

## PRESENTATION OF TECHNICAL INFORMATION

*The following notes were taken by Commander (E) J. I. T. Green, R.N., at a series of lectures given in April and May, 1947, by Professor R. Kapp, the Dean of the Faculty of Engineering, London University. Commander Green mentions that these notes are "as written" during the course of lectures, with the exception of an occasional sentence added later to clarify the meaning. They should not be read too quickly as the ideas are occasionally disjointed; shorthand was not used. It is hoped that this will stimulate thought and help those who may be in doubt as to the best way of expressing themselves on technical subjects.*

### INTRODUCTORY LECTURE

*The function of language in co-operative work. The technician's responsibility towards his mother tongue. Functional and imaginative language compared. General problems of presentation.*

Many voices have recently been raised concerning the need for a higher standard of education among executive engineers, e.g., *Physicists* want English and Literature, *Civil Engineers*—"Wider knowledge," *Mechanical Engineers*—"Clarity of expression," *Electrical Engineers*—"Broader knowledge, less specialising" and *Iron and Steel Institute*—"Cut detailed knowledge of sciences"; i.e., Engineers must have broader education if their tremendous influence on world affairs and trend of language is not to be harmful.

Tools of the executive engineers are talk and paper. For passing information from mind to mind, functional English must be used rather than imaginative English. A good example of functional English is Robinson Crusoe. Imaginative English is not for same purpose but is used to remind the recipient of what he already knows, and in particular to describe feelings (introspective rather than inspective).

Functional English should not contain too many metaphors as this may only confuse and divert attention. Minds rather than souls are the recipients. Hence the "English" of the usual University curriculum is not quite what is wanted. True functional English is required in many directions, and these remarks may equally be applied to any of them; e.g., a manager reporting to John Smith, his director; a lecturer addressing a class of John Smiths; a foreman instructing John Smith, the labourer; a junior officer reporting to John Smith his senior.

The lecturer has above all things to maintain the receptivity of his class. His language must be simple and clear. The problem then falls into these main phases (a) Linguistic, (b) Logical, (c) Psychological. As regards (a), the linguistic problem, the main things to avoid are unfamiliar words or phrases, misleading phrases, odd punctuation and clumsy sounds. The objective is to keep speech to a smooth flow parallel to thought. With (b), avoid irrelevancies (not so easy). Test all facts for relevance, otherwise receptivity is lost. Don't present unfamiliar ideas without connecting up logically. Don't omit steps in reasoning but don't elaborate the obvious. Don't emphasise the less important points; in all, use logic as a map and arrange everything in logical order. As regards (c), the psychological phase, be aware of individuals in class—extent of knowledge, interests, capacity, etc.—thus keeping in touch with receptivity.

### Choice of Material

Correct choice of material is important. Decide first what the information is for and for whom it is intended. Is it a report to a superior? If so, don't make it the occasion for a show-off of knowledge (irrelevancies). Is it an instruction to a junior? If so, temper it to his capacity.

A few detailed hints are :—

- (i) Precise figures are a mistake if round figures will do.
- (ii) Weak reasons are bad if strong ones are available.
- (iii) Cut out references to rejected solutions (say, in a research treatise) unless posterity will need it.
- (iv) Limit the matter to the terms of reference.

### II.—THE PART PLAYED BY PSYCHOLOGY IN PRESENTATION

*Association of ideas. The work of understanding. The work of memorising. Problems of pace and timing in presenting new information. Maintenance of receptivity.*

The lecturer must remember that the students are engaged in three separate activities of the mind :—

Associating, Understanding, and Memorising.

These acts must be eased. Metaphorically, the student has a storehouse of knowledge (subconscious mind) and storekeeper (brain impulses).

#### Association

This is not a card index system. How is this immediate association brought about? Process is still a mystery. Sometimes considerable effort is required. (Threshold value too low.) Time and effort is affected by consideration of such matters as :—

- (i) Tired or fresh?
- (ii) Pleasant or unpleasant?
- (iii) Subject matter.
- (iv) Time elapsed.
- (v) Frequency of recall.
- (vi) Number of links (i.e., what the recipient knows and how well he knows it).

Time and effort are required in correlating old ideas with the new knowledge. Devices for helping this process. Timing to suit receptivity, e.g., stimulation as done by comedian on stage; activation of mind done deliberately; for the subtle "gag" a slightly slower pace is used at the correct moment.

As an example of how not to describe industrial apparatus; a complicated sentence describing coal being *weighed* on arrival and *electrically tipped, conveyed* and *directed* to boilers leaves the brain groping for something to get hold of.

Difference between expressing and conveying information. Requires loosening up by separating the subjects if they have no logical connection. Avoid numerical information mixed up with ordinary qualitative facts. Stopping and restarting involves effort on the part of the listener, but it is worth while if numbers are necessary.

Pace of address is thus important.

#### Methods of Helping Association

- (i) With a slow witted labourer, separation of the different thoughts involved are required, e.g., "You know XY. He works in Z. Find him. Tell him I want him," NOT "Tell XY I want him."

- (ii) With an F.R.S. moreover, references or a preface showing existing state of knowledge is valuable.
- (iii) At a conference, an introductory word or two are essential. Frequently an abrupt but shrewd statement is ignored for lack of this.

Use of phrase “with reference to” is wearisome if overdone. Sometimes necessary to state what you are *not* discussing, e.g., “Relativity considerations apart . . .” whether subject is simple or obscure should be stated.

Discontinuity is sometimes stimulating but the change must be made clear and complete.

### III.—THE PART PLAYED BY LOGIC IN PRESENTATION

*Selection of material. Language as a vehicle of thought. Language as an aid to thought. The logical approach to a conclusion. Devices for making information easy to remember.*

#### Understanding

Explicitness of functional English. In imaginative English the facts are left to speak for themselves, e.g., Shakespeare does not have to give a list of qualities of his characters but leaves this to the sensitiveness of his readers—imaginative writing. Also in imaginative films. Obviously this is a totally different business to that of scientific writing. Insight v. Reason.

Do not, therefore, be afraid of stating the obvious, say, as a conclusion, more especially when numbers (figures) are involved. e.g., “Lamp Black does not give a perfectly black surface.” This can have two meanings, but add the word “Even” at the beginning makes all the difference. This is true functional English. Many such small additions are needed, commenting to clear up doubts. Objectivity alone is all very well but it is not good enough in spite of “training in scientific method,” e.g., “*A dangerously high* temperature of 750° F” would strike an average civil servant as wrong as giving a personal opinion.

Examples of comment words. For a mathematical “bridge” the word “obviously” is very poor. “From which it follows” is no better. A writer should remind himself that his readers have not the same mental agility and that jumps without bridges are bad. This helps to clarify thought, provided the words are well chosen.

Reasoning in philosophy can only be checked by better reasoning, whereas in science it can be checked by experiment.

If surprising information is being conveyed it is best to provide more than one bridge, e.g., Relativity was at first not accepted in some quarters because there was only one bridge.

DO—In mathematical argument, point out significance of intermediate steps.

- Use graphical methods. (Stifle mathematical conscience for sake of weaker vessels).
- Use comparisons to bring out shapes.
- Describe inventions from the general angle first. (Compare patent specifications).

DON'T—Confuse diagrams with too much detail, or too many curves, or too many scales.

- Use drawings of too much detail if simple ones will do.

## Memorising

Some students don't listen—they just “bask” at a lecture. Even the best lecturers, keeping Association and Understanding in mind may fail in Memorising. Possible factors which guide the student to “harbour and still waters,” are :—

- (i) Rich in association, e.g., mental pictures can be suggested.
- (ii) Relevant. Context must suit the facts put over.
- (iii) Suitably timed. Association and Understanding must have time to settle before student commits to memory.
- (iv) Preparation of mental state, e.g., by asking questions.
- (v) Well phrased—no literary tricks.
- (vi) Judicious repetitions, e.g., telling a story to illustrate a point is a way of repetition.

## IV.—SOME SPECIFIC PROBLEMS

*Avoidance of vague or meaningless phrases. Tact and persuasiveness. The presentation of generalisations. The presentation of qualifications. The presentation of unexpected information. The use of metaphor in functional English. Care in the use of words.*

### Circumlocutions

See Quiller-Couch's. “On Jargon” in *On the Art of Writing*.

A means of dodging thought, e.g., (i) in introducing a new subject “in regard to . . .” (ii) in saying what you are talking about “in this direction . . .” (iii) “from this point of view . . .” (iv) in lieu of the correct preposition—“as far as the population is concerned” should in case quoted be “for the population.”

### Presentation of a General Statement

This causes or evokes work from the listener or reader. This work must be lightened by providing the examples which everyone would otherwise have to start searching for themselves. Choice of examples. True and free from complication. Of same language, i.e., not metaphorical or translated into another. Familiar to audience, i.e., not necessarily familiar only to lecturer. It is also of interest to note that Shakespeare often gave his general statements *after* the particular example. There is no definite rule, but it is suggested that where the general statement is rather profound it should come last.

### Meaning What You Say

If a read-over of the manuscript is made too soon after writing the error will not be noticed. Carelessness, exaggeration, and wishfulness are three causes of such errors. Remember the quantitative significance of words. Wishfulness creeps in under the word “only,” e.g., “The only way to prosperity is Socialism/Free Enterprise.” Another phrase similarly used is “essential feature” when it is quite erroneous.

### Qualifying Statements

Sometimes overdone and makes it difficult for the listener. Sometimes q is included within a q. This can be overcome by suitable warning, e.g., “To a first approximation,” or “In general . . .” Isolate or avoid them altogether.

### Choice of Words

Technical terms must of course be standardized before technical information can be conveyed with certainty. There is no room for shades of meaning. Logical but not subtle. But many mistakes are made through sheer ignorance of the meaning of normal words, e.g. :—

*Diminished* in lieu of *reduced*.  
*Responsibility* in lieu of *blame* or *mistake*.  
*Calculated* in lieu of *likely*.  
*Standard type* in lieu of *conventional type*.  
*Preferred* in lieu of *preferable*.  
*Outcome* in lieu of *result*.  
*Problem* in lieu of the *cause of the problem*.

The lecturer concluded by saying that he had only touched the fringe of a vast subject, but he felt that the large number attending the lectures showed that its importance was realized. Arrangements were thereupon made to hold meetings at the University College to try to work out ways and means of spreading interest further afield, and to interchange ideas.

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## CORRESPONDENCE

### Rum and Salt

I have read with interest the article " Soap and Soup " in JOURNAL NO. 1.

A similar, but luckily not so serious state of affairs, occurred early in the commission of H.M.S. *Ocean* when complaints were made one day that the rum had been diluted with salt water, and although immediate tests of the ship's tanks and evaporator fresh water discharge were made, no contamination was found.

Further investigation, however, showed the culprit to be a junior rating in the ship's company galley who had been using the potato peeler, which can be supplied either with fresh or salt water, the two systems meeting just before the water control valve.

Owing, possibly, to a temporary failure of the fresh water supply, the rating had opened up the salt water supply without bothering to shut off the former, and when the potato peeler had been stopped the pressure in the fire main had been sufficient to force the fresh water back along its line as far as the rum flat, but, luckily, no further. Hence, in a way, the rum saved the ship !

The salt water valve is now kept locked and the key is held in the Engineer's Office.—E. H. NUTTER, *Commander (E)*.

*This illustrates once again the principle that where two systems are cross-connected, some safeguard against improper operation is usually necessary. During the war while at Scapa, a ship, in order to facilitate taking in fresh water, cross-connected the feed and fresh water systems over a short length of the feed line. If the system was operated correctly all was well, but one day someone opened a wrong valve and Scapa " fresh " water (coloured brown by the local peat) found its way into the feed tanks.—EDITOR.*