than twice the modal red-green threshold, on a probability-level of less than 0·001, although the modal threshold was the same for both sexes. Similarly, there were more women with twice the modal red-green threshold among those with known colour-blind relatives than among the random sample of women, on a probability-level of less than 0·01. In yellow-blue vision there were no significant differences, either between men and women, or between women at random and women with colour-blind relatives.

If we take Vernon and Straker's figure of 7·31 per cent of red-green defectives among men in Glasgow and the west of Scotland[2], which seems to be a likely proportion compared with other estimates for their frequency among white people[3,4], we may expect about 13·57 per cent of heterozygotes for sex-linked red-green defects among the population of women for the same area. In a sample of 185 women taken at random, we should expect about 25 heterozygotes. In the sample of 185 actually observed, there were 18 more women with twice the modal red-green threshold than there were men in the sample of 191 men, and this does not differ significantly from the 25 heterozygous women expected. This confirms the reliability of the test.

Although there are more major red-green defectives in the population of men than of women, there are more women than men with slight red-green weaknesses. This confirms the view that major red-green defects are sex-linked recessive characters, but incompletely recessive, so that most of the heterozygotes show the character to a slight degree. No sex differences of either kind can be found in yellow-blue vision.

R. W. PICKFORD

Psychology Department,
University, Glasgow.

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## The Name 'Penicillin'

THE recent note "Aspergillin: a Name Misapplied to Several Different Antibiotics", in which Tobie[1] deprecates the practice of assigning names to antibiotics without due consultation of the literature, prompts me to point out, for its historical interest, that even penicillin has not escaped such a duplication in naming. I refer to the use of the name 'penicillin' by Palei and Osuicheva[2] in 1936 to designate a thermostable substance isolated from *Penicillium luteum purpurogenum*, which was unfavourable to the production of citric acid by *Aspergillus niger*. This was seven years after the first use of the term by Fleming[3] in his now famous paper. The oversight is probably due in part to the vagaries of indexing. The name 'penicillin' did not appear in *Chemisches Zentralblatt* until 1934, or in the British abstracts until 1933; it can, however, be found in the 1929 *Chemical Abstracts* and the *Biological Abstracts* for 1930. This serves as another warning against too much reliance on a single abstracting source.

FRANK H. STODOLA

Northern Regional Research Laboratory,
Peoria, Illinois.

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## Emission of Secondary Charged Particles in Fission

IT now seems fairly well established that in roughly 1 per cent of all fissions an $\alpha$-particle is liberated at the moment of fission[1,2]. These secondary $\alpha$-particles are mostly of small energy ($<$ 2 MeV.) but some are found having energies greater than 20 MeV. It is obviously of interest to discuss the conditions in which such 'secondary' emission may occur.

As concerns the moment of liberation of the $\alpha$-particle, the direct evidence from the tracks found in loaded emulsions is that an interval of time greater than about $3 \times 10^{-13}$ sec. does not in general elapse between the instant of fission and the moment of liberation; and the fact that directions of emission at right-angles to the line of separation of the fission fragments are more probable than any others is perhaps even more cogent, though less direct, evidence that the average time interval is much smaller than this. In any case, it is clear that, for $\alpha$-particles of energy less than 2 MeV. and nuclei of medium atomic number, the half-value period for normal radioactive disintegration is enormously greater than $10^{-12}$ sec., so that these low-energy particles at least cannot be emitted spontaneously from nuclei which have already settled down to conditions of near-spherical symmetry after the main phenomena of fission have taken place.

We have to discuss, therefore, what is in effect ternary fission, with the third fission fragment assumed to be an $\alpha$-particle in all cases: and we have to attempt to answer the questions, first, why protons are not as frequently emitted in similar events and, secondly, why ternary fission with $\alpha$-particle emission is relatively so rare. For almost every other case of fission can plausibly be regarded as a case of ternary (or quaternary) fission, with a 'secondary' neutron as the third (or fourth) particle involved.

One possible approach to an answer might be to assume that since neutrons are in excess in the heavy nucleus in relation to all types of binary fission, the liberation of secondary neutrons is natural, and that when in rare cases protons also become free in the process of division of the compound nucleus, they coalesce with the 'nascent' neutrons to form an $\alpha$-particle. Such a point of view has the advantage of tackling both questions at once, but the disadvantage that it requires the setting free of protons in pairs.

However, I favour another approach altogether—and it takes first the question why $\alpha$-emission is relatively so rare. It is assumed that this rarity is connected with the fact that natural $\alpha$-radioactivity does not appear with medium-heavy elements except within very restricted ranges of $Z$ (atomic number). At present, only one 'naturally' $\alpha$-active species has been definitely identified ($^{148}_{62}$Sm), but there is some evidence that ($^{145}_{61}$) may be another, and that a second narrow range of $Z$ ($Z \sim 40$) may be found to include species which are $\alpha$-unstable[3]. Also, from the practical point of view, the distinction should be made between the 'natural' $\alpha$-activity of the medium-heavy elements which has remained undiscovered because the characteristic half-value period lies between, say, $10^3$ and $10^8$ years, or is greater than $10^{14}$ years or thereabouts; and that which has hitherto escaped detection because of the much more probable positron activity of a species which is 'artificially' produced. Theoretically, of course, such a distinction is of no significance, but it may well reflect one aspect of the situation explaining possible gaps in our present knowledge.