them. Having found that 86 per cent of the families were satisfied with their family doctor and that in 85 percent no one had changed their doctor through dissatisfaction, they went further and asked whether anyone in the family had ever felt they had wanted to change their doctor and found that 72 per cent had never wished to. That three quarters of the families should have expressed themselves as completely satisfied with their doctor in replying to loaded questions of this nature is gratifying. Doctor Gemmill in his survey found that of the 600 patients whom he interviewed half had changed their doctors but only 15 per cent of those who had changed had done so because they were dissatisfied.

Doctor Gemmill was interested to find out what people thought of the National Health Service and he put to both the patients and the doctors the question, " What changes, if any, do you think should be made in the National Health Service ? " and he devotes two interesting chapters to " The Patients' Likes and Dislikes " and " The Doctors' Likes and Dislikes ". Long waits were the chief dislike among patients, although he comments:

> Waiting in doctor's surgeries, though protested mildly, is usually taken pretty much in stride in Britain; and I have sometimes "waited" with patients who filled the waiting-room, and overflowed into the hall and even outside the building, without my hearing any worse complaint than what sounded like good-natured sallies. I have witnessed, too, genuine anger aroused by the non-arrival of a doctor until some little time after his scheduled office-hour; and the speedy subsidence of that anger once it became known that the delay was caused by an emergency call.

Both these surveys contain much valuable information which planners in the future will be glad to have before them. Both cover not only the general-practitioner services but the hospital services as well and PEP give valuable information on the use and appreciation of maternity and welfare clinics, health visitors and district nurses.

1. *Family Needs and the Social Services.* PEP. Lond. George Allen & Unwin Ltd., 1961, Pp. v + 233. Price 30s.
2. *Britain's Search for Health.* Paul F. Gemmill. Pennsylvania University Press. Lond. Oxford University Press, 1960. Pp. vii + 171. Price 32s.

PSEUDO-PRECISION

Toss a coin three times. Four results are possible—three heads, one tail and two heads, two tails and one head, and three tails. This is simplicity itself. But ask an ordinary medical author to express the result in his own way, and he will write it down as a percentage; for example, he will put "the coin fell head uppermost

in 33⅓ per cent of cases ". It can be argued that this is simply a matter of expression, and another way of writing " one of three ", but it deludes the reader (and, we suspect, the author) into thinking that a degree of precision has been achieved which has not. The true answer to the falling penny is fifty per cent heads and fifty per cent tails (if we exclude instances when it falls on its edge), but this answer cannot be derived in any way if the coin is tossed three times only. Over a hundred trials are necessary before it is sense to talk about times per cent.

This may or may not seem self-evident, but it is a rule so often ignored that it is worth pursuing further. Reputable journals are spattered with examples of percentages, often taken to decimal places, when the number of cases involved in no way justifies such precise statement. For example, *The Practitioner* of May 1961, page 623, gives a table in which appears one case, expressed as " 6 per cent ". Had one more patient had no relief from the drug being tested, the percentage would have been 12; and one less patient would have caused the result to be 0 per cent. A most ludicrous example of percentage statement was in a report on patients who were being studied for attack rates of infectious disease. The series was broken up into age-sex groups. Of the male under-1-year-olds there was but one, and he caught the disease. The attack rate was expressed as 100 per cent for that age-group. Sadly for those who enjoy a joke, the editor's blue pencil destroyed this happy thought.

When is a series large enough to justify expressing it in percentages? The logical answer to this is when it exceeds 100 cases. If it exceeds 1,000 cases it may be justifiable to express the results in percentages with decimals to the first place, and so on. There are other ways of expressing the proportions of smaller numbers; for instance, it is plain and accurate to say simply " 23 cases out of 41 " or " 17 out of 32 ". Anyone can see that about half the cases are indicated in these two examples. A percentage addict will think that if he converts both into figures per hundred, he will know which is larger. But the numbers involved do not justify making such a decision—the comparison is misleading and worthless.

What advice can be given to those whose school mathematics left them unprepared for this sort of statistical problem? They should realize that expressing parts of a small number as percentages makes them into lies; and the smaller the number, the bigger the lies.