedly, in their attitudes to language and in their academic backgrounds, from the students who fill the more 'traditional' non-specialist language classes. The higher the level of technical or other specialisation of the student, the more marked is the divergence between his background and interests and those of the teacher. The position is aggravated by a lack of suitable teaching materials for this category of student as well as by the language teacher's sense of insecurity when handling technologically-oriented students, often in a technical institution. Yet it is the more specialised learner - the postgraduate or research student - who requires the fullest range of language skills and must employ them most urgently in his own field of study.

### 1.1.3 : Advantages of an Academic Setting

A third and crucial reason for investigating the use of English in an academic setting is that any approach to E.S.P. must acknowledge that the central problem of specialised second-language learning is one of language use rather than of language form. There



would seem to be very few formal properties, if any, that are exclusive to the use of a language for specialist communication (CILT : Reports and papers No. 1, 1969, No. 7, 1971 : Lackstrom Selinker Trimble 1970). The fundamental question is, then, under what conditions of communication does the specialist prefer one form of expression to another, and for the expression of what content? Even if no 'technical terms' appear in a stretch of specialist communication a distinctive association of content and particular choices of expression will still signal to the layman that he is confronted with an instance of specialist language. This means that we will be concerned with language use under particular social and situational constraints, and we must frame our enquiry in such a way that it reveals the determining effect of the latter on any realisation of the former.

For example, in order to know under what conditions of communication a particular specialist operates, and what effect these have on his use of language, we must examine the stock situations in which he is placed from day to day in the course of his work. We insist, with Candlin *et Al* 1974, that in any occupation certain elements of these situations are fairly repetitive, some even highly so, and that it should be possible to predict with some certainty which communicative tasks the specialist will encounter and what alternative forms of expression will be open to him to accomplish these tasks. Yet the nature of many specialists' work makes it difficult to identify typical situations, or distinctive elements of situations, which will characterise the communicative tasks of a given occupation.

However, this procedural difficulty is greatly eased when one considers the specialist working in the academic field. From the foreign student's point of view, the lecture, the seminar or tutorial discussion, the laboratory or practical session, the shop-talk over coffee, together with his reading and writing assignments, represent a limited number of well-defined and highly recurrent situations. They set the boundaries of his specialist language needs, within which his ability in English will sustain or fail him; and we can be sure that no significant part of these needs could be fulfilled by his first language. What is more we can be sure that, apart from a few idiosyncratic traits, the staff and fellow students he encounters in these situations will be bound by the same conventions and constraints, and that their language use and his language needs should be equally predictable. Each of these stock academic situations therefore constitutes a situation-type which may be characterised by the participants and the location, by the kind of interaction which ensues and by the level of formality at which it is conducted.

One therefore feels that the grounds for situational analysis are safer and more familiar in the educational fields, and as Sinclair *et Al* (1972) point out in connection with the classroom, one can operate with confidence borne of academic experience rather than with the hesitancy that would beset analysis of a strange and ill-defined area of specialist communication. If the criteria adopted for assessing more familiar situations prove reliable, they could be extended with a greater measure of confidence to specialist activities outside the educational field: the possibility of a wider application must therefore

be kept in mind in formulating the criteria.<sup>1.</sup>

1.2. : The 'Newcastle Project'

My first opportunity to examine the language demands made on foreign students in tertiary education in Britain arose in 1971. R. Mackay, then a lecturer at the Language Centre, University of Newcastle-upon-Tyne arranged for a group of postgraduate students at Edinburgh University to use the services of the Centre and the foreign research students attending its English courses, for the completion of several postgraduate assignments in applied linguistics.<sup>2.</sup> Since this enquiry is an extension of the work done at that time, it would be appropriate to summarise the conclusions that were drawn in the 'Newcastle Project.' The assignments were concerned not only with the language requirements of the overseas students but with the difficulties of arranging tuition for students with disparate language backgrounds and abilities and working in disparate disciplines with incompatible timetables. We therefore considered:-

- The language skills required.
- The disciplinary composition of the students.
- The students' motivation.
- The implications for syllabus design.

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1. A recent attempt to categorise specialists and their language needs in terms of a socioprofessional classification (Richterich 1973) tends to produce professional stereotypes and so conceal possible similarities in their communicative tasks. A more dynamic model could be developed from work reported by Griffith and Miller (1970) which considers the specialist as an information collector/disseminator in a network of professional contacts. A model of this kind might reveal more common ground between the student and the practising specialist than is immediately perceptible.
  2. Assignments in Syllabus Design, Programmed Instruction and Language Laboratory Materials, submitted for the Diploma in Applied Linguistics, Edinburgh University, by R.H.S. Cook, J. Hughes, A.J. Mountford, 1971.

### 1.2.1 : The Language Skills Required

The Centre offers service English courses for approximately fifty overseas postgraduate students whose command of English is not considered to be adequate for their course of studies: many more have expressed a wish for tuition but cannot be accommodated. Almost all the students have come to study for higher degrees, mainly in Engineering and the Sciences. They are exposed to the same language situations as British postgraduate students, and so require a full range of language skills. However, although their abilities vary, they have almost all had a grounding in English during secondary education or later; this has generally lain dormant except as a reading skill, since they have mostly read a certain amount of technical literature in English in the interim. I had informal interviews with a number of the students and examined their commitments and timetables in their own Departments. On this basis certain language needs were identified, and they have since been largely confirmed by a series of student surveys conducted by Mackay & Jordan at the Centre and at Manchester University (1973, 1974, 1975).

Although their reading skill could generally be improved it is not their most serious shortcoming, perhaps because it is the one skill most likely to have been maintained. Their writing skill needs serious attention because they will mostly be required to prepare reports, written assignments or theses in due course. But since this work falls mostly in the later stages of their studies, it is not the most urgent priority. Having freshly arrived from abroad they enter almost immediately into courses of lectures, seminars, discussion

groups, practical sessions and fieldwork, all of which make a considerable demand on their oral and aural skills. Of these, the latter is of the most immediate concern for several reasons:

- (a) While academic staff may be tolerant and sympathetic towards foreign students' productive shortcomings, they cannot be expected to make large concessions in their own speech habits to compensate for the students' poor aural comprehension.<sup>3</sup> Where they do make concessions, by speaking slowly and deliberately, or making frequent recapitulations, the benefits are dubious: excessive explanation and repetition can become confusing, and students easily form the impression that the lecturer is being patronising rather than helpful.
- (b) Lectures are an important feature in the earlier stages of many overseas students' studies, since Departments often encourage them to attend lectures to final year first degree students or arrange special orientation lectures.
- (c) The lecture situation imposes sustained aural comprehension over periods of 40 - 50 minutes on foreign students, and it is very unlikely that their earlier training in English will have fitted them for this skill. A common complaint, and not only at Newcastle, is that even where students are familiar

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3. The point has been stressed recently by Candlin, Kirkwood and Moore (1974).

with the technical terms and have a reasonable grasp of any particular stretch of the discourse, they find it difficult to follow the lecture as a whole. This inability to identify the patterning of longer stretches of discourse may be a contributory factor to the widely-recognised problem of ineffective note-taking among foreign students.

For these reasons, then, the examination of lecture discourse is the major priority in this study, both to gain a better understanding of the structuring of lectures, and to suggest strategies and practice that might be adopted by overseas specialists to improve and sustain their aural comprehension. There is the further consideration that by studying the speaking tactics adopted by British academic staff we may be able to produce guidelines for practice in spoken discourse (as distinct from, and complementary to, pronunciation and other standard oral production exercises). It must be borne in mind that an ability to put forward their own ideas in short talks and in free discussion is generally demanded of foreign postgraduate students well before they are called upon to produce serious written work.

#### 1.2.2 : Disciplinary Composition

The multidisciplinary composition of the students was striking. The approximate distribution of students in 1971-72 was as follows:

Agricultural Marketing	9
Electrical Engineering	8
Soil Science	8
Chemistry	3
Geology	2
Marine Engineering	2
Agricultural Engineering	2
(Various Departments in Science and Arts, only 1 student per discipline represented).	17

It must be stressed, of course, that the distribution may change quite significantly from session to session. Personal experience and contacts lead one to suppose that this is a feature of many of the service English courses offered in Britain and overseas. One could also assume that the more restricted and highly specialised the fields one caters for, the more multidisciplinary and individualised the composition of the students will be. We felt there was a need for a syllabus framework and materials that could accommodate an indefinite number of specialities, rather than being designed for students from a single discipline. However, justification for this approach comes not only from the heterogeneous composition of the students but from a consideration of their language-learning motivation.

### 1.2.3 : The Students' Motivation

We recognised that students of E.S.P. have a vested rather than an intrinsic interest in the language, an interest sustained only by a sense of genuine personal utility and of tangible aid to progress in their own speciality. They are therefore impatient of any element

of the syllabus which they do not see as directly relevant to their immediate needs: they are contemptuous of materials with a superficial or spurious air of technological concern, materials pitched at too low a level of specialisation or indeed written for the layman. Nor are they content to acquire skills exemplified and practised through materials unrelated to their interests, and to make the transposition to their own predicament for themselves.

No doubt this attitude is partly engendered by the fact that mastery of a foreign language presents itself as an irksome chore, as a hurdle preventing them from extending their knowledge of a specialist field which they have already acquired through their first language. But it also derives from a tension which often exists in E.S.P. classes. Specialist students suffer from the same sense of vulnerability and insecurity in a language learning situation as does the language teacher in a technological situation. Both are mistrustful of tasks and materials which threaten to expose personal ignorance or inadequacy: and even if these fears are largely imaginary, they create a strained atmosphere in classes using unfamiliar materials and often working towards inappropriate goals. A balance therefore had to be struck in designing a syllabus, between (i) the need to provide texts and practice materials pitched at the students' own standard of expertise and based on their respective disciplines, (ii) the need to supply a unifying factor to hold these diversified materials together, and (iii) the need for a format which would allow the teacher to operate confidently without being particularly well-informed about the



various disciplines covered.

1.2.4 : Syllabus Design

The solution adopted in the group of assignments mentioned in 1.2. was as follows:

- (a) A 'spinal' syllabus structure was proposed, in which optional materials branch out from a spine, the latter having a unifying function (see (e) below, and Fig. 1.1).
- (b) Each unit in the spine would present communicative tasks (see 1.3.2 below) as they occur in mundane situations not directly related to particular disciplines, and would practise a set of appropriate means of expression. The general theme of these units would be 'social survival' in student life in a British University. The content would be well within the capabilities and experience of the teacher yet would be of common interest to the whole group. This is component A in Fig. 1.1.
- (c) On completion of the spinal unit by the full group, students would move to a corresponding unit in a reading comprehension and writing practice component (B in Fig. 1.1). The same tasks would be exemplified again, this time in specialised texts. But the tasks would now be associated with a new set of means of expression appropriate to the register and to the level of specialisation. A series of optional materials would be available

for each speciality in order to engage each student immediately in practice related directly to his own professional interests. Study of the texts would rely heavily on a programmed self-instructional format, and the writing practice would also be partly self-instructional. The teacher's role, backed by supporting notes on the technical aspects of the texts, would be mainly advisory and corrective.

(d) From the reading/writing component students would progress to an aural comprehension and oral production component, again based on the same tasks as exemplified in model lectures and sample discussions. This component would take the form of language laboratory work, using a bank of optional tapes for different disciplines. In monitoring the students the teacher would again be provided with notes where necessary. This is component C in the diagram.

(e) The general structure of the syllabus and the route followed by students in working through the materials, could be summarised as:

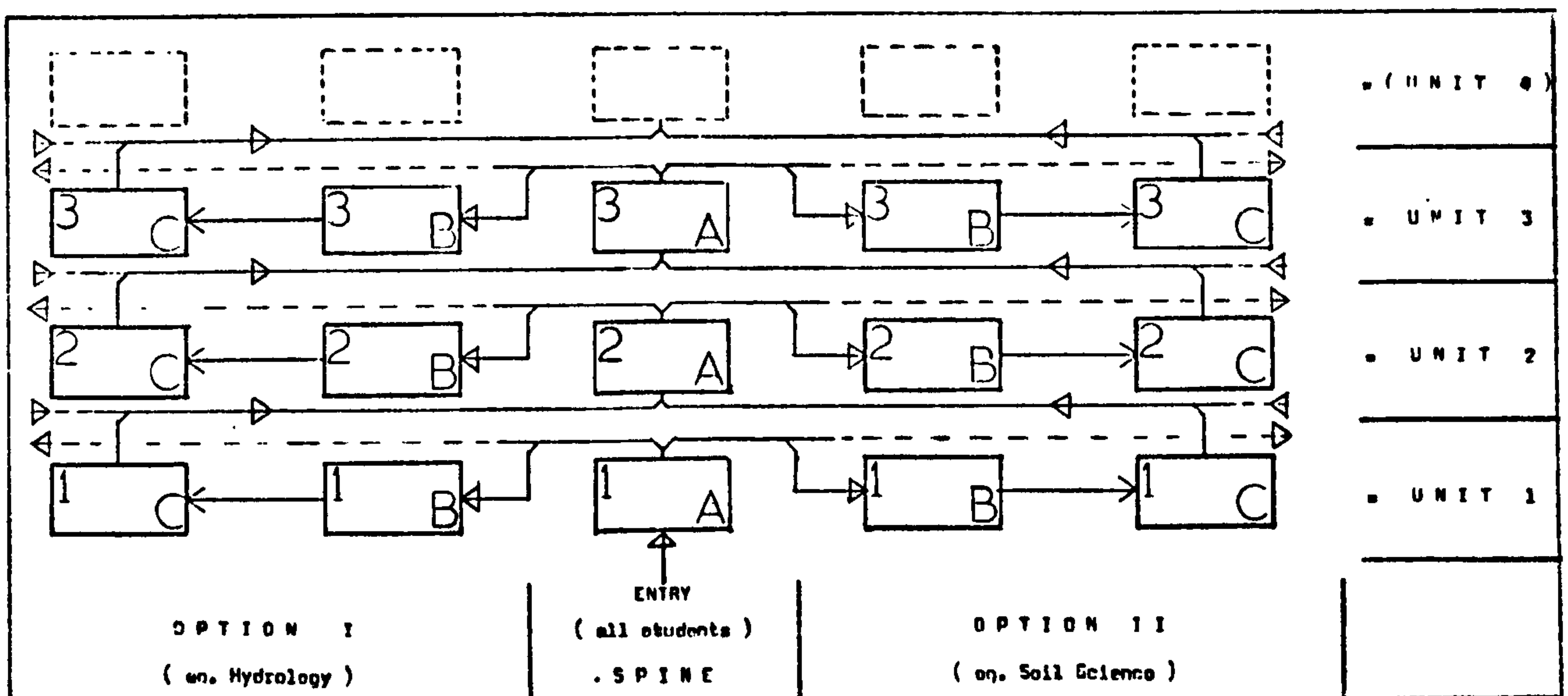


Figure 1.1

The spine would thus provide a unifying area of common interest for both teacher and students, while in dealing with the specialised materials the teacher would be backed by supporting notes. Rather than attempting to cope with different disciplines in open class, the teacher could let students work semi-independently on the specialised material, and at their own pace. This arrangement allowed for the varying abilities of the students, and also permitted a flexible approach to the problem of timetabling. The students would need to attend as a full group only for the teaching of the spine. For the optional materials they would be able to work individually or attend in small groups.

### 1.3 : Queries raised by the Newcastle Project

The syllabus design outlined in the assignment and summarised above raised various queries about the nature of E.S.P. and the kind of teaching materials that should be developed to teach it. These relate to the level of specialisation, to the need for a unifying principle of organisation for the syllabus, and to the need to take due account of the communicative setting.

#### 1.3.1 Levels of Specialisation

We felt that teaching materials in E.S.P. available prior to 1971 used texts and exercises which generally did not meet the stipulation (in 1.2.3 above) that the subject-matter should be pitched at the student's level of expertise in his own field. Some were not

sufficiently relevant to the range of disciplines we had in mind, either because they concentrated intentionally on texts which represented a certain level of 'general scientific discussion' (e.g. Ewer & Lattorre, 1969) or because they attempted to find topics which might conceivably interest readers from several disciplines, Thornley 1967, 1973. Others fell short on level of specialisation because they drew their texts from books for or by the layman (e.g. English Studies Series II, III, etc.) or because they were aimed at a more elementary level of specialisation (e.g. Brookes & Ross, 1967) or because they were apparently based on the premise that the 'science' must be simple so as not to distract the student from the 'English', (e.g. Brasnett 1969, Wells 1970, Hawkey 1970). Further, there was an almost exclusive preoccupation with the written text, often displaying the scientist addressing the layman or practising a literary or quasi-philosophical *métier*.

We wished to uncover the language used for day-to-day practicalities and intercourse in the specialists' working *milieu*. In the case of postgraduate students this would be more plausibly connected with the reading of technical papers or with the writing of research reports, than with texts of a popularising or general nature. It would also involve extensive spoken communication exercising productive and receptive skills in a variety of speaking situations. E.S.P. materials must be developed on this basis if the student's language-learning experience is to simulate his experience of language use in his specialist studies. It is particularly important that this basis should be adopted, if one accepts the premise that language in specialised use

is not stylistically uniform, and that shifts in the modes and circumstances of communication entail shifts in language use which the overseas specialist must learn to recognise and handle.

### 1.3.2 : Syllabus Organisation

The framework given in Figure 1.1 will not of itself provide 'pedagogical unity', that is a sense of coherence and unified progress, unless the materials devised for each Component of a given Unit are also unified by focussing on the same elements of language. But the widely-accepted principle of structural grading would not be an appropriate way of determining which elements were to be selected. Firstly, it would have been difficult to devise or discover texts from a wide range of disciplines exemplifying the same grammatical features in a uniform manner, and more difficult still to provide dialogues or other materials for the spine which would appear natural yet retain the same formal features. Secondly, we wished to encourage an awareness of shifts in language use in relation to levels of social formality and to the media of communication. This suggested that communicative functions might offer an element of consistency across the Components, while grammatical features were allowed to vary from Component to Component and to reappear in 'spiral' fashion from Unit to Unit. Thirdly, allowance also had to be made for the possibility that the same communicative functions may draw upon different grammatical features for expression in different disciplines.<sup>4</sup>

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4. See Swales 1971 (Introductory Preface) and Widdowson 1973 (Chapter 7).

In short, while a linear grading of structural items may provide pedagogical unity in a standard syllabus, we felt that in an E.S.P. syllabus unity should derive from the exemplification and practice of what we first called 'procedures of rhetorical organisation.' By this we understood that certain communicative acts such as defining, classifying, describing, have an organising function, and are used by speakers to marshall and express their ideas - that is, to accomplish communicative tasks.

We also realised that the same 'procedures' are relied upon in everyday exchanges though they may not be so explicitly formulated,<sup>5</sup> and that a unifying principle was therefore available to integrate the spine with the options in the other two components. Thus in Unit 1. it was proposed that the definition-type 'A is B' would be realised by the informal pattern N/Prep./Demonstr. + BE + NP in the spine, but in the reading/writing component by the formal pattern NP<sub>1</sub> + BE + NP<sub>2</sub>. Both patterns might appear in the aural/oral specialist component, depending on the level of formality exemplified. Similarly the type 'A is B which C' would appear in the spine as N/Prep./Demonstr. + BE + N + who/ that/where/+ NP; in the specialist components it would be expressed by NP<sub>1</sub> + BE + NP<sub>2</sub> + which + NP<sub>3</sub>.

### 1.3.3 : Discourse and Communicative Setting

Clearly the development of this preliminary scheme will involve us in a consideration of the organisation of extended discourse. Our provisional identification of a limited set of 'procedures' relates to the notion of communicative acts and to their function

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5. c.f. Wartoffsky (1968) Chapter I, on the relationship between scientific and lay constructs.

in discourse structure, while our interest in the alternative means of expression available to the specialist relates to the syntactic and lexical options open at a given point in a stretch of discourse. At the same time, while E.S.P. materials based on a broadly 'rhetorical' approach to reading and writing have since appeared (e.g. Swales 1971, Allen & Widdowson *et Al* 1974 *et seq.* ), there seemed to be a need for further examination of the organisation of spoken discourse and of the possibilities for improving the teaching of aural/oral skills to E.S.P. students.

Similarly, although some attention has been given to the use of such non-verbal resources as diagrams and illustrations in written discourse, their function in spoken discourse and their integration with verbal resources in speech merited further examination. But so also did other non-verbal resources in face-to-face communication, such as gesture and posture, where these appear to operate as discourse features rather than as extra-linguistic factors. These points will be taken up in more detail in Section 2, but are mentioned here to indicate how the present enquiry emerged from the 'Newcastle Project.'

A third factor, which we were unable to handle in the Newcastle Project save in impressionistic fashion, is that at least in spoken discourse both the selection and ordering of lexical and syntactic elements are to a large extent determined by what we will call the communicative setting (corresponding roughly to Hymes' "speech factors" (Hymes 1962)). This is readily illustrated by casting the same information in two forms of verbal expression:<sup>6</sup>

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6. The first is from written data (Text JP/RP), the second is hypothetical, but modelled on a corresponding spoken sample (Text JP/L).

- (a) 'The Lodge Field' under a paddock grazing system shows an interesting divergence from the normal stability pattern in the results for the R value in 1970 and 1971.
- (b) now thinking about these...this stability pattern the lodge field shows an interesting div difference in your R values here....that um that we got in seventy seventy one...and that field was as you all know has been under grazing the last few years.

The first is characteristically a written statement, the second is spoken. We can deduce from the second that speaker and audience are known to each other, that they are both familiar with the topic in hand, that a table or chart containing the R values is displayed before the audience, that the appropriate figures are probably pointed to when mentioned. And if we are told that it is part of a lecture we can surmise that the speaker is striving to maintain a balance between an appropriately formal level of speech demanded by the conventions of the situation, and the informality that close contact with a known audience requires.

No deductions of this kind can be made about the written version. In fact a table of R values is appended, but no overt reference is made to it; it was originally written for presentation to a limited readership of colleagues and professional associates, but there is nothing to indicate this, at least in this portion of



the text. Further, we note that in the written version "Lodge Field" is fronted and "grazing" is incorporated in a complex nominal group, so that the significance of grazing use in relation to instability is not immediately clear. In contrast, "stability pattern" is fronted in the spoken version, and stands as a kind of 'topic heading', while "grazing" is separated from "lodge field" and placed in an utterance which appears to have some concluding or deducing function: in this scheme, the fact that grazing use is the cause of abnormal soil characteristics is made more evident.

This brief example indicates that such factors as the mode or channel of communication used, the nature of the audience and its connection with the speaker, the availability and format of visual or other supporting materials, the physical and the conventional constraints of the situation, may all play some part in determining the particular shape of a stretch of discourse. And we can readily see that an assessment of the communicative setting must take account of both the conventionally-defined roles of the participants, such as 'student', 'lecturer' and of the status which the speaker (or successive speakers) attempts to establish or manipulate between himself and the other participants, (see particularly Section 2.3.2).

#### 1.4 : Aims of the Enquiry : Procedure

This study is an attempt to answer at least some of the queries raised in 1.3.1-3. Using data which are genuinely representative of the level of specialisation encountered by postgraduate

students, detailed analysis of a recorded lecture will be undertaken. A descriptive apparatus will be required which is capable of revealing the organisation of extended spoken discourse centred on a principal speaker. It must describe this organisation in terms of communicative functions yet be sensitive to the choice of syntactic and lexical elements open to the speaker within the limits imposed by the communicative setting, for the expression of those functions. Its application to syllabus design and materials will then be assessed.

1.4.1 : Selection of Data

A selection of spoken and written samples was obtained on a second visit to Newcastle in November 1971 with a view to both analysis and subsequent materials development. I felt that priority should be given to language situations demanding predominantly receptive skills, such as lectures or discussions (assuming that foreign students would initially adopt a passive role in the latter) and research papers which students were expected to read. Several disciplines were chosen and in order to retain some control over variation in subject matter and personal style, one lecturer was selected in each discipline. An attempt was made to obtain from each a research paper (preferably of his own authorship) and a recording of a lecture based on the theories or findings of the paper. Three such sets were successfully obtained, and in two cases it was possible to obtain recordings of follow-up sessions, one in the form of a laboratory practical class, the other in the form of a seminar discussion. In compensation for the lack of a follow-up to the third lecture, I was able to obtain a recording of an entirely impromptu talk which may

eventually shed light on structuring or the lack of it, in desultory spoken discourse.<sup>7</sup> The data are summarised in Figure 1.2.

<u>Text</u>	<u>Spoken</u>	<u>Written</u>	<u>Subject</u>	<u>Remarks</u>
AR/L	✓		Agricultural Engineering	45 mins: to approx 20 students: stress and shearing characteristics of soils under load.
AR/RP		✓	" "	'The Tractor and its Driver: A Technological Failure.'
AR/P	✓		" "	Discussion of technical problems in experimental machine developed for a final year design project: 15 mins: 5 students.
J/RP		✓	Hydrology	'A Catchment Storage Model for Run-off Routing' (not own authorship).
J/L	✓		"	50 mins: to approx. 40 students: detailed exposition of principles underlying statistical approach contained in above paper.
JP/RP		✓	Soil Science	'Assessment and Significance of Aggregate Stability.'
JP/L	✓		" "	47 mins approx. to 17 students: climatic and other factors in soil stability. Discussion of 2 measurement techniques contained in above paper.
JP/P	✓		" "	30 mins approx. to 19 students working in small groups: laboratory practice in stability measurement techniques.
MG/L	✓		Medical Taxonomy	40 mins approx. to 11 students: principles of taxonomy in medicine - informal lecture, all seated round one table.
WW/L	✓		Agricultural Marketing	20 mins approx. to 40-50 students: impromptu talk with several interventions, on financial aspects of farming, following a documentary film on this topic.

Figure 1.2.

7. I am grateful to the Director of the Language Centre, Mr. C. Andison for making the facilities available to me, and especially to Mr. R. Mackay for establishing preliminary contacts with the lecturers and arranging times of recordings.

Word-level transcription of several of the recordings was undertaken before a final selection was made. The data used for this study is Text JP/L, a lecture in soil science, given to a group of final year B.Sc. students in the School of Agriculture. It deals with the factors affecting aggregate stability, particularly the effects of cultivation, crop rotations, storage, and climate. It then broaches the problem of stability measurement in the field and in the laboratory and discusses the relative merits of two measurement techniques, one of which is an innovation developed by the lecturer.

It was selected partly because it was delivered under perfectly 'normal' lecturing conditions (as compared with Texts WW/L and M/L, for example) and so was felt more likely to reflect the organisation of typical lecture discourse. But it was also chosen because the subject matter dovetailed well with the research paper (JP/RP) which deals with the innovatory technique more fully, and with the laboratory session (JP/P) which saw the application of several measurement techniques to soil samples. It is hoped that the descriptive apparatus developed in Section 3 might eventually be modified and extended to handle all three texts, and so offer a basis for the examination of a wide range of texts with an academic bias and for the creation of suitable E.S.P. materials.

#### 1.4.2 : Controlling for 'Naturalness' and Level of Specialisation

In preliminary discussions some lecturers had been quick to stress that in lectures to groups with a high proportion of

foreign students they "made allowances", as was mentioned in 1.2.1., by speaking slowly, checking frequently that they had been understood, interpolating explanations directed specifically at the foreign students, and so on. But to have taken instances of such abnormal language behaviour as a standard would have debased the value of the data. In order to ensure the 'naturalness' of the spoken data, recordings were made of groups containing few, if any, foreign students - groups for which the lecturers were definitely making no *ad hoc* and haphazard concessions in language.

It should be added, of course, that the target competence for a foreign student facing such situations must be based on an assessment of native-speaker ability rather than on some concessionary standard. It emerged in discussion with staff and foreign students that it is precisely this communicative gap and the need to make concessions, which leads staff, however good-willed, to regard foreign students as an irksome anomaly. The inconsistency with which concessions are made leads students to adopt a 'double-bind' position whereby lecturers who make concessions are regarded as patronising, and those who do not as unsympathetic. The goal of a service English course must be to minimise the need for anomalous treatment, on grounds of language ability, in the student's own Department.

A further consideration was the level of specialisation. The following precautions were taken to ensure that the samples reflected the standard at which overseas research students would be

working. Research papers were to be ones to which lecturers would be expected to refer their supervisees: lectures were to be ones delivered to final year first-degree students, to postgraduates or to a mixed attendance. The topics covered were to be relevant to post-graduate courses of study or areas of research. More stringent stipulations, such as recording only postgraduate groups, were not feasible during a short visit.

#### 1.4.3 : Recording Procedure

Labov (1972) has recently reviewed the value of different kinds of data and broached some of the difficulties in obtaining natural speech samples under natural conditions of utterance. Any disturbance of the normal communicative setting inevitably compromises the communicative behaviour of the participants. The use of recording or television studios or specially allocated rooms, and the obtrusive presence of observers, have often been an unfortunate feature of recorded data. But Labov poses the 'observer's paradox': "To obtain the data most important for linguistic theory, we have to observe how people speak when they are not observed." Though technically feasible, this requires sophisticated and expensive equipment. The procedure adopted for these recordings was a compromise between the need for acceptable standards of recording and severe financial limitations.

Previous experience had taught that the observer carrying and controlling his own equipment represents an almost overbearing intrusion. In any case, good quality portable equipment is expensive,

requires skilful handling to avoid amateurish results and until recently offered a very restricted recording time. On the other hand one wished to avoid heavy obtrusive equipment, sacrificing communicative spontaneity for rigid technical standards. A compromise was found in a reel-to-reel Ampex 2000 series stereo recorder offering 2½ hours of uninterrupted recording. This was concealed behind furniture and left running a few minutes in advance, so that students assembled in an apparently undisturbed room and the observer was left unencumbered. An omnidirectional Acos microphone, coupled through an extension lead with a built-in condenser, permitted flexible and unobtrusive microphone placement.

The observed and the observer could, then, have been mutually unobserved. But it had been decided that simple notes should be kept of the use of visual resources such as blackboard notes and diagrams, of selected gestures of the lecturers and their movements around the room, and of changes in the communicative setting; for this the presence of the observer was unavoidable. To coordinate these situational notes with the tape recording, the microphone was linked to the upper track, while each entry in the notes was placed on a separate line and accompanied by a signal fed to the lower track by depressing a specially-designed miniature foot-pedal concealed under the observer's foot.<sup>8</sup>

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8. I am grateful to Mr. S. Steven, technician in the Department of Linguistics, University of Edinburgh, for designing the foot-pedal signal generator.

The observer dressed as a student and placed himself on the fringe of the students present, rather than in a position of noticeable isolation. Students were told that he had come to observe the lecturer while the lecturer was under the impression that he was observing the students - thus minimising feelings of self-awareness.

The recordings were acceptable, though two were impaired by electrical and other interference. The situational notes were not always adequate, especially when two or more participants spoke simultaneously, or where equipment was being handled by the participants. The inadequacy of these procedures for detailed communication analysis will be apparent to anyone familiar with the minute records of Birdwhistell or Scheflen and with the elaborate analytical facilities developed by Eckman and others.<sup>9</sup> But it was a cheap and expedient method, and served well enough to obtain natural data in a more or less natural setting, with sufficient visual and gestural evidence to draw conclusions about the integrated use of verbal and non-verbal resources.

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9. See for example: Birdwhistell 1970; Scheflen 1963, 1964; Eckman, Friesen, Taussig, 1969.



SECTION TWO : A Functional Approach to the Structure of Extended Discourse2.1. : A Problem of Discourse

It is apparent from Section 1 that although the students' grasp of grammatical structures is far from perfect, the difficulty we wish to resolve does not stem primarily from poor recognition of grammatical patterns. None of the students at Newcastle were beginners in English, having had in excess of two, and generally in excess of six, years of formal tuition.

Though the quality and intensity of this tuition are suspect, it was clear that students could understand complex sentences, and that they could respond, if ungrammatically, in short utterances or in short stretches of discourse. Nor did terminology present any serious difficulty in recognition: students were already acquainted with the technical terms of their discipline either through previous reading or through close equivalents in the  $L_1$ , though the use of slang in technical discussions could prove puzzling at times. Content presented no difficulties since in the early stages of their courses and especially in introductory lectures, the level of specialisation of the subject-matter is relatively low.

In essence, then, the problem is one of scale rather than of structural patterning *per se*: students simply failed to recognise the patterning of extended spoken discourse, still less manipulate such patterning as a productive skill. On their own admission

they could follow most of the individual parts of a lecture, yet not grasp the whole. Lecturers complained not only of a lack of overall comprehension but of a lack of awareness of interpersonal cues. Deprecation and praise, veiled criticism or irony, "off-the-cuff" and "off the record" comments, were all given equal weight and were likely to be quoted back at the lecturer in all seriousness. It seemed likely that prosodic and paralinguistic elements of the discourse must have been largely ignored: further, that the relationship between verbal and non-verbal elements such as gesture, posture and blackboard diagrams, and the function of the latter in the discourse, must also have been missed.

It was suggested in Section 1 that aural comprehension must be the students' highest language priority, above productive skills and reading and writing skills. An appropriate means of describing extended spoken discourse seems necessary as a first step towards catering for this need. But there is at least a possibility that an understanding of discourse structure might benefit the teaching of productive skills as well. For students must obviously develop strategies for arguing a case, presenting ideas, contributing to a discussion: and for this they must learn to handle discourse patterns in a manner which will be both acceptable and intelligible to their British colleagues. Another possibility to be borne in mind is that an adequate functional description of spoken discourse might serve to assess written discourse also, provided it is sensitive to differences in patterning which may exist between the two modes.

Since the objective is to teach communicative skills - either discerning or creating recognisable patterns in extended discourse - an approach must be adopted which will treat a lecture as a structured communication and view it in terms of units of communicative activity building up to form a structured whole. It is likely that these units will not be identifiable in terms of formal grammatical properties, but rather in terms of the function they fulfil in accomplishing a communicative task, and in terms of their place in a hierarchy of larger functional units.

## 2.2 : Functional Approaches to Discourse

The grounds for a communicative-function approach to discourse have been well laid, and it would be unprofitable to repeat here the reviews of relevant literature which are to be found in Sinclair *et Al.* 1972, Sinclair and Coulthard 1975, Coulthard (in preparation) and Widdowson 1973. It will be sufficient to draw attention to certain points made in those reviews which are of particular importance for this study. Widdowson has drawn a useful distinction between use and usage (1973, Chapter 2) and has suggested that the process of idealization which is a pre-requisite of any grammatical description (c.f. Lyons 1968 p. 140 ff.) necessarily limits the scope of grammatical theory to an account of usage (exemplification of the use of linguistic rules, generally in the form of sentences). Language use concerns not the formal linguistic properties underlying an utterance at some idealised level of treatment, but the making of statements, requests, instructions and so on through utterances.

In embarking on a description of utterances in terms of their use rather than in terms of their underlying formal properties, it would seem that we are also embarking on a level of description which Hymes depicts as an "autonomous level" dealing with an "autonomous system of signals"; though related to a grammatical level covering syntactic and semantic structure and to some further level covering speech events and speech settings, it remains independent of both (1972). Sinclair *et Al*, Widdowson and Hymes all stress the lack of a direct relationship between the grammatical forms of sentences and their potential function in discourse. Thus declarative forms may function as questions, interrogative forms may serve on occasion as commands: and just as a single utterance may fulfil different functions on different occasions, so a single function may be fulfilled by a string of several utterances on the same occasion.

Hymes has tried to offer a theoretical justification in support of this level by drawing an analogy between the relationship of discourse functions to utterances, and that of surface realizations to deep structure in generative grammars. He argues that if an ambiguous surface form is seen as derivable from two different deep structures, or a set of paraphrases as different realizations of the same deep structure, then it should be possible to view discourse functions and the utterances used to realise them, as standing in a similar relationship.

However, the analogy overlooks an important difference in the factors governing this relationship. One's understanding of Chomsky,

especially 1957, Chapters 1, 9 and 1965, Chapters 1 - 3, is that in a generative grammar the elements of deep structure wholly specify the syntactic possibilities afforded in the surface structure. But it cannot be said that a given discourse function wholly specifies the possibilities of its realisation as utterances in speech. To specify which utterance, (and with which underlying syntactic form) may fulfil a given function on a given occasion, one is bound to take into account a range of factors such as contextual and cotextual occurrence (c.f. Firth 1937 (1964) ), topic, and prosodic features (c.f. Crystal, Davy, 1969). Thus in determining which function is fulfilled by the utterance, "Would you mind shutting the window?" on a given occasion, one might rule out the possibility that it functions as a genuine question, by reference to the topic; one does not enquire how a person is disposed in principle to the business of shutting windows, rather one hopes to instigate an action. But does it then function as a request or a command? To ascertain this, one would need to know something of the interlocutors, their relative social status and their roles in the situation in question. One would also wish to know whether the utterance was followed by the window being shut, and if so whether the action was accompanied by a verbal response. For example, assuming that the interlocutor intended it as a command, it is possible for his companion to counter with a reply such as, "Would you like me to close it?" and so deliberately give the first utterance the force of a request.

Even if one could specify all the relevant factors, and could determine that the utterance does indeed fulfil the function of a request, the relationship between function and utterance remains

essentially probabilistic, and it is quite possible that under exactly the same circumstances the function could have been served equally well by some alternative utterance, such as "It's perishing in here with that window open." Therefore it would seem more satisfactory not to consider the syntactic properties of an utterance in the first instance, but to attempt to predict the function that is being fulfilled at the point of occurrence of that utterance in the discourse, in terms of the antecedent and subsequent functions. The syntactic form underlying the utterance may then be regarded as *a posteriori* confirmation or supporting evidence for one's prediction. For example in a sequence of functions identified as CAUSE + (X) + JUSTIFICATION one might predict that X should be filled by RESULT, and one would then turn to the utterance(s) appearing at that point to ascertain whether an expression of result is indeed realisable through the syntactic and lexical elements displayed.

### 2.3 : A Suitable Descriptive Apparatus

Sinclair *et Al*, 1972, Widdowson 1973 and Coulthard (in preparation) provide between them a thorough survey of the models of discourse that have been proposed in recent years, and it will again be sufficient to draw attention to certain features of the models they have reviewed and to aspects of their work.

#### 2.3.1 : Avoidance of Stereotyped Characterisations

The notion of register as laid out, for example, in Halliday, McIntosh and Strevens (1964, pp. 77 and 87-94) is an attempt

to characterise types of discourse in terms of salient lexical and grammatical features. Widdowson suggests that a serious weakness of the approach is that it only "provides an identifying tag for pieces of discourse which differ in their linguistic properties", without indicating how they function as pieces of discourse. But there is another weakness; it is that in order to provide an identifying tag based on differences between discourses, the assumption must be made that the discourses are in themselves stylistically consistent: if there is a shift in register there is a shift in the type of discourse (Halliday *et Al*, 1964, p. 93). The approach therefore fails, in the view of Crystal and Davy (1969, p. 62) to allow for "the fact that linguistic features do not correlate in any neat one-to-one way with the situational variables in an extra-linguistic context"; a discourse from, say, an ecclesiastical register is assumed to be internally consistent and uniformly ecclesiastical throughout.

The point underlying both criticisms is that the notion of register imposes a rigid stereotype on a piece of discourse. If, following Halliday *et Al*, we identify a lecture on an agricultural subject as being, say, a formal situation in which the topic 'Measurement Techniques in Soil Analysis' is covered, we may expect to find a range of technical and other terms and of grammatical features associated with this field. But if we re-define the lecture as an informal situation, what will our expectation of linguistic features be? That a shift in register to technical jargon, non-technical terms or slang will be consistent and exclusive of all technical terms, or

that an 'admixture of registers' will occur? If the latter case, can we be sure either that the principle of characterisation by register holds good, or that the lecture is indeed still a lecture?

More seriously, perhaps, the attempt to view discourse in terms of inflexible stereotypes conceals the interlocutor's exploitation of lexical and grammatical choice; he may deliberately play off technical terminology, for example, against occasional intentional excursions into slang or jargon. In terms of manipulation of interpersonal relationships, such shifts might represent an assertion of authority followed by an attempted ingratiation followed by a phase of relaxed and perhaps anecdotal illustration. If one admits the possibility of grammatico-lexical manoeuvres of this order, then the notion of register rests only on the extent to which a language activity contains ritualistic elements. In the case of prayer, an example cited by Halliday, the use of archaic verb forms and of archaic forms of address, and the use of the imperative for requesting, the frequent use of "who-" type relative clauses to qualify the addressee, are all features associated with the ritualistic aspect of the activity. But while the ritualistic element predominates in prayer almost as much as it does - dare one say - in sports commentating, in other activities it is of far less consequence. Sinclair and Coulthard point out that the syntactic patterns identified by Mitchell (1957) as being closely associated with buying and selling, are only those associated with the ritual aspects of the transaction, so leaving much else of the language involved in need of further explanation (1975, p. 10).



In the case of lectures, the ritual aspect seems to be almost entirely submerged. In a formal writing situation such as the production of a research paper, depersonalisation and reliance on technical terminology and on verb and noun forms of Greek or Latin derivation, could be regarded as a prominent ritualistic requirement. But there is no obligation either to employ or to avoid such features in an academic speaking situation. The important question for lecture discourse is not so much whether these features occur, as when do they occur, and what effect do they accomplish?

At the same time, one must avoid producing stereotypes in terms of situation and social roles. One is well aware, of course, of language-teaching materials which, in the guise of situational relevance, introduce such locative or activity-based stereotypes as 'At the Station', 'In the Lift', 'Teatime', without any regard for the many interactive possibilities which each stereotype conceals. But it is just as misleading to produce social stereotypes. As Candlin has pointed out in connection with a forthcoming Medical English Course (Candlin, Leather, Bruton, 1974), it is unrevealing merely to identify roles such as 'doctor', 'nurse' and to characterise the status of participants fulfilling those roles, if one cannot allow for the 'status-negotiating' or 'defining' activity which manifests itself in the language of interaction. One may add that this is particularly true when the roles happen to be 'doctor' and 'doctor.' The relevant characterisation in the case of lecture situations is not 'In the Lecture', involving 'lecturer' and 'students.' It concerns the particular lecturer involved, his familiarity with the

students, the numbers involved and the size of lecture room, the stage of the course which the lecture represents, the content of the lecture (e.g. whether revisional or breaking new ground, whether already familiar to one section of the students), the expectations which all these factors suggest to both lecturer and students, and above all the limits which the lecturer sets himself in exploring his status to manipulate interpersonal relationships (c.f. Section 2.4.2, 1(b), below, and Section 3.5.2).

### 2.3.2 : Activity - Based versus Language - Based Description

The desire to retain some indication of the dynamic aspects of the discourse, in terms of participants and of interaction through language, may lead to an approach which, though functional, concentrates on the activities being pursued (whether through language or independently of language) at the expense of a systematic consideration of the language itself. Watzlawick *et Al*, 1968, propose a method of examining psychiatric interviews and dyadic interactions involving a disturbed participant, in which a constant process of mutual definition and redefinition of roles and status is extended over successive exchanges. Here language is seen as only one of a variety of communicative resources employed to an end which is essentially independent of, or beyond, language; and such interest in language as is generated by this approach rests on the 'metacommunicative' aspects of language. The pattern of interaction which emerges is most revealing for the study of pathological communicative activity, but offers no framework for describing the discourse through which this is accomplished.

Bellack *et Al*, 1966, used notions derived from game theory to describe classroom activity, but defined the activity in pedagogical terms. The aim was to determine what kinds of classroom activity are accomplished by teacher and pupils and how the activity is distributed between them. Although this approach offered valuable suggestions for discourse analysis which are incorporated in Sinclair *et Al*, 1972 and so by implication in this study also, the classes of activity which were identified were often unrevealing in terms of discourse. For example, the equation of "game" with "lesson" suggested that every lesson was a coherent and self-contained pedagogical unit of such and such a duration, while the categories of which games were deemed to consist were generally unrevealing in terms of discourse (for example the category "responding" did not differentiate between non-verbal and verbal responses, nor between answering, questioning, counter-questioning and other possible forms of verbal response).

An earlier study by Taba, Levine and Eley, 1964, attempted to code verbal transactions in terms of the source of information or request (whether from the teacher or the pupil), the pedagogical function of the information (with a subdivision between management function and directive function), and the type of cognitive task involved for the pupil. Again, certain elements may be traced through Sinclair *et Al* to this study, but as in the case of Bellack *et Al*, classroom discourse is only of incidental interest, and the main objective is to assess pedagogical units in terms of the conceptual tasks they present for the learner. We will refer briefly to both Bellack and Taba in due course but it is clear that this *genre* of studies, though concerned with aspects

of communication and interaction, and indeed with the functions of language in communication, will not yield a descriptive framework conducive to discourse analysis.

### 2.3.3 : Some Functional Descriptions of Discourse

A valuable approach to functional description has been provided by Widdowson (1973). He distinguishes between textual analysis, which concerns the cohesion between linguistic elements at a supra-sentential level, and discourse analysis which concerns the coherence between utterances put to communicative use in the performance of social actions. He suggests that while an account of textual cohesion is essential to an understanding of discourse it is not a sufficient explanation; the presence of cohesive elements merely makes explicit the "pragmatic relationship" of coherence between successive utterances (Chapter 4) which are not, and are not assumed to be, random in occurrence (Chapter 9). He also introduces the notion of rhetorical value, which an utterance assumes as a function of the relationship between its linguistic significance and its context in discourse: he is then able to identify such types of relationships as extension (the linguistic significance being modified by context), selection (the appropriate signification being selected by reference to context) and suppletion (the linguistic significance being overruled by context).

However, the approach only partially satisfies the requirements of this study. Widdowson's main concern is with the

syntactic patterning of various types of illocution and the rhetorical value which they may assume in different contexts, and so by implication concerns the integration of patterns of coherence with devices of cohesion: this preoccupation is particularly evident in the illustrations he offers in Chapters 8 and 10. He is therefore able to draw many insights from short samples of discourse by concentrating on the relationships and properties of adjacent or near-adjacent illocutions.

The relevance of this approach to the present study is therefore a matter of scale. Our primary aim is to reveal the functional organisation of extended discourse such as unbroken stretches of monologue running for perhaps 30 or 40 minutes. This is, in Widdowson's terms, a matter of coherence in the first instance since, as he suggests, cohesion does not provide a full understanding of discourse patterning. But it is difficult to know how Widdowson intends the notion of coherence to be developed for an account of extended discourse. One suspects that only a hierarchical or superordinate system of description will be satisfactory, for discourse would otherwise appear simply as a chain of contiguously-related elements without an overall pattern. Widdowson does not provide this system; but if such an account of coherence is once given, then his approach offers valuable guidelines for examining the function of particular illocutions and their integration in the whole.

The work of Candlin, Leather and Bruton, of which progress reports are available (1974, 75), also provides valuable suggestions without offering a suitable framework. Examining doctor-patient

interviews as part of the communicative network within which the doctor performs his duties, they try to identify the speech functions on which a doctor relies, and the language skills he requires. Although we shall draw on certain notions which they have developed, such as multiple function and communication management, it is in the nature of the data they have used, that no scheme for handling extended discourse emerges. For they are concerned with short interviews in which doctor and patient have a roughly equal participation and in which the questioning role of the doctor is predominant, and followed only by his need to give directions. Thus among the speech functions they identify, 9 might be classed as forms of question-function, and 5 as forms of directing-informing function. Functions of discourse management such as those discussed below scarcely feature in their scheme.

The approach which comes nearest to the requirements of this study is available in the work of Sinclair, Forsyth, Coulthard and Ashby, reported in Sinclair *et Al*, 1972 and Sinclair and Coulthard 1975. They develop a descriptive apparatus in which functional units of discourse are identified on the basis of their contribution to exchanges between teachers and pupils in classroom discourse and to the teacher's control and manipulation of classroom activity. The units build up in a hierarchical arrangement by which a pattern of organisation can be identified for relatively long stretches of discourse and through which discourse may be treated as a structured whole. Their work is based on spoken data and besides incorporating functions which are probably specific to spoken discourse, an attempt

is made to include relevant non-verbal elements in the discourse. There is a further advantage in that the description is based on a recognised theoretical framework provided by Halliday's (1961) rank scale approach to grammatical description. A detailed account of the system will not be given here, though much of it will become apparent through the discussion which follows, and from Section 3. Instead, some familiarity with the system will be assumed, and we will consider certain modifications to the scheme (referred to as a matter of convenience as the 'Birmingham System') which were felt to be necessary to transpose the scheme from classroom to lecture discourse.

#### 2.4 : Modification of the 'Birmingham System'

A striking feature of the work of Candlin and Sinclair and their associates is the extent to which the method of description reflects the data for which it was developed. Against the 9 classes of question-function proposed for the medical interviews, only two are proposed for the classroom discourse - question and elicitation; of the two elicitation is predominant since the teacher rarely requires of his pupils information of which he is not already himself aware. On the other hand, fairly complex procedures for elicitation in the classroom are not paralleled in the surgery. Further, the scale of the discourse in the classroom is such as to warrant an account of overall patterning, which is not felt to be necessary for the shorter interviews. In moving from classroom to lecture discourse a similar redistribution of priorities is required.

2.4.1 : Response Situations versus Monologue Situations

In the work just cited, interest is centred on the discourse produced in what we will term response situations, and to identify these it is helpful to distinguish between participants and protagonists. There may be many participants in an interaction (as in a lecture or a class), but a response situation is one in which at least two of the participants make sizeable verbal contributions to the discourse (i.e. they are also protagonists) under social conventions which, with appropriate conditions of control, permit contributions from all the participants.

In the case of surgery situations, there may often be no more than two participants; but although the doctor is in a position of control and the patient takes his cues for response from the doctor, both are protagonists and make more or less equal verbal contributions to the discourse. In classroom interaction the teacher is in control and is the main protagonist; but any other participant may become a protagonist, either through bidding for attention or through selection by the teacher. Although the verbal contribution of each may be small, cumulatively this represents a considerable portion of the discourse. Both studies imply this much by the employment of a key term, 'exchange' and by the attention they pay to the devices of demanding, requesting and making responses.

In the Birmingham System these functions relating to the organisation of responses form the bulk of the 'Acts' which constitute



the lowest rank in the descriptive system; working upwards through the system, an act or acts realise a 'Move' and a move or moves realise an Exchange. In this hierarchial arrangement, a series of acts may be accomplished by a single protagonist, and so also may a series of moves. But no single speaker can accomplish an exchange, with the exception of an 'informing exchange'; for it is inherent in the structure established for all other exchanges that the utterances of the teacher shall be matched by some form of response by the pupils. At the rank of 'Transaction' the possibility of an entire transaction being realised by a single speaker is extremely remote, even when it incorporates informing exchanges. This is partly due to the other types of exchange which appear in the transaction; it is also due to the fact that although informing exchanges may not necessitate responses, both teacher and pupils expect responses to be made within a transaction. It may be that "pupils do little but acknowledge"; on the other hand, "embedded within an informing transaction may be brief teacher elicitation used to keep attention or to check that pupils are understanding, and also pupil elicitation on some point raised by the teacher;" (Sinclair and Coulthard, p. 57). Practically speaking, then, responses are, if not an obligatory feature, an almost inevitable occurrence in classroom discourse. In the texts offered by Sinclair and Coulthard, (Chapter 4), there is only one transaction in which pupils make no response, and that is a directing transaction in which the response is as it were 'latent' and is intended to be a "react" made in the pupils' spare time (p. 86).

By contrast the lecture may be defined as a 'monologue situation.' By this it is understood that regardless of the number of participants, only one is a protagonist: he is responsible for almost all the verbal contribution to the discourse, under social conventions which allow other participants to intervene only very occasionally, only very briefly, and only on the invitation (verbally or non-verbally indicated) of the protagonist. From this it may be understood that one does not, merely by speaking, acquire the status of protagonist. Only if speakers make a sizeable contribution either individually or collectively, to the discourse, may they also be regarded as protagonists. It is of course neither possible nor desirable to indicate a minimum proportion of discourse (say in terms of total minutes of speech) by which monologue and response discourse could be differentiated; rather, one can envisage a progressive change in ratio from completely restricted monologue to completely free response. This notion of a scale along which different types of discourse might be ranged will be taken up again in the following subsection.

#### 2.4.2 : Monologue Situations versus Writing Situations

Lecture discourse has particular features of functional organisation which one could not expect to handle descriptively by reliance on the Birmingham System as it appears in Sinclair *et Al*, 1972, and Sinclair and Coulthard, 1975. But before investigating possible modifications, it would be as well to consider other general features of lecture discourse, particularly in relation to written discourse.

Though both lecture discourse and written discourse have in common the fact that long stretches, if not the entire discourse, are organised by a single speaker, there are nonetheless certain divergences between the two which merit our attention. Abercrombie has made a useful distinction between written language on the one hand, and the categories of spoken prose, monologue, and conversation on the other (1959 (1965) ). He stresses that "prose is essentially language organised for visual presentation" and makes the widely-recognised point that "spoken prose" differs from other forms of spoken language in that it lacks the repetitions, false starts, unfinished sentences, characteristic of spoken language. Monologue "is the use of spontaneous spoken language not prepared but created as it goes along, on those occasions when other people present, if any, are not meant to join in, whether in fact they do or not." Conversation covers "all those linguistic occasions when there is the opportunity for give and take" and where "there is more than one active participant."

It will be seen that the last two categories correspond closely to the distinction between monologue and response situations which was drawn in Section 2.4.1. However, Abercrombie admits that "the distinction between these categories can obviously not be a hard-and-fast one", and we propose to regard the categories of spoken language as being arranged on a scale of relative formality in addition to being differentiated by such criteria as the role of the participants and the circumstances of production. At the one

extreme there is the lecture read entirely verbatim from a fully-written text, and one would concur with Abercrombie that this is strictly an instance of spoken prose rather than of monologue.

One suspects that it is a rare case in day-to-day lecturing and that it is more characteristic of prepared addresses, inaugural lectures or research presentations. Indeed, Halliday (1964, p. 91) goes so far as to regard it as "a special case of written rather than of spoken language." At the other extreme, bordering on discussion, there is the lecture given spontaneously in a very informal setting; there will be no guiding notes and the shape of the discourse will tend to evolve through digressions and abrupt changes of topic on the part of the lecturer and through fairly free interventions by students.

A recording of such a lecture has been obtained (Text·WW/L); but this is not seen as a normal procedure in lecturing, and the text chosen for analysis is felt to represent a fairly standard level of formality for a lecture monologue.

(a) Differences in Organisation

Monologue discourse is produced in 'real time'; that is to say, all the processes involved in its production must operate within, and only within, the duration of its utterance in speech. Therefore, lecture discourse is rarely the result of careful forethought at the lower levels of organisation, even though notes or headings may provide a guide for the higher levels of organisation.

Long or frequent pauses for planning or deliberation are rare. As a rough indication, in the lecture used for data there are few 'pure' pauses (i.e. with no intervening non-vocal activity) in excess of two seconds, and very few indeed in excess of three. In all the data recorded, the longest pure pause is probably one of  $7\frac{1}{2}$  seconds, which strikes one as embarrassingly long, and which certainly prompted signals of unease among the students present.

Written discourse is not produced in real time; the writer generally has ample time to plan, to choose the exact organisation and grammatical and lexical realisations he prefers, and indeed can change any of his decisions. Elaborate intratextual relationships and interdependencies can be set up, and complex syntactic patterns can be thought out. Spoken prose, since it derives from a written text, is not produced in real time even though it is recited in real time; all the processes involved in its production, short of speech production itself, have taken place prior to recitation; it therefore carries into speech the features of functional organisation characteristic of written discourse, and it will strictly retain those characteristics.<sup>10.</sup> Lecture discourse on the other hand, even where

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10. If, during a 'recited' lecture from fully written notes, the speaker breaks off to give additional information or to explain blackboard diagrams, we have, not a change of characteristics in spoken prose but a switch from one discourse to another; the interpolations may be regarded as lecture monologue and will have the appropriate rhetorical and linguistic features.

the lecturer has a pre-planned lecture scheme, will be shaped by such unpredictable factors as student interventions and the lecturer's own digressions. These cause reshaping and re-emphasis of the topic or a departure into some related field of interest; they also prompt changes in the level of formality (c.f. Section 3.2).

(b) Interactive Effects

Written discourse naturally involves no feedback from the readership, and can have no reliance on paralinguistic and other non-verbal resources. It is therefore highly explicit, since all intra-textual references and all text-to-diagram references must be made verbally and since the writer must attempt to anticipate what the reactions of the readership might be. In lecture discourse, not only are verbal interventions possible, but the lecturer receives constant non-verbal feedback. Although this could only have been captured by sophisticated VTR equipment, and although one could even then only guess at its precise effect, it would be naive to suppose that it did not affect the lecturer's general strategy and presentation.

The sample lecture illustrates the effect of both interventions and feedback. There is a fairly long exposition of the effect of climate on major soil groups: towards the end most of the students are leaning back in their seats or gazing down at their notepads, and it is probably no coincidence that the lecturer not only brings the exposition to a prompt close but tries to justify it ("you must keep an eye on climate because...it can dominate this

*see p. 177-178*

structure story" : "I've carried it on slightly for the benefit of the two doing plant physiology"). The next step would presumably be to consult one's notes and embark on the next topic: but a student intervention occurs, and the general signs of renewed attention that this brings prompts the lecturer to change tactics and elaborate at length on the reply. At the end of the reply the students appear to be willing to extend the digression but the lecturer deliberately overrides these visual cues and reimposes the lecture plan, ("we'll go back to soil physics now").

By contrast, a 'recited' lecture is far less affected by feedback, if only because the business of verbatim reading reduces the opportunities for eye-contact and for the reception of many other visual cues. The lecturer is committed to the written word and any serious deviation would cause him to lose his concentration. Interventions from the audience are generally precluded by the formality of the situation; and if they were to occur, as we suggested in the preceding footnote, there would be a switch in discourse with a return to spoken prose as the lecture was resumed.

(c) Differences in Level of Formality

Thirdly and perhaps most importantly, monologue discourse differs from formal written discourse in respect of the latitude afforded both by the more relaxed conventional constraints and by the broader range of communicative resources which will include prosodic signals, gesture, posture, movement within the room, eye contact. To

give just one example, the conventions surrounding a written research paper will impose fairly strict limits on the syntactic and lexical possibilities for the realisation of communicative acts. Thus Sinclair and Coulthard propose a limited range of items such as "Right/Well/Now" as realisations of 'markers' in spoken discourse: in formal written discourse they are more likely to be realised by such devices as "Further/Next/Turning to...", or by an impersonal construction in paragraph-initial position, or by a subheading. Yet these devices (and others relating to other Acts) are not precluded from lecture monologue; and the fact that the lecturer can draw upon these alternatives when he wishes gives him considerable scope not only to impose upon the discourse a level of formality of his choosing but to shift from one level to another in the course of the lecture, within the broad limits of lecturing convention. What is more, he has the option to mark transitions in the discourse by non-verbal devices such as pausing (c.f. in particular Section 3.3.5), by a change of position in the room or a change of posture, or by prolonged eye-contact, or by combinations of verbal and non-verbal devices.

Spoken prose will retain the restrictions on verbal realisations but will afford the lecturer the possibility of non-verbal markers. However, it will be seen that the latter will always be in a sense redundant: for the very fact that he is reciting implies that discourse markers will be fully realised verbally wherever they are required, and that although he may choose to add non-verbal indicators he cannot supplant the verbal markers; if he did, the discourse would cease to



qualify as spoken prose. In any case, the formality of the situation will impose restrictions on the non-verbal realisations as well, the lecturer will be disinclined to make extensive changes of posture, while the fact of reading verbatim will severely limit his use of movement. Beyond this there are differences in speech production as between spoken prose and monologue (c.f. Abercrombie 1965, pp. 7-9) such as the evenness of tempo and standardised intonation patterns in spoken prose, and the occurrence of pauses unrelated to grammatical structure in monologue.

(d) Differences in Comprehension

A final major difference between written and monologue discourse relates to the receptive rather than the productive process. The reader may skim the text or read it closely, may re-read, stop to take notes, use a dictionary: he may even return to the text on a later occasion. The 'real-time' production of monologue constrains the listener to receive it in real time also; his speed of comprehension must be paced by the speed of delivery and he cannot stop for notes, nor can he recapitulate (this is the prerogative of the speaker). These factors impose difficulties in comprehension which will be considered further in Section 4. But it is worth noting that although monologue and spoken prose are 'performed' under the same conditions, it is likely that spoken prose is less easily comprehended. The fact that the speaker makes frequent use of repetitions, of reformulations, parenthetics and asides (c.f. Section 3.3.5) and has full recourse to non-verbal resources, ensures that a sufficient level



of redundancy is generally built into the discourse for the native listener to keep his receptive processes in pace with the speaker's production. What is more, the speaker will either check for agreement or comprehension on the part of his audience, or will invite interventions. As we have seen, these strategies are rare in spoken prose, verbal redundancy is greatly reduced, and use of non-verbal resources is limited. There is also the fact that pauses are tied to grammatical structure in spoken prose, whereas in monologue and conversation it is possible that pauses may be more related to information structure and that this facilitates comprehension (Goldman-Eissler 1961, 1967). Finally, although it is difficult to assess, it seems to be widely held that the distribution of information is much denser in written discourse (and by implication, in spoken prose) than it is in spoken discourse (c.f. McCroskey, 1968, McCroskey *et Al*, 1971, Vetter, 1969).

The requirements of a descriptive apparatus accounting for extended monologue discourse must therefore be that it should reveal the features of rhetorical organisation and, potentially, be capable of showing in what respects this differs from the organisation of written discourse and response discourse. It must allow for the increased possibilities for interpersonal manipulation which, as we noted earlier, are greatly augmented in lecture discourse as against both written discourse and spoken prose. It must be capable of handling the scale of formality implied in the availability of a wide range of lexical and syntactic options, and of reflecting the lecturer's use of these resources for manipulative effects. It must

also account for the effect of non-verbal feedback and of interventions, on the structuring of the discourse; and it must be able to indicate the function of non-verbal elements as an integral part of discourse structure.

2.4.3 : Towards a Descriptive Apparatus for Extended Monologue

It is therefore proposed that the descriptive apparatus should reflect two major sources of organisation in lecture discourse:

1. rhetorical functions
2. communicative functions: (a) managerial  
(b) manipulative

1. One would hope to identify a set of rhetorical functions relating to the organisation and communication of information. The Birmingham System has already provided certain acts which serve to mark out, punctuate, give general shape and direction to the information conveyed. These include 'marker', 'silent stress', 'metastatement' and 'conclusion', 'inform', and to some extent 'starter' and 'aside.'

However, the Birmingham data do not contain long stretches of monologue,<sup>11.</sup> and the descriptive system has not been called upon to handle the internal structuring of uninterrupted monologue. If applied to lecture discourse, the description would consist at the rank of Act of

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11. In the sample texts in Chapter 4 of Sinclair and Coulthard, the longest unbroken stretch of monologue consists of approximately 170 words in transcript, which at a rough estimate represents no more than 1½ minutes of speech.

long strings of undifferentiated informs (or alternatively of long stretches of text prefaced simply by "inform"). At the rank of move and above, as we have seen, the system is geared to the verbal contribution of more than one protagonist, so that the only indicators of information structuring would be boundary moves encompassing extremely long stretches of "informing" discourse. It is therefore proposed that some indication of major transitions within the monologue, equivalent to boundary moves, should be established, and that the stretches of discourse within those bounds should be described in terms of the rhetorical structuring they display. This point is taken up in Section 2.4.4.

2. This is not to say that communicative functions play no part in the structuring of monologue: one would hope to establish a further set of functions relating to the management and manipulation of interpersonal relationships, and one would expect them to fall into two types:-

2(a) Managerial functions are regarded as a class of speech functions relating to the management of exchanges between protagonists. As we have seen, the Birmingham System identifies certain relevant Acts - e.g. elicit, prompt, cue, reply, accept, comment. These are closely tied to student interventions, to the lecturer's attempts to elicit responses and to exploit them for pedagogical ends. Two points must be stressed, however. The first is that in free response situations such as seminars and discussions the business of attention-gaining, turn-taking and role-playing is not simply the major but the

predominant source of discourse organisation and is being investigated further by T. & C. Johns (1975 and in preparation): their importance in the structuring of monologue is far less marked. The second is that one is not seeking to make sharp demarcations in every case between rhetorical and managerial functions, or between managerial and manipulative functions: there may be many instances where the types of function shade into each other or overlap. Both these points are given further consideration in Section 3.5.

2(b) On the other hand there are manipulative functions, not all of them realised through speech, relating to the exploitation of levels of formality within the conventional constraints which the lecturing situation imposes. As we hinted in Section 1.3.3 and at the end of 2.4.2 it would be possible for a description of a laboratory procedure to take any one of the following forms:-

- (i) "Next the soil sample is placed upon the sintered glass plate....."
- (ii) "Then you put your sample on the porous plate....."
- (iii) "Now out comes the old porous plate and on goes your sample....."

This is an area where, as Sinclair and Coulthard suggest (1975, p. 23) the discourse scale and the grammatical scale overlap. Whether one chooses to regard these as syntactic and lexical alternatives realising a common deep structure, or as realisations of

different manipulative functions, is merely a reflection of one's preoccupations. In our case there is every reason to employ a functional interpretation and to say that (using *ad hoc* labels for the moment) case (i) realises a 'distancing' function, case (ii) a 'cooperative' function and case (iii) an 'ingratiating' function.

Assuming that this functional interpretation is adopted, one may introduce another functional concept. If it is accepted that three different manipulative functions have just been illustrated, and if (as in the scheme outlined in Section 3) process-description is seen as a type of rhetorical function, then it follows that any realisation is potentially a realisation of at least two functions. It is with this understanding that we incorporate Candlin's term multiple function into our scheme.

#### 2.4.4 : Managerial Function versus Rhetorical Function

A partial basis for a rhetorical approach might be derived from the work of Taba, Levine and Eley cited earlier. They were interested in a non-linguistic categorisation of 'units of thought', but coincidentally provided certain notions relevant to discourse analysis. We have already discussed the possibility of managerial functions, and they too identified utterances which are "psychological or managerial in their function and unrelated either to the logic of the content or to the level of thought", and coded them not only in terms of managerial function but of functions akin to interpersonal manipulation (1964, p. 116).

They distinguished these from a second class of utterances which "function to give direction to discussion, but which, at the same time, can be coded according to the level of thought and the logic of content." This distinction provided the notion of focus, which reappears in the Birmingham System, and the derivative notions of change-of-focus and deviation-from-focus. Once a focus was established, further functions of extending, controlling and modifying thought were proposed, to account for the discourse (or more exactly the thought unit) which developed from the point of focus. These functions were further subdivided in terms of the 'cognitive tasks' they entailed, such as grouping, classing, labelling, making inferences, predicting, identifying cause and effect or consequence.

Their contention was that pedagogical targets, and the demands they made on pupils, could be specified in terms of the successive foci established and the cognitive tasks entailed. It would not be appropriate to assess here the pedagogical value of the approach; nor would we propose to investigate the relationship between discourse and what Wartoffsky (1968) has termed the "conceptual structure" of information. But we do propose that, because discourse has a broadly 'performative' aspect in that it serves in part to express ideas and concepts and relationships between them, the performance of these 'rhetorical acts' will be reflected in the functional organisation of the discourse. This is, and will remain, a primitive notion underlying the system of description developed below and in Section 3: but one supposes that a similar notion

underlies Widdowson's discussion (1971) of rhetorical acts and their relevance to the study of scientific English discourse. For he suggests that to define, illustrate, classify, qualify, describe, report, and so on, is to perform rhetorical acts, and that corresponding rhetorical functions may be identified in discourse.

In examining stretches of unbroken monologue one will therefore be concerned in part to see which rhetorical functions may be identified, whether they provide a basis for the determination of superordinate ranks, and whether a class of rhetorical functions may be placed alongside managerial or manipulative functions as an alternative source of functional organisation. But one will also be concerned to avoid confusion between discursal and conceptual organisation. For example, the distinction between grouping, classing and categorising, quoted from Taba *et Al*, may be valid and useful in identifying conceptual tasks, but since it depends wholly on the degree of formality or rigorousness observed in the classification, it is not a functional criterion that can be applied in discourse analysis. But classifying is an act which may be performed through speech, and is a rhetorical function which can be distinguished from other rhetorical functions, and so may be regarded as a feature of discourse organisation.

At the same time one will be concerned to avoid a proliferation of classes of function which may result from a failure to observe a certain level of generality. Consider, for example,



the kinds of metastatement (c.f. Sinclair and Coulthard, Chapter 3) which one might identify in extended discourse. The lecturer may wish,

- (a) to establish a relationship between the discourse and other discourses, texts or events;
- (b) to establish a relationship between different parts of the discourse;
- (c) to indicate the plan of the ensuing discourse, or
- (d) to make the plan of a preceding portion of discourse more explicit.

Simply to apply labels to each of these functions and to regard them as separate classes of act, is both to foster a proliferation of acts and labels, and to conceal the commonality of function which underlies them. The Birmingham System is however based on the theoretical framework established by Halliday (1961), and we may draw upon the notion of delicacy provided in the theory, in order to maintain a level of generality in the form of primary classes of act, or of move, yet to retain useful distinctions such as those above in the form of subclassifications. We might identify 'metastatement', as a primary class indicating the commonality of function, and differentiate the subclassifications by subscript. Thus as secondary classes of act

we might identify case (a) as 'interrelate', indicated as 'meta<sub>1</sub>', case (b) as 'link' (meta<sub>2</sub>), (c) as 'prospective' (meta<sub>3</sub>) and (d) as 'retrospective' (meta<sub>4</sub>) (see also Section 3.4.1).

On this basis we can develop a descriptive system which will parallel that of Sinclair and his colleagues in that it is based on the same theoretical model and shares certain commonly-defined ranks and units, but which will differ from it in that fundamental divergences in the kind of discourse to be described will demand the establishment of different classes and subclasses. In the next section the elements of the system are explained and illustrated and, where necessary, justified.

SECTION THREE : Explanation of the System of Description

3.1 : General

The System of Description will be laid out and explained at a primary level of delicacy, and working from highest to lowest rank. Secondary structures and classes will then be proposed and justification given for making secondary distinctions. However, in view of the determining effect of the data on the descriptive system, which was stressed in Section 2, it seems appropriate to begin with a brief characterisation of the lecture used for data.

3.2 : The Lecture

The location was a fairly small lecture room with seating for perhaps 30 students, though only 17 were present. Desks were arranged in traditional fashion in ranks facing the blackboard, the lecturer being provided with a desk and lectern stand. The area in front of the class is sketched below in order to indicate the lecturer's exploitation of movement in the area. Movement naturally gravitated around the lectern (Area A) and blackboard (Area C) whenever notes were being consulted or diagrams produced, but a marked tendency towards more formal discourse was repeatedly observed in association with this area. Area B, on the other hand appeared to be associated with an intermediate level of formality and was the lecturer's preferred position. Area D, little used, coincided with moments of greatest informality in the discourse, and was the nearest the lecturer approached

the students. But extreme informality was avoided: the lecturer did not move up among the students' desks at any time, or perch on the front row of desks, sit, or lean against the wall, tactics of movement and posture which were adopted by lecturers in the other lectures recorded.

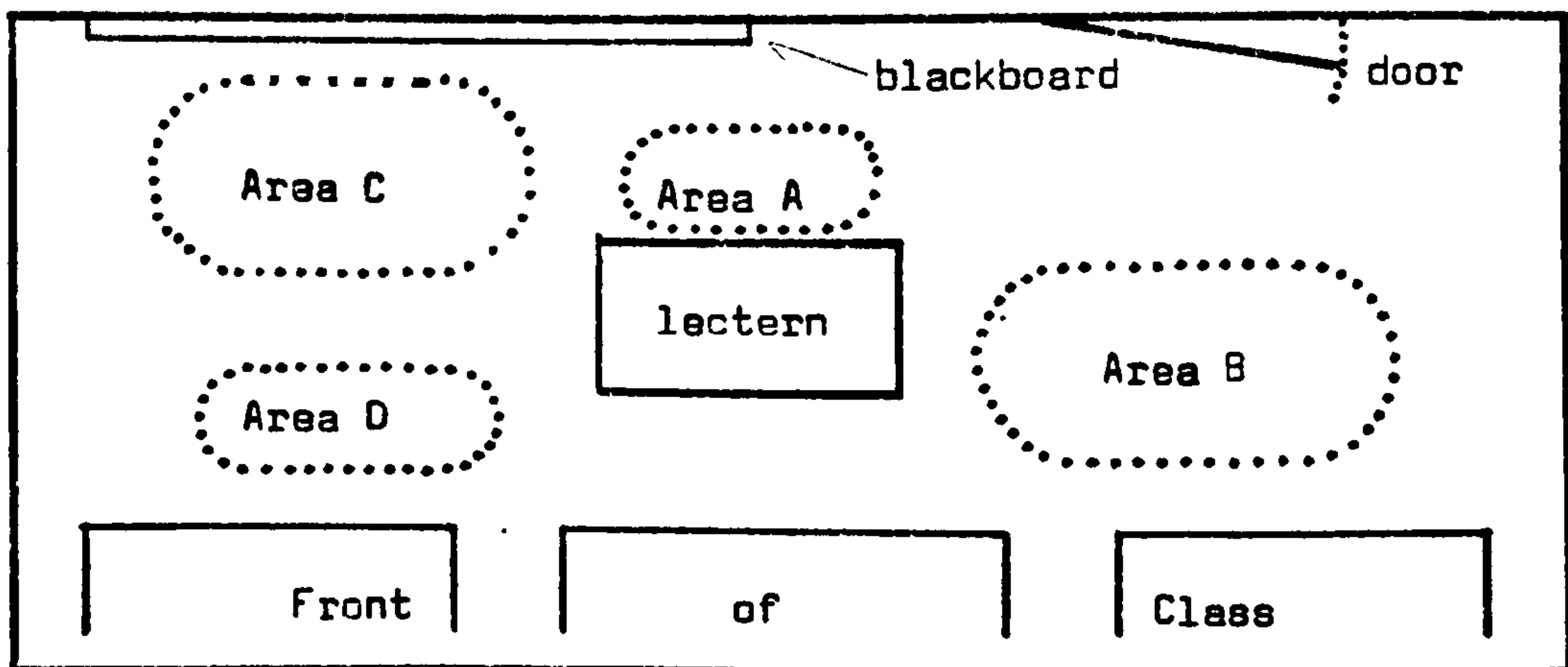


Figure 3.1

This general distancing of the lecturer from the students was, however, offset by the fact that all were in final year and well-known to the lecturer from laboratory sessions and field excursions as well as through lectures. If one may be allowed an entirely subjective comment, an atmosphere of friendly efficiency was generated, rather than a feeling of over-familiarity or of aloofness; there were occasional smiles, a few chuckles, but at no time was there a complete relaxation on both sides of the room, as in certain other lectures.

Given the familiarity of the participants and the fairly advanced stage of the course, it is perhaps understandable that the

lecture does not display any great pedagogical unity. Within the general topic outlined in Section 1.4.1, we can distinguish several different phases through which the lecture passes. The early part consists of a *résumé* of the principal factors affecting aggregate stability in agricultural soils, and would appear to have been carried over from a previous lecture. The *résumé* is dealt with fairly brusquely, but the lecturer relaxes sufficiently to allow herself two digressions - one on molehills, the other on couch grass. A second phase then establishes itself, not too coherently at first, and develops into a survey of the world's major soil groups in terms of climatic conditions and stability characteristics. For some students this is plainly revisional, but for at least two following different optional subjects it is partly new ground.

The next phase is entirely digressive, largely anecdotal and opiniative, and more relevant to farming practice than to soil physics. It would be wrong to suppose that this time (some 8 minutes) was pedagogically unproductive. The students are from farming backgrounds and by showing an appreciation of traditional practices and of the value of experience gained "through hand and eye" in the field, the lecturer draws two advantages. On the one hand she reinforces something that the students already know; that she is a practising farmer: thus she asserts herself as a farming peer as well as an academic peer, and so accrues authority and credibility. Secondly, she establishes what McCroskey (1968, and drawing on Toulmin, 1958) terms a warrant; the measure of credibility serves in turn to make

the methods and advice she puts forward more readily accepted by the students.

A deliberate return to the theme of soil physics opens a further phase, in which standard methods for measurement of aggregate stability are to be reviewed; an anecdotal passage serves to underline the lecturer's preference for in-situ measurement before laboratory measurement techniques are broached. However, in the event only one major technique is dealt with in any detail; it is followed by a description of the technique put forward in the research paper (Text JP/P: see Section 1.4.1), hedged about with a series of apologies and qualifications. This exhausts the time available, and the lecture closes with a statement of intent which indicates that this phase will extend into the following week's lecture, and with a series of instructions and expectations regarding the practical session which is to follow immediately in the laboratory.

### 3.3 : The Descriptive System at Primary Delicacy

As foreshadowed in Sections 2.4.3 and 2.4.4, the descriptive system is based on a hierarchical arrangement of units identified in terms of rhetorical functions. The status of management functions and manipulative functions and their place in the system is discussed in Section 3.5 below. Although almost the reverse of the process through which the framework was created, we will begin by discussing the superordinate ranks of the system and work downwards, since this provides a clearer understanding of the full scheme. The

units which were eventually identified were, in order of rank:-

Rank 1 : Lecture

Rank 2 : Exposition

Rank 3 : Episode

Rank 4 : Move

Rank 5 : Act

3.3.1 : Lecture

This rank has no necessary correspondence with the "lecture-period" but merely represents the highest level of discourse organisation identified in the data used. It does not, for example, cover the final moments of the lecture-period, in which arrangements for the ensuing laboratory period are made; this is structurally distinct in several respects and is best regarded as a separate portion of discourse. The lecture is regarded as consisting of a series of 'Expositions'; while a structure could be readily identified for the latter, no conclusions could be drawn about the structure at the rank of Lecture or about the ordering of the Expositions. In the text examined, the Lecture consisted of a sequence of six expositions but no basis could be found for a structural differentiation between, say, initial, medial and terminal expositions. The most that one may venture to say in view of the limited data, is that a Lecture is realised by a series of expositions. It is an open question whether further data would show these to be ordered. To summarise,

Rank 1 : Lecture

Structure: (a series of expositions)

3.3.2 : Exposition

An Exposition approximates roughly to a pedagogical phase as illustrated above (Section 3.2); but as with 'Lecture' and the lecture-period, there is no direct or necessary correspondence. One should beware both of equating pedagogical units with discourse units (c.f. remarks on Bellack *et Al* in Section 2.3.2) and of attempting to identify patterns of discourse on the basis of teaching-content. The phase dealing with methods of stability assessment, for example, yields several structural entities in terms of discourse, each of which is regarded as an exposition. The structure identified for Expositions may be summarised as:

Rank 2 : Exposition

Elements of Structure : Preliminary, Orientation, Development, Terminal.

Structure : (P) O D<sup>1-n</sup> T<sup>1-n</sup>

Structure realised by classes of Episode as follows:-

P : Expectation

O : Focal

D : One or more Developmental Episodes

T : One or more closing Episodes.

The realisations occurring at P and O are discussed below in Sections 3.3.3 and 3.4.3, but the last two places of structure, D and T, require comment. The number of developmental episodes appearing at D ranged from one to seven. No basis could be found on which to subclassify these episodes, nor could one identify



any structural constraints on their order of appearance. It seems likely that some ordering should operate at this juncture, but it may only become evident through work with a larger corpus of recordings. In terminal position, it is understandable that in informal discourse a speaker may, as he draws to a conclusion, think of a further conclusion, and even of an after-thought to follow that; in the data examined there is one case of three closing episodes occurring at T. But one would not expect a lecturer to produce a long string of closing episodes (unless he were exceptionally disorganised or longwinded), or to produce a string regularly at T, and most expositions in the data contained only one closing episode at T.

### 3.3.3 : Episode

Episodes vary in length from a quarter of a minute to some three and a half minutes in the sample lecture. The variability in length is doubtless due to the fact that they are determined by rhetorical rather than managerial factors. In the Birmingham System, the unit 'Exchange' was governed by the teacher's need to involve the pupils in the lesson through verbal responses or through directed activities: informing exchanges were therefore fairly short and were aimed (from a pedagogical point of view) at evoking a response or at preparing the ground for eliciting or directing exchanges. Uninterrupted monologue requires description on a rather different time-scale, even though the ranks and units show a superficial correspondence. Episodes which serve to "lay the ground" are generally short, but what they lay the ground for is (again in pedagogical terms) the presentation of an

idea or a method or a set of observations or an opinion. These pedagogical aims tend to be reflected in the length of developmental episodes; though there is no necessary match between the accomplishment of an aim and the completion of an episode, developmental episodes are often relatively long.

A general structure has been identified for all types of episode, and is summarised as:

<u>Rank 3</u>	:	Episode
Elements of Structure	:	Focus, Extension, Conclusion.
Structure	:	$F E^{1-n} C$

Structure realised by classes of move as follows:-

F	:	Focussing
E	:	One or more moves of classes other than Focussing/Concluding
C	:	Concluding

For reasons given later, it was felt to be more satisfactory to state a general structure at primary delicacy, in order to show the commonality of function of all episodes. Each consists of an obligatory Focussing move and Concluding move: each contains at least one move at E drawn from classes 3 - 12 of the moves listed below. Again, the limited data make it a little difficult to identify structural constraints; but in the sequences occurring at E the following characteristics have been noted:

- (a) The number of moves at E ranges from one to sixteen, but a distinct pattern can be seen in the length of these sequences:-
- (b) Developmental episodes contain the longest sequences; ranges 1-16, average 5.5: expectation and focal episodes contain much shorter sequences; ranges 1-5 and 4 respectively, averages 3 and 2 respectively: closing episodes are occasionally somewhat longer; range 1-7, but average only 3.
- (c) Bound moves (see Section 3.3.4) may only follow free moves in these sequences, and at least on the evidence of this lecture the sequence "free-bound-bound" would therefore seem to be inadmissible.
- (d) Since focussing moves are free, it is possible for a bound move to occur in initial position at E; where this occurs, however, the bound move does not stand alone but is followed by a free move. In short, the normal sequence at E is "free (bound) free (bound)..."; "bound free..." is possible, though in this case the bound move modifies the preceding focussing move rather than the free move which follows; "bound" is unacceptable, as is "...bound bound..."

Finally, it will be seen that no structural distinction has been made at primary delicacy between the four classes of episode: as already stated, the differentiation rests on subclassifications of the moves - specifically, on subclassifications of focussing and concluding moves operating at F and C in the episode-structure.

Discussion of this point is held over to Section 3.4.2. Nor have we given examples of any episodes; this is simply because they are best illustrated after some explanation has been given of 'Moves' and 'Acts' in the scheme, so illustrations will follow in Section 3.4.2.

3.3.4 : Move

Twelve classes of move were identified for the lecture; they are:-

- |                           |                            |
|---------------------------|----------------------------|
| 1. Focussing move (FOC)   | 7. Recommending move (REC) |
| 2. Concluding move (CON)  | 8. Listing move (LIS)      |
| 3. Describing move (DES)  | 9. Justifying move (JUS)   |
| 4. Asserting move (ASS)   | 10. Qualifying move (QUAL) |
| 5. Summarising move (SUM) | 11. Contrasting move (CNT) |
| 6. Relating move (REL)    | 12. Explaining move (EXP)  |

The moves fall roughly into three main groups, and can be described on this basis.

Group 1 : FOC and CON.

It was suggested in 2.4.3 that there may not be entirely clear-cut distinctions between the kinds of speech function that were proposed, and this is well illustrated by FOC and CON. They serve to shape and demarcate the episodes: focussing moves lay the ground for the extensions made at E, and generally point the way forward; concluding moves summarise and round off the episodes and are capable both of recapitulating the ground covered and of pointing the way forward. They can therefore be regarded as having a rhetorical function

insofar as they shape the informational aspect of the discourse. But they may also be seen as having a partly managerial function because, in the absence of any real structuring through exchanges and turn-taking, they mark major points of transition in the discourse which are associated very often with changes in the lecturer's general speech style and interpersonal behaviour, as discussed in Section 3.5 below.

The structure of these two classes of move is given in Section 3.4.2, where a subclassification is proposed. The constraints on FOC and CON in the structure of episodes are firstly that they can operate only at F and C respectively, secondly that only one of each move may occur at each place in the structure, thirdly that their occurrence is obligatory.

Group 2 : DES, ASS, SUM, REL, REC, LIS.

These moves are regarded as having a distinctly rhetorical function, and operate as free moves at E in the structure of episodes. They serve to propound a propositional element contained in the focussing move which precedes at F. No constraints could be established with any certainty on the order of occurrence of these moves in the sequence  $E^{1-n}$ , but two general observations can be made about their function in the discourse:

- (a) Firstly, it will be noted from an examination of the text, as laid out in Appendix (i), that there is a very high rate of occurrence

of describing moves; yet some of the functions proposed by Widdowson in his paper of 1971 - classifying, for example - do not feature at all. It seems very probable that the distribution of rhetorical functions in different kinds of discourse reflects the general nature of the discipline and the themes dealt with. In this instance changes in soil stability, and stability assessment, rest on climatic and other states which instigate processes of change in soil composition and structure, resulting in soil conditions which are regarded for purposes of assessment as terminal states; the assessment itself involves procedures to be adopted in the field, and the observation of further processes in the laboratory. It is understandable that the lecturer must rely heavily on description to deal with this subject - so much so that merely to identify describing moves at primary delicacy would frequently be unrevealing in exactly the same way as an undifferentiated string of informing moves might have been.

It was therefore expedient to subclassify describing moves in terms of the type of description they served, and the subclassifications and associated structures are given in Section 3.4.2. In support of this decision one may cite one of the other lectures obtained (Text M/L) which deals with Medical Taxonomy: not unnaturally classification is a prominent feature of the discourse, and although it has not been transcribed and annotated it would seem desirable to find some basis of subclassification to handle 'Classifying Moves' in the description of that lecture. Although it was necessary to introduce the listing move (LIS) in the present descriptive system, there is in fact only one occurrence in the soil science lecture. Presumably in the lecture

on medical taxonomy, or in any lecture dealing with a complex set of categories or inventory of items, the listing move could be expected to feature more prominently.

(b) Secondly, it is not entirely surprising that the occurrence of free moves at E should display no structural constraints. Just as frequency of occurrence is determined not by discourse but by the nature of the subject-matter, so also is the order of occurrence on a particular occasion. No rule of discourse could dictate that a recommending function, for example, cannot be accomplished without a prior assertion, or that a summarising function is admissible without a prior description. These are entirely pragmatic considerations, and relate to subject matter and to what the lecturer wishes to say of it. On the other hand, assertions, descriptions, recommendations, and so on can only be made on the basis of some proposition (using the term in an informal sense), and it is within the scope of discourse structure to state this constraint. This has been allowed for in the summary of structure for episodes and in the constraints noted there on the operation of moves. None of the moves listed above may occur at F, nor may F not occur; therefore they are necessarily preceded by a focussing move which as it were encapsulates a proposition of some kind (c.f. Section 3.4.2).

Another legitimate statement that can be made within the descriptive system, and which has already been noted, concerns the occurrence of bound and free moves. The bound moves identified in the lecture are:-

Group 3 : JUS, QUAL, CNT, EXP.

None of these moves may stand in isolation, not only because they may modify a proposition or because they may modify one of the free moves in Group 2, but because they must modify one or the other. One cannot make a qualification, for example, unless it be to qualify a proposition or an assertion or a recommendation, and so on. Further, an attempt to discover whether any position of occurrence was particularly associated with any of the bound moves, yielded some useful indications:-

- (a) Justifying moves followed FOC, REC, REL, ASS, DES, but not SUM. In most cases they followed FOC or ASS.
- (b) Qualifying moves followed FOC, REC, ASS, DES, SUM, but not REL. In the majority of cases they followed FOC or ASS.
- (c) Contrasting moves followed REL, ASS, DES, but not SUM or REC or FOC. They generally followed ASS.
- (d) Explaining moves only followed ASS and DES, with about equal frequency.

The interpretation of this summary (which, it must be remembered, is based on a fairly small amount of data) might be as follows. The propositional element in FOC may be defended (a following JUS) or hedged about (a following QUAL) but cannot, of itself, be



contrasted, compared or explained (no following CNT or EXP). Only asserting moves are followed by all four bound moves with equal probability. Summarising moves carry only the possibility of qualification, which suggests that there may be something in the nature of summarising which would tend to preclude other kinds of modification. Contrasting and explaining moves have a high occurrence following  $DES_1$ , which is the subclass of description covering processes and causal sequences (c.f. Section 3.4.3); one may surmise that there may be a wish to elucidate processes and cause-result sequences either by direct explanation or by contrasting them with different cases (or alternatives which did not occur), or by comparing them with similar instances. Since the subject matter on this occasion was mainly concerned with natural events it is understandable that they would not need justification or qualification, which would be more likely to apply to human events and actions.

A summary of the structure of moves which were not given a subclassification now follows. For the structure of FOC, CON, DESC, see Sections 3.4.2 and 3.4.3.

Rank 4 : Move : 4, Asserting (Assertion of fact, opinion, rule, physical law)

Elements of Structure : initial, prehead, head, augment, posthead

Structure : (i) (pre) h (a) (post)

Structure realised by classes of Act as follows:-

i : marker ( $mark_1$ )

pre: select from metastatement ( $meta_{1,2,3}$ ), qualification (q), suggestion (sg).

h : statement (st<sub>1</sub>)  
a : statement (st<sub>5</sub>)  
post: select from metastatement (meta<sub>1</sub>), qualification (q),  
statement (st<sub>5</sub>)

Rank 4 : Move : 5, Relating (making intra textual and extra  
textual relationships explicit)

Elements of : initial, prehead, head, augment, posthead  
Structure

Structure : (i) (pre) h (a) (post)

Structure realised by classes of Act as follows:-

i : marker (mark<sub>1</sub>)  
pre : metastatement (meta<sub>3</sub>)  
h : metastatement (meta<sub>1,2</sub>)  
a : qualification (q)  
post: statement (st<sub>1,5</sub>)

Rank 4 : Move : 6, Summarising (giving a *résumé* of the immedia-  
tely preceding discourse (c.f.  
Act, st<sub>4</sub> below) ).

Elements of : initial, prehead, head, posthead.  
Structure

Structure : (i) (pre) h (post)

Structure realised by classes of Act as follows:-

i : metastatement (meta<sub>2</sub>)  
pre : metastatement (meta<sub>1</sub>)  
h : statement (st<sub>4</sub>)  
post: select from suggest (sg), qualification (q)

Rank : Move : 7, Recommending (giving support to an opinion,  
course of action, method, etc.)

Elements of : initial, prehead, head, posthead.  
Structure

Structure : (i) (pre) h (post)

Structure realised by classes of Act as follows:-

i : select from marker ( $mark_1$ ), qualification (q)  
 pre : causative ( $c_1$ )  
 h : suggestion (sg)  
 post: statement ( $st_5$ )

The structure of the Listing Move, of which there is only one instance, consisted of a sequence of Acts; 'ordination ( $ord$ ) + heading ( $prop_2$ ) +  $ord$  +  $prop_2$  +  $ord$  +  $prop_2$ '. A formal statement of structure does not seem justified.

The structure and realisations of the bound acts are as follows:-

Rank 4 : Move : 9, Justifying (Bound: offering justification for a proposition, assertion, recommendation, etc.)

Elements of Structure : initial, prehead, head

Structure : (i) (pre) h

Structure realised by classes of Act as follows:-

i : select from marker ( $mark_1$ ), causative ( $c_1$ )  
 pre : causative ( $c_1$ )  
 h : statement ( $st_5$ )

Rank 4 : Move : 10, Qualifying (Bound: placing reservations on, partially retracting from, prior assertion, proposition, etc.)

Elements of Structure : initial, prehead, head, posthead.

Structure : (i) pre h (post)

Structure realised by classes of Act as follows:-

i : marker (mark<sub>1</sub>)  
 pre : qualification (q)  
 h : statement (st<sub>1</sub>)  
 post: select from qualification (q), statement (st<sub>5</sub>),  
 metastatement (meta<sub>3</sub>)

Rank 4 : Move : 11, Contrasting (Bound: drawing a parallel of comparison or contrast between a previous fact, event, etc., and a second one contained in the statement at head)

Elements of Structure : initial, prehead, head, posthead.

Structure : i (pre) h (post)

Structure realised by classes of Act as follows:-

i : marker (mark<sub>2</sub>)  
 pre : causative (c<sub>1</sub>)  
 h : statement (except st<sub>5</sub>)  
 post: select from statement (st<sub>5</sub>), qualification (q)

Rank 4 : Move : 12, Explaining (Bound: expounding or making explicit a prior assertion, description, causal chain, etc.)

Elements of Structure : prehead, head, posthead

Structure : (pre) h (post)

Structure realised by classes of Act as follows:-

pre : marker (mark<sub>1</sub>)  
 head : causative (c<sub>1,2</sub>)  
 post : select from qualification (q), statement (st<sub>5</sub>),  
 resultative (res)

3.3.5 : Act

Seventeen 'Acts' have been identified, although some of them are of very low incidence in the sample lecture. Some are borrowed directly from the Birmingham System, some are borrowed with substantial modification, others have been identified on the grounds of their rhetorical function in the structuring of monologue. Again, in the interests of maintaining a degree of generality without losing rhetorically-significant distinctions, subclassification has been introduced for certain acts. In these cases the primary class will be mentioned briefly and fuller treatment will be found in Section 3.4.1. The Acts are first listed as primary classes, then introduced and commented upon in turn.

- |  |                         |
|--|-------------------------|
| 1. Prosodic Signal (pros)<br>of Transition | 9. Qualification (q)    |
| 2. Marker (mark)                           | 10. Suggestion (sg)     |
| 3. Proposition (prop)                      | 11. Elicitation (el)    |
| 4. Delimitation (del)                      | 12. Response (resp)     |
| 5. Statement (st)                          | 13. Directive (dir)     |
| 6. Metastatement (meta)                    | 14. Ordination (ord)    |
| 7. Causative (c)                           | 15. Reformation (ref)   |
| 8. Resultative (res)                       | 16. Parenthetical (par) |
|  | 17. Aside (as)          |

Rank 5 : Act : 1, Prosodic Signal of Transition (pros).

This Act requires detailed explanation. Its discourse function is to mark points of transition from episode to episode, and therefore is an obligatory opening feature of each focussing move and terminal feature of each concluding move. One became acutely aware in examining lecture

discourse that prosodic features play at least as great a role as they do in response-based discourse, and perhaps greater. At the same time one had neither the time nor the training to embark on a full-scale analysis of prosodic functions in discourse and until work on this area by Brazil becomes available (Brazil, forthcoming, and Brazil and Coulthard, in preparation) one can only offer an approximate description of the most striking function. This is not to say that prosodic features play no part in the internal structuring of episodes - only that one is not competent to engage in a fine-grained analysis.<sup>12</sup> For the moment, then, this is the only act identified on a prosodic basis, and its realisation may be characterised thus:-

pros : an act assigned arbitrarily to both the concluding move of one episode and the focussing move of the next, though it should strictly be regarded as a continuous adjustment of prosodic features which passes through three stages:

- (a) a relaxation stage consisting of
  - (i) a gradual drop in pitch range, often spread across the entire concluding move and associated with
  - (ii) a drop in loudness and
  - (iii) optionally, a drop in syllable rate (c.f. Crystal and Davy's term "rallentando")
- (b) a pause stage, falling between the episodes in question; generally "long" by comparison with other pauses examined in the data,<sup>12</sup> i.e., in the order of  $\frac{3}{4}$  -  $1\frac{1}{2}$  seconds, but

---

12. An attempt was made to identify transitions on the grounds of pause length alone, but useful criteria could not be established. The attempt is summarised in Appendix (ii).

occasionally longer especially if non-verbal activity also intervenes between episodes. Sometimes the pause length is severely reduced, in association with the absence of a drop in syllable rate, and compensation is made by a long pause following stage (c). Clancy (1972) terms this a "rhetorical run-on effect."

- (c) a recovery stage in which general pitch range, loudness and syllable rate are restored to levels equal to or above those obtaining before the onset of stage (a). So far as one can ascertain the restored levels are maintained until at least the end of the focussing move.

'pros' may only occur at i in focussing moves or at h or post in concluding moves.

Rank 5 : Act : 2, Marker (mark)

Realised by a limited number of lexical items and set phrases which serve to mark points of transition either within or between episodes. A subclassification has been proposed : see Section 3.4.1.

Rank 5 : Act : 3, Proposition (prop)

Realised by a noun or nominal group, but not a full clause, which serves to propose the theme or topic which an episode will develop. A restriction on its occurrence is that it may only occur at h in focussing moves: 'prop' has also been subclassified.

Rank 5 : Act : 4, Delimitation (del)

Realised by a word or phrase which serves to place a restriction or limitation on the scope of a proposition. For example:-

"looking at this question of climate on a world scale if we come to  
(del) (del)

the major soil groups its worth mentioning here something about the  
(del) (prop)  
change in aggregation"

Rank 5 : Act : 5, Statement (st)

The act of stating occurs so heavily in the lecture that subclassification was felt to be essential in order to give an adequate account of rhetorical function and of the place of these acts in the structure of higher ranks.

Rank 5 : Act : 6, Metastatement (meta)

Metastatement was discussed briefly at the end of Section 2, and as was suggested there, a subclassification has been found helpful.

Rank 5 : Act : 7, Causative (c)

Realised by one or more phrases indicating causes, causal chains, conditions: a subclassification will be given in Section 3.4.1.

Rank 5 : Act : 8, Resultative (res)

Realised by a declarative expressing a result ensuing from a causative. However, no necessary order is implied: res may precede the relevant c;



or an act or acts may intervene between c and res; or c and res may occur in separate moves, again with the possibility of an intervening move or moves.

Rank 5 : Act : 9, Qualification (q)

Realised by a phrase placing a qualification or restriction on a preceding statement, suggestion, etc.

Rank 5 : Act : 10, Suggestion (sg)

Realised by a declarative (though one could envisage its realisation by an interrogative) proposing a method, course of action, etc., for students to follow subsequently.

This accounts for all the acts which played a major part in the discourse structure in the data examined. The next few were of low occurrence.

Rank 5 : Act : 11, Elicitation (el)

Though there are very few instances, it was felt convenient to make a subclassification to differentiate between elicitations instigated by the lecturer and those initiated by students. Elicitation is discussed further in Section 3.5.

Rank 5 : Act : 12, Response (resp)

(Only one instance - a student response, following an elicitation by the lecturer).



preceding act; it often makes the information more explicit and also carries the line of argument forward. 'Par' is realised by a declarative which makes the information conveyed through an act more explicit, but generally without restating the act or carrying the argument forward: it is generally signalled by a momentary lowering of pitch range. These functions may become clearer through illustration. A typical reformulation would be:-

"...this is probably due to the effect of  $c_1$  surface tension the change (ref)

in surface tension and viscosity of the water..."

A typical parenthetical is:-

"...the effect of your farming system on the bacterial population  $prop_2$

this is thinking about the farming rotation that you're practising..."  
(par)

At first, attempts were made both to regard these as acts in their own right and to give a full account of their occurrence in structure. But this made nonsense of the structural description of moves, since they are not only frequent (especially res) but most ubiquitous (occurring after fourteen classes or subclasses of act) and so the number of optional places that had to be allowed for in the statement of structure at Rank 4 became absurd. A second possibility was that they might be given no status at all at the discourse level, and would then be regarded merely as part of the lexico-syntactic

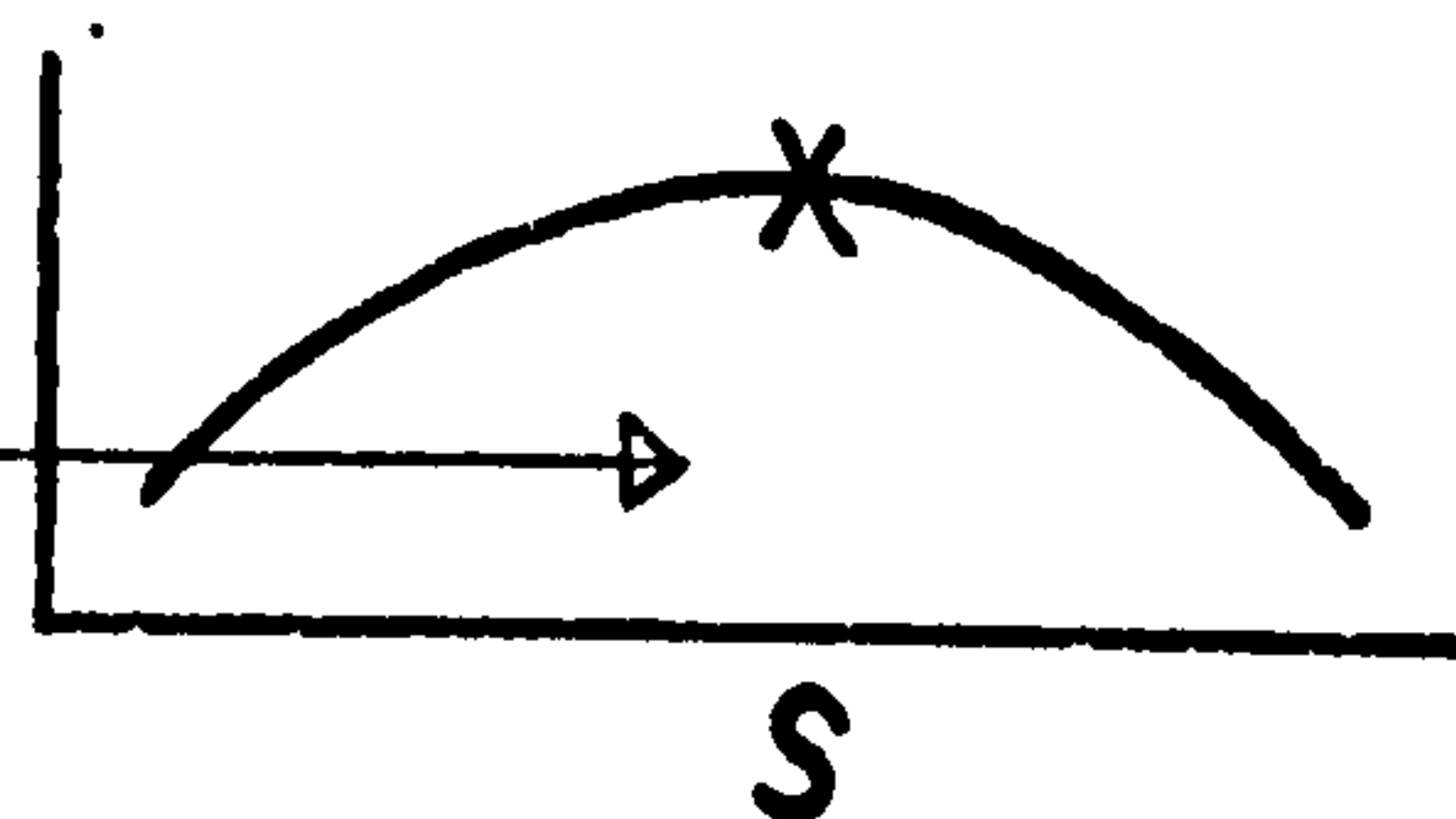
realisation of acts. But this was equally unsatisfactory, firstly because it would simply have transferred difficulties to the grammatical level, secondly because it effectively denied the existence of such functions at the discourse level. Yet it would seem desirable to retain these functional identities: reformulation is quite possibly employed as a deliberate tactic at times, and in all cases it substantially modifies the act with which it is associated; parenthetics not only have a clarifying function but can sometimes carry deictic significance, as in the example below,<sup>13.</sup> and so must be regarded as functionally distinct.

For the moment the status of these two acts will be left anomalous: they are regarded as acts, and as a part of the discourse, but no specific place has been allotted them in the structure of moves. It seems expedient to regard them virtually as free agents, since it is clear that they may follow almost any act so far identified, except perhaps pros and mark - on the other hand they are in a sense 'bound' because they cannot occur independently of any of the remaining acts. A careful reading of Halliday, 1961, especially pages 254-267, provides

13. for example:-

"in the winter months this is your summer here in the winter  
 st<sub>1</sub> (par)NV\*  
 you'll find that there's a general decrease takes place"

\*flat hand circles round  
 area below cross



no solution; one can think of no grammatical entity with such structural indeterminacy. The status of the final act, 'aside', is somewhat easier to handle, and does not offer a true parallel to the case of ref and par.

Rank 5 : Act : 17, Aside (as)

In the Birmingham System asides were defined as "speech acts that are not specifically part of the discourse" and included "remarks..... which are unrelated to the discourse but not to the situation" (Sinclair and Coulthard, p. 39). They are incorporated in the present scheme with exactly this understanding; and precisely because they are unrelated to the discourse they do not require any structural allocation - they may be regarded as intrusions which may occur at any point without disturbing the discourse structure itself. But this is clearly not the case with ref and par. They are not an intrusion from some other discourse, indeed they only appear by virtue of the evolving discourse, and so while one would wish to regard them as structurally independent, one would not wish to treat them as independent of the discourse.

3.4 : The Descriptive System at Secondary Delicacy

We will now consider the subclassifications that have been proposed, and illustrate the utility of these distinctions in the descriptive system. Since the value of any subclassification presumably lies in the finer distinctions it allows one to draw at a higher rank, we will begin with Rank 5 and then discuss the value of subclassifications of acts in the description of moves at Rank 4 and, in turn, the value of subclasses of move in describing episodes.

3.4.1 : Subclassification of ActsRank 5 : Act : 2, MarkerSubclass 2(a) : Marker of Transition (mark<sub>1</sub>)

Realised by a set of lexical items and set phrases which make explicit a point of transition in the discourse. They occur most often at the beginning of focussing moves, in association with pros, but may occur at the boundary of other moves. By far the most frequent in the sample lecture is "now", but other possibilities were "also, right, so, just, well, 'eh', remember." Set phrases incorporating "again" appeared,

here )  
 e.g. : and )again, also "you see" and "to take an example", both  
 now )

occurring as openers to an episode and both followed by a distinct pause, and serving to mark the episodes as explanatory and as illustrative respectively. A further possibility which lack of a visual record prevents one from following up, is that prolonged eye-contact, in which the lecturer gazes round the audience, may also function as a mark<sub>1</sub>. This is certainly how the lecture opened, and the tactic was repeated at the opening of a number of episodes.

Rank 5 : Act : Class; 2, Marker.Subclass 2(b) : Marker of Contrast (mark<sub>2</sub>)

These markers serve to make explicit a contrast between the statement they introduce and the preceding statement. In cases where they occur in initial position in a focussing move, it would seem that a contrast is entailed between the entire following episode and the previous one.

They are realised in the sample lecture by the items "but, yet, whereas, however", and by a stressed negative construction realising the contrasting statement; the lexical items and the grammatical tactic were sometimes employed jointly.

It was decided to subsume contrast and comparison under one head, since comparisons were of fairly low occurrence. Most of them were 'implied comparisons' functioning by juxtaposition rather than by overt marking. The only realisation of mark<sub>2</sub> in this respect was "the same (as/thing)"; no grammatical devices of comparison were found. For this very reason it should be emphasised that markers are only optional indicators of transition and contrast. One acknowledges that some of the items listed as markers (e.g. "so(that), again, whereas, however") are used as devices of textual cohesion, but one feels justified in taking the view that, purely in terms of coherence, they also serve as 'discoursal landmarks.' Even if the cohesive function is ignored, they signal that a point of transition or contrast has been reached.

Rank 5 : Act : Class; 3, Proposition

Subclass 3(a) : Proposal (prop<sub>1</sub>)

Subclass 3(b) : Heading (prop<sub>2</sub>)

The subclassification serves to distinguish between propositions realised by headings read out from notes (prop<sub>2</sub>), from propositions arising on a more impromptu basis without recourse to notes (prop<sub>1</sub>). For example "temperature", or "the localised effect of temperature" realise prop<sub>2</sub> in the lecture, but a parallel realisation such as

"this temperature question", or "temperature and so on", might serve to realise  $prop_1$ . The distinction is useful for a consideration of levels of formality.

Rank 5 : Act : Class; 5, Statement

Subclass 5(a) : Statement (Assertive) ( $st_1$ )

$St_1$  is realised by one or more declaratives, generally syntactically coherent, regarding facts, opinions, rules (e.g. of procedure, method, accepted practice) or physical laws. Typical examples are:

"here the aggregation tends to reach its maximum"

"there is no satisfactory method of producing a single numerical index from this curve."

It may occasionally be realised by an 'interrogative-declarative' form, that is as a question to which the lecturer himself supplies an immediate answer. For example, in

"and the podzil type of soil what happens again ↗ aggregation's decreasing ↘"

the first utterance ends on a low rise and in the intervening pause the lecturer gazes briefly at her students with a fleeting smile. But the pause is somewhat less than one second and eye-contact is not maintained; the tactic is clearly intended to gain attention rather than to initiate an elicitation, and the 'answer' is fairly



promptly supplied. As in the case of  $\text{prop}_1$  and  $\text{prop}_2$  it seems reasonable to assume that while each act has a set of possible realisations, the particular realisation at a particular juncture is determined by interpersonal factors.

Subclass 5(b) : Statement (Operations, Sequences) ( $\text{st}_2$ )

Realised by a series of declaratives which may be regarded as expressing the steps in an operation, the order of events in a sequence. One might have expected this act to be associated with 'ordination' (see below) but no occurrence was found. It may be the case that operations and sequences are only marked as ordered in formal discourse. The sequence may be incorporated in a single declarative at times, as:-

"I simply take the soil sample after its pretreatment load the burette until I have applied x centimetres suction let it reach equilibrium and take the moisture content on the plate"

Subclass 5(c) : Statement (Physical States and Properties) ( $\text{st}_3$ )

Realised by one or more declaratives expressing physical states. The statement may be realised by a simple verbal realisation:-

"they'd never drawn a drop of water they were as fresh as the day they'd been put in"

More often, at least in this sample lecture, the verbal statement was made in association with visual representations of states in the form

of graphs. In this case it is important to realise that a statement such as:-

"now with your sand or with your glass beads here's the type of  
 mark<sub>1</sub> qual st<sub>3</sub>  
 moisture characteristic curve you're going to get"

has more than a deictic function in conjunction with an appropriate gesture: it also determines the function of the visual representation itself. Here we are disposed to see the profile of the curve as a representation of the properties of a particular soil type in a particular state, and so the graph itself may, until such time as our expectations are changed, be regarded as a visual realisation of st<sub>3</sub>. St<sub>3</sub> statements would seem to be associated particularly with "be, have, get, contain" and do not admit progressive forms of the verb.

On the other hand, the graph may be accompanied by an st<sub>2</sub> statement such as:-

"a large amount of water is released early on and the curve then tails off"

and we are disposed to regard the profile as representing part of a process of change. St<sub>2</sub> statements, where they relate to graphs, appear to be associated with verbs such as "increase, decrease, fall, tail off, come/go up, reach" etc., and to admit progressive forms and V-ing clauses.

Subclass 5(d) : Statement (Summary) (st<sub>4</sub>)

Realised by one or more declarative structures offering a summary statement covering the statements contained in any moves up to the next previous st<sub>4</sub>, or up to the next previous focussing move if no other st<sub>4</sub> intervenes. Although st<sub>4</sub> occurs most frequently as the head in concluding moves there is no necessary connection - st<sub>4</sub> may also occur in summarising moves, and concluding moves may contain metastatement as an alternative head. For example a discussion of soil types and structural characteristics is followed by the statement:

"you'll never find a well-structured podzil but you'll always  
st<sub>4</sub>  
find or usually find a well-structured chernozem"  
(q)

Subclass 5(e) : Statement (Justification) (st<sub>5</sub>)

Realised by a declarative, or occasionally by an interrogative, offering supporting evidence or argument in favour of a preceding statement, causative, resultative, qualification or suggestion. May be syntactically linked with the prior statement, usually through "because", but often stands as an independent declarative with an implied relationship. Thus,

"quite frankly I prefer them.....because you're doing it on undisturbed  
sug st<sub>5</sub>  
natural soil"

is possible, but so also is:



Subclass 6(b) : Metastatement (Linking) (meta<sub>2</sub>)

Realised by the same syntactic resources as meta<sub>1</sub>, but establishing an overt relationship between the episode in which it occurs and some prior episode in the discourse. As in the case of markers, meta<sub>2</sub> may be realised by familiar syntactic devices of cohesion such as:

"so that", "not only can we plot moisture content but....."

but one would still argue that functionally they are equivalent to:

"as I said just now", or "so this time factor, Eddie....."

Subclass 6(c) : Metastatement (Prospective) (meta<sub>3</sub>)

Realised by a declarative which indicates the plan of the ensuing discourse, or anticipates the theme of an ensuing episode or exposition. For example:

"we'll go back to soil physics now"

"this is where we've to look at the measurements that are in vogue"

Subclass 6(d) : Metastatement (Retrospective) (meta<sub>4</sub>)

Realised by a declarative which indicates the plan or recalls the theme of an earlier portion of discourse:

"we spent too long on the first part of the lecture"

"if we look at the relationship between aggregation and not rain-  
del (meta<sub>4</sub>)

fall but um increasing temperature"



### 3.4.2 : Subclassification of Focussing and Concluding Moves

Three subclasses of focussing move, and four subclasses of concluding move were identified, and the occurrence of a particular subclass of each, at F and C in the structure of episodes, determines the type of episode and its function.

Rank 4 : Move : Class; 1, Focussing Move

Subclass 1(a) : FOC<sub>1</sub>

Elements of Structure : initial, prehead, head.

Structure : i (pre) head

Structure realised by classes of act as follows:

i : pros  
pre : mark<sub>1</sub>  
h : select from prop<sub>1</sub>, meta<sub>1,3,4</sub>

FOC<sub>1</sub> occurs at F in expectation episodes, and this may explain why forms of metastatement appear at h, giving an *aperçu* of the coming discourse or relating coming episodes to previous portions of discourse or to other discourses. Similarly prop<sub>1</sub> would seem to be favoured, since prop<sub>2</sub>, a formal statement of topic read from notes, is more characteristic of focussing episodes. An example would be:-

"now I want to            at this stage            go through the            methods of  
pros mark<sub>1</sub> meta<sub>3</sub>  
FOC<sub>1</sub>  
measuring aggregate stability|....."

Subclass 1(b) : FOC<sub>2</sub>

FOC<sub>2</sub> occurs at F in focal and developmental episodes. Since the item occurring at h in this move serves as a proposal or statement either for the entire exposition (in the case of focal episodes) or of the episode itself (in the case of developmental episodes), it is understandable that it may be accompanied by certain reservations, that the scope of the proposal may require delimitation or that its relevance to an earlier topic may have to be made explicit. The need for these options is reflected in the structure:-

Elements of Structure : initial, prehead, intermediate, head, posthead

Structure : i (pre) (int) h (post)

Structure realised by classes of act as follows:

- i : pros
- pre : select from mark<sub>1</sub>, del, meta
- int : select from del, meta
- h : select from prop, st<sub>1</sub>
- post: select from del, meta, st<sub>1,5</sub>

Broadly speaking if the options provided at pre and int are taken up, they are unlikely to be taken up at post also, so that a typical example of FOC<sub>2</sub> would be:

" now if we look at the relationship between aggregation and  
 pros del (meta<sub>4</sub>)  
 FOC<sub>2</sub> mark<sub>1</sub>  
 not rainfall but um increasing temperature you'll see the same  
 prop<sub>1</sub>  
 sort of pattern developing "



Subclass 1(c) : FOC<sub>3</sub>

Elements of Structure : initial prehead intermediate head posthead

Structure : i (pre) (int) h (post)

Structure realised by classes of act as follows:-

i : pros  
 pre : mark<sub>1</sub>  
 int : select from del, meta<sub>1,2</sub>, st<sub>5</sub>  
 h : select from prop<sub>1</sub>, st<sub>4</sub>  
 post: select from del, meta<sub>3,4</sub>, st<sub>5</sub>

FOC<sub>3</sub> is associated with Closing Episodes and this is reflected not so much in the structure as in the realisations which have been found. At head, a summarising statement appears as an alternative to prop<sub>1</sub>, while a formal announcement of topic (prop<sub>2</sub>) does not occur. Delimitation alternates with justification (st<sub>5</sub>) at intermediate, whereas it only occurs at posthead in FOC<sub>2</sub>. It is worth noting that where prop<sub>1</sub> does occur at head, it introduces a proposition which does not advance the theme of the pedagogical phase in question, but rather rounds it off. For example, following a discussion of the effect of rotational practices on soil condition, the lecturer introduces the topic of 'field classes', and suggests that observations of soil condition could be made on a casual basis during field trips. However, this 'rounding off' is a pedagogical rather than a discourse tactic, and it cannot be incorporated in the descriptive framework.

Rank 4 : Move : Class; 2, Concluding Move

Subclass 2(a) : CON<sub>1</sub>

Elements of Structure : prehead head

Structure : (pre) h

Structure realised by classes of act as follows:-

pre : select from meta<sub>1</sub>, st<sub>5</sub>  
h : pros

CON<sub>1</sub> is associated with expectation episodes and consists of an optional verbal element (though it is only missing in one case) and an adjustment of prosodic features. An example in which the concluding move is realised by a justificatory statement is:

" I think we're more or less on the right lines with this technique"  
CON<sub>1</sub> st<sub>5</sub> pros

Subclass 2(b) : CON<sub>2</sub>

Elements of Structure : head

Structure : h

Structure realised by class of act as follows:-

h : pros

CON<sub>2</sub> is associated with focal episodes: no verbal component could be identified, and the closure of these episodes is signalled only by the adjustment of prosodic features. A possible reason for this is that, since the function of a focal episode is to establish the theme of the

entire ensuing exposition, it is hardly likely to contain remarks of a concluding or summarising nature. Yet some indication that the episode is terminating must be given, and so a concluding function is obligatory even if a conclusion (at the pedagogical level) is missing.

Subclass 2(c) : CON<sub>3</sub>

Elements of Structure : initial prehead intermediate head

Structure : (i) (pre) (int) h

Structure realised by classes of act as follows:-

i : select from mark<sub>1</sub>, meta<sub>1</sub>

pre : st<sub>4</sub>

int : q

h : pros

Naturally enough, pros is an obligatory terminal feature, and in a few cases is the only signal of conclusion. But CON<sub>3</sub> is associated with developmental episodes, and in the great majority of cases it contains a summary statement of the step or steps in the argument which the episode covers. Where an st<sub>4</sub> occurs, it may be marked as a point of transition (mark) or the statement may be qualified (q): in only one case is it interrelated with other events (meta<sub>1</sub>).

Subclass 2(d) : CON<sub>4</sub>

Elements of Structure : prehead head augment posthead .

Structure : (pre) h (a) post

Structure realised by classes of act as follows:-

```

pre : select from mark, q
h   : select from meta1,3, st4
a   : q
post : pros

```

In addition to an obligatory pros, CON<sub>4</sub>, which is associated with Closing Episodes, would appear to require an obligatory element, realised either by a summary statement or by some form of metastatement with an interrelating or prospective function. In two cases the summary statement carries a preceding or following qualification. A typical example is:

```

"      right      we'll go back to soil physics now having digressed
| CON4 mark1      meta3
      onto agriculture for a spell
                                | pros

```

### 3.4.3 : Operation of FOC and CON at Rank of Episode

The subclassification outlined above is used to identify the different classes of Episode at the rank above. It was mentioned in 3.3.3 that no clearly-defined structure emerged for the string of moves appearing at E in the structure of episodes, but that the general pattern of  $F E^{1-n} C$  occurred in all the episodes. But the characteristics of the focussing and concluding moves on which the subclassification is based provide the following formula for the classification of Episodes:-

<u>Class of Episode</u>	<u>Realised by:-</u>
Expectation	$FOC_1 + E^{1-n} + CON_1$
Focal	$FOC_2 \dots\dots\dots CON_2$
Developmental	$FOC_2 \dots\dots\dots CON_3$
Closing	$FOC_3 \dots\dots\dots CON_4$

An example of a Closing Episode determined on this basis would be:-

" so that um this question of cultivation then I say the  
 mark<sub>1</sub> prop<sub>1</sub> ASS  
 FOC<sub>3</sub> pros

think about the ataberg limits you can produce a suitable  
 sg st<sub>1</sub>

aggregation size distribution in the soil | but unless you've got  
 CON<sub>4</sub> q

your eh stabilising factors in that soil then its not going to  
 st<sub>4</sub>

be very much good " |  
 pros

The formula holds good for all but two of the episodes identified in the lecture. One of these, indexed as number 11 in the transcript in Appendix (i), is clearly anomalous by any account. In terms of subject matter it jumps from climate to frost to soil management but promptly leaves the last topic in suspension. In terms of discourse structure, a proposition is established but instead of any coherent development a second proposition is made; but its development is also abandoned in the middle of a DES<sub>3</sub>, and a fresh episode is broached. The second case is less easily dismissed

(number 39 in the transcript). Here the episode is a closing one, and the focussing move at F is a  $FOC_3$  type: at E there is a summarising move, realised by  $st_4 + q$ , but this leaves only 'pros' as realisation of the concluding move, and this is inconsistent with the structure established for  $CON_4$ . The alternative would be to regard the sequence  $st_4 + q + pros$  as a  $CON_4$ , but this would leave us with an anomalous structure at the rank of episode (F + C instead of F + E + C) and this is even less acceptable. Rather than disturb an arrangement that works for all other episodes, these two episodes have been left as anomalies and inverted commas have been used in the transcript to indicate the provisional nature of the assignments that have been made.

#### 3.4.4 : Subclassification of Describing Moves

Three subclasses were identified, and it will be seen that they are determined principally by the class or subclass of act appearing at head - and in particular by subclasses of statements as described in 3.4.1.

Rank 4 : Move : Class; 3, Describing

Subclass 3(a) :  $DES_1$  (Processes and Causal Sequences).

Elements of Structure : initial prehead head augment post

Structure : (i) (pre) h (a) post

Structure realised by classes of act as follows:-

i : select from  $mark_1, meta_2$   
 pre :  $st_{1,3}$   
 head:  $c_{1,2}$   
 a : select from q,  $st_1$   
 post: res

The two obligatory elements are realised by a causative and a resultative, expressing a causal relationship though not necessarily in the form of a single clause or sentence. Of the two it is the causative, occurring at head, which would appear to be the more susceptible to some form of reservation. This is realised by options at pre and a, in the form of assertions, qualifications or descriptive statements: they regard relevant states under which the causal connection obtains, or offer a general context in which the causal connection is set, as in this example:-

"this is when the danger point was reached when your stabilising  
DES<sub>1</sub> st<sub>1</sub> c<sub>2</sub>  
factors were decreasing and decreasing until finally they reached  
res  
a level where even when you put the soils back into grass you saw no  
(q)  
result for it"

Subclass 3(b) : DES<sub>2</sub> (Previous Events; Operations)

Elements of Structure : initial prehead head posthead

Structure : (i) (pre) h (post)

Structure realised by classes of act as follows:-

i : mark<sub>1</sub>  
pre : select from meta<sub>1</sub>, st<sub>1</sub>, q  
h : st<sub>2</sub>  
post: q

St<sub>2</sub>, as explained earlier, consists of a series of declaratives

regarding a sequence of events or the steps in an operation. Placed at head in this subclass of move, it may be modified by  $st_1$  or  $q$  in the manner described above, or it may be interrelated with a comparable event, or indeed with a related lecture or subject:-

" I may have told you about this in second year but I just remind  
DES<sub>2</sub> meta<sub>1</sub>  
it remind you about it one particular rotational experiment  
st<sub>2</sub>  
we were measuring up in the north where every year..... "

Subclass\_3(c) : DES<sub>3</sub> (States)

Elements of Structure : initial prehead head posthead

Structure : (i) (pre) h (post)

Structure realised by classes of act as follows:-

i : mark<sub>1</sub>  
pre : select from meta<sub>1</sub>, q  
h : st<sub>3</sub>  
post: q

DES<sub>3</sub> is associated with the description of physical states in two ways. Firstly there may be a direct description of conditions in the field, as in:-

" you had straw about six inches in height with a cereal head  
DES<sub>3</sub> st<sub>3</sub>  
at the end producing next to nothing the grass had droughted  
off "

More often, physical states are represented by graphs and the function



of  $DES_3$ , as we have already suggested, appears to be both to describe salient features of the graph and the physical states it represents, as in:-

" and this one here where breakdown has occurred the pore  
 $DES_3$   $st_3$  (q)  
spaces have the size of the pore spaces have changed and this is reflected in the shape of the curve..... "

### 3.5 : The Status of Managerial and Manipulative Functions

It has been argued already that the organisation of monologue discourse derives principally from rhetorical functions and that although clearcut distinctions cannot always be drawn between rhetorical and other types of function, the latter play a less important role than they might in response-based discourse. This raises the question of what status managerial and manipulative functions might have in the descriptive framework.

#### 3.5.1 : Managerial Functions

In Section 3.3.3 it was suggested that focussing and concluding moves might have a partially managerial function, but their position at a superordinate rank in the structural hierarchy is determined on their rhetorical function alone, and the structure of both moves has been specified through the occurrence of acts of a specifically rhetorical nature at the rank below. The position of both moves could only be justified on a managerial basis if they

were realised by acts which had a recognisable managerial function. So far only four such acts have been mentioned in passing (elicitation<sub>1</sub>, elicitation<sub>2</sub>, response, and directive) and none of them have been given a specific place in the structure of moves. We have already proposed that directives may not strictly be a feature of lecture discourse, but we must now settle the status of the remaining three.

The reason why they have not been dealt with before is simply that there are so few verbal exchanges in the sample lecture that no clear structural arrangement can be established. If student interventions had made a substantial contribution to the discourse, or had played a major part in shaping the discourse (as might the questions posed in a radio or television interview), then one might have been justified in seeking a hierarchical description on the basis of managerial functions. But an examination of the three interventions that do occur suggests that they play only a minor role in the discourse structure.

The first is instigated by the lecturer (episode No. 6 in the transcript) and her elicitation requires only a one-word response. Once the correct answer is given she uses the reply to develop the ensuing stretch of discourse. In terms of the 'F-E-C' structure identified for episodes, the ensuing discourse falls into place under E and C in the normal fashion, and so it seems appropriate to regard the elicitation-and-reply sequence as a focussing tactic: the reply functions as a 'prop<sub>1</sub>', or at least as a means of establishing

a prop<sub>1</sub>, and the whole sequence functions theoretically as a focussing move.

But it can then be seen that, although not instigated by the lecturer, the other two interventions also have a focussing function, since they only serve to establish a proposition which is then developed in the usual manner. In one case (episode No. 7) the intervention merely serves as an opportunity for the lecturer to reassert an earlier view-point and obviously does not constitute a major contribution to the discourse. In the other case (see episode 20) an entire exposition evolves from the intervention: but one must be careful to emphasise that the student is not shaping the discourse, but merely providing an opportunity for the lecturer to establish a fresh focus; once the proposition has emerged, control and direction of the discourse rest entirely with the lecturer, and the development follows a rhetorical, not a managerial pattern.

For these reasons it would seem preferable to regard the interventions as a part - and only as a part - of a focussing move. In principal, one might be justified in going so far as to establish a subclass of focussing move to handle the contribution made by these interventions, but certainly no higher status in the descriptive system would be warranted. However, even this step cannot be taken since there are, after all, only three instances and each displays a somewhat different pattern. Instead, they are covered in the transcript by 'FOC', with inverted commas to indicate the provisional nature of the

classification, but the acts involved -  $el_{1,2}$  and resp - are given due place at Rank 5 with other acts of a more rhetorical nature.

The sequences of acts which occurred in the three interventions were:

case 1 : pros +  $st_1$  +  $el_1$  + resp +  $el_1$  + resp +  $prop_1$

case 2 :  $el_2$  +  $st_5$  +  $prop_1$

case 3 :  $el_2$  +  $prop_1$

The position that has been adopted, then, is that managerial functions are given the status of acts in the descriptive framework, but units of higher rank are identified only in terms of the rhetorical function they serve, and on the rhetorical purpose served by acts at the lowest rank.

### 3.5.2 : Manipulative Functions

It was suggested in earlier sections (2.3.1, 2.4.2, 3.4.3) that manipulative functions are effected partly through the choice of a particular realisation for a given act, and that if this is the case, a given realisation could be regarded as serving a dual function - rhetorical or managerial on the one hand, manipulative on the other. But it follows from this position that manipulative functions cannot be incorporated in the same descriptive system, since in a rank scale arrangement two elements cannot fill the same place in structure at the same time and since two functions cannot be represented by the same element at the same time (Halliday 1961, p. 256). In addition, one suspects that manipulative functions are differently ordered and

punctuated and are not closely coordinated with rhetorical functions.

Two solutions to this difficulty would seem possible. One is to treat manipulative functions as an unstructured string, and it is then convenient to note them in the form of a subscript to the textual notation provided by the descriptive system, as illustrated below. The other is to treat them as independently structured and to develop a descriptive framework which would operate in parallel to that established for rhetorical structure.

One's choice between these alternatives is a pragmatic one. We have already suggested that manipulative functions may be realised not only through vocal resources but through a range of non-vocal cues provided through gesture, posture, movement around the room, facial expression and so on. If a continuous record of these cues had been possible, and equally importantly, if an exhaustive analysis of prosodic features through the entire discourse had been feasible, then a parallel framework could have been developed to account for manipulative functions. Even the partial record obtained offers a strong indication that this aspect of communication probably has a rhythm and pattern of its own, and that the features we intend to note might well provide a basis for the identification of periods of tension and relaxation, for example, at a higher level of organisation. The fact that these features have only been noted as a subscript should not be taken to imply that they are inherently unstructured, only that practical limitations prevent one from examining the possibilities of structure. An example of the notation

adopted, with the subscript included, would be:-

" and after all these animals are just doing exactly the same thing  
 CNT            mark<sub>2</sub>            st<sub>1</sub>                            /emph/  
 as            you are doing sticking a voltmeter through the soil "

where /emph/ represents the realisation of a manipulative function.

During much of the analysis and the search for an appropriate descriptive system, the labels adopted for manipulative functions were impressionistic, not to say emotive. In Section 2 we mentioned 'distancing', 'cooperative', 'ingratiating', as possible labels: other terms were tried and abandoned, such as 'reassure' 'familiar' 'brusque.' The difficulty with all these characterisations is that they rest on subjective judgements about the lecturer's attitudes and personality. While in no doubt that participants do hazard such judgements and interpretations of each other during communication, one simply does not know in detail upon what cues and by what processes such decisions are reached. The use of these labels is therefore a case of the observer trying his hand (or his luck) as a participant.

At the expense of losing some descriptive detail, it was decided that only four manipulative functions should be identified; and that rather than try to indicate directly what one supposed the lecturer to be trying to achieve, one would use labels which characterised the functions in terms of the devices used to realise them.

The four manipulative functions are therefore listed as:-

1. formal function (/form/)
2. semi-formal function (/semi/)
3. informal function (/inf/)
4. emphatic function (/emph/)

These are regarded as part of a general class of communicative acts which would feature in a system of description operating independently, though in parallel with the system established for rhetorical functions. The following criteria have been used in identifying the manipulative functions: verbal, (including syntactic and lexical); prosodic; postural; gestural; movement within front of class. They yield characterisations of each function, which may be summarised as:-

1. /form/

May be characterised on such verbal criteria as

- (a) use of 'depersonalised' realisations, e.g. : "a distinction should be made between the methods used for the assessment of aggregation....."
- (b) a tendency to use complex syntactic patterns and to express them in their fullest surface form, e.g. "in the laboratory there is no doubt that aggregates are found to be less stable when subject to treatment with warm water."
- (c) a preference for technical terms ("aggregates" rather than "lumps/clods") and for verbs of Latin or Greek derivation,

often in a nominalised form (e.g. "degrade", "the degradation" (of aggregates), rather than "break down").

May also be characterised on non-verbal criteria such as:

- (d) tendency to stand at lectern in Area A (c.f. Fig. 3.1): little movement within area: generally erect posture.

## 2. /semi/

May be characterised on verbal criteria such as:

- (a) preference for 'personalised' realisations using 1st and 2nd person plural pronouns and substitution of possessive pronouns for definite and indefinite article (e.g. "our classic condition was when we used to get down to the drains.....", "your dry arid soils which you'll find here")
- (b) a tendency to use less complex syntactic patterns (for instance coordination rather than subordination) and to resort to various forms of ellipsis, omission and apposition (e.g. "you'll get shrinkage taking place stresses and strains set up again and a tendency for the soil clods to be broken down", "...but you put it on the wet sieving equipment you'll find the aggregates'll break down")
- (c) a preference for 'general' rather than technical terms ("lumps, clods" rather than "aggregates"): heavy use of phrasal verbs and of "get" or "get + participle" (e.g. "come in" rather than "appear" or "is involved"; "fall off" versus "decline"; and



"you get conditions", "you'll get expansion", "get the seed bed prepared"): less reliance on nominalisation, e.g. "you...get very large number of small crystals formed" versus "the formation of large ice crystals"

May also be characterised on non-verbal criteria such as:

- (d) general preference for areas B and C rather than A. Relaxed stance (e.g. hands on hips; lean against blackboard using left hand and arm as support; if in Area A, lean on or over lectern); more movements, pacing a little within area occupied.

### 3. /inf/

May be characterised on verbal criteria such as:

- (a) preference for 'personalised' realisations as in 2(a) above, but including 1st person singular pronoun/possessive pronoun
- (b) in addition to elliptical forms and omissions, a tendency to leave syntactic patterns unfinished ("if you let it go too far...then obviously this was the something had to be done") or to lapse into ungrammaticality as well ("there was no stabilizing factors present", "now this was this was bad condition", "I haven't had time to do today")
- (c) lexical preferences as in 2(c) but a tendency to use slang or colloquial expressions ("stick it on the wet sieving machine", "shove the soil into a deep freeze", "instead of yanking up a block of soil"; "you got to watch it", "people turn round quite happily and say...")

- (d) occasional tendency to personalise inanimates, e.g. "your bacteria are going to attack all the organic matter they can lay their hands on"

May also be characterised on non-verbal criteria such as:

- (e) preference for areas B and D; free movement within area, relaxed posture, freer use of gesture.

4. /emph/

May be realised by the following resources, either separately or in combination:

- (a) verbal (e.g. "just doing exactly the same thing as you are doing" rather than "doing the same as you") including inversion ("into the laboratory they have to come") and interrogative forms ("and the thing was how did you get the process started")
- (b) gestural: a variety of reinforcing gestures, as indicated in the transcript
- (c) prosodic: use of exceptionally prominent stress, as in "'grass even 'grass was 'struggling." Only these prominent stresses have been marked in the transcript.

Two final points must be stressed regarding the manipulative functions. Firstly the characterisations are mainly stated in terms of tendencies and preferences, and no single criterion is relied upon in identifying which function is being realised at a

particular point. This is compatible with the view expressed earlier, that the essence of manipulation is a constant shifting of relative formality within the conventional constraints imposed by the situation. Secondly, /emph/ necessarily occurs concurrently with one of the other three functions - though generally speaking emphatic devices are more often associated with /semi/ and /inf/ than with /form/.

SECTION FOUR : Application of the Descriptive System in the Development of Teaching Materials - A Functional Approach to Aural Comprehension Practice

4.1 : Communicative Functions and Aural Comprehension

It will have been evident from Sections 1 and 2 that one of the principal objectives in embarking on this study was to find a basis for the development of practice materials in aural comprehension and in particular for the comprehension of extended lecture monologue. The descriptive apparatus demonstrated in Section 3 and in Appendix (i), might well be applicable to training in language skills other than comprehension: but in this Section its relevance specifically to sustained aural comprehension will be assessed and illustrated.

One may take as a point of departure two recent but influential papers by Wilkins on notional syllabuses (1972, 1973). He poses the question (1973, p. 131) "What are the notions that the..... learner will expect to be able to express through the target language?" He suggests that the answer to this question could provide an alternative to the structural and situational orientations in syllabus design of the nineteen fifties and sixties, and that "it should be possible to establish what kind of thing a speaker needs to say, what situational constraints will be operating and what linguistic forms are suitable for the encoding of his message." Although this study has not used the categories which he proceeds to outline, the approach

is very much in sympathy with the orientation he proposes. For the rhetorical functions that have been identified relate particularly to what the speaker wishes to say and to how he chooses to organise it into a structured monologue discourse; and the managerial functions identified here and in the Birmingham system and in Johns & Johns, relate to how the speaker contributes to response-based discourses.

Further, the class of manipulative functions which has been proposed clearly relates to Wilkins' concern with situational constraints and linguistic form. But the operation of these constraints should not be thought of as a deterministic procedure in which the speaker is propelled to a particular choice of expression purely by situational and conventional pressures, and we have drawn attention to the selection which the speaker must make within a range of acceptable alternatives of expression. We hope to have shown that this process of selection is a dynamic one, that it fulfils an important communicative function, and that it can be accounted for in a descriptive apparatus. However, two major points must be made regarding the adoption of such an approach to aural comprehension.

#### 4.1.1 : Production versus Reception

Firstly, Wilkins' approach suggests a notional view of the productive process, since it is centered on the speaker's encoding rather than on decoding by the listener. It appears to suggest a process conducted at three levels: the first would derive from what

the speaker wishes to say, and so would be the level at which the speaker determines the notional categories he will need to draw upon and how they will be arranged in sequences. At a second level the realisation of these categories for speech would involve a further process of selection from among the linguistic alternatives appropriate to the particular occasion. Both of these processes are presumably prior to a third level, that of speech production itself, which is not the immediate concern of Wilkins' papers. To put it in the terms adopted in this study, the rhetorical functions the speaker will require and their ordering in the discourse will be determined by what Wartoffsky (1968) calls the "conceptual framework" underlying a scientific communication. Overlying this first level will be the operation of manipulative functions, reflecting which attitudes the speaker wishes his listener to adopt towards him, how he would wish them to receive his communication. These functions determine which particular linguistic resources are used to realise the rhetorical functions: and at a third level, these linguistic choices would be processed into speech.

But we are concerned with the receptive process and with the strategies the listener must use to decode the message. These are best revealed by asking two kinds of question about the discourse. Faced with a stream of language, the immediate questions are, how is the speaker arranging his information, and why? Why does he choose to express it in this particular way? How does it build up into a message? Beyond this one may pose a different and essentially non-linguistic

question, but it is nonetheless the paramount question in comprehension: what is the speaker saying? What is the information he is trying to convey? It can be seen that the first set of questions relates to the linguistic realisations of notional categories, and to the selection and ordering of those categories, while the second kind relates to the underlying conceptual framework. If one accepts this series of assumptions, then one must suppose that the native listener scans the evolving discourse for signals which will help him to predict or to reconstitute the structure of the discourse, and at the same time searches beyond the reconstituted structure for the organisation of the information itself. One must also suppose that he uses his accumulating awareness on all levels to anticipate coming information and makes constant adjustments wherever the discourse fails to match his expectations.

#### 4.1.2 : The Receptive Process

The second point is that although Wilkins' approach implies a certain view of the productive process it is essentially a statement of pedagogical priorities, not a general conception of the speech process. In viewing the receptive process as in some respects the reverse operation one is proposing an orientation to syllabus and materials design, rather than claiming a basis in psychological reality for the levels and stages sketched above. Nonetheless it would be worth making a brief comparison with current suppositions about speech processes and auditory perception, as summarised by Cooper (1972)

and La Berge (1972). Most experimental work has concentrated on the lower or 'peripheral' levels of processing, but this has produced hypotheses about the higher levels of processing, mainly by positing mechanisms analogous to those found to operate at lower levels. It seems likely that productive and receptive processes both involve successive encodings (i.e. encodings of encodings) at different levels, and this in turn suggests that substantial preplanning must take place in order to coordinate, for example, segmental with suprasegmental units, (c.f. Liberman 1970). Cooper notes the complexity and quantity of information in the speech code, and poses the question "how can perceptual mechanisms possibly cope with speech signals that are as fast and complex as the production process has made them?" The likelihood is that auditory processing relies considerably on the mechanisms of production; evidence for this has come from investigations into the role of auditory feedback in the control of speech production, and from experiments measuring subvocalisation during reception (though concentrating on reading tasks rather than audition: c.f. McGuigan 1970). La Berge is anxious to stress that besides "borrowing" the productive mechanisms for perception, the listener probably employs different strategies for different comprehension tasks; also, the processing may be conducted simultaneously at different levels. He points out that if auditory signals were first converted into speech signals before interpretation, the reading of a sentence such as "The bouy and the none tolled hymn they had scene and herd a pear of bear feat in the haul" would present no problem in processing: in fact, electromyographic evidence shows that the more "difficult" a receptive task is, the more



pronounced subvocalisation becomes, which suggests that it is only brought into play when, and as far as, it is required for a particular task. La Berge cites experiments which show that if an expected stimulus is received, rather than an unexpected one, the subject processes more rapidly: the higher the predictability the faster the processing. He puts forward the hypothesis that the "subject may tune his analysers according to the stimulus he expects to receive and that, in addition, he can adjust himself to process that stimulus at a chosen level." If the input, for example, begins "the dog chased....." initial receptive processing may instigate a productive process at a higher perceptual level; this will attempt to complete, or to predict the completion, of the incoming signals: "the cat/the rabbit" might be items of high predictability and if they indeed occurred, the lower-level processing might be only partial, or would be by-passed. If correct, this hypothesis would have important implications for the learning process: initially considerable attention space would have to be devoted to the inward flow of information since prediction at all levels would be severely limited and all incoming signals would require equal scrutiny. But if the learner once reaches a stage where low-level processing becomes semiautomatic, or requires only partial scrutiny, or includes by-passing strategies, then attention-space will be available for the higher-level processes. These will include scanning for meanings, making inferences from them, predicting oncoming information. La Berge ends by emphasising that "there must be important information flows from higher processes outward to the perceptual levels" to allow the listener to cut down his perceptual processing time.

It would seem, then, that the assumptions implicit in the orientation we have adopted are at least in accord with informed guesses about actual auditory processes, even if experimental work to substantiate these suppositions has barely been broached. With this sketch of the receptive process in mind, we may turn to the foreign learner and to the difficulties he faces in aural comprehension.

#### 4.2 : Levels of Difficulty in Aural Comprehension

A useful catalogue of comprehension difficulties has been given by James & Mullen (1973). Their work with foreign students at Manchester University suggested that the principal sources of difficulty were: phonemic distinctions, speech rhythm, stress patterns and lexical stress, vowel reductions, juncture, unfamiliar grammatical patterns, idiomatic expressions and regional varieties. They felt that even though each order of difficulty may be overcome separately by selective practice and drilling, it is their co-occurrence in a natural speaking situation which the foreign student finds particularly baffling. One sees here an analogy with the processes outlined above; because the learner's inexperience constrains him to give equal scrutiny to all incoming signals, the very redundancy on which the native speaker builds is the foreign student's downfall. His failure is often sufficient to force him into a "retreat into print" and he remains deeply apprehensive of contacts through spoken English (p. 20). It will also be noticed that the kinds of error listed relate mainly to the lower levels of processing. One hypothesis might be that the native listener does not make errors of processing at such levels. An

alternative and more plausible hypothesis would be that the native listener does make errors at this level (though not so extensively), but that they are cancelled out or corrected in the course of higher-level processing, which would build on the evolving message rather than on the minutiae of speech signals. But the foreign learner does not have a developed capacity at this level; his attention space is entirely taken up with lower-level processing and in the absence of any firm grasp of the context or of the message, even the most fanciful interpretations become plausible.

One can therefore identify several orders of error corresponding to the levels of processing we propose above. The errors discussed by James & Mullen are mainly of a low order and arise through faulty auditory processing. A somewhat higher order of errors would be represented by an incomplete understanding of the discourse organisation; the student may miss many of the signals of transition and discourse markers, he may ignore the effect of devices of cohesion and he may be insensitive to the lecturer's manipulative strategies. Even if he performs adequately at these two levels, there is a yet higher order of error: he may be so occupied with the business of decoding and with the search for discursal patterns that he may well lose track of the information itself. In James & Mullen's words, he will be unable to "hold a continuous argument.....a line of thought in his head": and in the words of a foreign postgraduate at Newcastle, "we understand the English but we don't follow the lecture."

According to James & Mullen, to suppose that context will dispose of many of the lower-order errors is misleading, since the student's grasp of context will be incomplete or faulty - that is, because the student also commits errors of the second and third orders. But this should not be taken as an argument for disregarding the support which fluent processing at the higher levels could provide, and for concentrating entirely on resolving low-level errors in comprehension. The position that will be adopted here is that recent materials developed for training in aural comprehension and note-taking cater well for practice in lower-level processing, but that improvement could be made in techniques for higher-level processing. The suggestions and sketches which follow in 4.5 should be seen as complementary to them, and will be slanted towards helping to counteract low-level processing errors rather than asking straightforward "Content-questions" which have often characterised comprehension exercises based on longer stretches of discourse.

#### 4.3 : Some Aural Comprehension Materials

It would be impractical to engage in a broad review of aural comprehension exercises and practice available at present. Instead, consideration will be given to a small selection of materials or suggested materials for aural comprehension in ESP and "Academic English." They have been singled out, not necessarily for their proven merits, but for the different approaches to aural comprehension which they illustrate.

4.3.1 : Black (1971) outlined a programme proposed for EFL students in Finnish higher education, but gave few examples of the materials. In his scheme, taped talks and discussions were to be graded into Introductory, Intermediate and Advanced levels. Introductory tapes were to consist of readings from simplified textbooks, for example those aimed at lower secondary level, on general educational subjects: they would be read by a single speaker with a "standard pronunciation"; the readings would be complemented by tapes of a single speaker talking on an impromptu basis on a familiar subject. Intermediate material would be based on speeches such as radio talks, with a standard pronunciation; on impromptu talks with a "non-standard pronunciation"; and on impromptu discussion of topics at a low level of specialisation. Advanced level materials would consist of "carefully prepared speech" - which would seem to range from lectures read verbatim to comedians' patter and readings of poetry. In addition, there would be samples of speech in non-standard dialects and impromptu discussion at a high level of specialisation. Introductory texts would be of some five minutes' duration rising to a maximum of fifteen minutes for Advanced tapes. A range of exercise types were proposed, from blank filling, true/false and yes/no answers, checking on comprehension of lexical items and grammatical patterns, to exercises on making inferences and interpreting the speaker's intentions.

Although details of how this programme would be implemented are not given, a number of comments can be made on the basis of the outline, about its relevance to the Newcastle situation

and to the comprehension process. Firstly there is the question of length of tapes: whatever the pedagogical merits of beginning with five-minute talks, the goal must be comprehension of very extended discourse, and even the fifteen-minute talks at Advanced level may not equip students for sustained comprehension of a full lecture. In fact, the fifteen-minute limit appears to have been fixed for administrative reasons, to permit comprehension questions to be attempted, and the talk to be heard several times, in the space of one laboratory session. So far as the Newcastle students are concerned, the urgency of their situation precludes a slow graded approach and it would seem more fitting to introduce them to extended listening as quickly as possible. Secondly, one feels bound to question the grading of material by simplification and by resorting to talks specially prepared to fit the time limits imposed. There is no guarantee that the samples produced in this way will reflect the discourse of unrehearsed monologue. At least for the Newcastle situation, a better alternative might be to use extracts from longer lectures (recorded under natural conditions), but to make the extracts on the basis of major divisions identified in the discourse.

Black's exercises aimed "at recognition of sounds rather than comprehension of content" need not concern us. But several of the true comprehension exercises deserve comment. A 'classification by concept' exercise, which requires students to characterise sentences from the tape by selecting from a set of concept labels, is a promising proposal. However, the labels appear to be *ad hoc*

and their "correct" allocation seems to be somewhat arbitrary. Students are expected to connect "Some people enjoy seeing public accounts of their worst acts" with the concept-label "Vanity"; this strikes one as a highly subjective evaluation, and even if students guess the "correct" answer, the value of the exercise is dubious. There are exercises aimed at comprehending factual content and "developing an overall view of the entire passage", but this is accomplished by fairly traditional content-questions which really test whether students have grasped points of information, rather than whether they have grasped either the conceptual or the discourse structure.

Two further types of exercise are "interpretation of the speaker's intention" and "interpretation of emotive and figurative language." The first of these turns out to be content-related, and asks questions such as "what is the speaker's motivation in making this point?" but it could be developed to test whether students are aware of interpersonal effects, by asking questions about the speaker's intentions towards his audience. The exercises on emotive and figurative language could be developed to practise a broader set of strategies for identifying choices of expression and grasping the significance of one alternative as against another. This would be subsumed in the present scheme under practice in manipulative functions.

4.3.2 : An experimental programme reported by Mendelsohn and Klein (1974) shows certain similarities with the scheme offered by Black. The taped material is claimed to be a set of "lectures", but since they range

in length only from 3 minutes to 10 minutes, it is not clear whether they are extracts or specially-prepared short talks on the lines indicated by Black. Mendelsohn and Klein propose to extend the set by editing and re-recording samples of live lectures and radio talks. Presumably a teacher's voice would be used, not the original voice, since this would require highly skilled electronic editing. In any case, they evidently intend to "write in" to the edited text all the deictic and emphatic elements carried by gesture in the lecture, and to "improve" the diction. The result, one surmises, would be a recitation of spoken prose rather than a sample of spontaneous monologue (c.f. Section 2.4.2) and it is not clear what effect the severe editing would have on the discourse structure. It is encouraging that they intend to insert graphs and diagrams (where appropriate) in the transcripts: but this implies that the students will read as they listen, and the value of this practice might be called into question. Like Black, they intend to grade the material in terms of the degree of "naturalness", the difficulty of content, and regional variety, and also in terms of speed of delivery. Three levels of difficulty are to be identified on this basis.

In preliminary use of the materials several types of exercise relating to higher-level processing were adopted. Content-questions were supplemented by "writing down the main idea of a short part of the lecture" and by using the lecture topic as a basis for subsequent discussion groups. As in the case of Black, one presumes that "content", "ideas", "topic", imply subjective assessments of



parts of the conceptual organisation of the lecture, but it is not at all clear whether they bear any relation to discourse organisation. Yet it is interesting that they should find that "once the main idea has been isolated, everything else falls into place." Another set of exercises was used to test understanding of "innuendos and implications", but the exact method is not described. However, since they remark that "the types of questions asked were either too obvious or were concerned with very fine points" one is led to suppose that they concentrated on imputations about the lecturer's attitudes rather than on the language through which they were conveyed.

Mendelsohn and Klein included note-taking practice in their scheme, and evidently intended to develop it in the form of short extracts from a lecture, which presented "the most important parts" in abridged form. The student makes notes on the extracts, then hears the full lecture through once and takes supplementary notes: on the basis of his notes he then answers traditional open-ended comprehension questions. There appears to be no specific training in note-taking methods, and the practice is evidently introduced as an adjunct to aural comprehension. The presentation of focal parts of the lecture in abridged form is an interesting type of "guided" listening since it gives the student some idea of the structure of the lecture, and does so in the form of stretches of discourse which he will readily recognise when he comes to them: if he had first read a synopsis of the lecture, he would have an idea of its content but would have the problem of recognising the relevant portions of the discourse and correlating them with the synopsis.

4.3.3 : The 'Study Skills' Course developed at Lancaster University by Candlin, Kirkwood and Moore (1974) also uses note-taking as a part of training in aural comprehension, but it includes guidance in note-taking techniques. Comprehension of discussion groups (and participation) are dealt with separately in the course, and the following remarks are confined specifically to the practice given in lecture comprehension and in higher level processing. In one version of the practice the student listens to a recorded lecture of some 25 minutes, taking notes. He then compares these with a neighbour, and there is mutual correction and improvement of notes. In another version the note-taking phase is followed by discussion with a neighbour, then by listening to a 5-minute extract which is repeated in sections with intercalated comprehension questions requiring verbal responses. Mutual correction is carried out with a neighbour and the student then revises the entire lecture with the aid of a transcript. In a third version, the note-taking phase is followed by exercises in identifying stress and emphasis, with the use of a tapescript. Extracts then follow in exploded form and the student repeats the phrases, imitating the lecturer's prosodic patterns and pronunciation. This practice is sometimes interspersed with comprehension questions.

The use of long unbroken recordings of lectures which are natural and ungraded and pitched fairly near the student's level of specialisation, corresponds more closely to the Newcastle requirements than the other two schemes, since it offers practice in sustained comprehension and prepares students to deal with "real" lecture conditions in their own subjects. It is not clear whether a student

who is accustomed to short talks presented as spoken prose would be equipped to cope with full lectures. However, Candlin *et Al*, appear to offer no guidance during initial presentation of the recording: some form of guided listening might have been advantageous. The emphasis on repetition practice is also interesting in view of the discussion of the receptive processes in 4.1.3. If it is true that productive processes play an important part in higher level receptive processing, then the use of repetition drills might well help to stimulate aural comprehension. But some safeguard might be required to prevent repetition from becoming quasi-automatic, with the student imitating the sounds without paying heed to the patterning of the discourse or to the evolving message.

4.3.4 : A set of materials which is particularly pertinent to this study has been developed by Morrison (1974) specifically with the overseas students at Newcastle in mind. There are eight units, each consisting of a taped talk or discussion and a set of comprehension exercises. The tapes are drawn from radio broadcasts on science topics and are of five minutes' duration, or less. They are mainly dialogues featuring an interviewer and an expert, and only two are monologues. All the examples save one are of experts addressing the layman on a subject of general scientific interest, requiring no specialist understanding (c.f. Section 1.3.1). Indeed, one of the two monologues is from a schools broadcast aimed at lower secondary level: consequently it betrays discourse features peculiar to the "schools radio" *genre*, such as excessive repetition and back-tracking, heavy use of cohesive

devices, the argument broken down into very small steps. The extract which approximates most closely to the lecture situations which students are likely to meet in Newcastle, is from a "Study on Three" talk; but since it consists of a summary statement covering a series of preceding broadcasts, it is couched in rather general terms and is only a few minutes long.

In a typical unit, the student first hears the whole extract, then hears it again in sections with intercalated questions (generally of a true/false or multiple choice type). This is followed by blank-filling and other exercises concentrating on low-level processing and based on short extracts. They include use of stress for contrast, word recognition, common idioms, use of pitch to mark parenthesis, and various forms of blank-filling exercises. Exercises which practise higher-level processing consist of traditional comprehension questions answered with and without transcripts, use of stress as a connecting device, and "connection of ideas." This last exercise covers forms of syntactic cohesion and expressions of cause and result, comparison, illustration, where these are explicitly marked in the discourse. A solitary note-taking exercise appears in one of the units, but no guidance on note-taking is given, and it is not followed up in subsequent units. The units are rounded off by a rehearing of the entire talk and the answering of general comprehension questions.

The intercalated questions with which each unit opens tend to anticipate and help to correct misinterpretations deriving

from confusion of lexical items or from poor understanding of syntactic patterns: they generally do not relate directly to the development of the arguments or the structuring of the discourse. The content-biased questions at the end check whether students have extracted certain points of information, but do not guide them in a systematic way towards an understanding of the discourse structure. The exercises on stress and pitch contrasts are extremely useful, but are not developed to practise identification of major transitions in the discourse. The exercises on cohesion are a valuable contribution to higher-level processing even though they are demonstrated and practised only over short stretches of discourse and would, in our terms, only reveal the structure within, rather than between, episodes. In short, as with the other materials we have cited, the programme outlined below is seen as complementary to Morrison's approach. The practice he offers concentrates on developing an awareness of syntactic and lexical devices in discourse structure, and on checking whether points of information have been grasped. The intention here is rather to lead students towards identifying the broader structure of discourse through an awareness of the tactics adopted by the lecturer in his use of communicative functions.

4.4 : Suggested Syllabus for Aural Comprehension

4.4.1 : Aural Comprehension in the 'Newcastle Project' Syllabus

The syllabus format originally envisaged for the Newcastle materials was outlined in Sections 1.2.4 and 1.3.2 and in Figure 1.1. The materials which will be illustrated in the ensuing subsections

would fall into Column C in Figure 1.1; i.e. they illustrate how aural comprehension would fit in an oral-aural practice component within the optional specialised materials. The materials will fit vertically in that each Unit would concentrate on a different set of communicative functions, and will fit horizontally in that each component within a Unit will concentrate on the same set of communicative functions.

There is, of course, no logical necessity which dictates the order of presentation of functions, but certain preferences can be made on pedagogical grounds. First it would seem desirable to use the rank of Move as a base: early Units in the syllabus would then illustrate and practise the various permutations of Acts permissible for a given move and give practice in recognising the Move in spoken discourse. Later Units would concentrate on ways of assembling the moves into higher discourse units. Secondly it would seem desirable to place Asserting and Describing moves in the early Units of the syllabus because of their frequent occurrence (at least on the evidence of the data used). Bound moves would provide a natural sequel; because of their dependency they would have to be presented in conjunction with free moves introduced earlier. Similarly, Focussing moves could be presented in the earlier stages and Concluding and Summarising moves would provide a sequel. All the moves would reappear in later Units as the higher levels of discourse organisation are broached. In this way the syllabus would have a natural 'cyclical' form (c.f. Howatt 1974).

In the aural comprehension component, however, where the recognition of patterns in extended discourse must be an early priority, there would be a case for practising sustained comprehension from the very beginning in addition to practising recognition of the lower levels of discourse organisation. This arrangement will become clearer in the following subsection.

The proposed syllabus was to have covered 15 weeks at between four and six hours a week. A six-unit syllabus was envisaged, and this would provide some 20 - 30 hours' tuition per Unit; allowing for the fact that proportionately less time was to be allocated to the spine, the reading-writing component and the oral-aural component would each provide 8-12 hours per Unit. The aural comprehension allocation was expected to be in the region of 4-5 hours per Unit. This allowed ample time for practice in sustained comprehension using long samples of discourse, and in addition it was expected that the work would be undertaken on a semi-independent basis in the language laboratory, and could where necessary be completed in the students' spare time on a 'library' basis.

Each aural comprehension component could therefore be built around a set of tape recordings of lectures obtained by much the same procedure as that described in Sections 1.4.2 and 1.4.3. They would represent normal full-length lectures given under natural conditions and pitched at the students' level of specialisation. No concessions would be made in this respect, in contrast with the approaches described in 4.3.1, 2, 4, where level of specialisation, length of

lecture, grammatical and lexical features, delivery, were substantially modified in different ways. Instead, the 'concession' offered here lies in the amount of guidance offered during listening practice, and in 'splitting' the recording between two Units in the early part of the syllabus, as described below (4.4.2). For each discipline the syllabus is required to cover, an optional set of recordings would have to be compiled (c.f. Figure 1.1); it may not be feasible to obtain all of these in a short space of time, and one can envisage a transitional period during which students in related disciplines might use materials with a theme of common interest until a full set of options has been compiled. In all that follows, however, it is assumed that we are speaking of the layout for any single option within the complete set of materials covering the range of disciplines involved. For the purposes of illustration we will suppose that the option is Soil Science and that the recording already used as data has been selected as a sample lecture for aural comprehension.

#### 4.4.2 : The Aural Comprehension Component

The aural comprehension component of each Unit would consist of five phases of practice built round a sample recording: each phase practises a different aspect of aural comprehension. In the scheme which follows, various forms of practice of increasing difficulty or complexity have been devised for each phase, and as the student progresses through the Units he will meet increasingly more challenging forms of practice for each phase; in all, sixteen different forms of practice have been provided.<sup>14</sup>

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14. The term 'practice' is held distinct from 'exercise': a particular form of practice might be the basis for several exercises covering a common teaching point and following a common format.



Rather than lay out an entire syllabus in full detail, the different phases and the kinds of practice devised will be listed, and the Units in which they would appear will be indicated. Then the manner in which the forms of practice fit in the syllabus will be explained (see Figure 4.1). Finally, in Section 4.5, the different phases and types of practice will be explained and illustrated in more detail.

Phase A : Practising recognition of discourse structure at the rank of Exposition and above.

Practice 1 (Units 1 - 6) Punctuated Listening.

Practice 2 (Units 1 - 3) Comprehension check.

Practice 3 (Units 4 - 6) Identifying the function of an episode in terms of its place in the discourse.

Phase B : Practising recognition of discourse structure at the rank of Episode.

Practice 4 (Units 1 - 3) Identification of the focussing move and propositional element.

Practice 5 (Units 3 - 4) Identification of concluding and summarising moves.

Practice 6 (Units 5 - 6) Identification of main points of transition and development at rank of episode.

Phase C : Practising recognition of discourse structure at the ranks of episode and move.

Practice 7 (Units 1 - 3) Identification of asserting and describing moves.

Practice 8 (Units 3 - 4) Recognition of bound moves.

Practice 9 (Units 4 - 6) Recognition of reformulations, parenthetics, asides.

Practice 10 (Units 3, 4, 6) Recognition of relating moves and of forms of metastatement.

Phase D : Practising recognition of manipulative functions and recommending moves.

Practice 11 (Units 1 - 3) Recognition of indicators of formality.

Practice 12 (Units 3 - 5) Recognition of indicators of informality.

Practice 13 (Units 4 - 6) Recognition of indicators of emphasis and of recommending moves.

Phase E : Notetaking and repetition practice.

Practice 14 (Units 1 - 3) Guided notetaking.

Practice 15 (Units 4 - 6) Unguided notetaking and *précis*.

Practice 16 (Units 1 - 6) Repetition of extracts.

It will be noted that the different types of practice under each phase often overlap in a given Unit (e.g. Practice 4 and Practice 5 both appear in Unit 3). The distribution has, however, been carefully balanced in each Unit. In the first two Units the listening practice

will be based on a full recorded lecture split (at the nearest convenient Exposition boundary) into two sections. The first 25 minutes or so would provide listening practice for Unit 1, the second 25 minutes or so would form the basis for listening practice in Unit 2. To ease the burden on students in the earlier Units still further, only seven forms of practice are included in Unit 1 and Unit 2. For Units 3 and 4, a fresh lecture is used but is again split in two sections; this time, however, there are eleven different forms of practice. In Units 5 and 6 there would be a full fifty-minute lecture for listening practice in each Unit. The extra time required for listening is offset by having only 9 forms of practice, though they are generally more difficult than forms of practice in the earlier Units. This balance is illustrated in Figure 4.1 below:-

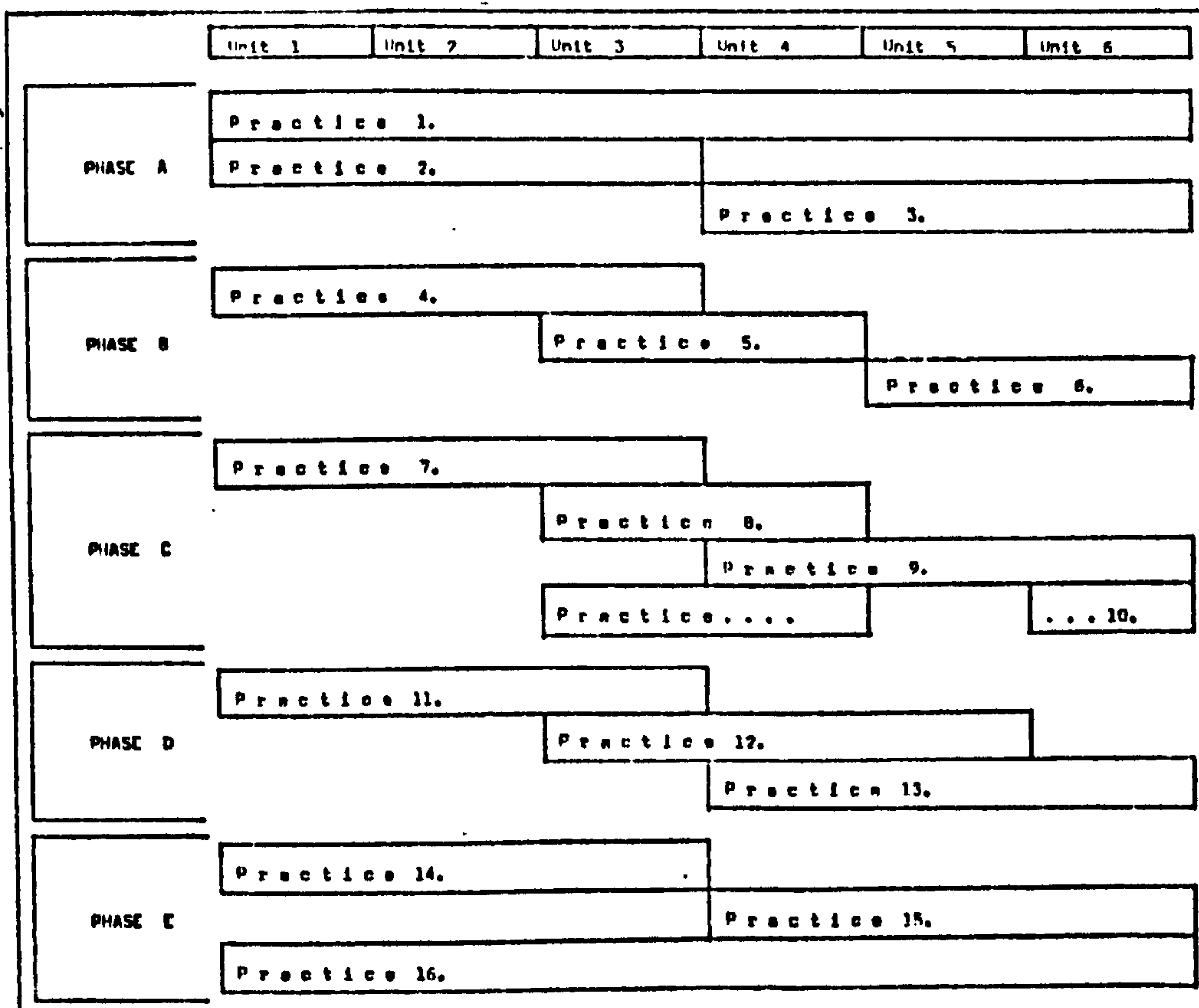


Figure 4.1

4.5 : The Phases of Aural Comprehension Practice

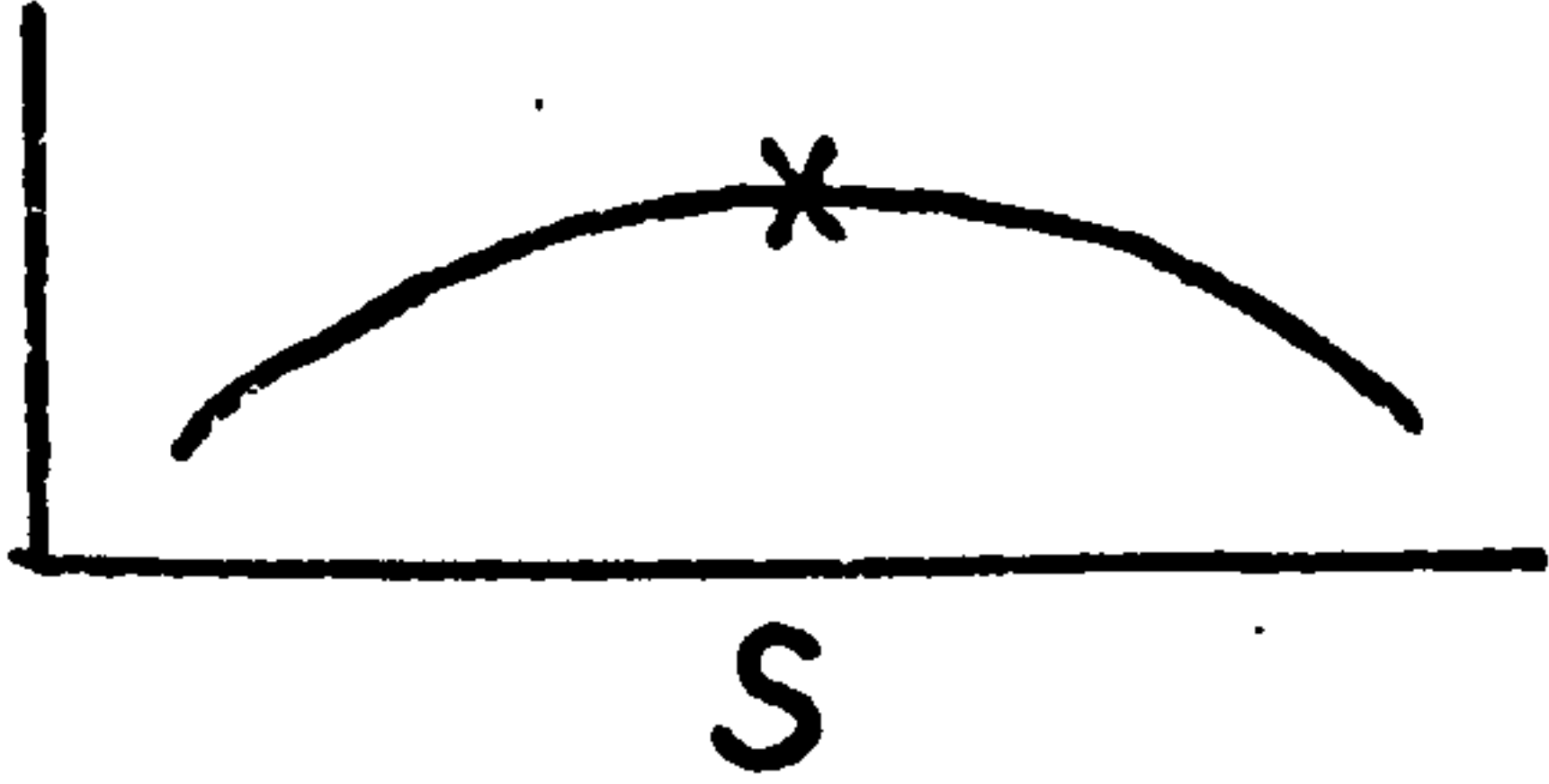
Each Phase and form of practice and their place in the syllabus will be discussed and, where necessary, illustrated drawing on the lecture transcribed in Appendix (i) for examples. The illustrations will generally be of the practice to be undertaken by the student. However, since self-instruction would be an important feature of the scheme, some of the illustrations will be of the initial instruction and guidance that the student would receive before embarking on the practice itself.

4.5.1 : Phase A

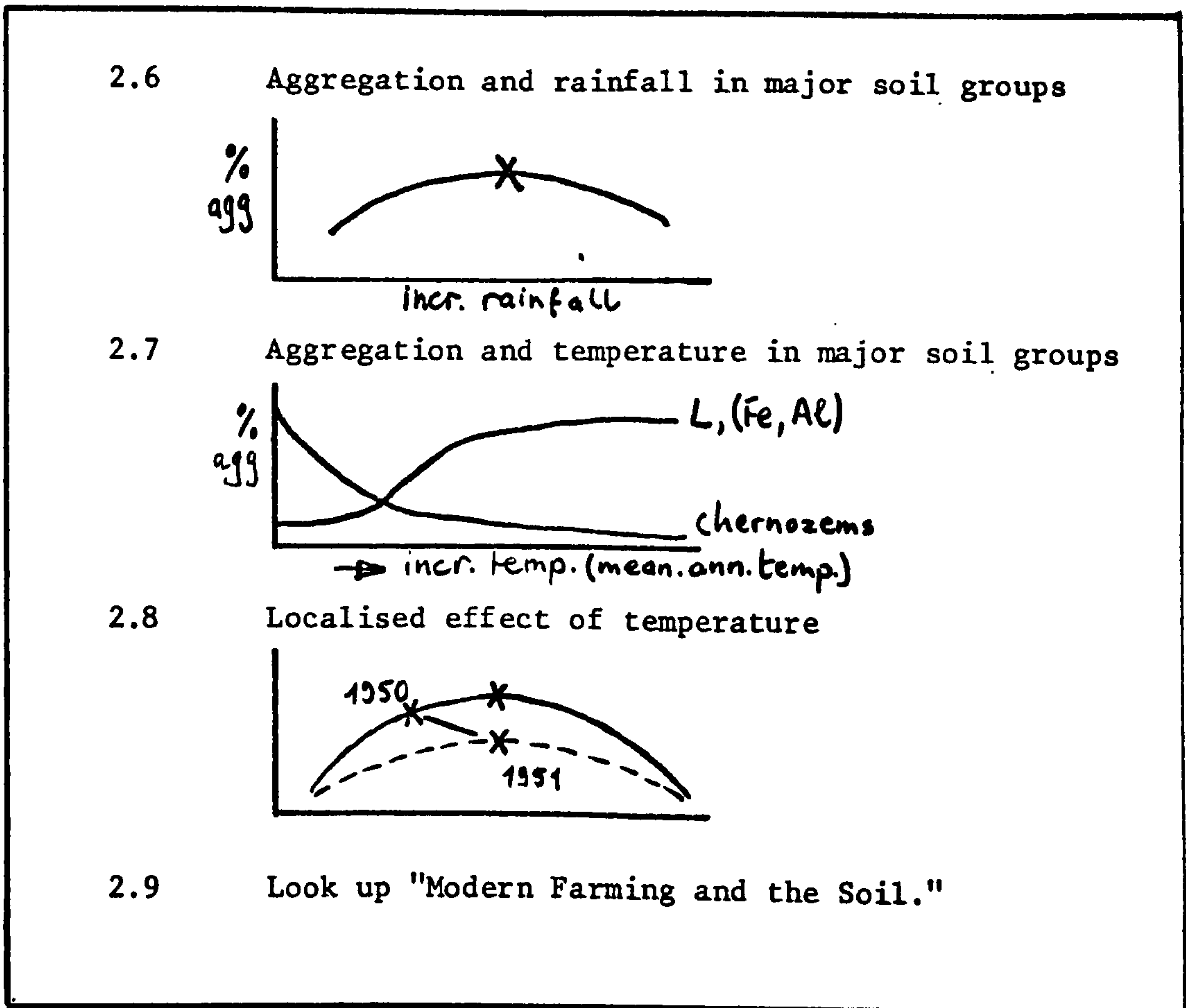
Practice 1 : It was noted in Section 4.3 that comparable materials for comprehension practice usually begin with listening to a recorded extract which is generally quite short and often interrupted by comprehension questions. The latter should be aimed at guiding the student through the passage rather than directly testing comprehension, and they are well illustrated in Morrison. However, if one uses even as much as one half of a standard lecture for sustained comprehension, the student may have considerable difficulty on the first hearing; yet the relatively larger number of intercalated comprehension checks that would be required might hinder rather than aid comprehension. In any case, these questions generally refer to points of information rather than to the structure of the discourse, and so it was felt that they should be replaced by a device which would genuinely indicate discourse structure without unduly interrupting the students' concentration.

Practice 1 therefore consists of 'punctuated' listening practice. The entire recording or extract will be heard in an unbroken stretch, but a superimposed voice will indicate the main points of transition at the ranks of Episode and Exposition. However, these terms will not be directly employed since the terminology is in itself of no relevance to the learning process. Instead, the familiar word "Part" will be used to indicate expositions, and episodes will be denoted numerically. The commentator's voice level will be adjusted to be plainly audible but discreet, and will be timed as far as possible to fall within the central pause described under 'pros' in Section 3.3.5. Students will hear superimposed, "Part one.....one two.....one three..... one four.../...Part six.....six one.....six two.....etc. The students will be provided with a work sheet which will serve two purposes. It will indicate in short terse headlines the approximate topic of each exposition and episode, and will also include sketches of any relevant diagrams or illustrations. A sample of a worksheet for the lecture transcribed in Appendix (i) (starting from p. 169) might be as follows:

<u>Part 2</u>	<u>Climate</u>
2.1	Climate affects aggregation
2.2	Effect of frost
2.3	Effect of moisture
2.4	Effect of temperature
2.5	Seasonal changes in aggregation

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Students would be allowed to wind back and re-listen at will until they are satisfied that they have a general grasp of the lecture even if certain details puzzle them. The teacher would be available for consultation for at least a part of this practice. Students would then progress to Practice 2.

Practice 2 : This would consist of fairly traditional content-oriented comprehension questions which would check whether students had grasped the main topics of the lecture. Rather than pick on random points of information, however, the student would be directed to a portion of the text, which he would re-hear several times before giving a summary-type answer. The point of this procedure is that his listening and answering

are tied to units of discourse rather than to random points of information. A worksheet for this practice might appear as:-

1. Wind to Part 2.4 of the Lecture. Listen very carefully to Part 2.4 and 2.5 several times, until you are prepared to make a summary. Do not write anything down until you are ready - then try to make the summary without listening again:-
2. Now write a summary of 2.4 and 2.5; your summary should include answers to the following questions:-
  - (a) Why are aggregates less stable at higher temperatures?
  - (b) Will this effect be very noticeable in the field?
  - (c) Which processes of stabilisation would you associate with spring and summer, and which with winter?
  - (d) What is the explanation for these processes?

The intensive listening and summary-writing would, of course, be confined to a few extracts each running for two or three episodes.

Practice 3 attempts to increase students' awareness of discourse structure by showing the function of an episode in terms of its place in the discourse. The questions posed relate to content rather than to discourse structure, but the answers the students supply should help them to see how the passage in question connects with the rest of the discourse. Naturally, to achieve this it is necessary that they should hear the episode again in the context of a longer portion of the discourse: in the following illustration an entire exposition is re-heard.

1. Wind back to Part 3 of the lecture, and listen to all of 3.1 - 3.7. Listen especially carefully to 3.6. Your worksheet will guide you.
  2. Now try to answer these questions about 3.6:-
    - (a) The lecturer begins by talking about "letting the soil go too far." In what way has it gone "too far?" What example did she give earlier of a soil that had deteriorated badly?
    - (b) The lecturer says "it's all very well saying, 'Put that soil back into grass'." What difficulties did she mention earlier in establishing grass on deteriorated soils?
    - (c) The lecturer says "it was economic circumstances - that's what did it." What farming practice had farmers been forced to adopt by economic difficulties? How did it affect the soil?
    - (d) The lecturer mentions a field that had been in arable for twenty years without deterioration. How is this remark related to the question the student asked at the beginning of 3.1?
    - (e) In 3.7 the lecturer asks you to look at soils during your field classes and try to guess what rotation has been used and what condition the soil is in. How would the things she talks about in 3.6 help you to do this?
- ... etc.

4.5.2 : Phase B

These forms of practice are aimed at improving recognition of moves, rather than of episodes, and at leading the student to see how moves are assembled into episodes.

Practice 4, since it concentrates on focussing moves, is a natural candidate for the first three Units. Students will hear a complete episode drawn from the lecture, without commentary, several times. They will then look at a transcript of the episode and listen again; they will be required to mark off the focussing move and to underline the



propositional element. An example of the initial instruction and guidance that they would receive, might be:-

1. Listen to Practice 4, Exercise 1 on the tape. You will hear a part of the lecture: listen several times if you wish, until you are ready to try the exercises. We will do Exercise 1 together to help you.
2. Now look at the tapescript and read it while you listen once more:-

"now the cultivation question the effect of cultivation on aggregation is a function of the soil moisture content at the time of the operation now two lectures ago we spoke about the ataberg limits and you'll see here how cultivation can play its part in providing a suitable seed bed you can get an ideal aggregate distribution by cultivation but remember unless the stabilising factors are present at the same time your cultivations not going to be very much good what you want is to get the soil cultivated get the seed bed prepared if your stabilising factors are there right your aggregation will remain stable if theyre not there the aggregation in the soil will continue to break down and you will get conditions that are not suitable for germination so that um you could say that any mechanical disturbance of the soil itself will produce a change in the aggregate size distribution but will play little part in the stabilisation"

3. The extract is about aggregation and c\_\_\_\_\_.

The lecturer says that cultivation will only be effective if _____ are present in the soil.	cultivation
Aggregate stability depends on the s_____ m_____ c_____ of the soil.	stabilising factors
Therefore the effect of cultivation on aggregation depends on (is a f_____ of) the soil moisture content.	soil moisture content

Now look back at the beginning of the extract: Which phrase introduced the idea of cultivation?	function
And which phrase showed the relationship between aggregation, cultivation and moisture content?	the first phrase
The main idea of the extract is cultivation: the main idea of the lecture is aggregation. So we could say that the ___ and ___ phrases make a kind of introduction to the extract.	the second phrase
Mark them off in your transcript by putting a stroke (/) after the second phrase. But which one introduced the <u>main idea</u> of the extract? Underline it.	first second
So we can say that the first part of the extract in ___s the main ideas, and the next part of the extract d ___s them.	the first phrase
Now listen to the extract for Exercise 2 and try to underline the main idea and mark off the introduction in the same way.	introduces develops

Practice 5 would be on the same lines as Practice 4, though concentrating on concluding moves and summarising moves; a short programme of the kind above would aid students in identifying the relevant portions of discourse and several exercises based on episode-length extracts would follow.

Practice 6 is more challenging, and is only introduced in Units 5 and 6: it is in some ways a synthesis of Practices 4 and 5, but also relates to Practice 3. Students would hear an extract covering three or four episodes, without commentary, and would be asked after

initial listening, to go through the extract several times, tackling a fresh task each time. Step 1 would be to listen for the prosodic markers of transition and the verbal markers, and to split off the episodes on an unpunctuated transcript of the extract. Step 2 would be to identify the focussing move and propositional element, and Step 3 to identify the concluding moves. Students then have before them, in effect, moves arranged in the F E C structure of episodes, and the 4th Step would be to answer a few fairly conventional comprehension questions about the 'development of the ideas' at E in each episode. The extract will then be presented again at the end of the Unit for repetition practice (c.f. Practice 16) for further reinforcement.

#### 4.5.3 : Phase C

The aim of this phase of each Unit is to foster an awareness of how Moves consist of permutations of Acts. We suggested earlier that the Move was the most appropriate unit for pedagogical purposes: here we would still work in terms of the move, but while holding certain acts constant others would be substituted so that students would see how different permutations can be made within the move.

Practice 7 This would concentrate on the identification of asserting and describing moves. Students would first hear each of the moves as exemplified in the materials and would be guided by programmed instruction to identify the act appearing at head. They would then

hear several invented examples of the move and would be asked to circle the act at hand. Questions would be posed for each example which would lead students to identify the move as an assertion, say, rather than as a description, or as a process description rather than as a stative description.

Practice 8 In order to practice recognition of bound moves, students would be asked to listen to short extracts consisting of two moves, the first free and the other bound, as in:-

"if you did your wet sieving technique with water say at 5 degrees centigrade and repeated it with water at 50 degrees centigrade you'd find that the aggregates are less stable at the higher temperature now I think this possibly due to the effect of surface tension the change in surface tension and viscosity of the water."

A short programme would instruct them first to identify in the transcript the process description, with its two causatives and common resultative ("if you did....higher temperature") then to identify the bound move as an explaining move ("now I think.... viscosity of the water"), and to differentiate it from other bound moves. They would then complete an exercise repeating the procedure with several examples. The practice falls within Units 3 and 4, and two bound moves would be dealt with in each

unit: students would be expected to distinguish between the two moves in each case, and in the final exercise of Unit 4 would be expected to identify all four moves.

Practice 9 A fairly straightforward technique would be used to differentiate between reformulations, parenthetics and asides. Examples of each would be presented in the context of a preceding and following Act. Students would first hear examples of asides, and a short programme would be used to help them to recognise that the aside does not form a direct part of the discourse. Then they would hear examples of parenthetics and would be asked to note the modification in pitch range and the fact that the parenthetic does not appreciably modify the act with which it is associated. Lastly reformulations would be presented and their substantial modification of the associated act would be stressed. In an ensuing set of exercises contextualised taped examples would be presented in mixed order with a transcript, and students would be asked to underline the relevant portion and say which act it represented.

Practice 10 A short programme would introduce examples of the different forms of metastatement, and an exercise would practise distinguishing between the different forms, using short examples and a tapescript in the manner explained above. Two subclasses would be dealt with in each of Units 3 and 4. In Unit 6, students would be required to identify relating moves, using the technique described for practice 4 on a set of exercises in which they would pick out

the relating move in a short taped extract.

4.5.4 : Phase D

Practice is given in recognition of manipulative functions and of recommending moves both to make students more aware of the persuasive tactics open to the lecturer and to help them to draw inferences about the lecturer's attitudes towards the material he is presenting and towards the students themselves.

Practice 11 The student is presented with examples of /form/ drawn from the taped lecture and a short programme draws his attention to both the syntactic and the lexical choices made in such assertions as, "a distinction should be made between the methods used for the assessment of aggregation the measurement of aggregate size distribution in the soil and the assessment of its stability." The features which mark the extract as formal have been described in Section 3.5.2, and these would be incorporated in the programme. The student would then work on taped examples with mixed levels of formality and he would be asked to identify those cases which are formal.

Practice 12 follows exactly the same pattern but first presents examples of /semi/ and /inf/ and then requires the student to identify them in a mixed selection.

Practice 13 consists of briefly presenting different kinds of emphasis, and requiring students to judge their relative force. Examples of recommending moves would then be introduced and

identification practice given on the lines of Practice 4. Finally, examples of recommending moves in conjunction with /emph/ would be given, and students would attempt to judge their relative force.

4.5.5 : Phase E

This consists of notetaking practice and repetition. It could be argued that both transmediation and oral production involve somewhat different skills from aural comprehension: but in view of the discussion of higher-level processing in Section 4.1.2, there would seem to be a strong case for associating productive activity in a controlled and limited way with receptive practice, in order to reinforce and enhance skill in aural comprehension. Notetaking has a natural connection with the aural comprehension of lecture discourse, and as we saw in Section 4.3, it has been incorporated into aural comprehension in several recent courses. It should be stressed that the materials proposed here are not intended to teach techniques of notetaking (how to abbreviate, how to use symbols, when to write, how much to write, etc.). This is seen as an important but separate enterprise; it should certainly feature in any course for overseas postgraduates but is not a part of this syllabus. One could regard Practices 14 and 15, as a bonus, as further practice in notetaking techniques already introduced in some other part of the course, but here linked with a taped lecture whose structure has been made evident in the earlier forms of practice.

Practice 14 In order to ensure that notetaking is tied to the

discourse structure and does not become merely random jottings, guided practice is given in the first three Units. In Unit 1, students would listen to a single sample episode: a short programmed text would help them to identify the F E C structure, anticipating to some extent Practice 6. Here, however, they would only be expected to look for a 'main idea', for its 'development' and a possible 'summary.' The programme would then assist students to build a short note covering the salient points of the episode. Assuming that the episode in question was Number 31 in the transcript in Appendix (i), and that the earlier part of the programme had already introduced some of the terms, this stage of the programme might appear as:-

Now, the main idea in the extract is that it would be useful to _____ moisture content over the whole _____.	
This would offer a guide to changes in _____ distribution.	monitor year
So we could make a short note like this (a) :- "_____ m.c. all year → guide to _____ changes."	pore size
This idea was developed by explaining how _____ blocks, for example, could be put at _____-inch intervals in the soil profile.	monitor pore size
So we could add to the note (b) :- "e.g. _____ blocks at 4" _____."	moisture four
The lecturer concluded that this was a _____ guide to changes in the _____ of the soil.	moisture intervals





investigation before it can be decided whether mimicry does indeed enhance comprehension, and if so what form of repetition would be most appropriate. All one can offer by way of justification at present, beyond the discussion in Section 4.1.2, is an entirely subjective observation, that groups of ESP students on whom the method has been tried in the past have felt that their aural comprehension has benefited from laboratory repetition of recorded comprehension passages.

The form of practice proposed here follows a repetition technique used in sample materials developed for the 'Spine' of the syllabus, (see footnote 2, Section 1, p. 5), as part of the 'Newcastle Project' (c.f. Section 1.2). Elements of one or two utterances are repeated with progressive expansions until the student is repeating the full utterances. It was argued that this method would enable students (a) to repeat rapidly without stumbling over unfamiliar sound patterns (b) to build up to fluent repetition of long utterances (a task which presents considerable difficulty if students hear the full utterance and have to repeat the full form immediately) (c) to retain a better notion of the intonation and stress patterns of full utterances, and (d) to gain a better impression of utterances in natural speech - foreign students, to use Widdowson's distinction, tend to speak in locutions. An example of such a 'build-up' could be as follows: it is assumed that the student would repeat immediately after each fragment:-

"now in the laboratory  
now in the laboratory  
you 'saturated these soils  
you 'saturated these soils under what 'should have been  
under what 'should have been if you'd done it 'properly  
under what 'should have been if you'd done it 'properly  
under what 'should have been if you'd done it 'properly a 'two  
centimetre 'head  
under what 'should have been if you'd done it 'properly a 'two  
centimetre 'head  
now in the laboratory you 'saturated these soils under what  
'should have been if you'd done it 'properly a 'two centimetre  
'head"

Having worked through a series of expansions on these lines, covering an extract one or two moves long, students would hear the more conventional 'exploded' version of the extract for a final repetition. The length of extract would increase from one or two moves in Unit 1 to an entire episode in Unit 6.

#### 4.6 : Conclusion

This study began by describing a particular set of problems encountered in teaching English to overseas postgraduates in a particular institution. But what attracted us to the Newcastle situation in 1971 was a feeling that it was representative of the difficulties faced by many other institutions proposing to offer EFL tuition to students specialising in a variety of disciplines and studying them or researching in them through the medium of English. It is hoped that some of the solutions which have been suggested here

will prove to be applicable to the development of a range of ESP teaching materials.

Aural comprehension has been used to illustrate possible applications of the descriptive system because it is one of the student's most urgent requirements when he arrives at the receiving institution, and priority must be given to the development of suitable practice materials. But the approach could well be applied to training in productive skills, particularly to the verbal presentation of reports and research proposals; for there are various speaking situations in which overseas students may be called upon to produce sustained monologue. Although the differences between written discourse and monologue were stressed in Section 2.4.2, the similarities are nonetheless sufficient to suggest that the descriptive apparatus might be helpful in developing a functional approach to written discourse, and eventually in the production of reading and writing practice materials.

The system has certain shortcomings, of course, and would no doubt benefit from application to a larger body of data. It was suggested in Section 3.3.4 that the distribution of rhetorical functions may well vary from discipline to discipline and even from one topic to another: the system would be considerably refined if it were called upon to handle samples of discourse from a carefully selected range of disciplines. The system is clumsy in handling discontinuous relationships at the rank of move: it is quite possible

that in the sequence  $c_1 + res + q$ , the qualification relates to the causative rather than the resultative, and one could envisage circumstances where several acts might intervene between the two.

What is more, it also fails to reveal complex discontinuous relationships at higher levels of organisation, where a sequence of episodes, say at D in the structure of an exposition, may not be contiguously related. In the sequence  $\dots m \ n \ o \ p \dots$ , it is quite possible that n and o both depend directly from m, rather than o being related linearly through n to o, and it is also quite possible that they do not relate at all to p, that the line of argument runs from m to p, leaving n and o as digressions. Of course, we have been concerned with coherence rather than cohesion, and many of these discontinuous relationships may well be indicated by devices of cohesion. But it must also be said that just as the level of discourse impinges upon the grammatical level at one end of the scale, so also does it impinge at the other end on the level of content. Though content analysis is clearly not a linguistic enterprise, there may be pedagogical benefits to be derived from investigating the organisation of the information itself. As we noted at the beginning of this Section, in 4.1.1, the paramount question in comprehension is 'What is the information the speaker is conveying?', and at least in the case of aural comprehension there is some justification for examining the logical relationships inherent in the information conveyed.

Despite these shortcomings, it is felt that the descriptive

system has provided a coherent account of the structure of extended monologue, and that this in turn can form the basis of comprehension practice materials aimed specifically at an increased awareness of the patterning of lecture discourse. One hopes that it will equip the foreign student to extend and sustain his understanding of the hours of lectures and talks to which he will be subjected, and that he will less easily succumb to a seemingly endless flow of words.

A P P E N D I X ( i )

1. Conventions of Notation

In devising the annotation adopted here, the object has been to indicate the main divisions of the discourse, yet to leave the transcript clearly readable. The word-level transcription is represented as a continuous unpunctuated text in which all identified pauses are denoted by an equal space.

Expositions are indicated by the abbreviation EXP and a roman numeral in the margin at the head of each page.

Episodes are indicated by the prefix E and are numbered consecutively through the text: they are also marked off from each other by a line across the page.

Moves and Acts are noted immediately beneath the line of the text, as near to the point of initiation as possible; the initiation of a Move is also marked off by a short vertical line. Where one Act is inserted within another, it is represented in brackets. Where an Act or Move is only provisionally designated, it is represented within inverted commas. Intonation and stress have not been noted since a tape recording accompanies the transcript, save that prominent stresses coordinated with gestures have occasionally been indicated.

Diagrams, Gestures and Movements of the lecturer within the room

(c.f. Figure 3.1) are depicted on the intervening half-sheets. Their point of occurrence is indicated by an asterisk in the transcript, and where a sequence of gestures occurs, their order of occurrence is made clear by numbering the asterisks. It should be understood that these non-verbal resources are regarded as an integral part of the Act designated for the portion of discourse within which they fall.

The following conventions have been adopted to denote hand gestures:-

•	= hand unused
—	= hand flat, horizontal, palm downwards
∪	= hand flat, horizontal, palm upwards
	= hand flat, vertical plane, fingers facing forwards
6	= hand in vertical plane, fingers curved towards palm
∪	= hand in horizontal plane, palm upwards, fist loosely closed
○	= hand in horizontal plane, palm upwards, fist clenched
☞	= hand in vertical plane, fist clenched.

Hand position and movement are as viewed from audience, thus — → • indicates Lecturer's left hand is unused while the right hand describes a leftward movement. All gestures assumed to be located in front of Lecturer's body unless otherwise indicated.



2. Annotated Transcript of Text JP/L (Soil Science)

Subject : Soil Physics.

Lecture on Aggregate Stability to  
Final-Year B.Sc. Students.

Source : Recorded at the School of Agriculture,  
University of Newcastle upon Tyne,  
16th November, 1971.

Duration : 47 minutes (approximately).

Setting : Small lecture room, no fixed furniture;  
17 students present.

standing in Area B.

look round class

move towards lectern, Area A., and....

....read from notes, glancing up.

EXP  
I

E1. / I think it would be useful if / \*we just look at the effects  
 of the farming system on the formation and degradation of  
 aggregates because this is the linkup between the / /  
 lecture I gave you last week and the work that we did  
 at netherton in the field and the lecture that was given  
 at the week afterwards in other words the linkup between your  
 soil physics lectures and ah the soil management I'm  
 just going to spend a few minutes on this because you can  
 ah then look at the netherton work and just see how  
 you can relate this \*to what I have been saying both  
 this week and in previous weeks and also to what you've  
 been doing in your practical classes

E2. important variables that I want you to remember are  
 firstly the potential of the plant roots to form and  
 destroy aggregates secondly the effect of your farm-  
 ing system on the bacterial population this is think-  
 ing about the farming rotation that you're practising and  
 lastly we'll put it in here cultivation effects

E3. / / with regard to the potential of the plant roots here  
 you've got pressures exerted by developing rooting systems / /  
 now this is associated with both aggregate formation and break-  
 down you get root penetration into large clods which  
 will break up into the smaller more desired size of  
 aggregate and you also get the opposite action when your  
 non-aggregated material may be emmeshed and compressed into

EXP

I

aggregates | now wherever you have active rooting you tend  
 to have dehydration | ASS<sup>mark</sup><sub>1</sub> st<sub>1</sub> /form/ and I emphasised last\*week to you / /  
 that dehydration is a process of stabilization | when clays  
 become dehydrated | DES<sup>c</sup><sub>1</sub> /semi/ and they are more stable in the soil /  
 if roots are actively withdrawing water from the soil | CON<sub>3</sub> st<sub>4</sub> then  
 roundabout that rooting system you're going to get dehydra-

tion taking place | pros FOC<sub>2</sub> mark<sub>1</sub> ord to come to the second point / /

E4.

the effect of your rotational system on the bacterial population  
 prop<sub>2</sub>

/ / wherever you have active roots you will have active bac-  
 terial populations | ASS<sup>st</sup><sub>1</sub> /semi/ and here again you're introducing / /  
 another phase | REL<sup>meta</sup><sub>2</sub> of the stabilization process your bacterial  
 waste products | and as long as these are being continually  
 produced | DES<sup>c</sup><sub>1</sub> your aggregation ah will be stabil-  
 ized | CON<sub>3</sub> st<sub>4</sub> so that these two things really tie up together | pros FOC<sub>2</sub> mark<sub>1</sub> now

E5.

remember plant species differ in their effects | st<sub>1</sub> /emph/  
 effectiveness as aggregate producers | the size and shape  
 of their rooting system's going to be | ASS<sup>st</sup><sub>1</sub> important here / /

remember at netherton I told you about that dreadful weed  
 DES<sup>meta</sup><sub>3</sub> /inf/ rush in comfrey that had come in | st<sub>3</sub> where you have that very  
 / / strong tap-root going right down into the soil break-  
 ing up soil clods very effectively | grass varieties differ  
 / / in their effectiveness | ASS<sup>st</sup><sub>1</sub> as aggregate producers as well  
 / / because they | st<sub>5</sub> I think this has been proved on one  
 or two occasions though there are not a lot of figures out on  
 this work | but if you go into the field and look at differ-  
 ent varieties | DES<sup>c</sup><sub>1</sub> of grasses investigate what's underneath them / /  
 ref

return to Area A, consult notes and...

...look up from same, eyebrows raised...

...lean forward

lean right over lectern, elbows  
resting on same

downward gesture on stressed

"know"      6 .  
                 ↓

EXP  
I

you soon find out that some produce fairly effective / /  
res  
stable aggregation whereas others are not so good at  
CON3 st4

this pros \*it's unfortunate that one of our very worst agricultural  
"FOC2" pros st4 /form/

E6. weeds produces one of the best aggregation I've ever seen can  
anybody tell me what they think it is I said /inf/ one of our worst  
ref  
especially where cereal growth is concerned /emph/

M.S. wild oats

L. no not not a cereal a grass come on what's the main  
one that we're trying to bl1

M.S. couch )  
F.S. couch ) [overlaid]

L. yes

M.S. whickans

L. whickans or couch call it what you like that is one of the  
prop1  
most effective aggregate producers I have ever seen /emph/

/ / \*if you look at a field that has been cultivated and  
JUSc1  
/ / er especially one that's perhaps been ploughed  
ref  
/ / where you know \*there has been couch infestation / /  
q /semi/

and you look at the area where the couch is dominant  
c1

/ / you'll find a tremendous difference in the soil | it's  
st5 DES3 st3  
much more friable it's aggregated it's in first class  
ref

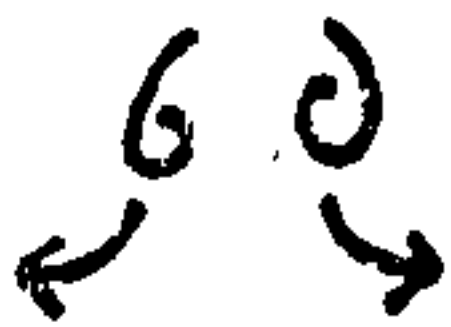
physical condition | but unfortunately with a weed like couch  
QUA mark2 st1

/ / it dominates everything else so that if the couch is  
res

there you can't grow anything else | this is why we're / /  
JUS st5

battling against it | but in fact it is one of the very best  
ASS st1

/ / aggregate producers and no doubt stabilizers in the  
/emph/



'throw away' gesture

[Class relaxes]

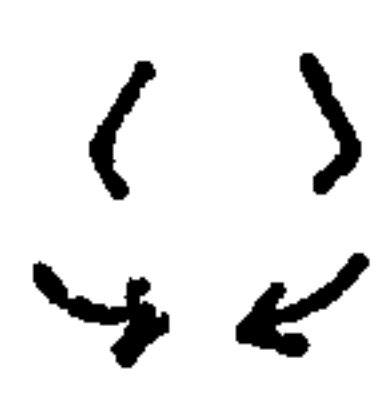
shrug shoulders

shuffle notes

smile....

smile fades abruptly

hands brought together at chest level, fingers interlaced



downward gesture on stressed "con'tinuous"



consulting notes again and....

EXP  
I

business because of that rise roam system once it starts  
 / / it'll go through anything and eh soils cloddy in  
 nature just broken up completely | \*so-that um though we  
 criticise couch remember that it does act in this  
 fashion and in some cases one might wonder on very bad soils  
 whether it would be worthwhile to let couch have its head  
 / / and then destroy it once you've got the aggregation  
 back this is something that might well you might well / /  
 \*seek to practise I know on our own farm we could practise  
 it in one field particularly well \*the aggregation is very  
 good but the cereal yields are not are not fab eh  
 "CON<sub>3</sub> pros "

E7.

M.S.

a bit um unpopular with er surrounding farmers  
 "FOC<sub>2</sub>" <sup>st<sub>1</sub></sup>

L.

isn't it ) [overlaid]  
 laugh )  
 not necessarily so long as you restrict it to your own field  
 st<sub>5</sub>

/ / \*but it just shows you that something that we consider  
 is considered as a very bad weed a very bad infestation in  
 arable farming does have this eh property of giving  
 you improved aggregation | the bacterial population ties up\*  
 with this this is one of the reasons why grass has  
 always been considered as the best answer to our  
 structural problems because you've got this rooting system  
 / / continuous \* organic matter active bacteria and  
 / / you've got all your stabilizing processes working at  
 st<sub>4</sub>

E8.

full blast /inf/ cultivation question | \*the effect  
 FOC<sub>2</sub> mark<sub>1</sub> the prop<sub>2</sub> /form/ | ASS<sub>st<sub>1</sub></sub>



....wander to Area B.

downward gesture on stressed

"not" .....



....repeated.

slight smile

sweeping gesture on "break-down"



EXP.

I

of cultivation on aggregation is a function of the soil moisture content at the time of the operation | REL<sup>now</sup> mark<sub>1</sub> two meta<sub>1</sub>

lectures ago we spoke about the ataberg limits and

/inf/ you'll see here how cultivation can play its part in providing a suitable seed bed | ASS<sup>st<sub>1</sub></sup> /semi/ you can get an ideal aggregate distribution by cultivation but remember unless

/ / the stabilizing factors are present at the same time / / your cultivation's not going to be very much good | DES<sub>1</sub> what you want is to get the soil cultivated get the seed bed prepared if


/inf/ your stabilizing factors are there right your aggregation will remain stable | CNT<sup>c<sub>1</sub></sup> if they're not there<sup>(mark<sub>2</sub>)</sup> /emph/ the aggregates in the soil will continue to break down and you will get conditions that are <sup>(mark<sub>2</sub>)</sup> not suitable for germination | CON<sub>3</sub> so<sup>st<sub>4</sub></sup>

that um you could say that any mechanical disturbance of the soil /form/ itself will produce a change in the aggregate size distribution but will play little part in the stabilization pros


E9.

/ / you can see this not only with cultivation but if any of FOC<sup>pros del</sup> you<sup>2</sup> ever investigate mole hills | REC<sup>sg</sup> look at mole hills when they're flung up in permanent pasture and look at mole hills when they're flung up in an arable soil /emph/ a mole can cultivate just as effectively as a plough | DES<sub>1</sub> if you bring these mole hills into the laboratory and measure their aggregate stability you'll find that under the arable soil it may look very nice when the mole throws it up but you put it on the wet sieving equipment you'll find the aggregates'll just break down \*the stabilizing factors are not there / /


'throw away' gesture : then  
return to lectern



during "stabilizing" and preceding  
pause, gesture  
repeated several times



cupped hand slowly closes into  
clenched fist



EXP

I

on the other hand if you pick up your mole hill from a permanent  
 CNT mark<sub>2</sub> c<sub>1</sub>  
 pasture and stick it on the wet sieving machine nothing'll  
 c<sub>1</sub> res  
 happen stabilizing factors are there and after all these  
 st<sub>1</sub> CNT st<sub>1</sub>  
 animals are just doing exactly the same thing as you are doing  
 (mark<sub>2</sub>)  
 /emph/  
 sticking a voltmeter through the soil just as effective / /  
 st<sub>5</sub>  
 and you know what mole hills are like when they're flung up  
 CON<sub>3</sub> st<sub>4</sub>  
 on any type of soil if the mole can get through a bad arable  
 soil it looks all right but water treatment it's  
 q  
 away \*it's just not going to stabilize so that um / /  
 /emph/ ref pros FOC<sub>3</sub> mark<sub>1</sub> pros

E10.

this question of cultivation then I say the think about the  
 meta<sub>2</sub> prop<sub>1</sub>  
 ataberg limits you can produce a suitable ad aggregate  
 ASS st<sub>1</sub>  
 size distribution in the soil but unless you've got your eh  
 CON<sub>4</sub> st<sub>4</sub>  
 / / stabilizing \* factors in that soil then it's not going

to be very much good just a brief word about climate because  
 pros mark<sub>1</sub> prop<sub>1</sub> JUS st<sub>5</sub>  
 FOC<sub>2</sub> pros

EXP

II

E11.

moisture and temperature can play a a direct role in  
 again the formation and breakdown of aggregates "if you"  
 prop<sub>1</sub>  
 consider the aggregating action of frost now this is a / /  
 mark<sub>1</sub> st<sub>1</sub>  
 a typical eh soil management problem shall we plough / /  
 "DES<sub>3</sub>" st<sub>3</sub>  
 in the autumn or in the spring if we plough a badly-  
 structured soil in the autumn give the weather the  
 climate a chance to get to work at it now the action of frost  
 mark<sub>1</sub> st<sub>1</sub>  
 FOC<sub>2</sub> pros

E12.

/ / is related inversely to the rate of freezing with slow  
 FOC<sub>2</sub> pros mark<sub>1</sub> st<sub>1</sub> c<sub>1</sub>  
 freezing you'll find that you will get larger aggregates  
 res  
 formed in the soil this is because the for of the forma-  
 c<sub>2</sub>  
 tion of much larger ice crystals if you freeze the soil  
 DES<sub>1</sub> c<sub>1</sub>  
 up very slowly indeed \* you'll get the formation of large  
 res

/emph/

hand opens out, fingers spread



stand back a pace from lectern....

....move to Area B

hand gesture as above, more rapid

pace quickly to Area A. and....

EXP II

ice crystals within the soil mass | you'll get dehydration  
 round about these ice crystals |<sup>DES<sub>1</sub></sup> <sup>st<sub>1</sub></sup> and when the soil / /  
 when the ice when the er water I should say freezes / /  
 you'll get expansion taking place \*and your soil clods will  
<sup>res</sup> break up into fairly large lumps fairly large aggregates  
<sup>ref</sup> / / but you think what happens with very rapid freezing / /  
 |<sup>CNT</sup> <sup>mark<sub>2</sub></sup> <sup>st<sub>3</sub></sup> you do not get sh large ice crystals formed in the soil / /  
 instead you tend to get el very large number of small crystals  
<sup>(mark<sub>2</sub>)</sup> formed | when they expand on freezing you're going to get  
<sup>DES<sub>1</sub></sup> <sup>c<sub>2</sub></sup> <sup>res</sup> the soil shattered down into relatively small aggregates / /  
 now you can do this in in in the laboratory in a refrigerator  
<sup>ASS</sup> <sup>mark<sub>1</sub></sup> <sup>st<sub>1</sub></sup> / / you can you can eh lower the temperature slowly  
<sup>DES<sub>1</sub></sup> <sup>c<sub>2</sub></sup> / / just below freezing point or you can shove the soil  
<sup>c<sub>2</sub></sup> into a deep freeze straight away at a very low temperature / /  
 and you can produce <sup>/emph/</sup> these effects | the much larger \*  
<sup>res</sup> aggregates produced with the slow freezing effect |<sup>DES<sub>1</sub></sup> <sup>res</sup> <sup>CNT</sup> <sup>mark<sub>2</sub></sup> but with  
<sup>c<sub>2</sub></sup> the quick freezing the soil can be dispersed almost  
<sup>c<sub>2</sub></sup> <sup>res</sup> down to until it's i in its primary particle state / /

and this you can find in the field as well | the same thing  
<sup>CON<sub>3</sub></sup> <sup>st<sub>4</sub></sup> <sup>pros</sup> <sup>FOC<sub>2</sub></sup> <sup>pros</sup> <sup>prop<sub>2</sub></sup>

E13. with drying and wetting | rainfall will tend to you'll  
<sup>DES<sub>1</sub></sup> <sup>c<sub>1</sub></sup> <sup>res</sup> /form/ get swelling taking place with drying in the in the field  
 / / you'll get shrinkage |<sup>DES<sub>1</sub></sup> <sup>c<sub>1</sub></sup> /inf/ taking place stresses and  
<sup>res</sup> <sup>st<sub>4</sub></sup> strains set up again and a tendency |<sup>CON<sub>3</sub></sup> <sup>st<sub>4</sub></sup> for the soil clods

/ / to be broken down | eh \* temperature in the labora-  
<sup>pros</sup> <sup>FOC<sub>2</sub></sup> <sup>mark<sub>1</sub></sup> <sup>pros</sup> <sup>prop<sub>1</sub></sup> <sup>st<sub>1</sub></sup> tory there's no doubt that aggregates are found to be less stable  
 / / when subject to treatment with warm water if you  
<sup>DES<sub>1</sub></sup> <sup>c<sub>2</sub></sup>

....wander to Area B.

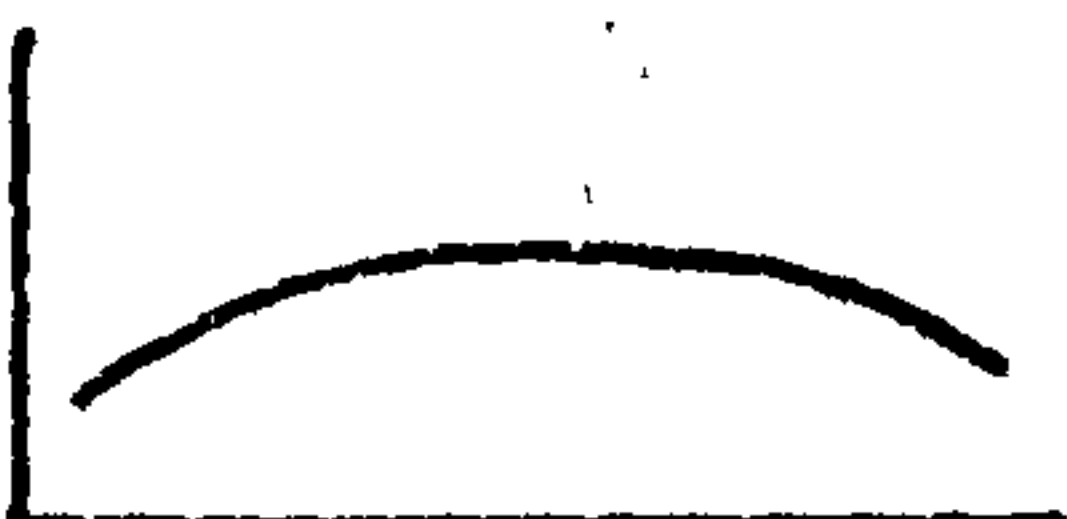
to Area A.; read from notes

gesture • ———— accompanies

"increase"

move to Area C.

draw (1) coordinates, (2) curve.



EXP  
II

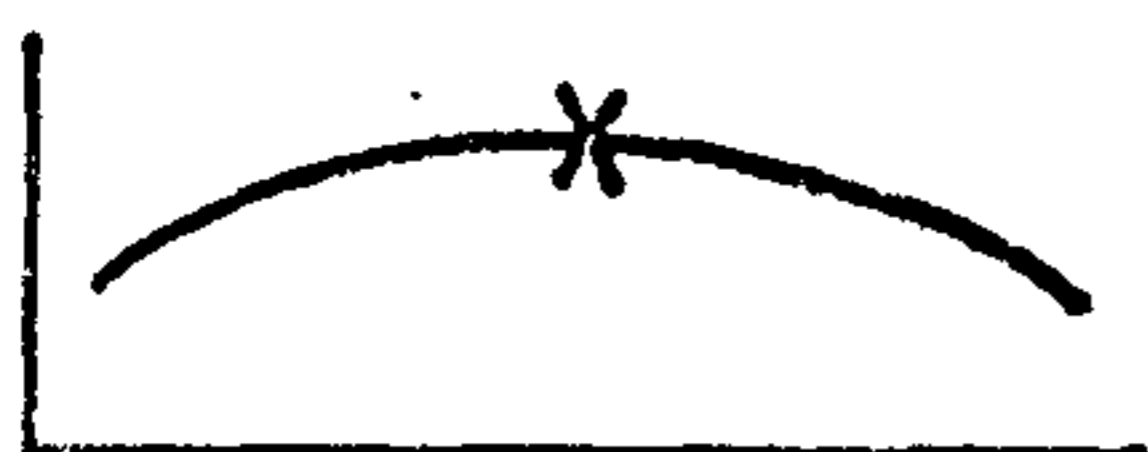
/ / did your wet sieving technique with water say at 5  
 /semi/ degrees centigrade and repeated it with water at 50 degrees  
 centigrade you'd find that the aggregates are less stable at  
 the higher temperature | now I think this is probably due / /  
 to the effect of um | EXP mark<sub>1</sub> /semi/ c<sub>1</sub> surface tension the change in surface  
 tension and viscosity of the water as the temperature rises  
 / / and um c<sub>2</sub> the rate at which water enters the aggregate  
 / / it probably gets in much more quickly at higher temperatures  
 |DES<sub>1</sub> c<sub>1</sub> / / than it does at lower temperatures and causes more des-  
 truction | now in the field you're not going to see much  
 effect of temperature | ASS mark<sub>1</sub> st<sub>1</sub> /inf/ because you do not get such rapid  
 temperature changes in the field as something as a the  
 example I gave you going from 5 degrees up to 50 straight  
 away the temperature changes in the field are not so  
 extensive as this | so that um you'll probably find / /  
 this effect is not so important but you got to watch it | SUM st<sub>4</sub> in  
 the laboratory strictly speaking eh all the lab methods | CON<sub>3</sub> st<sub>4</sub>  
 should be done under reasonably controlled temperatures / /  
 pros

E15.

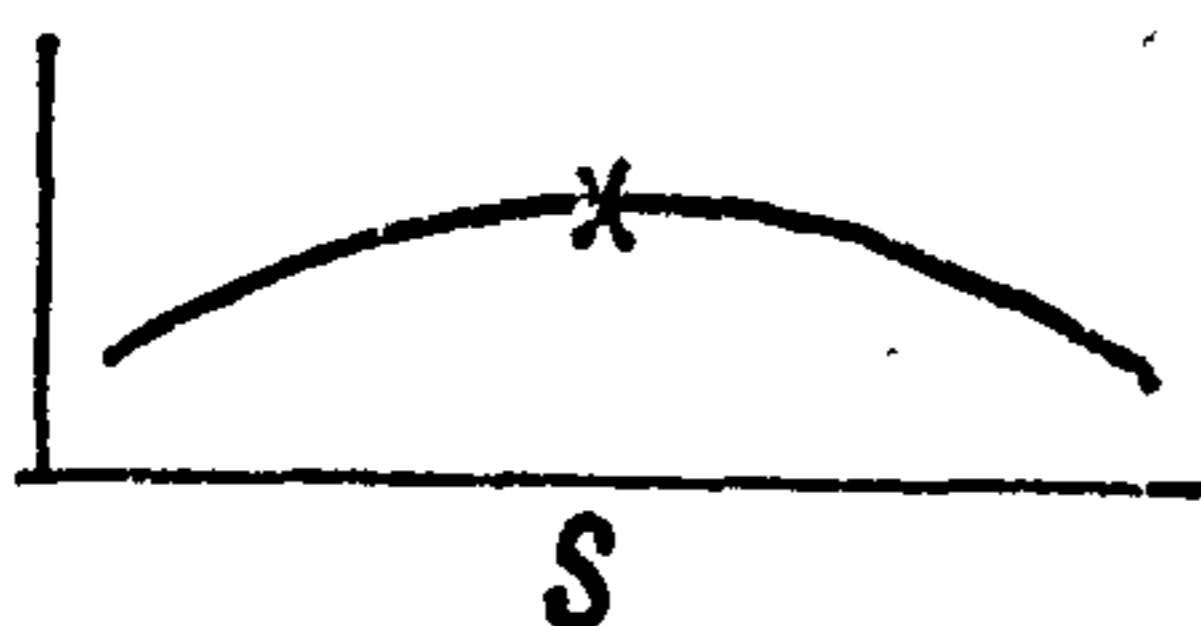
eh mark<sub>1</sub> \*the state of aggregation in the field will change  
 FOC<sub>2</sub> pros st<sub>1</sub> throughout the year | /form/ during the spring and summer months / /  
 the formation processes tend to be dominant | ASS st<sub>1</sub> (ref)  
 increase \*but during the winter months the breakdown  
 processes take over | so if you measure \*say you took um eh  
 / / samples every two weeks | DES<sub>1</sub> c<sub>1</sub> /inf/ from the field you'd probably  
 find that you'd get a<sup>1</sup>\* rough graph something like this | <sup>2</sup>\* not a  
 smooth one | but it would it would be an average / /  
 st<sub>3</sub> DES<sub>3</sub> (a)



(1) trace across curve with flat of hand, (2) add cross



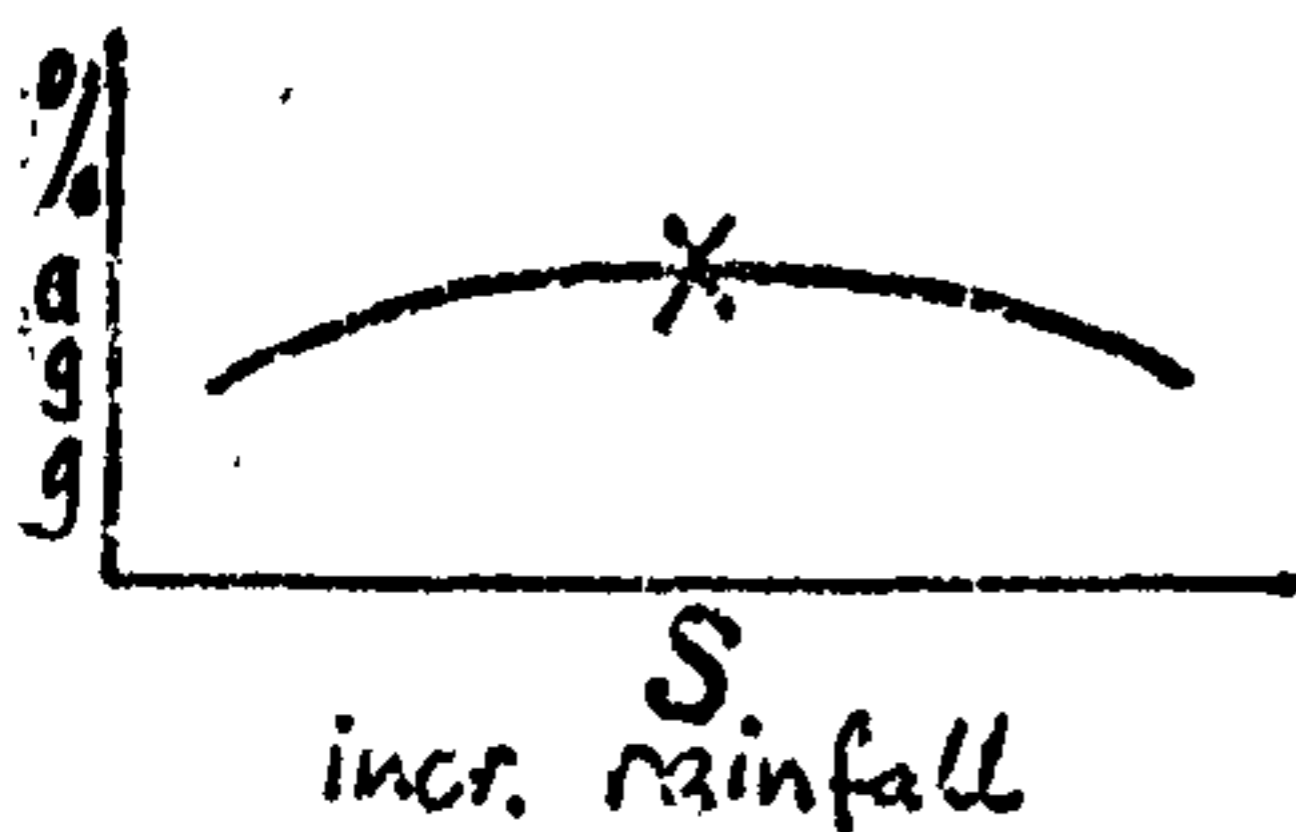
(1) 'S' added, hand circles around area below cross, (2) hand circles around tail of curve.



stand back and look at diagram

a hesitant step towards lectern and back

add labels on (1) vertical, (2) horizontal axis and (2) point to left hand tail



point to cross, then tap it with knuckle

EXP.  
II

curve something like that <sup>1\*</sup> reaching its peak <sup>2\*</sup> during  
 the summer months | when your aggregating processes your  
 stabilizing processes <sub>ref</sub> | <sup>EXP</sup> <sup>c<sub>1</sub></sup> if the climate is right are working  
 flat out | in the winter months this is your summer <sup>1\*</sup>  
 here <sub>ref</sub> | <sup>ASS</sup> <sup>st<sub>1</sub></sup> in the winter time <sup>2\*</sup> you'll find that there's a gen-  
 eral decrease takes place | the bacteria beginning to pack  
 up <sub>ref</sub> | <sup>EXP</sup> <sup>c<sub>1</sub></sup> their critical temperature's round about 5 degrees centi-  
 grade these stop functioning in the winter time | your  
 organic matter decomposition is dropping off <sub>res</sub> | <sup>DES</sup> <sup>c<sub>1</sub></sup> and you'll find  
 that there's a tendency for the aggregation to be reduced  
 / / especially under arable conditions | you don't get  
 such a a a s a severe change taking place under permanent  
 grass but under arable conditions you will <sub>pros</sub> | just looking  
 mark<sub>1</sub> <sub>FOG<sub>2</sub></sub> <sub>pros</sub>

E16.

at this question of climate on a world scale | if we come to  
 del <sub>del</sub> the major soil groups it's worth mentioning here eh some-  
 thing about the change in aggregation | <sub>prop<sub>1</sub></sub>  
 relationship between aggregation and rainfall | <sup>ASS</sup> <sup>st<sub>1</sub></sup> if you look at the  
 temperature is more or less constant you'll find this pattern  
 repeated if I just use the same curve | <sup>1\*</sup> this is percentage / /  
 aggregation increasing here | <sub>as</sub> | <sup>DES</sup> <sup>st<sub>3</sub></sup> and looking at increasing rain-  
 fall <sup>2\*</sup> with your dry arid soils which you'll find here at lu  
<sub>c<sub>1</sub></sub> <sub>q</sub> wi with low rainfall conditions you've got little weathering  
 taking place | <sub>res</sub> | <sup>DES</sup> <sup>st<sub>1</sub></sup> right there's not much silt and clay present in  
 these soils | <sub>res</sub> therefore your aggregation will be at quite  
 a low level | <sup>ASS</sup> <sup>st<sub>1</sub></sup> as the rainfall increases you come to  
 the chernozem type of soils | <sub>ASS</sub> <sub>mark<sub>1</sub></sub> now here \*you find / /  
 /emph/ <sub>st<sub>1</sub></sub>

point to left hand area below  
curve

flat hand circles under centre  
of curve & hovers there until  
"here".....

....and moves to right-hand tail

face class, point towards diagram  
over shoulder

new diagram: (1) axes, (2) %agg. (3)  
incr. temp., (4) (mean ann. temp.)

%  
agg.

incr. temp. — (mean ann. temp)  
point to lower end vertical axis

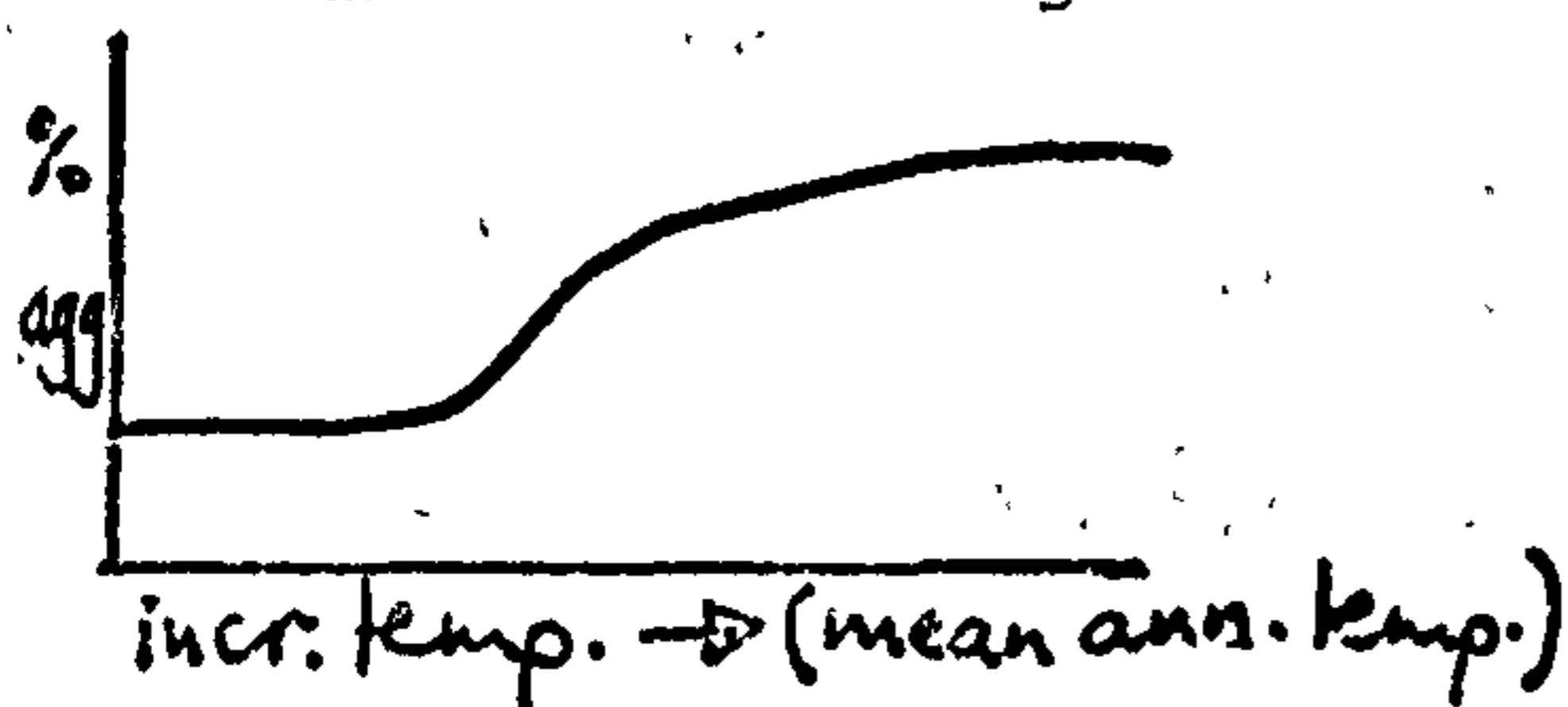
EXP.  
II

the aggregation tends to reach its maximum as the rainfall increases still further and you then come to wet conditions and the podzil type of soil what happens again / / aggregation's decreasing so that leaving temperature out of this and just looking at the relationship between aggregation and increasing rainfall from dry arid \* conditions where you've little or no clay and silt present / / through the intermediate stage \*where you get probably the best conditions for stable aggregation these chernozems contain a considerable quantity of organic matter and you'll be getting the organic matter effect coming in here / / but once you get into the \* very wet conditions you then start to find your clay silt possibly moving down the profile and again aggregation being reduced this is shown up very well with the podzils you never find a well-structured podzil but you'll always find or usually find a well-structured chernozem and again with the dry the the dry regions then the soils are much lighter in texture / / and you don't get the aggregating effect

E17.

we look at the relationship between aggregation and not rainfall but temperature you'll see the same sort of pattern developing \*increased aggregation \*and in this case instead of increasing rainfall increasing temperature now the picture here is if we start an increasing temperature we'll call this the the mean \*annual temperature now obviously at the bottom end here \* you're

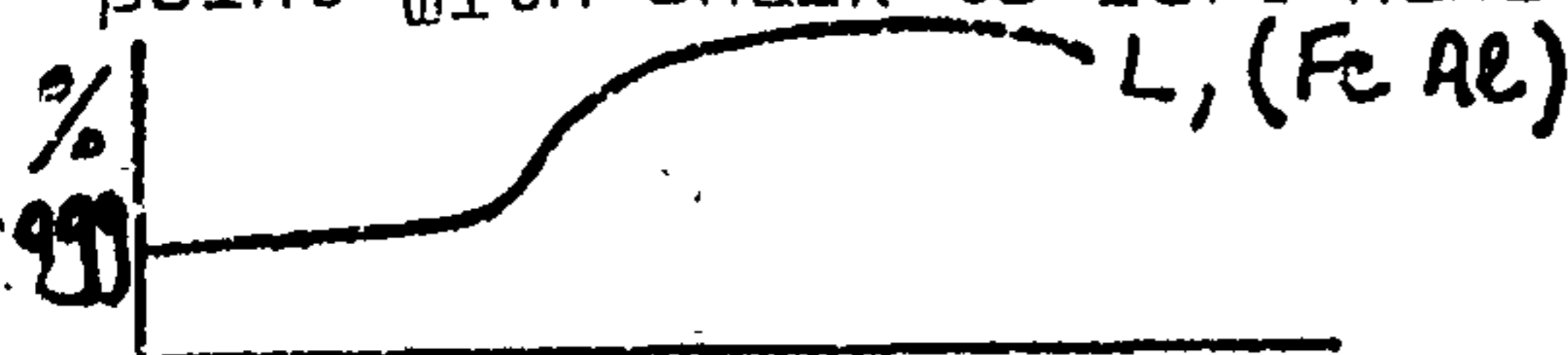
(1) draw in curve on "right up", (2) hand circles around right hand tail



repeat (2) above

add (1)L, (2)Fe, (3)Al, (4)brackets

point with chalk to left hand tail



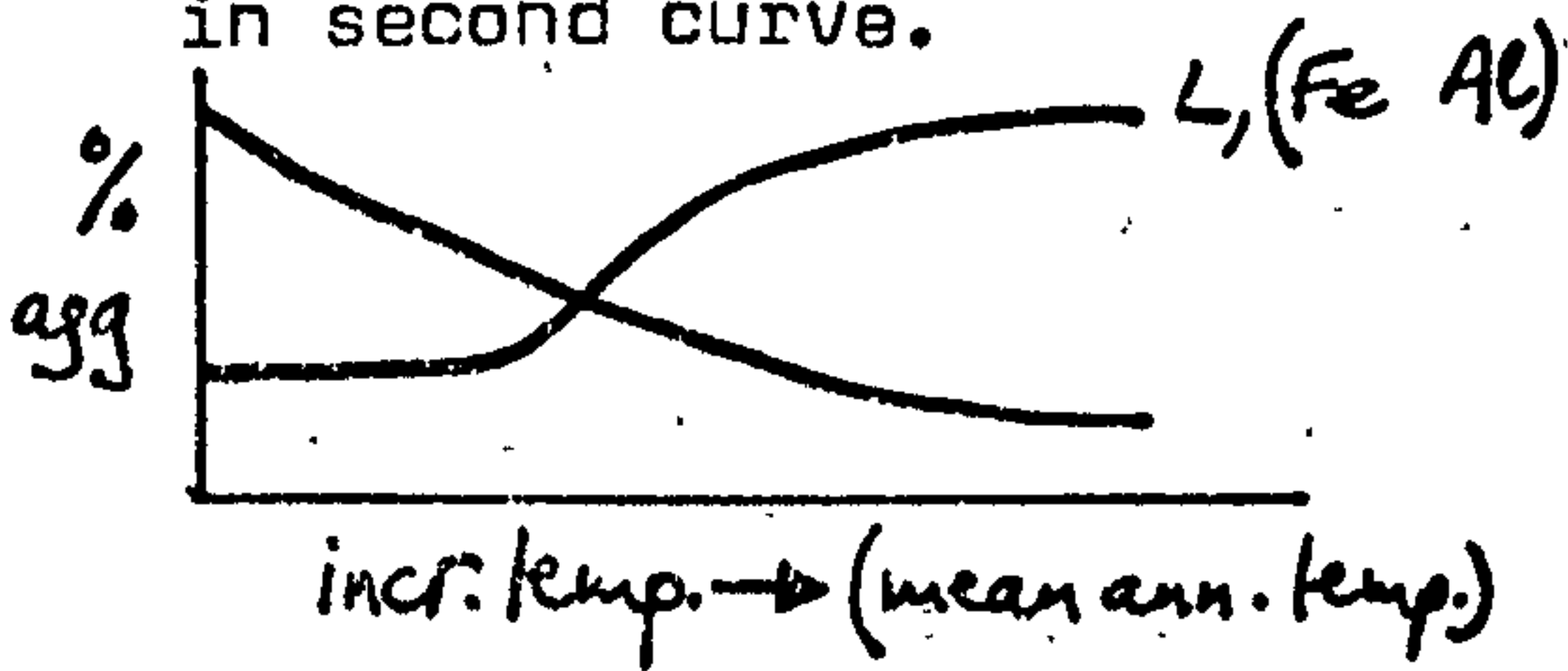
point with chalk to left hand tail

(see overleaf)

EXP.  
II

going to have the podzils developed under low temperature conditions <sup>low aggregation</sup> <sub>ref</sub> and you'll go from the podzils right up <sup>1\*</sup> to your high temperature conditions here <sup>2\*</sup> /emph/ with the laterites | <sup>now here again</sup> <sub>ASS mark<sub>1</sub></sub> very little aggregation in podzils | <sup>but with laterites you can get exceptionally high</sup> <sub>CNT mark<sub>2</sub> st<sub>1</sub></sub> degree of aggregation | <sup>and there is the temperature effect / /</sup> <sub>ASS st<sub>1</sub></sub> /emph/ at high temperatures you're getting a rapid turnover of organic matter | <sup>but with the laterite</sup> <sub>CNT mark<sub>1</sub> st<sub>1</sub></sub> \*it's not organic matter that is the important stabilizing factor | <sup>I think I</sup> <sub>REL meta<sub>1</sub></sub> referred to this last week <sup>I mentioned the question of alu-</sup> <sub>st<sub>1</sub></sub> minium and iron | <sup>with the podzils at low temperatures / /</sup> <sub>ASS st<sub>1</sub> (q)</sub> aluminium and iron play no part in aggregation at all | <sup>but</sup> <sub>CNT mark<sub>2</sub></sub> there's no doubt about it they play a very important part with /emph/ the laterites | <sup>because remember</sup> <sub>JUS st<sub>5</sub></sub> under very high temperature conditions <sup>your organic matter decomposition is</sup> <sub>st<sub>5</sub></sub> so rapid <sup>that unless there is a continual supply of organic</sup> <sub>(c<sub>1</sub>)</sub> matter present in these soils you're not going to get the organic matter cycle going at all | <sup>and obviously with</sup> <sub>ASS st<sub>1</sub></sub> these laterites, <sup>if</sup> <sub>(as)</sub> I put L <sup>1\*</sup> up there for laterites it is the iron <sup>2\*</sup> and possibly the aluminium <sup>3\*4</sup> that give you the stabilization factors | <sup>whereas down here</sup> <sub>CNT mark<sub>2</sub></sub> with your podzils \*they give you the opposite effect | <sup>eh looking</sup> <sub>ASS st<sub>1</sub></sub> at the chernozems with regard to this temperature effect / / with the semi-arid soils where you've got slightly / / | <sup>st<sub>3</sub></sup> <sub>DES<sub>3</sub> (q)</sub> where you have got organic matter and lower temperatures you'll find that they come in about this | <sup>1\* your chernozems</sup> <sub>DES<sub>3</sub> st<sub>3</sub></sub>

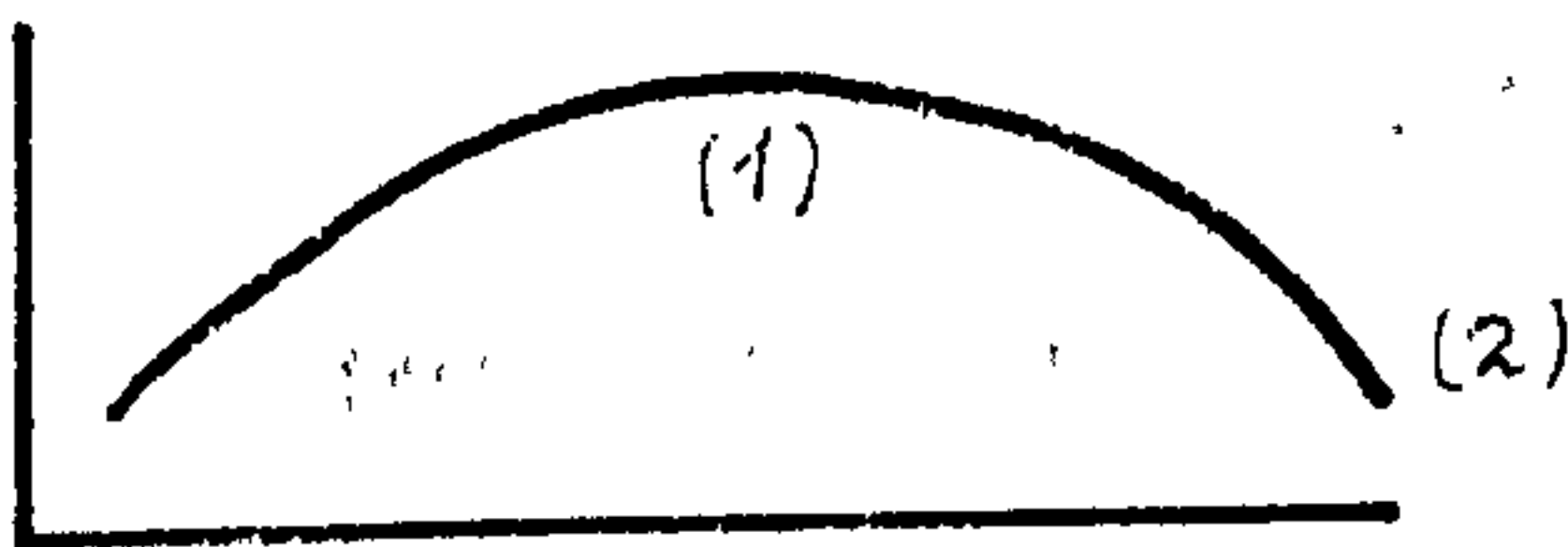
(1) from "they come" hand poised over top of vertical axis (2) draw in second curve.



start erasing diagram

drop eraser, fumble with chalks

draw in axes of new diagram



place chalk in position, vertical axis, then...

slowly draw curve reaching peak at (1) and tail by (2): then remove hand briskly

hand describes zigzag in front of right tail of curve  
hand describes smooth movement down the curve

EXP II

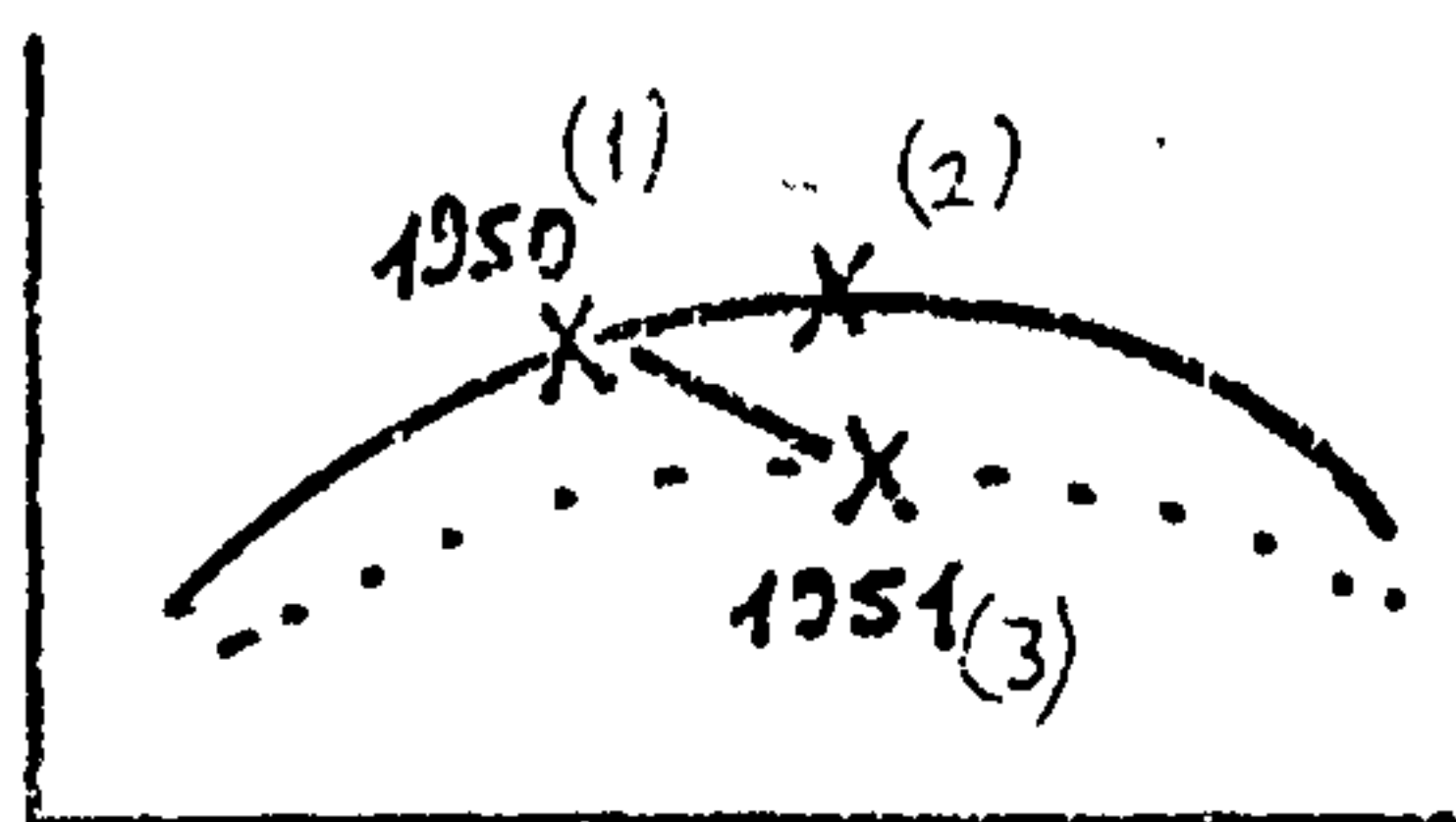
<sup>2</sup>\*tend to come down here | EXP <sup>c</sup><sub>1</sub> at the higher temperatures the  
 chernozems lose far too much organic matter and the aggrega-  
 tion tends to decrease | REL <sup>meta</sup><sub>1</sub> you'll find both these curves in  
 / / the in bever's textbook with eh just a / /  
 a slightly longer explanation than I've given you here | so  
 you can have a have a look at them there the completed dia-  
 grams | SUM <sup>st</sup><sub>4</sub> giving the relationship first of all between aggrega-  
 tion and increasing rainfall and secondly aggregation  
 / / against the increasing mean annual temperature / /  
 relating them to the world soil groups | CON<sub>3</sub> <sup>meta</sup><sub>1</sub> and from what  
 you've already learned I'm sure in your pedology and what  
 you've learned elsewhere in soil science em this should  
 / / em complete the picture | FOC<sub>2</sub> <sup>pros</sup><sub>2</sub> the localised effect of

E18.

temperature I'll just mention this to you<sup>2</sup> because it can  
 play \*a part<sup>st</sup><sub>5</sub> /inf/ even in this country in eh affecting aggre-  
 gation | REL <sup>meta</sup><sub>1</sub> and eh I may have \*told you about this in in  
 second year but I just remind it remind you about it | DES<sub>2</sub> <sup>st</sup><sub>2</sub>  
 / / particular rotational experiment we were measuring<sup>st</sup><sub>2</sub> (q)  
 in the north where year after year on a four course on an  
 eight course rotation {four} year grass four year arable  
 / / we were producing nice smooth curves \* like this | DES<sub>3</sub> <sup>st</sup><sub>3</sub> working  
 up to a peak<sup>1</sup>\* under the fourth or fifth year grass / /  
 dropping<sup>2</sup>\* off to a fairly low level in aggregation / /  
 after the four year em arable crop coming sometimes it  
 came down smoothly more often it zigzagged \* down like this / /  
 but taking the mean curve it appeared like this | DES<sub>2</sub> <sup>now year</sup><sub>1</sub> <sup>st</sup><sub>2</sub>



draw in 2nd. (dotted) curve, then (1) add cross and date, (2) add cross at peak, (3) add cross, 2nd. curve, date, link-line



from "root crops" to "like this",  
open hand hovers over right tail  
of 2nd. curve

EXP  
II

after year <sup>(q)</sup> under the same climatic conditions this curve  
 was <sup>t</sup> coming up in different fields | <sup>CNT</sup> but one <sup>mark<sub>2</sub></sup>  
 particular year <sup>(par)</sup> I think it was 1951 we suffered an all-time  
<sup>st<sub>2</sub></sup> drought <sup>ref</sup> for about four months we had next to no rainfall  
 / / <sup>(par)</sup> it was in the summer and when in september we came  
<sup>DES<sub>2</sub></sup> to measure <sup>st<sub>2</sub></sup> the aggregation in these eight fields we found  
 that what had happened was that in every field the aggre-  
 gation had dropped | <sup>DES<sub>3</sub></sup> <sup>st<sub>3</sub></sup> and we were producing a picture like this  
 / / <sup>meta<sub>2</sub></sup> so that for example if <sup>q</sup> that was my point <sup>1</sup> \*in 1950 for  
<sup>DES<sub>3</sub></sup> third year grass <sup>st<sub>3</sub></sup> this particular field instead of eh / /  
 increasing <sup>2</sup> \*in 1951 actually showed a decrease in <sup>ref</sup>  
 other words there's the same field <sup>3</sup> \*in 1951 | <sup>EXP</sup> <sup>mark<sub>1</sub></sup> <sup>c<sub>1</sub></sup> now this was  
 entirely due to these rather unusual climatic condi-  
 tions where <sup>c<sub>2</sub></sup> because of lack of rainfall <sup>res</sup> the crops  
 were not developing the cereals were very poor that year you  
 had straw about six inches in height with a cereal  
 head at the end <sup>t</sup> producing next to nothing the grass had  
 droughted off | <sup>ASS</sup> <sup>st<sub>1</sub></sup> in some fields it was impossible to put stock  
 / / otherwise it <sup>st<sub>5</sub></sup> the stock weren't getting anything to eat  
 and the <sup>em</sup> the grass was certainly suffering and even  
<sup>DES<sub>3</sub></sup> the <sup>st<sub>3</sub></sup> the root crops \*they too very poor yields / /  
 and the whole graph just slumped down like this | <sup>SUM</sup> <sup>st<sub>4</sub></sup> it obviously  
 in 1951 <sup>(q)</sup> the dominant factor was climate it was not the  
 crop | <sup>DES<sub>2</sub></sup> <sup>mark<sub>1</sub></sup> <sup>st<sub>2</sub></sup> now the interesting thing was <sup>/emph/</sup> that the following year  
 / / we <sup>2</sup> went back to our normal wet summer and yet it took

tap top of curve with chalk

hand traces 1st.curve

point to cross on 1st.curve  
peak

strike peak of 1st.curve  
with eraser .....

.....and turn face-on to class.

turn head to glance back at  
blackboard

EXP II

/ / \*several years before these curves came back / /  
 /emph/ to their original position | ASS <sup>st<sub>4</sub></sup> in other words this bad climatic  
 effect was not overcome in one year | <sub>ref</sub> it took two or three years  
 / / before we began to get the same sort \* of figures / /  
 as we had in 1950 for that particular rotation | <sub>q</sub> so that even in  
 this country | <sub>(q)</sub> where our climatic conditions | <sub>SUM</sub> <sup>st<sub>4</sub></sup> are not so /semi/  
 severe it can play a part in reducing or increasing  
 indeed aggregation | <sub>QUA</sub> <sup>q</sup> if we'd had a a very good summer \*eh  
 /emph/ / / adequate rainfall crops growing well occasionally <sub>st<sub>1</sub></sub>  
 you find these curves would increase | <sub>CNT</sub> <sup>mark<sub>2</sub> st<sub>1</sub></sup> but in this particular  
 year there was a significant decrease and it did not \*come  
 back to its original level the following year <sub>st<sub>5</sub></sub> nor indeed I /emph/  
 think the year after | <sub>DES</sub> <sup>st<sub>2</sub></sup> and unfortunately the experiment was  
 finished two or three years after this | <sub>(ref)</sub> we weren't able to  
 keep it going until we could truly turn round and say / /  
 that we had got back to our original eh conditions  
 / / that eh we had in ah nineteen fifty | <sub>q</sub> so that em  
 climate can upset these results | <sub>SUM</sub> <sup>st<sub>4</sub></sup> but it's got to be a  
 rather severe change in climate | <sub>QUA</sub> <sup>st<sub>1</sub></sup> this was I say for u u up in  
 the north there to have four three to four months with-  
 out any rain in summertime was just a completely unusual I  
 don't think it's ever been repeated | <sub>REC</sub> <sup>mark<sub>1</sub> sg</sup> /emph/ <sub>st<sub>5</sub></sub> but that is a  
 a warning when you're doing any structure work you  
 must \* keep an eye on climate because it can play a very / /  
 /emph/ <sub>st<sub>5</sub></sub> in fact it can dominate the other factors altogether | and  
 /emph/ you'll realise how it can dominate this structure story | <sub>CON</sub> <sup>st<sub>3</sub></sup> with  
<sub>st<sub>4</sub></sub> /emph/ <sub>q</sub>

smile, look around the group, continue smiling through question

hand moves up over left & central portion of curves

wide sweep of arm outwards and sideways, hand in vertical plane



EXP II

overseas soils working under tropical conditions <sup>pros</sup> <sup>now / /</sup> <sup>mark<sub>1</sub></sup> <sup>FOC<sub>3</sub> pros</sup>

E19.

from there on <sup>meta<sub>1</sub></sup> those who did the soil management course / /

can just think about what you saw at netherton <sup>ref</sup> you know

what I told you about the mechanics of aggregate / /

stability aggregate formation <sup>prop<sub>1</sub></sup> I've given you the farming

link there <sup>(meta<sub>1</sub>)</sup> and I say if you look at this in relation to

that soil management lecture I think I've gone as far as

I can go with it | <sup>REL meta<sub>1</sub></sup> and this is what the soil report modern

farming and the soil basically is all about | <sup>now any</sup> <sup>"REL" mark<sub>1</sub></sup> <sup>I've carried it</sup> <sup>meta<sub>4</sub></sup> <sup>el<sub>1</sub></sup> questions are you all quite happy about that

on slightly for the benefit of the two who are doing plant

physiology | <sup>CON q</sup> from I think that's as far as you really need to

go to it <sup>if<sup>4</sup> st<sub>4</sub></sup> you care to look at the farming report, <sup>(ref)</sup> the soil

report modern farming and the soil it won't do you any

<sup>harm \*</sup> <sup>pros</sup>

M.S. EXP III

if you <sup>um</sup> <sup>el<sub>2</sub></sup> just continue on in grass under ideal conditions <sup>"FOC<sub>1</sub>"</sup> what would happen to your curve would it

E20.

just would it just flatten out your [interrupted by L]:

L.

em this <sup>prop<sub>1</sub></sup> there's debate about this | <sup>ASS st<sub>1</sub></sup> I think that eh / /

it can it can go on increasing for anything up to

twenty thirty years | <sup>ASS q</sup> but I think what will happen is <sup>it st<sub>1</sub></sup>


goes up \* fairly steeply first of all then it'll start to

level out <sup>q</sup> but I don't think it'll ever completely level

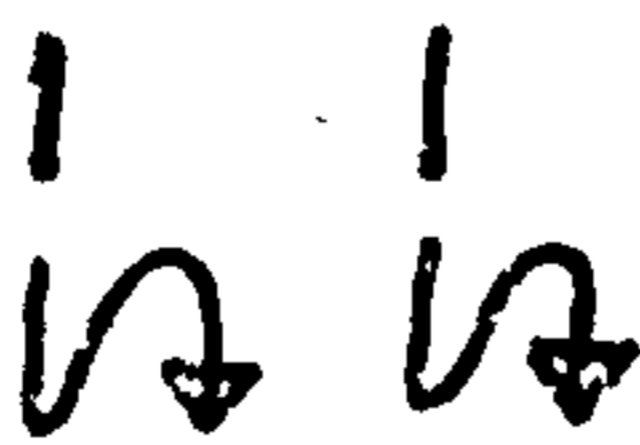
out | <sup>ASS st<sub>1</sub></sup> <sup>lowe</sup> suggests \* that down in the south of england from

the <sup>/emph/ q</sup> evidence that they've been able to pick up from past

histories of fields that have been in permanent pasture

slight turn to face Soil  
Management group, mostly  
sitting to L's left, then  
downward gesture  •  
(1, 2) on stressed " 'some",  
" 'too" : then point to  
diagram on "old fashioned"

hands in vertical plane move  
down(a) and across and down(b)  
on "area<sub>a</sub> to area<sub>b</sub>"



EXP  
III

/ / that they say they're still getting changes af even after  
 fifty years they can still get increases | but I think the fluctua-  
 tions that one tends to get after say twenty or thirty years / /  
 probably depend on the management of the soil depend on the  
 management of the grazing and depend on the climate | and I but  
 I think if you kept that soil under ideal management conditions / /  
 and your climate was reasonably stable then I think after twenty to  
 twenty five years you shouldn't get much of a change taking

place but this is the problem with some of the badly structured in  
 pros FOC pros del

E21.

this country (par) it is the problem of em for the netherton people  
 / / \*that letch soil that I think in some <sup>1</sup>\* cases these soils  
 have been allowed to go too <sup>2</sup>\* far the breakdown has become too  
 great for grass to restore it quickly | you see with these old  
 fashioned \*old fashioned rotations they were old fashioned / /  
 because they've all they went out just after about 1950 you seem  
 to have for the majority of soils through trial and error the ideal  
 balance | and you knew as you went from area to \* area that  
 in this particular area your soil had to be in grass for four or five  
 years before you could take four or five years decent arable  
 crops from it after that you then went back into grass again / /

but the the danger point came when people tried to stretch the  
 CNT<sup>mark</sup><sub>2</sub> arable <sup>st</sup><sub>1</sub> three years grass six years arable two years grass  
 ref

/ / seven years arable | this is when the danger point was reached  
 / / when your stabilizing factors were decreasing and decreasing year  
 after year until finally they reached a level where even when  
 res (q)

E22.

you put the soils back into grass you saw no result for it  
 CON<sub>2</sub> pros FOC<sub>2</sub> pros



on stressed " 'that'," 'back',"  
" 'sterile", downward movement of hand,  
palm upwards; on 3rd. movement hand  
closes into fist at same time



(3rd.:



)

EXP  
III

the worst example that I can show you <sup>meta<sub>2</sub></sup> you all can see for yourselves <sup>meta<sub>1</sub></sup> /emph/  
 in northumberland <sup>meta<sub>1</sub></sup> though it's not nearly as bad as it used to be / /  
 was the <sup>prop<sub>1</sub></sup> problem that <sup>(del)</sup> eh we were set away back in 1958 of  
 doing something about these very bad opencast soils | <sup>JUS</sup> <sup>st<sub>5</sub></sup> because there  
 you had these soils going through an artificial process | <sup>DES<sub>1</sub></sup> <sup>c<sub>1</sub></sup> where  
 the disintegration of the structure and the <sup>the</sup> <sup>DES<sub>1</sub></sup> <sup>c<sub>1</sub></sup> was so  
 bad <sup>res</sup> that we could get nothing established on them when they were  
 put back <sup>ref</sup> they were as bad as that | and this was simply due / /  
 to the storage of <sup>/emph/</sup> these topsoils <sup>EXP</sup> <sup>c<sub>2</sub></sup> /emph/ in very large heaps / /  
 when your topsoil <sup>ref</sup> virtually because of bad storage conditions  
 / / when the soil was wet <sup>res</sup> it was compacted <sup>ref</sup> your topsoil  
 virtually became subsoil | this is all that happened I mean if you <sup>c<sub>1</sub></sup>  
 store something in a heap <sup>DES<sub>1</sub></sup> /emph/ about sixty feet in height and a quarter  
 of a mile in length and it was all originally topsoil well the <sup>res</sup>  
 stuff in the centre <sup>c<sub>1</sub></sup> if <sup>(q)</sup> it's badly compacted your bacteria <sup>res</sup> are  
 going to attack all the organic matter they can lay their hands on  
 /emph/ after all your aerobic bacteria must have oxygen | well if you com-  
<sup>ASS</sup> <sup>st<sub>1</sub></sup> pact all the oxygen out of that soil <sup>DES<sub>1</sub></sup> <sup>c<sub>1</sub></sup> what are the bacteria going  
 to do <sup>res</sup> gradually they decreased <sup>ref</sup> the organic matter was all  
 used up | <sup>SUM</sup> <sup>mark<sub>1</sub></sup> <sup>st<sub>4</sub></sup> so when that soil went back it was almost sterile / /  
 \*there was no stabilizing factors present at all <sup>ref</sup> except the clay <sup>q</sup> /emph/  
 / / but the clay in itself couldn't <sup>q</sup> couldn't act and the  
 | <sup>QUA</sup> <sup>st<sub>1</sub></sup> /emph/ thing was how did you get the process started | <sup>ASS</sup> <sup>mark<sub>1</sub></sup> <sup>st<sub>1</sub></sup> now this was  
 this was bad condition and it <sup>st<sub>5</sub></sup> it took many years before we  
 even saw any signs of aggregation <sup>(q)</sup> let alone stable aggregation develo-  
 ping in these soils | <sup>JUS</sup> <sup>st<sub>5</sub></sup> where you got these the sample soil samples

fist clenched & vertical, index  
& little finger extended



hands horizontal, one above the  
other, 1 foot app. apart.



hands move back & forth, horizontal  
& level



then in  
pause, take eraser & place on  
lectern with deliberation, lips pursed,  
then look up sharply at group on "but"

glance & slight nod towards Eddie

EXP

III brought into the lab with grass existing in the top two or three inches <sup>\*a sort of dark</sup> <sub>ref</sub> semi-rotten rooting mass the top three inches <sup>/emph/</sup> of soil and underneath a solid compacted lump

<sup>/</sup> <sup>/ well</sup> <sub>SUM</sub> <sup>mark<sub>1</sub></sup> <sup>st<sub>4</sub></sup> grass may be a very effective aggregator but it took something to get grass roots through that <sup>\*it took time</sup> <sub>ref</sub> <sup>CON<sub>3</sub></sup> <sup>but</sup> <sub>st<sub>4</sub></sub> time wasn't on the farmer's side <sup>/emph/</sup> unfortunately <sub>pros</sub> <sup>now</sup> <sub>mark<sub>1</sub></sub> <sup>you w</sup> <sub>st<sub>1</sub></sub>

E23.

you won't see conditions as bad as this under <sup>FOC<sub>2</sub></sup> <sup>normal farm-</sup> <sub>pros<sub>1</sub></sub> <sup>ing</sup> <sub>inf/</sub> practices this was a rather extreme case where a soil was badly treated mechanically <sup>JUS</sup> <sub>st<sub>5</sub></sub> because it had to come off it <sup>had</sup> <sub>ref</sub> to be stored for a certain period of time and remember the opencast operations are still going on <sup>ASS</sup> <sub>st<sub>1</sub></sub> <sup>/emph/</sup> but em the process / / has improved because now <sup>st<sub>5</sub></sup> they attempt to store up the stop soil for the shortest possible time <sup>CNT</sup> <sub>st<sub>1</sub></sub> before 1950 1960 I think they attempted to store it for the <sup>(mark<sub>2</sub>)</sup> <sub>emph/</sub> longest possible time they could think up <sup>st<sub>5</sub></sup> this was the impression one got when you saw topsoil heaps lying around the countryside untouched for five to seven years <sup>ASS</sup> <sub>now</sub> <sup>mark<sub>1</sub></sup> you can imagine what your to heavy topsoils were like when they came <sup>st<sub>1</sub></sup> <sub>emph/</sub> out of that heap and were spread on \* the surface as potential top-soil they weren't they were subsoil <sup>CNT</sup> <sub>mark<sub>2</sub></sub> <sup>st<sub>1</sub></sup> <sup>/emph/</sup> \*but that is a process that one where grass even grass was struggling and this is where one would have liked to have seen <sup>/emph/</sup> <sup>CON<sub>3</sub></sup> <sub>st<sub>4</sub></sub> some attempt made even to get <sup>(meta<sub>2</sub>)</sup> <sub>couch</sub> established on it no matter what it was <sup>\*to try and</sup> improve the aggregation then kill it off and get something of a a more commercial nature established in its place <sup>pros</sup> <sup>FOC<sub>3</sub></sup> <sub>mark<sub>1</sub></sub> <sup>pros<sub>1</sub></sup> <sup>so this</sup> <sub>st<sub>1</sub></sub>

E24.

time factor eddie you could you could really <sup>st<sub>4</sub></sup> <sup>you could</sup> <sub>del</sub> <sub>inf/</sub>

on "far", "can", two sharp downward  
movements, palms vertical



shake head slowly

move forward to front of Area D,  
remain there for ensuing digression

EXP  
III

put any time on it you like | ASS <sup>st<sub>1</sub></sup> but I'm quite sure that netherton  
subsoil that netherton em topsoil under permanent grass  
/ / it's I I think it's stabilized as far as it'll go / /

that is as far as that soil can go | <sup>ref</sup> /emph/ JUS <sup>q</sup> \*its aggregation when you  
measure it in the laboratory may not appear to be very high / /

but well that's the basic nature of the soil <sup>st<sub>5</sub></sup> that's the best <sup>ref</sup>  
you can produce from it | ah it's been down I would say  
fifty to seventy years | ASS <sup>st<sub>1</sub></sup> \*it may be longer the history is  
/ / of that particular field | /emph/ QUA <sup>st<sub>1</sub></sup> <sup>st<sub>5</sub></sup> that length of

time it may well be to grass longer than that | <sup>ref</sup> /inf/ CON <sup>q</sup> \*but if you  
look at some of the papers and some of the reports on on  
structure then I think it's <sup>st<sub>4</sub></sup> people turn round quite happily  
turn round and say that anything from fifty to a hundred years / /  
(q)

you're still getting buildup taking place | <sup>pros</sup> FOC <sup>3</sup> <sup>mark<sub>2</sub></sup> <sup>prop<sub>1</sub></sup> /inf/

E25.

too far <sup>(st<sub>5</sub>)</sup> as obviously it has been allowed to go in some of these  
soils especially in the east of england where them the con-  
ditions became so bad that it was not possible to  
establish a commercial crop and get any return from it then  
obviously this was the something had to be done | and  
it's all very well saying put that soil back into grass | QUA <sup>q</sup> you  
may have to put it back into grass for ten twenty years before <sup>st<sub>1</sub></sup>  
you get it back to what it was before | ASS <sup>st<sub>1</sub></sup> 'cept thit was it was  
economic circumstances tha that's what did it | there's no  
doubt about it I mean we can't /emph/ JUS <sup>q</sup> enter into that argument but  
/ / that <sup>st<sub>5</sub></sup> was that was the reason for the decrease in  
rotations eh getting away from grass / /  
<sup>ref</sup>

strong leftward swing of head  
& torso on " 'such"

EXP  
III

and getting on to arable | some soils cannot take it | some  
 can without any trouble | ASS <sup>st</sup><sub>1</sub> | CNT  
 mark<sub>2</sub> <sup>st</sup><sub>1</sub> | 'cause we've been doing it on  
 our own farm at durham now | JUS <sup>st</sup><sub>5</sub> |  
 / / and it has reached a level where if I measure it in  
 the laboratory year after year there's no change / /  
 admittedly the physical condition's not perfect but we're  
 ASS <sup>q</sup> still o from that soil able to produce a a crop which  
 gives one a reasonable commercial return and its structure is  
 not decreasing any further the organic matter's stabilized / /  
 the structure's stabilized | and it is such \*that one can  
 still apply that definition to it that I gave you that th th  
 th the we have not yet exceeded <sup>meta</sup><sub>1</sub> these physical conditions  
 / / where it's going to affect the crop | when we do exceed it  
 / / then whether we like it or not | CON <sup>st</sup><sub>4</sub> /emph/ we'll have to start putting

---

the fences up and go back to stock | but if you're going round  
 DROS FOC<sub>3</sub> mark<sub>2</sub> del /inf/ just  
 E26. when you go round in some of some of your field classes | REC <sup>sg</sup>  
 look at soils as you're going going past or going over farms and  
 through farms just keep your eye open and and see what they're  
 like | try and imagine what kind of rotation's been practised on  
 REC <sup>sg</sup> the farm if even even ask and say er wh what ha what has  
 /emph/ been that soil recently | just look at it especially in the  
 REC <sup>sg</sup> winter time when they're under cultivation | you can see the  
 ASS <sup>st</sup><sub>1</sub> badly structured soils when they're ploughed you can see the  
 better structured ones | and it's interesting to try and link  
 REC <sup>sg</sup> up the you know you can see the farming practice in the dis-  
 (q) trict and link this up with what you see in the field | O.K. <sup>sg</sup><sub>1</sub>  
 "CON<sub>4</sub>"



move back to area A.

look at watch, shuffle notes,  
glance through same.....

....and begin reading from notes

EXP  
III

/ / anybody else quite happy about that right we'll go  
back to soil physics now <sup>meta<sub>3</sub></sup> having digressed onto agriculture \*  
for a spell <sup>meta<sub>4</sub></sup> FOC<sub>1</sub> pros mark<sub>1</sub> meta<sub>3</sub> /semi/ at this stage go through

EXP  
IV

E27.

/ / the methods of measuring aggregate stability eh | REL we've  
/ / we've helped in this because we've already looked at one  
or two of them in the laboratory but em we'll just have  
a a quick run through the methods that are available a for  
/ / measuring this structure | ASS mark<sub>1</sub> here again  
/ / a distinction should be made between the methods / /  
used for the <sup>st<sub>1</sub></sup> assessment of aggregation the measurement of  
aggregate size distribution in the soil and the assessment of  
its stability | CON<sub>1</sub> st<sub>5</sub> /semi/ because em I think that if (one's) going  
to link it with crop production especially and soil management / /  
it's the measurement of aggregate stability that is the more

E28.

important of the two FOC<sub>2</sub> prop<sub>1</sub> prop<sub>2</sub> /form/ now the two factors that are most impor-  
tant in terms of their effect on structure in its natural  
environment and also in the course of many common laboratory  
studies simply water and mechanical action | ASS mark<sub>1</sub>  
the field simple infiltration measurements giving an  
assessment of permeability or measuring water movement  
down the soil profile by the various techniques we'll look  
into this later on can give you a pretty reliable guide  
/ / as to changes taking place in structure and in its

E29.

stability within that profile | CON<sub>2</sub> pros FOC<sub>2</sub> pros mark<sub>1</sub> /inf/ these  
opencast soils when we worked on them first of all | DES<sub>2</sub> st<sub>2</sub> on the very  
bad ones we stuck a simple infiltration tube into the soil

abrupt downward gesture,  
hands in vertical plane | |  
↓ ↓

look around the group

bang lectern with eraser

EXP  
IV

/ / just a stainless steel tube it's driven \* in eh with  
 (ref) q  
 the top six inches protruding from the surface | you fill the  
 top six inches up with water and you sit back and wait |DES<sub>2</sub> st<sub>2</sub> \*well  
 on the opencast soils you'd have been waiting yet /emph/ q  
 \*because  
 nothing very /emph/ JUS st<sub>5</sub> your water was not infiltra-  
 ref  
 ting into the soil the water level in that infiltration tube  
 did not drop | you could try and measure it the rate of  
 (ref) of  
 infiltration per hour |ASS st<sub>1</sub> with the opencast soils we virtually  
 /emph/  
 measured it per week because it went in so slowly I think we  
 st<sub>5</sub>  
 lost more through evaporation than we ever lost into the  
 /emph/  
 soil itself | but as these soils gradually improved under treat-  
 CNT mark<sub>2</sub> q  
 ment you find you found that the infiltration rates increased  
 st<sub>2</sub>  
 / / now this was a perfectly simple test but it was telling  
 SUM mark<sub>1</sub> st<sub>4</sub>  
 you that something was happening to the pore space in the soil  
 / / the pore spaces were obviously increasing in size there-  
 |DES<sub>1</sub> res c<sub>2</sub>  
 fore something must have been happening to the structure and  
 ref  
 if the infiltration rates continued to increase then this was  
 CON<sub>3</sub> st<sub>4</sub>  
 the kind of thing one was looking for | the same idea  
 pros FOC<sub>2</sub> pros meta<sub>2</sub>

E30.

/ / in measuring the water movement down the profile | with  
 prop<sub>2</sub> ASS q  
 these very bad badly structured opencast soils eh one  
 tended to get all the rainfall lying on the surface | even in  
 st<sub>1</sub> JUS q  
 the summertime you got completely saturated conditions in the  
 st<sub>5</sub>  
 top inch and underneath the top inch you found that con-  
 ditions were almost dry | and our classic condition was when we  
 |DES<sub>3</sub> st<sub>3</sub> /emph/  
 used to get down to the drains at about three feet six we  
 found they'd never drawn a drop of water they were as fresh  
 ref /emph/

shrug shoulders

shake head several times slowly

EXP

IV

as the day they'd been put in about seven or eight years before

/ / now if you could measure the changes in moisture content  
|DES<sub>1</sub> mark<sub>1</sub> c<sub>1</sub>  
down that profile and especially relate these changes to

/ / your climatic conditions overhead and if you found that

/ / suppose you got \*twenty four hours rain and within

two or three days you were finding your moisture content

changing down at six inches a foot eighteen inches / /

at least you knew that that rain was getting in it must have  
res ref /emph/

been but if you found that your moisture contents were remain-  
|DES<sub>1</sub> c<sub>1</sub>  
ing the same in spite of two or three inches of rain on

the surface then obviously the structure was still bad no

pore spaces to conduct the water down the down the profile | so  
ref CON<sub>3</sub>

that if you could em set up some sort of monitoring sys-  
mark<sub>1</sub> st<sub>4</sub> tem

in the profile and simply keep a check on the

moisture contents over the year then again you were

getting a fairly reliable guide to changes taking place / /

in the pore size distribution in that soil and again we tried  
pros FOC<sub>2</sub> pros mark<sub>1</sub>

E31.

st<sub>1</sub> this at eh in the on the opencast soils with em these very

simple voyucus moisture blocks they were stuck in at four  
|DES<sub>3</sub> st<sub>3</sub>  
inch intervals down the profile and during the first year of

the experiment the moisture content changes \* were very  
/emph/

small indeed in fact down at about eighteen inches they just  
|JUS st<sub>5</sub> (q)

didn't change at all but after the second year and after

the third year we began to find that these moisture contents

were changing more quickly they were beginning to increase  
ref

down the profile and if one had especially heavy rain-  
|DES<sub>1</sub> c<sub>1</sub>

hand indicates 4 levels by  
jerking down 3 times, palm  
horizontal



during "held at the surface",  
lateral movement of hand, palm  
horizontal



on " "uncis'turbed 'natural  
'soil" gentle downward move-  
-ment, hand horizontal, on  
each stress



fist closed, index finger  
extended to point at class;  
wrist & elbow pivot until  
index is pointing to L's right







begin reading almost verbatim from  
notes, head slightly lowered

look round room, apparently  
distracted.

move to area C.

EXP IV

at the measurements that are in vogue at the moment for

the assessment of stability <sup>PROS</sup> now mark<sub>1</sub> again I emphasise to

EXP V

you you have done it twice in the laboratory once with glass beads <sup>meta<sub>1</sub></sup> <sup>FOC<sub>2</sub> pros</sup> /emph/

E34.

and once with soil the use of this moisture characteristic <sup>prop<sub>1</sub></sup>

curve | <sup>ASS</sup> <sup>st<sub>1</sub></sup> \*originally suggested eh when work was being

done on the hysteresis effect in soil | <sup>ASS</sup> <sup>meta<sub>1</sub></sup> and at the same time / /

keene mentions in his textbook that it would be a useful

technique to use for assessing structure | <sup>ASS</sup> <sup>meta<sub>1</sub></sup> it was later taken

up by child's eh in nineteen forty four one he has a paper

published using the same technique | <sup>ASS</sup> <sup>meta<sub>1</sub></sup> and again when the opencast

work was started in fifty eight we looked pretty closely

at this method and found that of all the techniques we tried

/ / this was the one that gave us the best results now / /  
CON<sub>1</sub> pros FOC<sub>2</sub> mark<sub>1</sub> pros

E35.

the shape of this moisture characteristic curve it depends on the

<sup>prop<sub>1</sub></sup> /form/ size of the pores and the number present of any one size / /

and when the air-dry soil is saturated the moisture retained

| <sup>ASS</sup> <sup>st<sub>1</sub></sup> on draining I'm talking here of of the moisture charac of

the draining moisture characteristic curve not the wetting

one eh to a particular tension <sub>(q)</sub> is determined by the

pore geometry | <sup>ASS</sup> <sup>st<sub>1</sub></sup> and from this you can see why it can be used as a

measure of aggregate <sup>/semi/</sup> stability | <sup>DES<sub>1</sub> c<sub>1</sub></sup> if the pore geometry changes

/ / \*when your air-dry soil is saturated then obviously / /

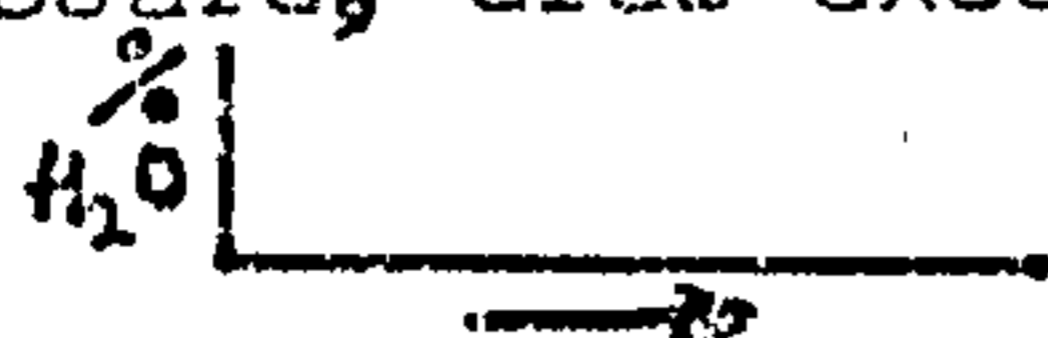
the shape the moisture characteristic will be reflected

/ / this change | <sup>CON<sub>3</sub> st<sub>4</sub></sup> if the pore spaces are not stable you'll

find that less moisture will be released from the saturated

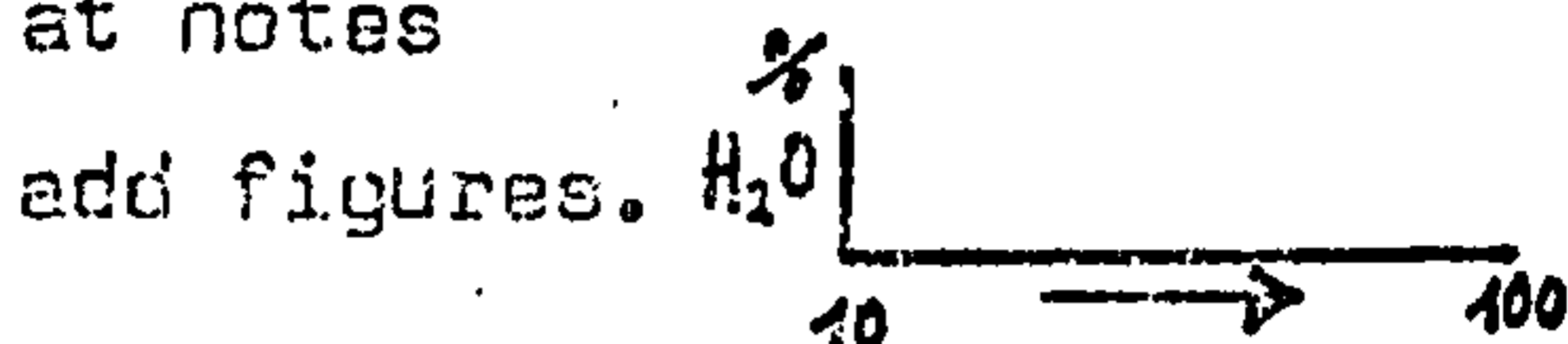
soil when you start applying the em suction \*if  
PROS FOC<sub>2</sub> pros

pull down fresh section of board; draw axes, new graph

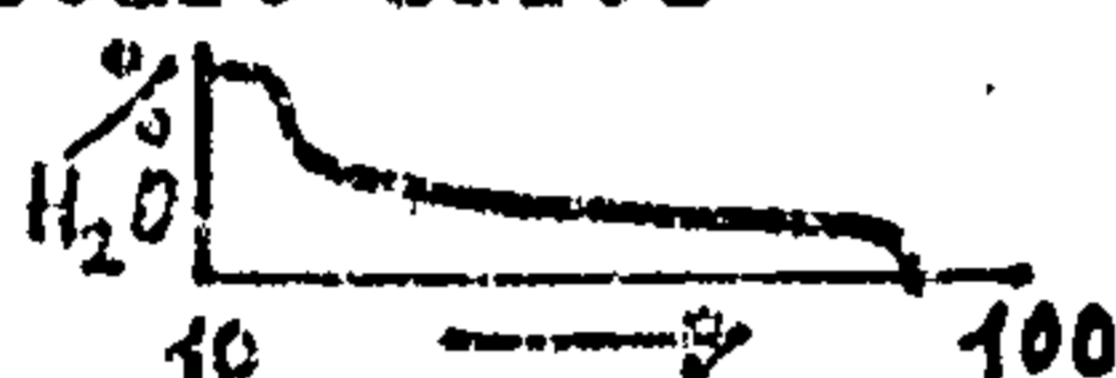


add (1) %H<sub>2</sub>O, (2) arrow

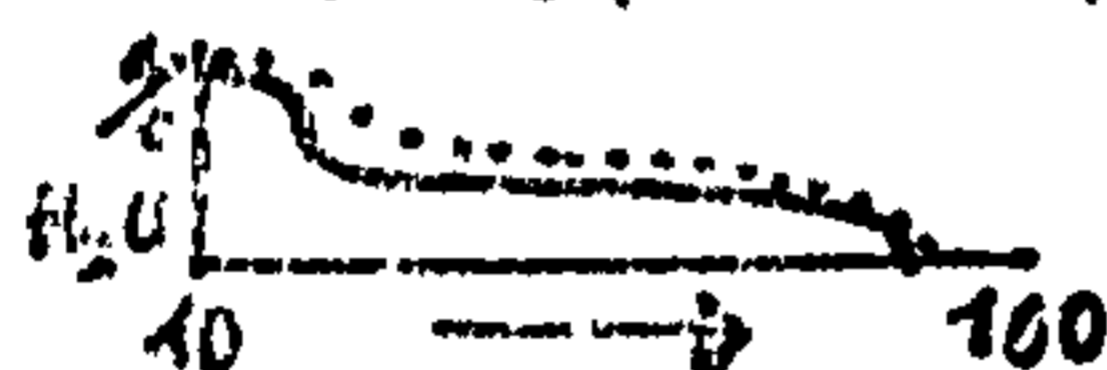
lean towards lectern, peer at notes



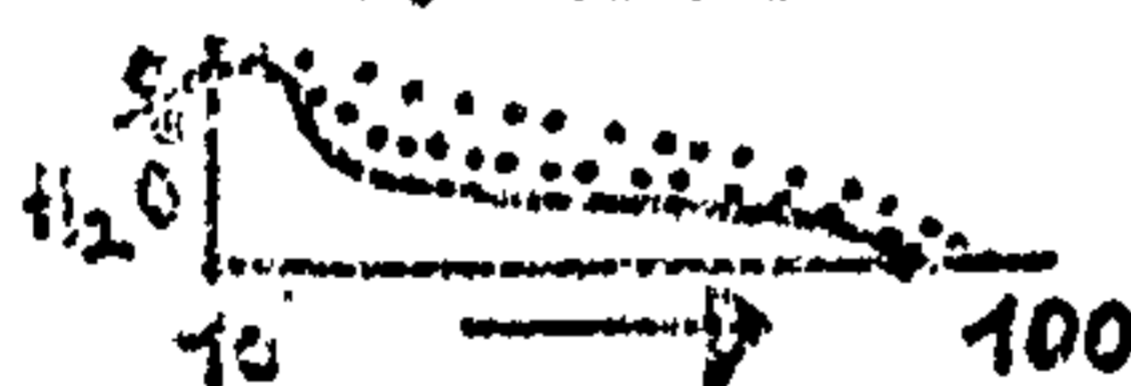
start curve



draw 2nd. (dotted) curve



(1) add 3rd. curve, (2) point to 1st. curve



point to 2nd. curve

push blackboard back up  
point to 3rd. curve

push blackboard back up

EXP  
V  
E36.

we look at the relationship between moisture content / /  
 prop<sub>1</sub>  
 pore size and suction | <sup>\*va</sup> look at these moisture curves just  
 (par)  
 remind you of what they're like there's your percentage  
 st<sub>3</sub>  
 1\*water 2\*increasing suction if we take it from zero let's  
 er <sup>\*what</sup> measurements did I put on this one ten up to a hund-  
 (as)  
 red ten <sup>\*centimetres</sup> up to a hundred | <sup>now</sup> mark<sub>1</sub> with your  
 DES<sub>3</sub>  
 sand or with your glass beads here's the type of moisture \*  
 st<sub>3</sub>  
 characteristic curve you're going to get | <sup>with your stable soil</sup>  
 DES<sub>3</sub> st<sub>3</sub>  
 / / your well structured soil (ref) that you produced on em / /  
 in the laboratory the same sort of thing <sup>\*perhaps</sup> not  
 coming down quite so steeply | <sup>with your very badly structured</sup>  
 DES<sub>3</sub> st<sub>3</sub>  
 soil where you get excessive breakdown where the pore geometry  
 q ref  
 is is definitely changed then the curve will flatten out still  
 further and you'll get 1\*this sort of thing | <sup>this is the type</sup>  
 ASS meta<sub>1</sub>  
 2\*of curve you were producing in the laboratory and I hope  
 that this is the type that you've produced with your glass  
 beads the very rapid release of moisture because the pore  
 st<sub>1</sub> st<sub>5</sub>  
 spaces are unchanged in size | <sup>\*here because you're using soil</sup>  
 DES<sub>3</sub> st<sub>3</sub>  
 / / but the soil is fairly stable (q) you've got a curve where  
 a large amount of water is released early on and the curve  
 then tails off | <sup>and this one here</sup> <sup>\*where</sup> breakdown has  
 DES<sub>3</sub> st<sub>3</sub> (q)  
 occurred the pore spaces have the size of the pore spaces has  
 changed | <sup>and this is reflected in the shape of the curve</sup>  
 CON<sub>3</sub> st<sub>4</sub> pros <sup>now</sup> mark<sub>1</sub>  
 FOC<sub>2</sub>

E37.

not only can we plot this moisture content against suction <sup>2</sup>  
 pros del /semi/  
 / / <sup>\*but</sup> we can get a relationship to the actual pore size here  
 st<sub>1</sub>  
 as well | <sup>because if you</sup> relate the radius of the  
 DES<sub>1</sub> c<sub>1</sub>

step by step, add to board :-

$$r = \frac{2T}{h}$$

erase "h" and amend :-

$$r = \frac{2T}{rgh}$$

supplement 1st. equation :-

$$r = \frac{2T}{rgh} \quad r = \frac{0.15}{h}$$

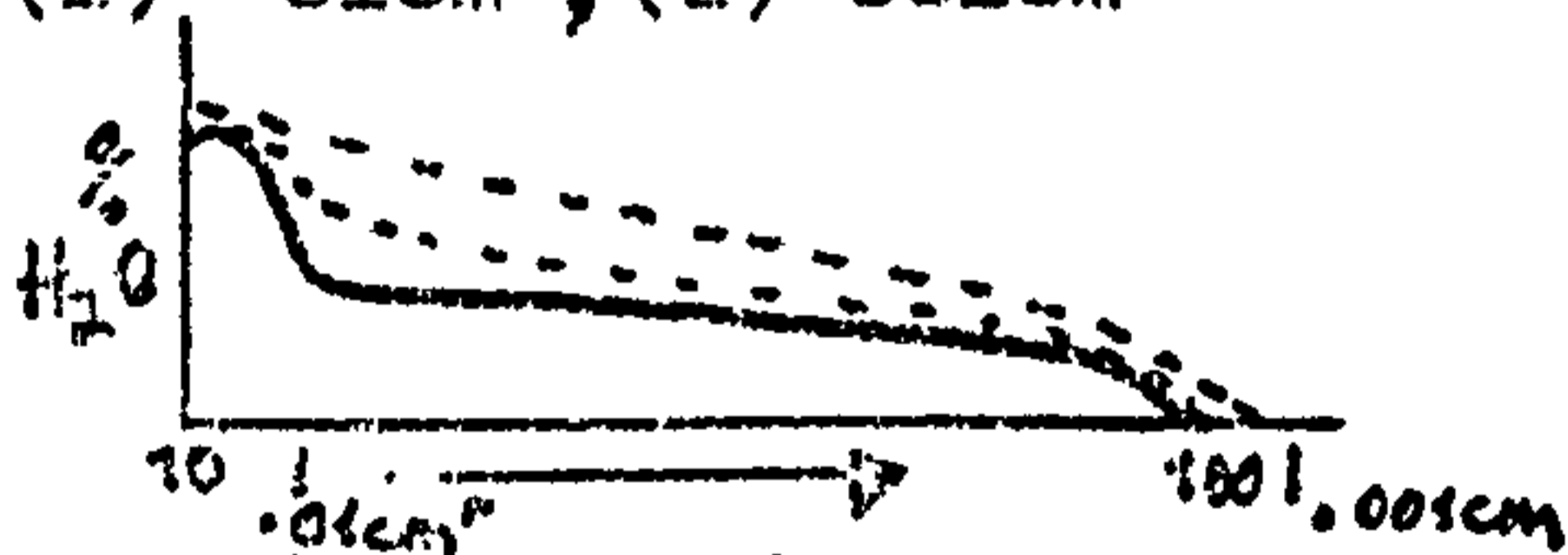
augment 2nd. equation :-

$$r = \frac{0.15}{h} \text{ at } 20^{\circ}\text{C}$$

point to horizontal axis, close to intersection

point to h. axis just beyond intersection with v. axis

add (1)  $0.01\text{cm}^2$ , (2)  $0.001\text{cm}^2$



place flat of hand across all 3

curves, fingers spread ...

...and pat board with hand

point to values added at (1), (2)

above ...

...then step back a pace, looking at

board; swing round to face class

point to base line of diagram

stand back a pace, staring at board;

swing round to class

EXP

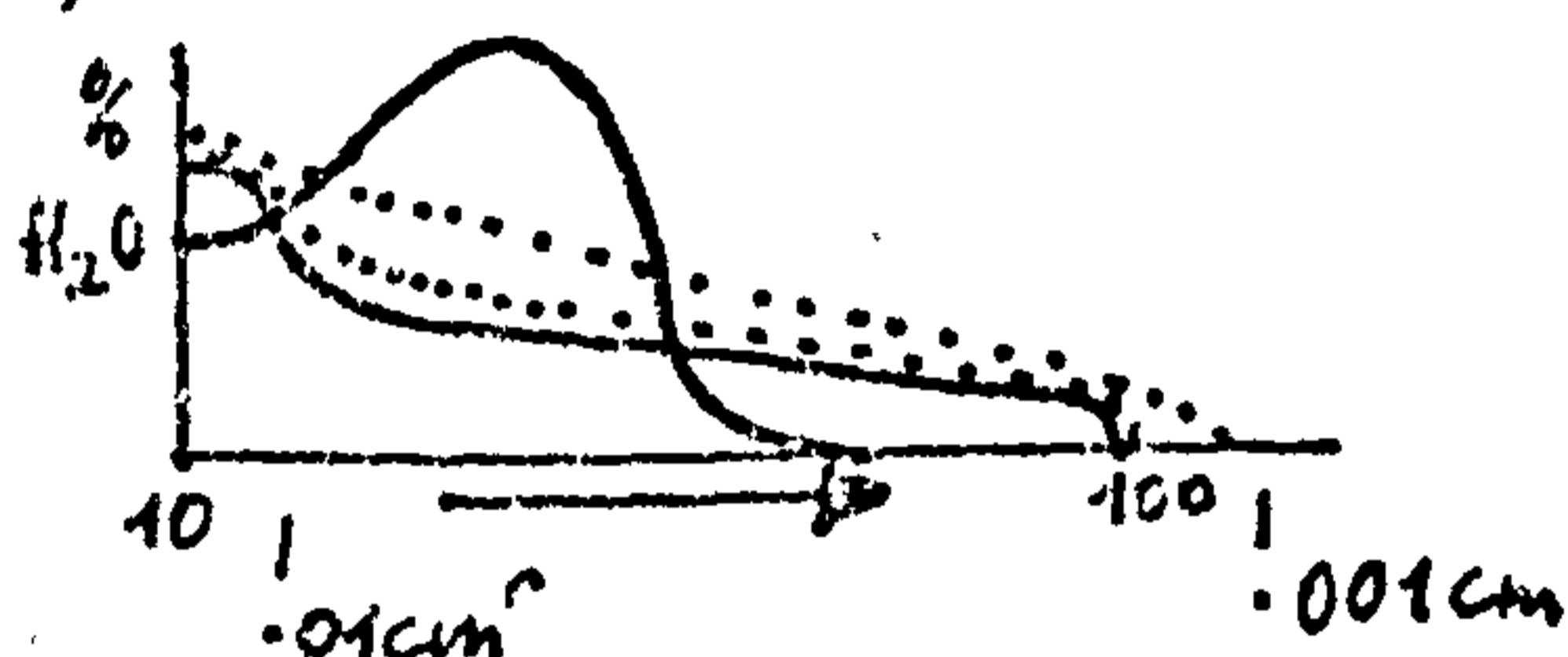
V .

pore neck to  $h$  in your simple capillary equation <sup>\*where</sup>  
 $r$  equals twice the surface tension divided by  $h$  <sup>eh</sup> or  
 if you (no sorry we shoul it should be  $\rho * g$   $h$  actually  
 (par) to be correct if you substitute in the values for  
 these <sup>\*  $r$  works out at approximately nought point one five / /</sup>  
<sup>RES</sup> divided by  $h$  | that is putting in my values for surface tension  
 / / at <sup>EXP  $c_1$  /inf/</sup> <sup>\* twenty degrees centigrade</sup> the value for th gravity  
 / / and the value for the density of the water there is your  
 / / rough relationship between the radius <sup>st<sub>1</sub></sup> of the  
 pore neck remember (par) it is the radius of the pore space but  
 the radius of the pore neck <sup>/emph/</sup> and the suction that is  
 applied | so that you can actually plot the pore sizes / /  
 along here <sup>ASS <sup>st<sub>1</sub></sup> /emph/</sup> <sup>\*for example</sup> just beyond this value here <sup>\*</sup>  
<sup>st<sub>5</sub></sup> your pore size is point nought one centimetre <sup>1 \*  $r$</sup>  and  
 along just beyond the hundred it goes to point nought nought  
 one centimetres | <sup>2 \* so that you can actually get the the pore</sup>  
 / / sizes <sup>CON<sub>3</sub> <sup>st<sub>4</sub></sup></sup> worked out and the amount of water held  
 / / in pores of different sizes can be plotted from  
 this curve <sup>\*in other words ignoring suction altogether and</sup>  
<sup>REF</sup> plotting here <sup>\* moisture content against</sup> this value for  $r$  / /  
 /emph/ <sup>PROS</sup>

E38. so that it's easy so that it's easy from this moisture  
 FOC<sub>2</sub> <sup>meta<sub>2</sub></sup> <sup>pros /inf/</sup>  
 characteristic curve <sup>\*to produce</sup> the pore size distribution  
<sup>PROP<sub>1</sub></sup>  
 curve | <sup>REL <sup>meta<sub>1</sub></sup></sup> this is what you did in the laboratory where you  
 measured the slope of the moisture characteristic and  
 again plotted it against suction | or in the same way  
 / / you could instead of using a suction value there <sup>\*you</sup>  
<sup>c<sub>1</sub></sup> <sup>REC <sup>meta<sub>2</sub></sup></sup> <sup>sg</sup>

point to 1st. curve

add 4th. curve(1) : hand traces  
curves 2,3 (2):point to 3rd.  
curve, then turn to face class(3)  
&(4)



place flat of hand across  
diagram

EXP  
V

could substitute in your actual pore sizes instead <sup>so you can</sup>  
 see where the water's been fa been held <sup>st<sub>5</sub></sup> you can find out the  
 most common in that soil set up on the [inaudible 1.5 seconds]  
 / / so that em for example this one here <sup>\*your moisture em</sup>  
 / / your differential curve for this particular one <sup>st<sub>3</sub></sup> would come  
 in something like that <sup>1</sup> \*and similarly for these ones / /  
<sup>2</sup> \*this one here <sup>3</sup> \* obviously the curve <sup>DES<sub>3</sub> meta<sub>2</sub></sup> flattening out and no  
 peak being formed at all <sup>CON<sub>3</sub> st<sub>4</sub></sup> so that em <sup>4</sup> \*we can determine / /  
 "FOC<sub>3</sub>" <sup>mark<sub>1</sub></sup>

E39.

this pore size distribution curve <sup>from the moisture characteris-</sup>  
 tic <sup>and it is by comparing</sup> these pore size distribution  
<sup>ASS st<sub>1</sub></sup> curves that we can get some indication of the stability of that  
 soil and any changes that take place if the dis if this  
 curve is measured year by year <sup>"CON<sub>4</sub>" pros</sup> now <sup>mark<sub>1</sub></sup> for routine analyses  
 FOC<sub>3</sub> <sup>del</sup>

E40.

unfortunately this method is most time <sup>prop<sub>1</sub></sup> consuming <sup>JUS st<sub>5</sub></sup> you've two  
 graphs to draw for one thing you've quite a lis you  
 you've a considerable amount of data to collect before you get  
 these graphs drawn and this is its main disadvantage / /  
 and also <sup>ASS mark<sub>1</sub></sup> in a way <sup>st<sub>1</sub></sup> there is no satisfactory method of produ-  
 cing a single numerical index from this curve <sup>JUS st<sub>5</sub></sup> after all  
 this is the age of the computer and the computer likes a whole set  
 of figures shoved into it can digest them and produce a nai  
 some sort of answer at the end <sup>now it's pretty difficult to</sup>  
 work from \* data like this <sup>ASS mark<sub>1</sub> st<sub>1</sub></sup> what you would prefer is to try  
 and get a single numerical index <sup>REC sg</sup> so that you can have a list  
 of these compare them one with the other <sup>because remember</sup>  
<sup>JUS st<sub>5</sub></sup>



move to Area A. and....

...tap lectern with eraser twice  
on "external values"

from "none whatever", move to area C,  
pass hand across diagram twice

erase board, finishing by  
"tell you", face class and...

move to front of Area D.....

smile at both occurrences of "the"

on "having seen", swing round, look  
at (now empty) board, swing back

EXP

V / / these structure methods are all comparative <sup>you<sub>ref</sub> are</sup>  
 working to no external values <sup>\*none whatever</sup>  
 simply comparing <sup>/emph/</sup> the peak of one curve <sup>ASS<sub>st1</sub></sup> with the peak  
 of another <sup>\*taken at different times or under different rota-</sup>  
 tions <sup>so that</sup> <sup>somehow or another we've got to get</sup> a  
<sup>CON<sub>4</sub></sup> simpler method of producing <sup>eh</sup> an index <sup>meta<sub>3</sub></sup> to characterise  
 stability from these curves <sup>pros</sup> <sup>now \* the way that we do it in the</sup>

EXP VI  
E41.

laboratory <sup>and I'm not saying this is the only way because I</sup>  
<sup>QUA<sub>st1</sub></sup> quite sure when you <sup>hear what I've got to tell you</sup> that  
 you'll realise there are other <sup>eh</sup> techniques that could be  
 used for producing this index <sup>but the one that we've found / /</sup>  
<sup>JUS<sub>st5</sub></sup> to be most satisfactory <sup>not only for opencast soils</sup> for  
 netherton soils <sup>but for one or two other</sup> <sup>/emph/</sup> odd soils that  
 have come into the laboratory at times <sup>from different parts of</sup>  
 the country and <sup>just out of curiosity \* we've tried these tech-</sup>  
 niques on them <sup>because I don't like suggesting to you that</sup>  
<sup>JUS<sub>q</sub></sup> this is <sup>I'm not suggesting it's the the method</sup> <sup>I am sugges-</sup>  
<sup>st5 ting it's one of the methods <sup>but unless you can be certain that</sup>  
<sup>QUA<sub>q</sub></sup> this method will work <sup>with a large variety of soils</sup> <sup>then I</sup>  
<sup>st1 I I don't like to <sup>to boost it as much as I</sup> I <sup>perhaps do</sup>  
 because <sup>\*having seen it work on</sup> soils <sup>covering a wide</sup>  
<sup>JUS</sup> range of textures <sup>soils that are stable</sup> <sup>soils that are not</sup>  
 stable <sup>I think we're more or less on the right lines with this</sup>  
<sup>st5</sup></sup></sup>

E42.

technique <sup>but to reduce it</sup> <sup>for routine analysis</sup> <sup>the</sup>  
<sup>CON<sub>1</sub> pros</sup> <sup>FOC<sub>2</sub></sup> <sup>pros del</sup> method that we <sup>is</sup> to change <sup>the pre-wetting treat-</sup>  
 ment <sup>now in the laboratory</sup> you saturated these soils / /  
<sup>REL<sub>mark1 meta1</sub></sup>

vague arm gesture towards  
blackboard, left arm

in pause, look round group; smile;  
repeat in following pause....

....and again

step briskly to board, write:  
x cm suction

EXP VI

under <sup>(a)</sup> what should have been if you had done it properly under  
 a two centimetre head | <sup>now you didn't</sup> <sup>you saturated them</sup>  
 for ten minutes | <sup>CNT</sup> <sup>mark<sub>2</sub></sup> <sup>st<sub>1</sub></sup>  
 under a very small wetting head and then  
 you carried on collecting the data <sup>because of the time factor</sup>  
 / / normally if you had been doing this <sup>st<sub>5</sub></sup> under em research  
 / <sup>DES<sub>2</sub></sup> <sup>q</sup> conditions <sup>st<sub>2</sub></sup> you would have wetted it under two centimetre head  
 for twenty four hours you would have then collected the data  
 / / to draw the moisture \* characteristic curve | <sup>CON<sub>2</sub></sup> <sup>pros</sup> <sup>but</sup> <sup>suppose</sup>  
 | <sup>FOC<sub>3</sub></sup> <sup>mark<sub>2</sub></sup> <sup>prop<sub>1</sub></sup>

E43.

I had taken that bad arable soil at netherton <sup>the one that</sup>  
 breaks down very easily and subjected it to its two centimetre  
 head wetting and as well as that subjected it to a very  
 gentle wetting under twenty centimetres suction | <sup>DES<sub>1</sub></sup> <sup>\*now what</sup>  
 do you think would happen you're reducing the severity of the <sup>mark<sub>1</sub></sup>  
 wetting treatment by <sup>c<sub>1</sub></sup> changing from a two centimetre head  
 / / saturation to a very slow suction wetting treatment / /  
 if breakdown's going to take place <sup>c<sub>1</sub></sup> you should know when it's <sup>res</sup>  
 going to take place | <sup>CON<sub>3</sub></sup> <sup>st<sub>4</sub></sup> \*it'll take place under the severe wetting  
 treatment not under the other one <sup>pros</sup> | <sup>now</sup> <sup>suppose I did</sup>  
 | <sup>FOC<sub>2</sub></sup> <sup>mark<sub>1</sub></sup> <sup>del</sup>

E44.

these two pre-wetting treatments <sup>and instead of drawing / /</sup>  
 the complete moisture characteristic curve <sup>del</sup> simply got one  
 point on that curve <sup>prop<sub>1</sub></sup> the moisture content at x centimetres  
 \* suction | <sup>CNT</sup> <sup>mark<sub>2</sub></sup> <sup>st<sub>2</sub></sup> in other words I don't go to the bother of loading up  
 / / two or three [steps ?] each time of taking all the data and  
 / / drawing my curve | <sup>DES<sub>2</sub></sup> <sup>st<sub>2</sub></sup> I simply take the soil sample after  
 its pre-treatment load the burette until I have applied x  
 centimetres suction <sup>(a)</sup> let it reach equilibrium and take the

add to board: 30 cm

add to board: S I =

point to x

write  $\begin{matrix} a \\ b \end{matrix}$  isolated on board(1), (2)

(3) augment 'S I' to:  $S I = \frac{a-b}{b}$

- (4) add to 'a' : a = 2cm head  
(5) ,, ,, 'b' : b = 20 cm 30cm suction  
(6) add '30 cm suction'

arm describes curve, hand flat & horizontal



with rapid stroke, draw rough curve on board



EXP VI

moisture content on the plate for  $x$  (at the moment / /  
 we have [inaudible  $\frac{1}{2}$  second] thirty centimetres | ASS  $st_1$   $st_1$  \*now I have  
 two moisture contents one (q) from a severe pre-wetting treat-  
 ment the other one from a much gentler pre-wetting treat-  
 ment and from this one can work out a stability index | the  
 stability index \*will equal the moisture retained / / | CON<sub>3</sub>  $st_4$   
 at thirty centimetres suction that is the one point  
 / / \*on the moisture characteristic curve after the two  
 centimetre head wetting minus the moisture content at  
 thirty centimetres suction after the twenty centi-  
 metre suction wetting | now suppose to make it simple / /  
 pros FOC<sub>2</sub> mark<sub>1</sub> par

E45.

if my head wetting moisture content is  $1^*$  a | my suction  
 del  
 wetting moisture content is  $b^2^*$  your stability index / /  
 is going to be  $3^*$  a minus b divided by b |  $st_1$  in other words  
 a is your  $4^*$  two centimetre head pre-wetting this  
 $st_3$   
 $5^*$  is the twenty centimetre suction wetting | and having  
 done that you then  $6^*$  apply thirty centimetres suction / / | DES<sub>2</sub>  $st_2$   
 $st_2$   
 with the burette and find out the moisture content at that  
 suction figure | this is entirely arbitrary we take it at  
 | ASS  $st_1$   $st_5$   
 thirty mainly because it is off the steepest point of  
 the moisture characteristic curve | if you think of that moisture  
 | DES<sub>3</sub>  $meta_1$   
 characteristic curve as we drew it em in the laboratory / /  
 you'll find that the steepest part of it is usually from  
 $st_3$   
 zero to ten centimetres suction after that it \* curves  
 round till about at fifteen twenty thirty the curve is  
 flattening out it comes \* down like this and you've got it

point to right tail of curve

one hand points to curve, other  
repeats gesture made at "curves  
round"(above)

with chalk tap values against  
a, b, on board....

....and point to same

point to 30 cm

point to 20 cm

point to 30 cm

point to  $\frac{a - b}{b}$

EXP VI

coming round there <sup>par</sup> this is round about \* thirty here | <sup>SUM</sup> so that <sup>st<sub>4</sub></sup>  
 we take the moisture content at the em off this steepest \*  
 part of the curve round at thirty but it's entirely arbit-  
 rary you can pick whichever point you like | <sup>REC</sup> I would say thirty's <sup>sg</sup>  
 about the minimum but se <sup>q</sup> I've seen it done at sixty you can  
 increase it \* if you want to | but it's simply set up two / /  
 / <sup>emph/</sup> soil samples on the porous plate <sup>DES<sub>2</sub></sup> <sup>st<sub>2</sub></sup> do your twenty four pre-  
 hour er pre-wetting treatment one at two centimetres head  
 / / one at twenty centimetres suction | and again <sup>ASS</sup> \*these are <sup>st<sub>1</sub></sup>  
 arbitrary you can change these if want to <sup>ref</sup> you can increase  
 the head wetting you can do it at zero if you want to \* zero  
 suction you can increase that \* you can decrease it | <sup>emph/</sup> it doesn't  
 matter what you do as long as you can get a difference in mois- <sup>CON<sub>3</sub></sup> <sup>q</sup>  
 ture content when you <sup>st<sub>4</sub></sup> <sup>emph/</sup> plot that single point on the

characteristic curve <sup>pros</sup> and the stability indexes indices / /  
<sup>FOC<sub>3</sub></sup> <sup>st<sub>5</sub></sup>

E46.

that you get from <sup>eh</sup> this routine technique fit in very  
 nicely most cases with the wet sieving data with the  
 dispersion ratio data and yet it's a simple routine method you <sup>prop<sub>1</sub></sup> <sup>st<sub>5</sub></sup>  
 draw no graphs at all your graphical work has gone | all you've  
 got to do are these <sup>emph/</sup> <sup>ref</sup> to get are these two moisture contents <sup>DES<sub>2</sub></sup> <sup>st<sub>2</sub></sup>  
 / / and from that work out your simple stability \* index / /  
 and find out <sup>ref</sup> the value you get for it | this is getting rid  
 / / of eh graphical work the collection of the data <sup>JUS</sup> <sup>st<sub>5</sub></sup>  
 necessary for graphical work and it's getting you down to  
 a single figure which will characterise your s aggre-  
 gate stability in the soil | <sup>ASS</sup> <sup>mark<sub>1</sub></sup> <sup>meta<sub>1</sub></sup> now unfortunately in the laboratory



from lectern, point with thumb over  
shoulder to board

bang eraser down, move to Area D  
rubbing hands.....

.....and wave hand vaguely in direction  
of board

glance back briefly at board.

EXP

VI

you haven't got time to to to work out work out this em out  
<sup>st<sub>1</sub></sup>  
 this technique | REC and anyway I think it's better for you to do  
<sup>sg</sup>  
 the complete curve and see how the shape of that curve varies  
<sup>ref</sup>  
 / / see how you get a pore size distribution curve from it  
 / / but em \*this is just one technique of shortening  
 | CON <sup>st<sub>4</sub></sup>  
 that <sup>em</sup> that method so that it could be applied to a very  
 large number of samples 'cause no graph work necessary at all  
<sup>pros</sup>

E47.

/ / and I haven't time to do today nor have I time to show the  
<sup>FOC<sub>3</sub> pros prop<sub>1</sub></sup>  
 slides today we spent too long on the first part of that lecture  
<sup>meta<sub>4</sub></sup>  
 / / \*em we'll do this next week show you some of the em  
 /emph/ | REL <sup>meta<sub>3</sub></sup> <sup>ref</sup>  
 / / results that you can get from using these eh \*  
 different pre-wetting techniques | and how it eh the data  
<sup>JUS st<sub>5</sub></sup>  
 seems to fit in very well with other structural stability  
 methods and more important fits in very well with what  
 /emph/  
 we know the history of these soils and what one can actually  
 see in the field | I think with the soil management class I  
<sup>REL meta<sub>1</sub></sup>  
 actually gave you the stability indices indices figures for  
 netherton | eh next week I'll sh I'll give you some others  
<sup>REL meta<sub>3</sub></sup>  
 / / for soils that are slightly different from netherton / /  
 and you'll just see how they appear to fit in quite well  
<sup>st<sub>5</sub></sup>  
 / / with the rest of the information at our disposal | yes  
<sup>CON mark<sub>1</sub></sup>  
 well we'll finish the um \*structure methods next week <sup>4</sup> / /  
<sup>meta<sub>3</sub> pros</sup>

"EXP"

VII

E48.

right we'll start the practical class em when you get up-  
<sup>"FOC<sub>1</sub>" mark<sub>1</sub> meta<sub>3</sub></sup>  
 stairs there'll be a shift round those of you who are on  
 the centrifuge this week it will have been it was going to go  
<sup>c<sub>1</sub></sup>  
 on at w two o'clock so that your first half hour treatment  
<sup>res</sup>

"EXP"

VII

will have been given to these soils and I suspect that michael's  
already got well under way with the second one <sup>st<sub>1</sub></sup> so when  
you go upstairs you'll probably find that the thousand eh / /  
revs per minute treatment is almost finished and the boxes  
will be ready to come off to weigh | however contact  
michael he <sub>(q)</sub> was starting it and you'll get the "CON<sub>1</sub>" dir set-up from  
him pros

A P P E N D I X ( ii )A Note on Measurement of Pauses at Points of Transition in Discourse Structure

An attempt was made to determine points of transition in the discourse structure on the basis of pause length alone. 32 short extracts of between one and two minutes were taken from different recordings at points at which transitions at the rank of Exposition had been provisionally identified. The extracts were fed into an oscillograph and the lengths of all pauses in the extracts were measured. It was hoped that a significant difference in length would be found between the pauses associated with points of transition and the other pauses in each extract, and that relatively long pauses might be a reliable indication of transitions. No clear pattern emerged, however. While pauses at such points were generally 'long' (in the order of  $\frac{3}{4}$  to a little over 1 second), pauses within stretches identified as Episodes were occasionally longer still (generally  $1\frac{1}{4}$  -  $1\frac{3}{4}$  seconds long, but occasionally as long as 3 seconds or more). These pauses did not necessarily occur at syntactic boundaries; they sometimes took on an emphatic function, though often it was not entirely clear what effect they were intended to achieve.

To take the example of Episode E.12 (p.p. 169-170 of the transcript), the transitional pause marked as 'pros' is 0.62 seconds long; yet the pause at the end of 'st<sub>1</sub>' is 1.36 seconds long and an intervening pause of 1.08 seconds follows "the action of frost." Nor does the pause of 1.36 seconds clearly denote the end of the focussing

move, since three pauses of similar length occur after "you will get", "larger ice crystals" and "when the water I should say freezes" (1.27, 1.51 and 1.45 seconds, respectively). It is difficult to tell whether the first of these is intended as emphasis or is due to deliberation. The second prefaces a process description carried over two describing moves, but it is not matched by a pause of similar length to preface the ensuing contrasting move. The third long pause would seem to be attributable to a recovery after two 'slips of the tongue.' Again, although a pause of 1.36 seconds may mark the end of the focussing move, it is not matched by a similar pause to indicate the onset of the concluding move.

This lack of a clear pattern of pause lengths in relation to discourse structure was evident in all the extracts. One is therefore bound to conclude that pause length cannot be considered independently of changes in syllable rate and shifts in pitch range in assessing points of transition. But to engage in a systematic study of the coordination of these prosodic features over such an extended discourse was beyond the scope of this study, and so the general features described under 'pros' in Section 3.3.5 have served as a 'rule of thumb' for present purposes.

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