soil in good heart, but even if our human waste was preserved there would still be a need for the addition of phosphate, because so much was taken away from the soil, exported and lost to us. In regard to bush sickness, he was not convinced that this was merely due to deficiency of cobalt, and felt we could not give the ultimate answer merely by adding little bits of this and that, here and there, where these were found by chemical means to be in short supply. He pointed out the virtue possessed by certain plants of collecting and concentrating elements which were present in infinitesimally small amount in their surroundings—a property which might be used to much greater extent than at present in remedying deficiencies.

Dr. McMeakin stated that he himself would be speaking out of turn on any medical matter, and he considered Sir Stanton Hicks, though an eminent man in the medical world, to be speaking without adequate authority on the subject he had chosen, and suggested he should see what was really being done by agriculturists in this country, as he was apparently unaware of the actual facts of the case. He stated that there was no country anywhere where comparatively so much was being done to use organic fertilisers as in New Zealand.

Sir Stanton Hicks replied that he was interested in human beings and not in the amount of butter-fat per acre which could be produced. He stated that the community in general was much more interested in the amount of butter-fat, wool and meat which could be produced per acre *and exported*, than with the amount of stock, human and otherwise, which could be raised and maintained satisfactorily on a particular area of land. This was wrong and what was badly needed was a change in outlook, particularly so in the scientific field. The essential needs of this country were: more people per acre, more men, women and children self-supporting on the land—not more men in the town and fewer on the farms, but vice versa. He instanced the conditions in China and Japan, where the value of the land was in the number of human beings who could be raised on it, a matter in which it was very successful. He considered that the wars of the future, as the wars of the past, will be decided essentially by manpower, a point which we should take deeply to heart.

Mr. Keyes pointed out that the produce of the land which was exported from New Zealand was being used for maintaining people in Britain.

Sir Stanton Hicks stated that it was impossible satisfactorily for the land to maintain a group of people at a distance. The land must support the people living on it. He stated that he was greatly disappointed to find that, in spite of the evident need for home-produced food during the recent war, England still had so much unused land, that good land was still raising nothing but sheep, and that so much food had to be imported. He compared Japan, where no land on which anything would grow was allowed to remain unused, and where, even in the ruins of Hiroshima, every little piece of land was again being cultivated and nothing was allowed to waste.

The Chairman, Sir Charles Hercus, finally closed the discussion, pointing out that at the recent meeting in England, attended by economists from all over the world, one of the things which had struck him most had been the universal anxiety over the standard of living, the appalling malnutrition, and the amount of preventable disease present amongst these people quoted by Sir Stanton Hicks as living entirely on their own land, and using an agricultural method of the type recommended by him. He considered that we in New Zealand would not be happy to change our type of life for theirs.

ABSTRACTS AND TITLES

Trends in the Development of Modern Health Services.

By H. B. TURBOTT.

The trend in England, Canada, and U.S.A. toward social medical service. Importance of home, social and psychological influences. Training of nurses. Attention to expectant mothers and infants. Dental services, school meals, special rations, annual holidays for mothers and children.

Early diagnosis and contact control in communicable diseases: diphtheria, whooping cough, tetanus, measles, scarlet fever, venereal diseases. Procedure in cases of rheumatic fever and tuberculosis.

Discussion.

Dr. Caughey instanced the work done by Dr. Ryle, the first Professor of Social Medicine at Cambridge, and the use of the social investigator in diagnosis of medical ills. On discussing a medical case, Professor Ryle had not only the clinical reports to go on, but the report from the social worker regarding family, work, and other environmental conditions which might have a bearing on the causation of the illness, and on which the treatment of the case might depend. Dr. Caughey considered this was a very considerable advance in medical practice, since at present so much medical treatment was carried out without adequate regard being paid to the environmental social factors which had a hand in the causation of the disease being treated. He stressed the need for more social workers, and the need for the inclusion of such social workers in the medical team, if satisfactory medical treatment were to be given. Moreover, this applied not only to the case, but to the family as a whole. He stated that at the Auckland Hospital they had one such social worker available to report on home conditions of cases, but although this was a start, it was in need of great expansion. He also mentioned the work at Brompton Hospital on the ambulant treatment of the early symptomless case of tuberculosis, which had been shown to be of extreme value. This also contradicted the often-heard statement that by intensifying the search for tuberculosis a greatly increased need for hospital beds would be shown, since many of the early cases found by mass X-ray could be treated satisfactorily without occupying beds in either hospital or sanatorium. Early cases found in this way were given artificial pneumothorax treatment and sent back to work in four weeks, to be kept under observation as ambulant cases, but without the tremendous social dislocation caused by prolonged hospitalisation. The clinical results had also been found excellent.

Dr. Hubert Smith asked Dr. Turbott his views as to how the trends outlined by him could be brought to fruition in New Zealand. Dr. Turbott replied that it would be necessary for the general practitioner to take up the preventive aspects of medicine and join this with the curative side, which was all exclusive at present. He envisaged health centres giving a complete coverage of preventive and curative medicine, where the whole family was taken as a unit. The health centre would work in conjunction with specialists and hospital services to ensure a complete medical service, and prevention of illness and the building of positive health would become the major portion of medical work.

"Q" Fever at 2nd N.Z. General Hospital in Italy. An Epidemiological Study.

By J. E. Caughey.

Between February and April, 1945, at the 2nd N.Z.G.H. at Caserta, Italy, an epidemic of a Primary Atypical Pneumonia occurred. This was reported in the *B.M.J.*, 16th February, 1946, by Adams, Staveley, Rolleston, Henley and Caughey, and the clinical picture, serial laboratory and X-ray findings were presented. These were reviewed in brief.

This year a further study had been made of the etiological agent of this group of cases. Blood from 23 of the group of 50 cases reported has been tested in the United States by complement fixation against antigen prepared from an Italian strain of "Q" Fever and 21 of the 23 were positive, which, it was suggested, established the diagnosis of "Q" Fever in our cases.

No epidemic of "Q" Fever has ever been recorded in New Zealand, and it was suggested that an attempt should be made to study the etiology of the cases presenting the syndrome of Primary Atypical Pneumonia which occurs in epidemic form from time to time in this country.

Discussion.

Dr. Hubert Smith pointed out that the follow-up work on the blood of the cases under examination, with the exception of one, had all been carried out in England, and asked if any attempt was being made to follow up the cases amongst New Zealand Army personnel who had returned to this country.

Dr. Caughey replied that he was endeavouring to follow up these cases.

A Clinical, Electrocardiographic and Radiological Study of the Heart in Rheumatoid Arthritis.

By E. J. FISCHMANN and F. J. GWYNNE.

[As Drs. Fischmann and Gwynne and Mr. Sagar had been working as a team, of clinician, radiologist, and physicist respectively, on the same series of cases, their papers were taken together. Dr. Gwynne commenced the session with a demonstration of 14 radiographs of charts showing heart dilatation. He was followed by Dr. Fischmann, who delivered the address on the clinical aspects and conclusions. This was followed by Mr. Sagar, who presented his paper on viscosity of bloods taken from this same series of cases. A discussion on the work presented then followed Mr. Sagar's paper.]

As this paper is to appear in full in the *British Medical Journal*, a summary only is given here.

Three American clinics reported rheumatic cardiac changes at autopsy, in patients with rheumatoid arthritis. In the present study of 60 patients with rheumatoid arthritis (selected from 150), heart enlargement was discovered radiologically in 14, without corresponding clinical or electrocardiographic findings. This, and a tentative explanation of the radiological findings, was considered.

The Kinematic Viscosities of Blood in Normal and Rheumatoid Arthritic Subjects.

By F. H. SAGAR.

Experiments indicate that the murmurs heard in the hearts of rheumatic fever subjects arise from turbulent blood flow. It is known that in a given circuit a transition from stream-line flow to turbulent flow may be produced by an increase in the velocity of flow above or a decrease of the viscosity below certain critical values Thus one possible explanation of the complete absence of murmurs in the hearts of rheumatoid arthritic subjects may be a whole-blood viscosity of more than normal value. To test this possibility the blood (and plasma) viscosities for a series of patients suffering from rheumatoid arthritis have been measured at normal blood temperature and the same measurements have also been made for a control series. Though average values a little in excess of the average control value have been found for whole blood and for plasma, it is considered the effect is too small to explain the absence of murmur which it is thought lies in the different acoustic behaviour of the heart in the two cases.

This abstract only is submitted here, as the paper is to be published in full in the *N.Z. Medical Journal*.

Notes. Mr. Sagar commenced his address with an outline of the physics of viscosity and turbulence, showing their application in regard to blood and blood vessels, demonstrating how increased blood viscosity would decrease turbulence and thus diminish the likelihood of development of abnormal heart sounds in rheumatic-arthritic cases, if increased viscosity of the blood could be demonstrated. If this were proven, it would explain the failure of clinicians to detect by abnormal heart sounds any abnormality of the heart, but enlargement of the heart might still be shown by means of X-ray. Evidence of increased viscosity, however, must be regarded as unproven.

Dr. Fischmann had demonstrated the absence of clinical signs of a so-called "rheumatoid-arthritic heart" in cases of rheumatoid arthritis, and been unable to obtain evidence of disease electrocardiographically. In the absence of actual post-mortem examination of any of the hearts discussed, no pathological evidence was forthcoming, whilst radiological examination by Dr. Gwynne of the cases showed definite heart enlargement in 15 out of 60 cases of rheumatoid arthritis, a very much higher proportion than would be expected by the examination of non-rheumatic persons. This seemed to confirm the American view.

Discussion of Papers by E. J. Fischmann and F. J. Gwynne and F. H. Sagar.

Dr. Caughey asked regarding the nutrition of the cases, mentioning the high percentage of achlorhydria present in such cases, with a possibility of avitaminosis, which could be a possible cause of the heart enlargement, it being due to a mild degree of beriberi. This would also account for the low voltages evidenced on the electrocardiographs of certain of the cases examined. He stated that treatment with large doses of Vitamin B1 and review of the cases after a period of this treatment would shed more light on this possible aspect of the

heart enlargement. He also asked whether changes of the viscosity could be due to different times of testing and whether they were correlated with the times of food intake.

Dr. Gwynne replied that the possibility of beriberi had been considered, but it did not appear to fit in with the rest of the picture. Dr. Fischmann stated that some of the cases had been given small doses of vitamins by tablet form, but admitted that beriberi would not react to the small doses given; all cases were, however, on fairly high Vitamin B diets. He also stated that in the cases of low voltage discovered in the investigation, only one had an enlarged heart; none of the cases showed any signs of heart failure or oedema, as would have been likely if the heart enlargement shown had been due to beriberi.

Mr. Sagar stated that all viscosity tests had been taken at the same time of the day, and that possibilities of variation due to dietetic habits had been excluded.

Dr. Gwynne further stated that he could not establish that the radiological enlargements demonstrated were actually correlated with pathological changes, nor was he claiming that changes would be shown here similar to those in certain hearts of rheumatoid arthritics demonstrated in America.

Dr. Malcolm asked Dr. Gwynne regarding the technique used by him in measuring the diameters of the hearts, particularly as to whether all radiographs were taken at the same time in the heart cycle. He stated the absence of heart sounds is probably relative, and that special microphones might bring into evidence some correlation of sounds with the enlargement, though change in resonance and size of the heart cavities might have something to do with the failure to record sound changes.

Dr. Gwynne replied that since his technique for taking the rheumatoid arthritic hearts was the same as for taking normal hearts with which they had been compared and that the only enlargements considered were those where there had been more than 1.5 cm. above normal, he considered the enlargement was really quite definite.

Dr. Fischmann stated that the patients had been treated on the assumption that where heart dilatation had been shown by X-ray, valvular heart disease was present, but not shown. He was rather pessimistic regarding the use of microphones for detecting abnormal heart sounds, as mere augmentation of the sounds present produced similar enhancement in the accessory sounds, which masked the ones which were being searched for. The work done by Mr. Sagar had shown the need for much greater co-operation between physicists and medical men, if we were really going to get to the bottom of these problems.

Recent Advances in the Attack on Dental Caries.

By J. P. WALSH, M.B., B.S., B.D.Sc. (Melb.), L.D.S. (Vic.).

This address was published in the *New Zealand Dental Journal*, July, 1947.

1. There are four primary variables in the etiology of dental caries, bacteria, medium, products and tooth surface; the relative importance of these may vary in different types of caries.
2. In general terms, prevention of dental caries depends on the control, by any practical measures either natural or artificial, of any or all of these etiological variables.
3. Direct inhibition of bacterial growth has yet to become an effective means of caries control.
4. Nutrition influences tooth structure only during development of the teeth. After eruption the diet provides the medium, fermentable carbohydrate, in which the causative organisms proliferate; control can be achieved by reducing the availability to the bacteria of this medium either by not providing it or by promptly removing it.
5. The action of bacterial products on the tooth surface may be reduced by
   (a) interference with production (enzyme inhibition).
   (b) interference with their access to the surface or prompt dispersion of products.
   (c) neutralisation or buffer action.
6. The susceptibility of the tooth surface may be reduced by
   (a) decreasing the solubility of the surface (e.g. with fluoride ion).
   (b) sealing the defects in the surface (e.g. with silver nitrate).
7. Biophysical and physicochemical factors, particularly surface phenomena, may play an important and as yet unappreciated part in the etiology and control of dental caries.

Discussion.

Mr. J. Ll. Saunders, in opening the discussion, referred to the very concise and yet comprehensive account given by Professor Walsh of the work done on dental caries. In his analysis of the work done to date Professor Walsh had reduced the problem to four variable factors. It was noted that all four were purely intra-oral factors. Would the essayist say that the concensus of opinion to-day tended to exclude the possibility of diet having any other than a purely environmental role in the etiology of dental caries? In a study made by the speaker, no correlation was found to exist between the incidence of rickets and that of dental caries, a finding which supported the enviromental theory, but in another phase of the same study a significant difference was disclosed in the incidence of dental caries at different social levels. Allowing that economic status, knowledge and judgment in regard to choice of foods would have a bearing on this finding, it did seem that the environmental theory would not necessarily of itself account for the variation in incidence between the different social groups.

Turning to the recommendations with which Professor Walsh concluded his paper, it was noted that he suggested that there was a magnificent opportunity for both the State services and private practitioners to undertake full-scale operation of the known preventive measures outlined in the paper.

Mr. Saunders said that speaking as a representative of the State services, he was sure that these services and the profession as a whole would adopt preventive measures with enthusiasm as soon as it was felt that their efficacy was established. He thought, however, that as yet these measures had not passed beyond the experimental stage. It was clear, however, that the outlook was promising, and the profession, including the State services, should be prepared to adopt full-scale preventive measures as they became available for general use.

After hearing Professor Walsh's paper, said Mr. Saunders, one felt that the time was approaching when, as a result of the research that was being done, the whole character of dental practice would change, and the dentist of the future would become to an increasing extent a dental physician rather than a dental surgeon, with the dental surgery yielding pride of place to the dental consulting room.

Professor Walsh replied that in pregnancy deterioration in dental status was due essentially to alteration in dietetic habits rather than to any drain of calcium from the teeth of the mother to the child. He stated that women who took extra care of their teeth at those times were found to have an improved dental state at the end of pregnancy. The rate of exchange of calcium within the teeth was extremely slow, even perhaps a life time, whilst in bones the exchange was quite rapid.

Miss Cunningham referred to the work with "tagged ions" which showed the interchange of calcium within the body structures, agreeing that the rate of exchange of calcium in the teeth was infinitesimal compared with that of the bones, where this could well be demonstrated in three weeks. However, change in the calcium content of teeth took place from the surface, and where there was calcium change during pregnancy this was exchange and not removal.

Dr. Muriel Bell stated that there was still much confusion between the theory and practice in regard to dental caries. She pointed out that the Chinese in China in general had good teeth, but that the Chinese in Malaya generally had bad teeth. The chemist could show no difference between the carbohydrates of refined white flour and those of refined white rice, and yet there was considerable difference in their effects on teeth. The high-carbohydrate rice diet of the Chinese in China still left them with good teeth. She therefore declined to accept that civilisation, merely through increasing the carbohydrate in the diet, is responsible for our increase in dental caries. There was still need for greater knowledge of the causation.

Professor Walsh agreed with Dr. Muriel Bell that in regard to diet we have not as yet got very far. Some sticky foods, though carbohydrate, had a detergent effect, though the reason for this was unknown. The physical characteristics of foods, apart from their chemical content, still needed much more investigation.

Mr. Lane stated that 90 per cent. of the white flour in England was treated by a chemical "improver" which destroyed the vitamins, and suggested this might explain the difference between white flour and rice and its effect on the teeth.