Money is Not Enough

EDWARD D. FREIS, M.D.*

As an outgrowth of discussions at a recent research committee meeting, I was asked to write these comments on "Improving the Quality of Young Investigators." The topic obviously is not one that admits of easy or immediate solutions, especially since many of the qualities of a good investigator, such as curiosity, drive, intellect and desire for excellence, are in large measure inborn. However, if these comments stimulate others to air their views and make constructive suggestions, they will have served their purpose.

Below are listed some of the pitfalls that trap many young investigators. No doubt you can think of others:

1. He reworks old problems without bringing fresh ideas or methods to their solution.
2. He fails to review the literature thoroughly and so repeats what has already been done.
3. He substitutes equipment for ideas and becomes a technician.
4. He fails to concentrate his time on the research endeavour.
5. He is too quickly discouraged and lacks resourcefulness in overcoming technical difficulties.
6. He may be overly ambitious and attempts projects beyond his capabilities in training.
7. Or, he may select projects that are trivial and pedestrian.
8. He fails to recognize faulty technique and artifacts.
9. He draws general conclusions from specialized models or from nonphysiologic experiments.
10. He has a poor understanding of statistical analysis. He utilizes inappropriate or no controls. He fails to use statistical tests when needed or uses them improperly. He draws wrong conclusions from statistical tests, such as placing too much confidence on negative results with small-sized sample.

The fact is, that while the young investigator is often long on money, he is short on two important ingredients: training and experience.

* Senior Medical Investigator, Veterans Administration, Washington, D. C.

Role of Granting Agency

In the matter of training, granting agencies could play a more active role. Probably the most important influence in the training of a young investigator is the preceptor. Talented people in the hands of an inspiring preceptor result in good investigators. Too often this important job is left to a busy department head who is so immersed in his administrative problems that he cannot provide the required day-to-day guidance and stimulation. Granting agencies should devote more effort to identifying successful preceptors and concentrate their awards on them. Let these preceptors pick their junior investigators. Further, granting agencies might encourage the junior applicant to apply to successful preceptors. The latter can be identified by the records of their graduate trainees. It is not difficult, for example, to recognize from the accomplishments of his former fellows, that Carl Wiggers was a most effective preceptor. In passing, it should be noted that the most glamorous established investigators need not be the most successful preceptors.

Granting agencies also could use other mechanisms for improving the quality of young investigators. A recent survey (1) has shown that approximately 70 per cent of papers published in leading medical journals exhibited deficiencies in experimental design and in the application of statistical methods. Most clinical investigators are recruited from residencies and have had little or no exposure to research. Granting agencies could organize short but intensive courses in experimental design and statistical analysis. Young investigators would meet and spend the first week of their award period learning the basic concepts of the experimental method as they apply to clinical research.

Another area where formalized training may help is in the technique of medical writing. Workshop sessions should be organized on a regional or national basis by the granting agencies near the end of the investigatorship when, hopefully, reports of completed work would be forthcoming. To these sessions the young investigators would bring their manuscripts for critical review, not only as to content but also as to style, clarity, organization, and the other elements that make

Clinical Research 15:7, 1967.

for good scientific reporting. The faculty may include science writers as well as experienced investigators.

As Irvine Page has said, too many young investigators do pedestrian research at the taxpayers' expense. "It is too easy to hire two technicians and a secretary when the investigators are little more than technicians themselves." Supplying money is not enough. Also provided must be the climate and the facilities for adequate training and development.

REFERENCE

1. Schor, S., and Karten, I.: Statistical evaluation of medical journal manuscripts. *JAMA* 195:1123, 1966.