It would be useless to discuss Claridge and Herrington's point on "arousal" since we were not concerned with this concept.

Finally, the problem of evaluating studies which are compelled from lack of publication space to drastically limit data presentation is one with which we sympathize. Needless to say we should be extremely glad to supply Claridge and Herrington with the detailed clinical descriptions and statistical analyses which we were compelled to cut from our first draft of the paper.

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ACEDIA: ITS EVOLUTION FROM DEADLY SIN TO PSYCHIATRIC SYNDROME

DEAR SIR,

In common with many psychiatric authors, Dr. Altschule (*Brit. J. Psychiat.*, February, 1965, pp. 117–119) pays little attention to those for whom the spiritual disorders he discusses are not reducible to psychiatric syndromes. There are still many people for whom the title of the paper might contain the word "devolution" rather than "evolution", because of a debasing and falsification of concepts. It is a trifle too bland to imply that knowledgeable opinion agrees with the assumed improved concepts of modern and psychodynamic psychiatry in these matters. The question of personal responsibility for the mental attitudes discussed is assumed to be answered on some basis of automatism, as in psychiatric syndromes.

Authors dealing with such matters might give more weight to the fact that there is still much alternative theory embracing issues of choice and moral responsibility; theory often closer to the original concepts, towards which a patronizing attitude is too often shown in psychiatric writings.

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Dr. Mark D. Altschule writes:

"I strongly agree with Dr. Flanagan in the main, and especially with his closing paragraph. As regards the rest of his letter, most of it is irrelevant: the paper was an *account* of what has happened and not a *judgment* on what has happened. Dr. Flanagan falls into a serious error in the last sentence of his first paragraph when he assumes, if I read him correctly, that the aetiology of all psychiatric syndromes involves some form of automatism."

E.C.G. ARTEFACTS AND POLARIZATION OF THE BRAIN

DEAR SIR,

In view of the three very interesting articles which you published on direct current polarization of the human brain (November, 1964, pp. 768–799), I thought that an interesting artefact which we came across in a somewhat similar endeavour might be worth while mentioning. Some time ago we became interested in the possible psychic effects of passing low levels of direct current through the human brain and did so in a few subjects. Unfortunately we observed them too briefly and superficially to note the interesting effects reported in the previously-mentioned articles. Amongst other physiological parameters, these patients' electrocardiograms were monitored, and an effect was noted which may be of interest to those considering utilizing this technique. A polarizing current was passed through our subjects via a cranial electrode in the shape of a skull cap and an electrode plate at the base of the spine. When the current was turned on we noted an instantaneous deflection of the SP segment of the E.C.G.; when the current was switched off this effect instantaneously disappeared. When the head was made positive with respect to the caudal electrode the deflection was upward, and when the head was made negative the deflection was downward. Figure 1 shows the

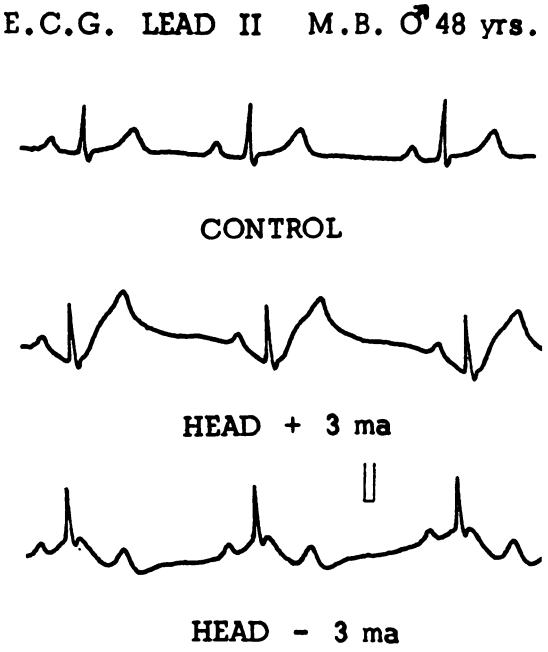

FIG. 1.

appearance of this alteration in Lead II of the E.C.G. for a 3ma current.

Our first thought was that this resulted from a direct effect on the course of polarization of the myocardium. However, further contemplation leads us to believe that this is an electrical impedance effect, in which the electrocardiograph registers, superimposed on the electrocardiogram, alterations in the field distribution which result when the central body impedance changes coincident with ventricular ejection of blood. This is essentially the same effect, generally measured on peripheral body segments, as in electrical impedance plethysmography.

The effect is proportional to the amount of current being passed through the body. With the smaller currents being used in the investigations reported in your *Journal*, one would expect a smaller effect. This effect might possibly cause misinterpretation of clinical electrocardiograms done on subjects who are being electrically polarized. It is also conceivable that, by applying the upper electrode on the base of the neck and underneath clothing, an individual might use the passage of an electrical current through his thorax in an effort at malingering.

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INVOLUTIONAL PSYCHOSIS: SOME NEW AETIOLOGICAL CONSIDERATIONS

DEAR SIR,

Dr. P. R. J. Burch's equation (1) in his paper "Involutional Psychosis: Some New Aetiological Considerations" which appeared in your November, 1964, issue (pp. 825–829) does not follow from his postulates.

Dr. Burch's postulates are simply that, for each individual in the population at risk (*a*) there are a large number, L, of cells at risk and (*b*) the gene somatic mutation rate per cell at risk is m_s. It is required to find the probability that an at risk individual has n or more cells which have had a somatic mutation. This situation is a standard textbook example of a Poisson process (see W. Feller (1950), *An Introduction to Probability Theory and Its Applications*. New York: J. Wiley and Sons, pp. 366), and its analysis may proceed as follows: write $p_r(t)$ for the probability that the individual has accumulated exactly r "somatic mutations generating r genetically identical forbidden clones" at age t then

$$p_r(t+dt) = p_r(t)\,[1-kdt]+p_{r-1}(t)\,kdt$$

$(r \geqslant 0,\ dt \to 0,\ k = Lm_s,\ p_0(0) = 1,\ p_{-1}(t) = 0$ for all t), that is, the probability that there are exactly r forbidden clones at age t+dt equals the sum of (i) the probability that there are exactly r forbidden clones at age t × the probability that no mutation occurs in the age period t to t+dt, and (ii) the probability that there are exactly r−1 forbidden clones at age t × the probability that a mutation occurs in the period t to t+dt.

The above stochastic equation may be written:

$$dp_r(t) / dt = -p_r(t)k+p_{r-1}(t)k$$

which has the well-known solution

$$p_r(t) = e^{-kt}(kt)^r/r!$$

This means that the age specific prevalence (Dr. Burch's equation (1)) at age t is

$$N_t = P_o \sum_{i=n}^{\infty} e^{-kt}(kt)^i/i!$$

This fact was pointed out in the correspondence on Dr. Burch's paper on "Inflammatory Polyarthritis" (1, 2, 3), by Mr. J. Maynard Smith and Mrs. S. Maynard Smith (4, 5), by Drs. R. Augustin and J. A. Spiers (6), and by me (7). Dr. Burch's equation (3) is similarly in error.

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REFERENCES

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3. —— (1964). *Ibid.*, *ii*, 479.
4. MAYNARD SMITH, J., and MAYNARD SMITH, S. (1963). *Ibid.*, *ii*, 357.
5. —— —— (1963). *Ibid.*, *ii*, 738.
6. AUGUSTIN, R., and SPIERS, J. A. (1964). *Ibid.*, *i*, 1280.
7. PIKE, M. C. (1964). *Ibid.*, *ii*, 151.

DEAR SIR,

Dr. Pike is a victim of a widespread fallacy. This fallacy involves the failure to distinguish between independent *trials*—described by binomial or Poisson equations—and independent *events*—described by the calculus of independent probabilities. The problem of independent events was correctly analysed by Yule, in the context of evolutionary theory, in 1924 (see also Irwin, 1964).

A good textbook example of "independent trials" is the sequential throwing of a dice. If we throw a dice T successive times ("trials") and if we wish to