colloquy, said: "If these may be taken as indicating the state of multidisciplinary research in materials in the United Kingdom and France, the technology gap between the US and Europe is surely going to increase. The United Kingdom seems to be badly handicapped by academic rigidity in the universities and conservatism in industry".

The colloquy seemed to make clear that materials science and engineering face several problems with no easy solutions. They seem to be resisting successfully all attempts to organize them, and, while they have given a more powerful impetus (with the help of government prodding and funding) to interdisciplinary research, there may be more form than substance to many of these efforts. On the other hand, progress is visible. The morale of the interdisciplinary laboratories is high in general and communication among the traditional disciplines is being stimulated. More students (and graduates) are becoming interested in materials science and subsequently in industrial research. Joint academic appointments are being fostered in some universities and the interdisciplinary laboratories are beginning to influence the standard of work done at other institutions. It is anticipated that this meeting will provide a fillip to research and education in materials science and lead to other meetings which will build upon the base it has prepared.

LINGUISTICS

Syntax and Semantics

from a Correspondent

THE three Shearman Memorial Lectures at University College, London, given by Professor Noam Chomsky from MIT attracted audiences of about a thousand each in spite of the title "Problems of Syntax and Semantics". The appeal of the lectures was primarily to linguists and philosophers already acquainted with Chomsky's theory of generative grammar. What Chomsky now refers to as the standard theory was developed in his *Syntactic Structures* (1957). The standard theory has come under numerous attacks, largely from Chomsky's former students. It was to these attacks that he addressed himself. Chomsky conceded that his theory required some modification but suggested that the modifications proposed by his principal opponents, who are grouped around a theory of generative semantics, would not do.

The standard theory factors syntax into two components. A base component contains in simple form (for example, subject predicate structures) the infinite set of base propositions which underlie an equally infinite set of surface structures which are the sentences we hear spoken. Between base and surface structures occurs the second component, a set of transformations. Both base and surface structures are recursive. The transformations alter the elements of the deep structure into that of the surface structure. The standard theory has generally started from surface structures and postulated underlying deep structural propositions. Transformations have then been elaborated; this is not done arbitrarily, for it is possible to specify various transformations in distinctions of the generality of active and passive voices, or pairs of deep structures represented by an ambiguous surface structure such as: Visiting relatives can be a nuisance. The base propositions in this example differ in the different position of

an implicit "the". "The visiting relatives" versus "Visiting the relatives".

For Chomsky the purpose of linguistic theory is to capture the largest number of significant rules. It is on the failure of his opponents' systems—to capture as many rules as his own—that his attacks on them are based. Chomsky outlined the view of the generative semanticists as being based on the claim in the standard theory that deep structure determines semantic representation. They strengthened this claim by arguing first that there was a one to one relationship between deep structure and semantic representation and then by the further step of taking deep structure as semantic representation. Their basic recursive component is generating semantic representations rather than deep structures of the sort specified in the standard theory. Chomsky presented several arguments against his opponents' views. His key arguments focused on low yield and on a confusion they made between performance and competence. For Chomsky, performance is to be related to procedure and competence to knowledge. Competence is demonstrated by understanding and performance by speaking; competence is more difficult to explain because meaning is understood without reference to the auditor's intention.

Chomsky's alternative was to modify the standard theory to take into account various cases in which surface structure seems to contribute to meaning. His conclusion was that he had overstated the importance of deep structure for semantic representation in the standard theory. The examples which Chomsky provided, as well as his arguments, seem to maintain the primacy of deep structure, but he provided several general cases such as those of logical particles, anaphoric relations and presuppositions in which surface structure played a principal part. Some striking examples were introduced, based on intonation.

He concluded that perhaps the most satisfactory representation of meaning was as the answer to a lot of questions asked by the auditor of both deep and surface structures of an utterance. He suggested that the principles in terms of which the questions are put may be quite universal. His final remarks returned to a theme he elaborated a decade ago in his refutation of B. F. Skinner. He argued that syntax is independent of sound and meaning; that the evidence of the nature of language which he had discussed was not available to language learners, and that this suggested that language learning must be based on an innate schematism.

SURGERY

What a New Heart is Worth

MORE than a hundred hearts have been transplanted in the 18 months since Dr C. N. Barnard first undertook the operation. The largest single group—fifteen operations—has been performed at the Texas Heart Institute by Dr Denton A. Cooley and his colleagues. The summary of their experience is that in present circumstances a heart transplant improves the quality of, but does not greatly prolong, the life of the average recipient. But length and quality of survival are directly related to closeness of histocompatibility between donor and recipient, a factor on which future operations should be made to depend.

Cooley and colleagues report that the mean survival