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out a plan, though the final thesis should be the student's own effort. Again a realistic timetable is essential and is sketched by the Science and Engineering Research Council. One final point which is a fact of life to most of us in charge of higher degree programmes is that if one promotes an individual researcher because he has nearly reached doctoral standard, he may not finally achieve the coveted doctorate. As the report says with impartiality, this may not be bad for science but it does have an impact on salary scales and promotion. In medicine we have yet to learn how to balance a track record against a thesis. They should have different if complementary roles in the development of a career but that obvious conclusion needs to be recognised by both academics and those who sit on appointment committees for substantive positions in the NHS.

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Doctoral students and the supervisor's role

What higher degrees are appropriate to medicine is a matter of controversy. Some would favour a universal doctorate of medicine; others a doctorate of philosophy; yet others opt for specialty such as a mastership of surgery. None can fail, however, to profit from a delightful document from the Science and Engineering Research Council which sets out an approach to good supervisory practice for any or all.¹ The familiar things that are talked about in common rooms but rarely rationalised in committee are sketched out here.

We all welcome doctoral students, but we do not always accept the responsibility that goes with our acquiescence. As the Science and Engineering Research Council reminds us, we believe that we lack deficiencies in supervising our amanuenses but this is not true. Too often we bask in numbers and relax in commitment. The story goes on by reminding us of the time constraints which govern doctoral research work and the need to set a proper and effective programme. Here there is a dissociation between supervisors' expectations and students' achievements. The former have well defined (in their mind) objectives; the latter get diverted into other channels, particularly in these days of computer "hackery," where the mastery of a technique displaces the imperative to get together a body of work which will impress the scientific establishment. Milestones should be defined ahead and adhered to as the student's development proceeds. Not only is there a need to teach students research techniques but they must also learn to get their professional act together, finding out how to "organise their affairs, something they will certainly have to do if they are going to make a success of any job in later life."

Beginnings, middles, and ends are dealt with in detail. How much the student should originate and how much the supervisor should intrude will always be a matter of controversy, but the Science and Engineering Research Council seems to come down in favour of a well supervised studentship, something which may not always appeal to the independent medical mind.

The last, and ultimately the most important, thing is drafting the thesis. Early on time should be spent in laying

Allergy to penicillin

Allergy to penicillin gives rise to a wide variety of clinical syndromes.¹ Immediate reactions include anaphylaxis, angio-oedema, urticaria, and some maculopapular rashes. Late reactions include those with a well defined immunological basis such as serum sickness like reactions, haemolytic anaemia, and acute interstitial nephritis and others which are less clearly immunological, such as some cases of neutropenia and the maculopapular rashes produced by ampicillin. Immediate reactions are mediated by IgE antibodies, whereas IgG antibodies are responsible for at least some of the late reactions—for example, serum sickness and haemolytic anaemia.¹

Accurate figures for the incidence of allergic reactions to penicillin are not available. The overall incidence has been estimated to be between 1% and 10%^{1 2} in different studies, and anaphylactic reactions are thought to occur in about one to five per 10 000 patient courses of treatment.³ Fatal anaphylaxis is very rare, but anaphylaxis due to penicillin has been said to cause 400-800 deaths a year in the United States.¹ Only 22 deaths attributed to acute reactions to penicillin were reported to the Committee on the Safety of Medicines between 1964 and 1983 (personal communication).

Allergic reactions in general are more common with the semisynthetic penicillins³ but anaphylaxis is usually due to benzylpenicillin. Anaphylaxis usually occurs after intravenous administration but has been reported after oral administration.⁴

The chemical basis of penicillin allergy is complex and incompletely understood. Penicillins are low molecular weight substances which are not themselves antigenic but give rise to a number of different antigenic determinants either by metabolism *in vivo* or by breakdown *in vitro* before administration.^{1 5} The major antigenic determinant is the penicilloyl group derived from the β -lactam ring of the penicillin nucleus, and most allergic reactions to penicillin are due to antibodies specific for this group.¹ Other penicillin breakdown products such as penicillamine and penicilloic acid may also act as haptens and are known as the "minor deter-