Polytetrafluoroethylene Films in Baking

SIR,—From time to time we have drawn attention to the need for evaluating the extent of residues resulting from the projected use of new processing aids in the food industry.¹ Thus, some years ago,² we discussed the potential take-up of silicon by bread from silicone resin pan glazes when used as a replacement for tin-greasing, and showed that no health hazard appeared to be involved in their use. These glazes have now been introduced in domestic cooking utensils to reduce, for example, the quantity of fat used in frying, and because of their non-sticking properties. Similarly, the plastic polytetrafluoroethylene (P.T.F.E., "fluon") may be applied to metal surfaces, either in the form of a dispersion which is sprayed on and then cured or used in the form of prefabricated sheets or cylinders. Because of its non-sticking properties, it is potentially useful as a coating for bread and cake tins. We have examined the uptake of fluorine by bread and cake baked in pans treated with P.T.F.E. As such a use might find its way into domestic practice, as in the case of silicones, we felt our experience may prove generally informative.

Bread was baked in P.T.F.E.-coated tins for two differing baking times (1) at 400° F. on five successive days and (2) at 550° F. on another five days. Control loaves were baked in conventionally greased tins. Fluorine was determined on the air-dried samples by the Society of Public Analysts' method,³ and in the control loaves the natural fluorine content of the crust was found to be 0.70 p.p.m. and of the crumb 0.75 p.p.m., the difference not being significant. Four loaves were prepared in each bake under the conditions mentioned using P.T.F.E.-coated tins. The products were bulked after air-drying, and on analysing aliquots it was found that the fluorine content at the first bake in the coated tin at 400° F. was 1.80 p.p.m., falling to 1.50 p.p.m. at the fifth bake, rising to 2.55 p.p.m. when the baking temperature was increased to 550° F. and falling to 0.90 p.p.m. at the fifth bake at this higher temperature. Although after a number of bakings the fluorine content of the crust was reduced to an amount closely approaching the natural fluorine content of bread it was thought advisable to ascertain whether an initial heat treatment or "curing" would reduce the take-up during the initial bakings. Accordingly, comparisons were made of the fluorine content of the air-dried crust from loaves baked in tins (A) without curing, (B) by sintering for 15 minutes, and (C) by sintering for 60 minutes at 626–662° F. The following fluorine contents in p.p.m. were obtained after allowing for the natural fluorine content of the bread.

Tin	A	B	C
1st baking	5.6	3.1	2.2
2nd baking	3.8	3.2	1.5
3rd baking	2.0	1.5	1.1
5th baking	0.7	0.7	0.4

Clearly, an initial heating of the tins before use has considerably reduced the fluorine uptake. A longer sintering time of 3–4 hours at 680° F. was then examined with the following results on bread subsequently baked in the tins so treated. After allowing for the natural fluorine content present in bread, the uptake of fluorine was calculated and is again expressed in p.p.m. in the air-dried samples, and as before the crust portion is approximately one-fifth of the loaf.

Number of bakings	Excess fluorine in whole loaf	Excess fluorine in crust
1	0.19	0.94
3	0.12	0.60
5	0.0	0.0

Thus it will be seen that curing under these conditions has resulted in a very small fluorine uptake. The overall increase in fluorine content is reduced to as little as 0–0.19 p.p.m. beyond the natural content of fluorine in bread baked in non-P.T.F.E.-treated tins, which in this latter series of experiments was 0.90 p.p.m.

Madeira, sponge, and high ratio cakes were then baked in contact with P.T.F.E. coatings sintered under the last-mentioned conditions. The natural fluorine content on the air-dried sample of the Madeira cakes was 1.25 p.p.m., and the fluorine content at the 1st bake on the treated tin 1.23 p.p.m., and at the 11th bake 1.23 p.p.m. Corresponding data for sponge cakes were 0.92 p.p.m., 0.92 p.p.m., and 0.92 p.p.m. at the 10th bake, and in the case of high ratio cake 0.78 p.p.m., 0.81 p.p.m., and

0.84 p.p.m. at the 10th bake. This clearly demonstrates that the uptake is negligible when adequate "curing" has been given.

It is interesting to note that the fluorine contents of the bread or cakes in the experiments in which suitably "cured" P.T.F.E. coatings were used were considerably less than the proposed⁴ limit for the fluorine content for self-raising flour of 3 p.p.m. Thus it emerges that the fluorine uptake from P.T.F.E.-coated tins or baking sheets is considerably reduced by "curing" at 680° F. for 3–4 hours. Indeed, in these circumstances there is little or no increase in the total fluorine content of the products baked thereon. We have advised the baking industry of the desirability of the "curing" process, and should P.T.F.E.-treated utensils be offered to the public we feel it would be advantageous if this practice was also followed, and, if possible, prior to their sale.—We are, etc.,

J. B. M. COPPOCK.

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- ¹ Coppock, J. B. M., *J. Sci. Food Agr.*, 1952, 3, 115.
- ² ———, Hulse, J. H., and Urie, A., *British Medical Journal*, 1949, 2, 597.
- ³ *Analyst*, 1944, 69, 243.
- ⁴ Report of the Food Standards Committee, *Minist. Food Bull.*, June 6, 1953, p. 13.

Speed Warning Device

SIR,—It was a nice compliment of Mr. D. T. Dickinson (*Journal*, July 20, p. 162), but I do remember the comparatively docile "T" model Ford. Indeed, I witnessed one of its favourite tricks. Years ago in the outback of Australia, where this car was very popular because of its easy clearance over tree stumps, I watched a sheep farmer being gently run over after starting his car on the handle, get up uninjured, chase his runaway, remount, and calmly continue the inspection of his boundary fences. It proved to be the only amusing and harmless car accident of my experience. Perhaps Mr. Dickinson remembers the day when it was the law for a mechanically propelled vehicle to be preceded by a man on foot carrying a red flag. We have come a long way since then.

The prevention of road accidents requires much more than a man carrying a red flag before the vehicle, or red lights on, and hymns from, its dashboard. Now any young Tom, Dick, or Harry with an ordinary licence is permitted to drive a car capable of speeds far exceeding 100 m.p.h. The result of this "freedom of the road" is on the record. The first motor-vehicle road traffic fatality in this country occurred on August 17, 1896, at the Crystal Palace, South London, when Mrs. Bridget Driscoll was run down and subsequently died of her injuries. Since then 232,000 have died and 10,000,000 have been injured from road traffic accidents. What will the record be for the next 60 years? Although the motor-vehicle fatality rate per unit of travel has been halved during the last twenty years, the great increase in the use of cars, trucks, and buses on our roads has yearly increased the numbers of casualties. Last year's total was the highest on record, with nearly 5,400 fatalities and over 262,000 injuries (damage to property and goods in transport is not recorded, but must be considerable). If this is to be our average then the next 60 years will, unless we do something about it, result in 324,000 killed and 15,720,000 injured. Figures alone do not tell the whole story. Most road accident victims are in the younger male age groups. This is significant in terms of the personal and productive resources of the country. Accidents now rank first as the cause of death in all males between the ages of 1 and 35 years, and are outranked in older age group males only by cancer and the so-called degenerative diseases. The man-days lost from work each year, as a result of injuries, are enormous.

At the recent Annual Meeting of the British Medical Association in Newcastle, the panel discussion on road accidents (*Journal*, July 27, p. 231) was in unanimous agreement that additions to the present hospital casualty treatment

services represent the first stage in the avoidance of delays, essential to improved methods of treatment if in the future we are to lessen the number of deaths and improve our standard of functional recovery. The panel had not the time to consider accident prevention. Yet within the 24 new major accident departments they recommended there is a very strong case for the establishment of research teams to study the wide field of prevention. These, working alongside clinicians and helped by police and ambulance reports and on the evidence of the accident victims themselves, should produce worth-while factual evidence on which to base improved methods of prevention.

Road accidents have all the characteristics of a mass disease of epidemic proportions, capable of study by established epidemiological methods. The "noxious agent" is clearly the motor vehicle, the "host" its driver, who is conditioned not only by his behaviour but equally by his environment—i.e., the design and state of the roads he drives on and the vehicle under his control. There is no easy solution to this serious and growing epidemic. Prevention and treatment demand, and must one day receive, the full measure of medical attention they deserve. Propaganda for better speed-warning devices, campaigns to make the public more accident-conscious, are only makeshifts. Fundamentally the problem is the concern of preventive and curative medicine. The men and the knowledge are available. It is a matter for the Ministry of Health first to accept the responsibility and next to mount the attack by attracting the right type of staff, at all levels, to get on with the job. The cost would be insignificant compared to the overall costs of accidents to the nation.—I am, etc.,

Birmingham, 15.

WILLIAM GISSANE.

Churches' Council of Healing

SIR,—Dr. Jane H. Thompson's letter (*Journal*, July 27, p. 238) is welcome, but we are a conservative profession demanding intellectual satisfaction before taking any new step. In this context we ask to be convinced on two particulars: (1) that there is such a thing as spirituality; (2) that the Newtonian laws of gravitation and motion (on which we are trained) must now give place to the laws of relativity. The latter change the meaning of the term gravitation, so that it now applies to the field of radiation extending from a mass centre to a peripheral plane with the probability of a two-way transfer of energy. The universe is the gravitational field of its own mass and both are finite. The nature of the action which restores the co-ordinates of curvature to the peripheral plane is unknown, but it would not outrage reason if Dr. Thompson equated the spiritual plane with the Einstein two-dimensional boundary. So much is valid theory. Since Einstein's special theory has been confirmed by the nuclear physicists, there is every reason for philosophers and biologists to assume that the general theory is also valid. Dr. Thompson and her friends can therefore assert with Einstein himself that the appearance of the co-ordinates of curvature (that is, the emergence of 3-D space out of the 2-D plane) is an act of intelligent creation. They can assert that the unbounded 2-D plane is the spiritual plane which the pure of heart are said sometimes to reach.

If applied to the understanding of the nature of knowledge, the general theory teaches that the sensory order occupies the finite space-time continuum and is separated by a calculable boundary from the infinite plane. The materialized part of space is comprehended through the five senses. The not-yet-materialized remainder is comprehensible only by mathematical and intellectual constructions. That is, man may aspire to comprehend the entire unified field, but there remains the infinite plane which cannot be comprehended by reason, because all its co-ordinates are zero. It is accessible only by intuition or revelation, which term we prefer.

In the system of thought for which the Churches' Council of Healing stands, the property of spiritual discernment is *given* to man and the gift proves his unique relationship to

the first cause. An intellectual exercise to formulate a basis for pneumato-psychosomatic medicine may intrigue many who now find themselves extruded from the practice of medicine at 65 and may even produce a twentieth-century theory for the future of medicine.—I am, etc.,

Caernarvon.

GRIFFITH EVANS.

Heartburn of Pregnancy

SIR,—Since entering general practice I have been impressed by the frequency of heartburn of pregnancy and the discomfort that it produces for the patient. I have tried in turn, with little benefit, the various treatments described in the standard textbooks on obstetrics. During the past year, however, I have had considerable success by using pyridostigmine ("mestinon").

Sixty-one patients have been treated, and of these only two have not responded. Dosage has been one tablet daily for 5 to 10 days. No side-effects have been encountered. A country general practice does not allow a controlled study to be made, but on clinical impression the results appear excellent and may interest other practitioners who find that the treatment of this common complaint is a problem.—I am, etc.,

Swords, Eire.

FRANK McLOUGHLIN.

Foreign Body in Stensen's Duct

SIR,—I think the following case may be unusual enough to warrant its inclusion in the correspondence section of the *Journal*. A short time ago, while visiting an outlying farm cottage, I was asked to look in and see the baby next door, as it had been having difficulty in eating solids for the past two days. The child was about 13 months old and looked well. On examining the inside of its mouth I noticed a small bead of pus on the mucous membrane of the cheek with what appeared to be the tip of a thorn protruding from it. After some difficulty I managed to get a grip of it with a pair of dissecting forceps, and, to my astonishment, pulled out something which looked like a black worm about 2 in. (5 cm.) in length coated with pus. On floating it out in a cup of water I was amazed to find that it was a feather which must have penetrated the duct orifice, quill end first. In view of the age of the child and the minute size of the opening, I think this must be considered a unique type of accident. I shall be very surprised if I ever come across another such case. I should be very interested to learn if a similar case is on record.—I am, etc.,

St. Albans.

D. HARDY KINMONT.

POINTS FROM LETTERS

Fainting on Parade

Dr. A. H. SKINNER (Southland, New Zealand) writes: Newspapers in Great Britain regale us with pictures of soldiers on parade who have fainted and fallen, emphasizing the effect of the heat wave. There is no need to name any one regiment, but presumably every such casualty has a medical officer. Would he speak up? Say there are 5,000 men on parade and there are 10 fallen fainted and carried off. Suppose on inquiry it was found that none of these ten were non-smokers, would that be significant in any way? Or is the number too small? It seems a pity not to extract some information from a hot-day parade.

St. Luke's Tide Services

Dr. J. B. GURNEY SMITH (Royal Earlswood Institution, Redhill, Surrey) writes: Reading the recent letter of the Bishop of Lichfield (*Journal*, July 13, p. 105), which refers to a panel of doctors who would assist in the pulpit at St. Luke's Tide, prompts me to make a few observations. . . . I would like to draw the attention of communicant Anglican doctors to the existence of the Union of St. Luke, founded in 1948 especially to unite such doctors in a living spiritual fellowship and to work in close harmony with the clergy. The union is thus nearly 10 years old and numbers some 70 doctors and 12 clergy as members. A growth in membership is most desirable, and, as a foundation member office-bearer, I would be glad to hear of any intending members, to whom a warm welcome is extended and to whom full details of membership will be sent.