

making and mating habits of the two ethnic groups. Cancer of the nasopharynx is most frequent in Chinese; it is possible that there is irritation of the nasopharynx in Chinese from hot liquids such as tea.

Cancer of the uterine cervix is most frequent among Hawaiian and part-Hawaiian women; because Hawaiians are by nature phlegmatic, the women probably do not receive as good care following pregnancies as do women of other ethnic groups. Skin cancer is most frequent among Caucasians; this is due probably more to differences in skin pigmentation than to socio-cultural factors.

Quisenberry suggests that some of the ethnic differences in the frequency of cancer may disappear with the integration of different racial groups in Hawaii. The changes may bring about either lower or higher incidences of cancer. For example, cancer of the breast seems to be increasing in Japanese women due to the stopping of nursing of children.

The study of coronary artery disease was carried out by David M. Spain of Beth El Hospital, New York, and indicates that there has been a significant

increase in the incidence of coronary atherosclerotic heart disease over the past twenty-five years in the United States. The possible environmental factors associated with this increase have been evaluated in relation to the possible common denominators in the environment believed to be associated with the reported low incidence of coronary artery disease in the South African Bantu, the Eskimo and the Chinese.

The preliminary findings of factors thought to be associated with coronary atherosclerotic heart disease in a study on several thousand males of the same ethnic origins from the New York metropolitan area were presented to illustrate the complex problems involved in the validation of the significance of such data. Such questions as standards of measurement, criteria for diagnosis, body build, occupational physical activity, obesity, hypertension, serum lipids, urinary oestrogens, diet and smoking habits were analysed while the limitations of studying coronary artery disease in living population groups, as well as the fallacy of generalizing from the findings in autopsy populations, were clearly shown.

THE STRENGTH OF SOLIDS

PROF. A. H. COTTRELL in his discourse to the Royal Institution on June 15, entitled "The Strength of Solids", emphasized the importance of this subject in engineering, and also in the functioning of the bones and muscles of the human machine he distinguished between two kinds of strength—that limited by plastic yielding and that limited by fracture. The manner in which a material fails depends on the relative values of strength against such ductile or brittle failure.

Those brittle materials which have very high inter-atomic forces and which should therefore have very high strengths are nevertheless weak due to the presence of small cracks or notches which act as stress concentrations. When a relatively flawless specimen of such a material can be prepared, it is found to have a strength that approaches the theoretical value. It is not, however, practicable to make such specimens in large enough size or sufficient quantity to be of use for structural components in engineering.

The ultimate strength of a ductile material depends on the stress at which a neck begins to form in a tensile test, that is to say, on its plastic behaviour, which involves the yield stress and work-hardening characteristics. An over-hardened material will not be ductile. The plastic deformation of crystalline

solids is due to the sliding of crystal layers over one another. Slip over any layer is not simultaneous, but is due to the movement of a dislocation line which separates the slipped from the unslipped portion. Ordinary solids in engineering contain many sources of dislocations so that they are intrinsically soft and ductile. The vast amount of plastic deformation permissible enables a ductile material to absorb the energy of shock loading and is a protection against fracture. Strengthening is achieved by placing obstacles in the paths of the dislocations—by alloying, heat treatment, neutron bombardment, etc. If, however, too much strengthening is given the plastic yielding strength may exceed the fracture strength and the material would become brittle.

Steel, though normally ductile, is a borderline case, low-temperatures or impact loading or a combination of these factors can cause brittle failure—a phenomenon which has led to many engineering failures.

Prof. Cottrell concluded with some remarks on fatigue failure, which is not yet fully understood. It is observed that in fatigue, plastic deformation becomes concentrated on a few slip planes, so that slip bands develop and then initiate cracks. It would appear that this is a process of local work softening.

K. J. PASCOE

RESEARCH IN CASE STUDIES

THE use of case studies in management training is well acknowledged as an important method of linking practical problems with management theory. However, as a training technique it is still unfamiliar to many people; and many who have heard about it have had no experience of it. Such was the basis and cause of a proposal by the South London Committee during the 1959-60 session to explore the methods of using case studies. This promised to bring significant benefits to members of the British Institute of Management in the South London area.

The effective use of a case-study discussion demands considerable skill on the part of the chairman if it is to have a real impact on every member of a case-study discussion group, from the vociferous to the reticent, and worth-while contributions from all are to be obtained. On account of this, the Committee felt that it should obtain guidance and training from an authoritative source. Co-operation was therefore established with Miss Avice V. Turnbull, research officer on case studies, Royal Institute of Public Administration, and special lecturer in management

studies, Northampton College of Advanced Technology, London, and Mr. Z. M. T. Tarkowski, adviser on training, and special lecturer in management studies, Northampton College of Advanced Technology, London, who have done a considerable amount of work in this field.

The South London Committee convened a Case Study Group, at the meetings of which, at monthly intervals, various case studies were considered. The bulk of those so far discussed were from a series produced by Mr. Tarkowski, which give a representative sample of management situations, each in a typical British context. The way discussion went was analysed afterwards, under the leadership of Miss Turnbull.

The wisdom of selecting this approach became apparent early on in the series of meetings of the Group. Postmortems brought out the many inter-related points which have to be recognized and brought to bear on each other by the chairman. The effect of the size of the group, of a time limit, of the extent of the previous experience of the use of case studies, the attitudes of members, the need for the leader to draw members into the discussion and to encourage cross-fertilization of ideas without imposing on the group, are some of the many points which were discussed and which call for skilful leadership.

The reaction of the group depended upon the nature of the case study. If, at first sight, a specific management problem was apparent, or if the case study described a dramatic situation, such as a conflict of actual decisions taken, there was a tendency to examine the obvious problem and to suggest a satisfactory line of action which could be the next step to be taken in the situation. Where the management problems were more intangible and demanded

a deeper analysis of individual characters, and of the situation, the more limited approach was replaced by a broader consideration of the personalities and the influences of the background in the work situation which caused a strained atmosphere. In fact, more than one problem can be isolated in these case studies, depending on the perception of individual members of a group. Practice in this type of analysis gave more satisfaction to the members of the Group. At the last meeting held, a case study already previously discussed was re-examined, and comparisons were made with the first discussion. These brought out the wide range of issues which can be illustrated by a single case study, and how diverse two discussions of the same case study can be.

Co-operating with Mr. Tarkowski and Miss Turnbull, several members of the Group have appeared as 'characters' in case study exercises held as part of a course at the Northampton College of Advanced Technology. The object of these exercises is to make the case studies more vivid and realistic, to bring out subtle issues of verbal communication and to give members of the group practice and experience in day-to-day interviews and conversations, which form a large proportion of a manager's work. So far as is known, no course on quite similar lines has been developed elsewhere.

The South London Committee has now arranged a week-end conference on "Research Necessary for the Preparation and Use of Case Studies: Some Recent Work and Prospects for Further Developments in Great Britain", to be held during October 7-9 at the British European Airways Staff College, East Burnham, Slough, Bucks. Further information can be obtained from A. E. Hout, South London Branch, British Institute of Management, c/o Management House, Fetter Lane, London, E.C.2.

THE RESEARCH COUNCIL OF ALBERTA

THE fortieth annual report of the Research Council of Alberta, covering the year 1959, contains lists of advisory committees and their membership and of the staff of the Research Council besides a list of publications for the period 1955-59 (pp. v+54. Report No. 79. Edmonton: Research Council of Alberta, 1960). During the year, programmes on geology, ground-water and soils were brought together in an "Earth Sciences Branch", and work on coal, petroleum, natural gas and gasoline and oil testing in a "Fuels Branch". The ground-water studies are providing basic information on the ground-water resources of Alberta, and have offered substantial annual savings of water costs, for example, from the research on charging of water from Driedmeat Lake into a nearby gravel terrace. In surface geological mapping in the Taber area a buried Indian camp site was uncovered in the valley walls of the Oldman River, and along with Indian artefacts the skeleton of a buffalo and a willow branch were found, for which radiocarbon dating gave an age of 11,000 years. The Geological Division has developed a mineral dressing laboratory with the special purpose of investigating the possibility of refining Alberta sands. Studies of Cretaceous stratigraphy have been expanded into a co-ordinated programme, and a sub-surface study of Lower Cretaceous strata of central Alberta is in progress with the purpose of

establishing the interrelations of the marine and non-marine zonations. Upper Cretaceous beds in the Peace River region have been zoned micro-faunally, and the southward marine extension of these strata is being examined for micro- and macro-faunal content.

The Coal Division is continuing an investigation of carbonization, which during the year has shown that the carbonization reaction is much faster than was thought, and the overall reaction is only slow because the coal-tar products have difficulty in working their way out of the carbonaceous residue; the overall reaction can be accelerated considerably in presence of nitric oxide. The Natural Gas Section is examining a process for recovering helium from natural gas, and the Petroleum Division discovered that mud from the bottom of a local lake contained completely developed petroleum pigments along with traces of other oil materials. Pilot plant experiments were extended to work on a concentric flow of heavy oil and water mixtures in a 1,000-ft. experimental pipe-line, which showed that injection of about 30 per cent of water gave a pressure drop of up to about 75 per cent. The Industrial Engineering Services Group has made good progress in studies on carburation to permit the satisfactory use of propane and butane as engine fuels. Studies have been commenced on the effects of various solvents on plastic