latter, their pathological childhoods and family histories will dominate the results.

Childhood depression was almost unknown. It now has become the most popular diagnosis. The patients have not changed. In 1400 consecutive admissions (spanning 11 years) of children under 18 years of age to the only psychiatric in-patient service serving a population of 400 000 in northern New York State, only 25 were diagnosed as suffering from primary depressive illness. Over 80% showed symptoms of depression and responded with improved self-control to small doses of antidepressants. They will grow up to be adults with many varied problems, and their family histories are full of pathology, but they do not suffer from major depressive illness.

The picture is further confused by the different natural history of behaviour disorders in males and females. Problems commonly begin by the age of seven in males, but only after puberty in females. This probably accounts for the different prevalence of the adult diagnoses of sociopathic, histrionic, and cyclothymic personality in the two sexes. These patients can often meet the criteria for the DSM–III diagnosis of major depression.

The issue raised by Dr Klerman is of great importance and will need much further research.

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Comparison of Electrical Measurements on Constant Voltage and Constant Current ECT Machines

SIR: The study of stimulus parameters and the effects of stimulus variables on the induced seizure and efficacy of treatment are essential prerequisites to a fuller understanding of mode of action and optimisation of treatment. The paper by Railton *et al* (*Journal*, August 1987, **151**, 244–247) is a welcome contribution to the sparse literature. We agree with the findings that, with properly standardised methods of application, variation in electrode resistance is in fact quite small, unlike that reported by Gordon (1982) (McClelland *et al*, 1987).

However, we have a number of reservations about the reported findings and their interpretation. Dr Railton *et al* state that the energy values for the constant voltage machine were calculated using the assumption that the sign wave of the stimulus was truncated at the peak value. From our own experience of the Duopulse Mark 4 and from the observations of the authors (Fig. 2a of their paper) this is not so. The time domain waveform is in fact 40% clipped, which significantly affects the energy content of the stimulus. The authors calculate the energy (E) for the constant voltage machine using the formula

$$E = 0.25 \times V_p \times I_p \times \text{time}$$

(where V_p is the peak voltage and I_p the peak current). This is only correct for a 50% clipped waveform. The energy in a 40% clipped sine wave must be calculated using the true RMS voltage (V) of the waveform, and is found by the equation

$$E = V^2/R \times t$$

The energy estimated by the authors for the constant voltage stimulus shown in Fig. 2 (a) is 54 J assuming a current of 750 mA in the diagram. Using the correct method, the energy delivered is 76 J, an error of approximately 30%. Therefore the energy delivered by the constant voltage device is approaching twice that delivered by the constant current stimulus unit (37 J average).

While the authors report no significant difference in outcome, the measures used were extremely crude, namely whether or not patients were discharged from in-patient care 3 months following treatment. Studies of efficacy require more precision in measurement, embracing symptom ratings, the number and characteristics of treatments, and a careful monitoring of side-effects. No mention of side-effects was made by the authors.

The evoked seizure in electroconvulsive therapy depends on an adequate current applied for a sufficient period of time. The constant current device ensures a stable current within a wide range of inter-electrode impedances. One reason for introducing the constant current device has been to reduce current dosage to near threshold in order to minimise side-effects. A major difficulty with the constant voltage device is the effects of impedance variation on the delivered current for a standard voltage. If the applied voltage is reduced to nearer threshold conditions, then such impedance variation will result in missed seizures or brief seizures.

On a final point, we note from Fig. 1 of the paper that the oscilloscope used to monitor the impedence was connected directly to the ECT machine. As oscilloscopes are generally mains powered, this would contravene British safety standards (BS 5724 part I). While the measurement of impedance is important in the scientific study of ECT, it is important for patient safety that this method of monitoring impedance is not employed.

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SIR: The correction that should be applied to the quoted values for energy produced by the constant voltage machine has already been dealt with (*Journal*, November 1987, **151**, 701).

We were well aware that our oscilloscope did not comply with the British Standard (BS 5724 Part I). This is also the case for microcomputers and video equipment which may also be linked to patient-connected equipment. In these circumstances, and in the case of our study, we utilise a mains isolation transformer which removes the hazard of earth leakage currents. If there is sufficient interest in monitoring routinely the patient impedance then this can be incorporated into ECT machines which comply with the British Safety Standard.

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The Symptoms of Chronic Schizophrenia

SIR: We read the article by Liddle (*Journal*, August 1987, **151**, 145–151) with a sense of *déja vu*. The results of the principal factor analysis are an almost exact replication of our study (Bilder *et al*, 1985) which was not referred to in his report. The two studies together support the validity of three separate phenomenological factors within schizophrenia, and prompts speculation that these factors might show greater concurrent validity *vis à vis* putative pathological processes than has been the case so far for other clinically-based syndromes in use, *viz* the positive and negative syndromes. In this regard we have further evidence supporting the validity of the 'disorganisation syndrome' which we more simply called the 'thought disorder factor' (TDF) (Pandurangi *et al*, 1988). In our study, TDF was significantly correlated with the ventricle-brain ratio (VBR) measured by computerised tomography ($r = -0.37$, $P < 0.03$) but the positive and negative symptoms factors were not. This relation with VBR is opposite to that proposed for the 'negative syndrome' (Liddle's psychomotor poverty syndrome) by Crow *et al* (1982). Moreover, TDF was significantly correlated with language dysfunction ($r = -0.58$, $P < 0.005$), memory dysfunction ($r = -0.61$, $P < 0.005$), and global neuropsychological deficit ($r = -0.41$, $P < 0.05$), while other symptom factors were not correlated with any of the neuropsychological scales. Our studies, together with the studies of formal thought disorder reviewed by Dr Liddle, would support the argument that the TDF (disorganisation syndrome) merits a syndromal status separate from the positive and the negative symptom complexes.

There is another important area of convergence between Dr Liddle's study and ours; namely the loading of both positive and negative formal thought disorders on the same factor. This suggests that investigators who split symptoms of formal thought disorder and assign these to positive and negative syndromes may in fact be introducing 'noise' into their assessments, reducing the chance of observing significant relationships of biological variables with those from the symptom domain.

Even though an ocean of difference in the diagnostic approach to schizophrenia might have separated us in the past, this convergence of findings is reassuring: accurate description of phenomena and appropriate techniques will help us discern meaningful subtypes within the schizophrenic syndrome.

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