Skin Cancer due to Handling Coal Tars Used for Preservation of Fishing Nets

COMPLAINTS that several fishermen had contracted cancer of the skin after handling tar used for the preservation of nets resulted in an interested firm submitting a sample of their tar to this department to investigate its carcinogenic effect on mice. This particular tar (our No. 7) was said to have been manufactured in a horizontal retort at a temperature of 1100° C. It was found to be highly carcinogenic for the skin of mice, 75 out of 100 bearing malignant tumours after bi-weekly applications of the tar for forty weeks. This result compared very unfavourably with a number of tars, used for various purposes, previously tested by us.

Later, three further tars from the same firm were submitted to us for test: (1) our No. 14, made in a vertical retort at 1390° C.; (2) our No. 16, as before but said to be cut back with light tar oils; (3) our No. 15, said to have been made from oil pitch and light tar oils.

Results of animal experiments showed that Nos. 14 and 16 were almost as carcinogenic for mice as No. 7, but that No. 15 was considerably less carcinogenic, only 17 mice out of 100 contracting skin cancer after forty weeks, although twenty of the mice survived for this period.

Preliminary tests with samples of creosote oil and anthracene oil revealed that both are carcinogenic for the skin of mice.

In our opinion, if gas tar as such is used for preservation of fishing nets, only that made in vertical retorts using a temperature as low as practicable should be used.

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The Garner Principle of Co-operative Activation

IN a letter in NATURE of August 12, p. 287, Prof. W. E. Garner has made, in my opinion, a most important contribution to the advancement of physico-chemical science. It seems probable that the Garner principle will be of great value in the understanding and formulation of many catalytic phenomena, including the interlinked sets of reactions which are now known to occur in the operation of many enzymes and co-enzymes.

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Points from Foregoing Letters

L. H. Gray and J. Read, working on the biological effects of neutrons, have used the ionization produced in air in small graphite ionization chambers as a measure of neutron dose. Experiments have now been made which make it possible to correlate the ionization with the actual increment of energy per unit volume of tissue due to the recoil atoms generated by the neutrons. Calculations based on interaction cross-sections agree with two different lines of experimental investigation in showing that a neutron beam which produces 1 E.S.U./c.c. of ionization in a graphite chamber will give the same energy absorption per unit volume of tissue as 7 roentgens of γ-rays (20 per cent).

M. Lecoin and I. Zlotowski have measured very carefully with an adiabatic microcalorimeter the mean energy of disintegration of radium E. They obtain the value 320,000 ± 5·000 ev., and the lower limit is regarded as very near the most probable value.

G. I. Jenkins and A. Norris describe a new method of measuring the thickness of built-up films on metal by finding the wave-length at which minimum intensity of reflected light occurs at constant angle of incidence. The method makes possible a measurement of the thickness of very small numbers of layers and seems especially promising in the field of protein investigation for which it was devised.

Surprise has often been expressed that Kepler failed to find the true law of refraction. R. A. Houstoun shows that Kepler's formula satisfies the observations that were available to him better than the modern formula does.

The spectrum of the N_2 molecule in the light of the night sky is well known to-day. The upper energy level of the most intense Vegard-Kaplan bands are $v = 2$ or 3; among the red bands of the first positive system, the band $B(v = 7) \rightarrow A(v = 4)$ is much the most intense. J. Cabannes and Rose Aynard try to explain that selection by resonance phenomena.

Evidence is brought forward by D. Keilin and T. Mann that carbonic anhydrase isolated from the red corpuscles of ox blood in a pure state is a zinc-protein compound.

P. Suomalainen has previously produced artificial hibernation by injecting magnesium and insulin into hedgehogs and transferring them into cold conditions. The quantities used, however, were so large that an equal amount of insulin alone killed the animals. The author has now decreased the amounts of injections, and artificial hibernation is brought about with insulin only and cold. Serum magnesium is considerably increased in the insulin hibernation, as in the natural hibernation.

G. Baddeley shows that the more general application of sterically hindered mesomerism is illustrated by strengths of acids and bases, velocities of side-chain reactions and nuclear substitutions, and by the hydrolytic fission of carbonyl attached to an aromatic nucleus. Steric promotion of nuclear polarizations is also considered a factor contributing to the 'ortho effect'.

Sir D'Arcy W. Thompson suggests that, as the catch of fish is a periodic phenomenon, it should be both useful and easy to take note of differences between one year and another in phase and amplitude as well as in the annual total. A new form of statistical chart is also suggested.