whether alcohol is beneficial or not; the cases vary so much among themselves. But if it was shown to have an effect on the respiratory centre, I do not think it would make much difference in the treatment of acute fevers, because most patients who are going to die from acute fever do not die from failure of respiration, but from heart failure. Even pneumonia patients are not often livid, and everyone will agree that the majority of fatal cases of pneumonia die of cardiac failure.

To sum up, I suggest that the chief therapeutical effect of alcohol in a beneficial sense is, that it is a pleasant depressant, peculiarly efficacious in inhibiting peripheral impulses, such as pain here, and discomfort there, that it diminishes those trivial worries which bother the sick. In larger doses it has the advantage of inducing sleep. It has the great advantage of being easily and rapidly absorbed. The small quantity usually given nowadays is not of very much value as a food, because a fluid ounce of brandy is only worth 100 Calories. I have never satisfied myself that, given in these moderate doses, it does any harm, nor that it benefits the respiratory and circulatory apparatus any more than it might be expected to do from making the patient more peaceful and quiet. But it appears to me that, in all these discussions, we are faced with two great difficulties—which it is almost impossible to surmount. One is, that it by no means follows that the effect of a drug in health is the same as its effect in disease, and its effect in disease is often very difficult to estimate. The second difficulty in such a discussion is, that no person, whether actually ill or convalescent, is ever given pure alcohol and water. We have to remember that perhaps there are other bodies present in wines and spirits, which have their actions; certainly there is a widespread belief that they have. For example, it is considered that brandy is the best form of alcohol for diarrhœa, that a glass of wine is, as Dr. Hutchison said, the best form of alcohol for one whose digestion is tired. Then, again, there is a firm belief—certainly among the laity, and, I believe, among many doctors as well—that old brandy is very much more efficacious for all therapeutic purposes than is a new raw spirit.

Dr. O. Leyton.

In the very able introduction with which Dr. Dale has favoured us he has indicated the lines upon which the discussion should run, and stated that I would give my experience of the use of alcohol in diabetes

mellitus: but before doing this I should like to refer to one or two uses of alcohol in other diseases.

On some number of occasions I have seen alcohol administered in cases of which it has been thought that the heart muscle would cease beating and death ensue from that cause, and I must own that it has been extremely difficult to draw any conclusion as to the effect of treatment. In my opinion at the present day we have no method of determining whether the heart is likely to stop beating, and in several cases in which that termination has been feared the patients have died from respiratory failure. The evidence placed before us by Dr. Willcox makes me wish to repeat my observations.

Dr. Dale referred to alcohol as a diet in cases in which absorption is extremely bad, and I am of the opinion that in prolonged diseases such as typhoid fever alcohol may prove a most valuable adjunct to dextrose and other easily assimilable substances. The tendency to administer food in short fevers is ill-advised, if the patient does not crave for food, for most individuals can live upon their own tissues for many days without detriment.

I should like to refer to one other use of alcohol, namely, that of reducing the inhibitory tracts. I remember many years ago, before Freud's theories had reached these shores, there was a woman in the London Hospital who was able to cough but not to phonate, and therefore could only carry on conversation in a whisper. She was quite content, but remarkable to relate her husband was not, and with his and her consent she was given alcohol in order to see whether she might not become merry and talk, and once having talked the spell would have been broken. This method of treatment I believe has been used in some number of cases with some success. In the case under my observation the patient went to sleep and the excitement stage did not arise: but perhaps other observers may be able to tell us the result of this line of treatment.

I will now discuss the main point of alcohol as a food in diabetes mellitus. Before the Allen treatment was adopted at the London Hospital the weekly allowance of alcohol issued from the stores to my patients was usually *nil*, or upon exceptional occasions when students or residents were under my care, the quantity was negligible and usually less than that prescribed by any of my colleagues. I mention this in order to show that even if I was not a practical teetotaler I was a theoretical teetotaler. During the last four years the quantity of alcohol supplied from the stores at the London Hospital to

my patients weekly has headed the list, but it is only diabetic patients that have had alcohol administered to them.

It has been my custom to order alcohol as a foodstuff to those patients who have been accustomed to take alcohol in the past, during the period of very meagre diet. There seem to be two advantages in this: first, a supply of a small amount of energy, and secondly (one to which Dr. Dale has referred), the patients are less irritable, pangs of hunger are more easily borne, and are less acute, and the patients seem able to stand treatment better. I still hold that the less alcohol the patient takes the better, but a large number of cases of diabetes mellitus have come under treatment in which the maximum diet they could take represents about 20 calories per kilogram per diem, or rather less than half that which was thought to be necessary in order for the patient to maintain life and energy. It is to these that in my opinion alcohol is essential.

I will not weary you by giving you a large number of instances but will refer to one patient who has been under observation nearly three years. A young woman who weighed about 5 st. 6 lb., and presented an appearance of great emaciation, was found to have a tolerance of only: carbohydrate 20 gr., protein 45 gr., and fat 60 gr. If any of these was increased, sugar appeared in the urine. Since the diet was so meagre it seemed to me hopeless to try to find one in which sugar in the blood was normal. This diet represents about 800 calories or less than 25 calories per kilogram. It seemed to me very unlikely that the patient would be able to enjoy her life on this diet, and therefore I added to it slowly and gradually 2 oz. of absolute alcohol daily. Absolute alcohol was chosen because the patient intensely disliked brandy, whisky, gin and other alcoholic beverages. The absolute alcohol was ordered to be well diluted and to be taken with meals, for it has long been realized that by giving it with meals it is absorbed more slowly and is less likely to produce any excitement or somnolence.

During the last year or so an improvement on dilution with water has been made by incorporating the alcohol into a jelly made with agar, and flavoured with citric acid, oil of lemon and saccharine. This jelly without the alcohol is—as far as I know—of no nutritive value, but tends to satisfy hunger. From it the alcohol diffuses out comparatively slowly and is slowly absorbed, so that in many ways it is an ideal method of administering alcohol.

The addition of 2 oz. of alcohol to the diet increased the value of the

patient's diet by 350 calories, so that the energy of the diet was raised to 33 calories per kilogram, a value which experience has shown suffices to allow an individual to take exercise and gain weight slowly. The patient to whom I am referring walks six miles daily, and would enjoy her life if it were possible to prevent her making food her deity. This case confirms what we have just heard from Dr. Mellanby who told us that 30 per cent. of the energy in a diet can be supplied by alcohol.

I had come to the conclusion that alcohol was a necessity in some of the more advanced cases of diabetes mellitus and I have on record patients who have maintained their weight whilst taking alcohol, but who have been persuaded by their friends to stop taking it and have lost weight, the diet having been maintained constant in every other respect.

I think we have to realize the extreme instability of the metabolism in diabetes mellitus, and therefore how careful we must be in drawing conclusions. When a patient is on a small diet and sugar free, a slight disturbance with a vaccine of influenza, streptococci, and pneumococci may lead to the appearance of sugar in the urine, and any infection, or even some emotional disturbance, may produce the same effect. But bearing all these things in mind I had come to the conclusion expressed above, and am now full of interest to learn what is happening in the United States of America, for I hear that Dr. Joslin gives no alcohol to his diabetics. I have written to him asking what he does in cases similar to those whose limits of tolerance are so low as to make it impossible to maintain life without the addition of energy given in some form other than carbohydrate, protein or fat.

Professor W. E. Dixon.

I regret I am unable to remember the exact context of my remarks in the paper on the action of alcohol on the circulation to which Dr. Willcox has referred. I refer to two points in the discussion:—

(1) The meaning of the word "food." My opinion is that from the physician's point of view in the use of alcohol in the treatment of acute disease, the insistence that alcohol is a combustible substance and not a food is of little practical significance, since it can be substituted for foods in any dietary.