Introductory Remarks to the International Symposium on the Physiopathology of the States of Consciousness

By

L. Perria

I have the great pleasure to give you all my welcome to Italy and to Genoa. My particular thanks to the moderator of to-day, Prof. Giuseppe Moruzzi (Pisa), to the moderator of to-morrow, Prof. Kristian Kristiansen (Oslo) and to the members of the panel, namely: Drs. A. Brodal (Oslo); G. F. Rossi (Genoa); A. Zanchetti (Siena); D. Borer (Roma); V. Longo (Roma); G. Alemà (Genoa); G. Rosadini (Genoa); H. Terzian (Padua); M. Jouvet (Lyon); G. Pampiglione (London); C. Loeb (Genoa); J. E. Paillas (Marseilles); G. P. Rowbotham (Newcastle); F. Visintini (Parma); C. Cazzullo (Milan); M. Mancia (Milan) and M. L. Bozza Marrubini (Milan).

The subject you are going to discuss is undoubtedly one of the most difficult and fascinating which confront the neurological sciences. Experimentation and pathology have brought forth effective and relevant contributions. Ste Marguerite (1953) and Brussels (1957) are to be considered two of the main stages in the evolution of the scientific thought on the states of consciousness. Nevertheless, there are still perplexities and zones of shadow on the wide problem of the neural mechanism underlying consciousness, both in the field of the research and in that of clinical pathology.

To-day, you are here assembled to report the latest conclusions of your researches six years after the Symposium of Brussels.

I wish only to make some brief remarks which are based on experience acquired through the work of our Institute.

1. Everybody would agree, I am sure, that we are always bewildered when we must give a definition to “consciousness” and, consequently, to its disturbances. Then, we realize that we often use quite a different language according to the “facts” which result from experience or rather that we distort phenomena dissimilar for their contents and entity by one-sided interpretation.

Acta Neurochirurgica, Vol. XII, Fasc. 2.
I will avoid the temptation of suggesting a definition, but will unhesitatingly say that, as a neurosurgeon, I hold the so-called "quantitative" conception of Bremer (1957) to be nearer to the clinical evaluations with which we are familiar. This conception is obviously linked with the antagonist paradigmatic situations of the conscious processes. Moreover, we must agree with Bremer's (1957) statement that consciousness is "une qualité particulière du fonctionnement cérébral, caractérisé par une réactivité différentielle et sélective, par l'intégration et l'organisation harmonieuse des actes du comportement, par leur adaptation correcte à la situation du moment"; which definition, on the whole, agrees with the view of several other scientists, e.g. Alajouanine (1957).

Now, although I have suggested that this quantitative criterion in the study of the changes of the states of consciousness should be accepted in this Symposium, I do not ignore the perplexities and doubts which result from it.

2. Physiological experimentation has proved the existence of "activating mechanisms", which maintain the cerebral "tone" necessary for the conscious processes. On the anatomical side, the activating structures have been identified with the reticular formation of the brain stem, more particularly with its mesencephalic and rostropontine districts and, perhaps, with the median thalamic nuclei and with the posterior hypothalamus. The experimental demonstration of the importance of these structures in the regulation of the level of consciousness is based on two fundamental experiences: that electrical stimulation of the reticular formation is followed by arousal from sleep (Moruzzi and Magoun, 1949); and that its destruction is followed by deep sleep or coma (Bremer, 1935—1957; Lindsley and coll., 1950).

Therefore, it would seem that every change of the level of consciousness might be attributed to the functional changes of these activating systems. Yet, in the last few years some experimental results (partly obtained in our Institute) suggest the possible existence of neural systems having a function opposite to the activating one. Therefore we should consider whether our present viewpoint on the mechanisms underlying the variation of consciousness ought to be changed by these new findings.

These few remarks, I believe, are quite sufficient to stress that the possible interpretations of the nervous mechanisms of consciousness are in a state of continuous evolution.

3. A further problem should be considered: are the experimental findings and interpretations in accord with those derived from pathological material? Everybody knows that the data obtained by the study of the intracranial pathology are frequently too obscure for a simple interpretation. Nonetheless, according to most current opinions there is a region of the brain that is of critical importance for normal consciousness. To this region belong the rostral brain stem, the diencephalic centres limiting the 3rd ventricle, including the structures at the level of the anterior perforating arteries