horn cell and the periphery. It is easy to distinguish the action potentials of motor unit activity from those of fibrillation, and this distinction is proving of definite use in clinical diagnosis and prognosis[3].

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March 27.

[1] Adrian, E. D., and Bronk, D. W., *J. Physiol.*, **67**, 119 (1929).
[2] Denny-Brown, D., and Pennybacker, J., *Brain*, **61**, 311 (1938).
[3] Weddell, G., Feinstein, B., and Pattle, R. E., *Lancet*, 236 (1943).

Science, Common Sense and Decency

WHEN a man of science deals with subjects outside his special sphere the result is always interesting, but not always illustrative of the caution and rigour of the scientific method. It is rather startling to find Dr. Irving Langmuir declaring (see NATURE, March 6) that "Reason is too slow and difficult", and adding that when we do not possess the necessary data or when we find a problem too complex for the methods of reasoning we must use "common sense, judgment and experience" and should not underrate the importance of intuition. Surely common sense (carefully controlled), judgment and experience are factors in the process of reasoning? As for intuition, the example given by Dr. Langmuir is this: "In almost every problem which I have succeeded in solving, even those that have involved days or months of work, the final solution has come to my mind in a fraction of a second by a process which is not consciously one of reasoning". Can this culmination of days and months of concentration be properly described as intuition? Or are we to conclude that Dr. Langmuir's concentration on the problems of physics has prevented him acquiring any knowledge, even intuitive, of unconscious cerebration?

Dr. Langmuir's conceptions of the psychology of reasoning will prepare biologists for his confession that he finds the idea of fitness to survive "inherently rather fuzzy".

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SOME of Dr. I. Langmuir's ideas on modern trends in scientific thought[1] require comment.

It is significant, I think, that the resurgence of metaphysics, spiritualism, etc., among scientific men has been mostly confined to physicists. Their entities —atoms, electrons, quanta—are all things which cannot be observed directly by the senses, so perhaps we can understand their doubt as to the relation of their concepts to reality. On the other hand, their knowledge of the biological sciences is not usually such as to give them that confidence in the power of scientific method which is pronounced in modern biologists.

It is important to distinguish clearly between concept and reality. The chemist's 'atom' may differ from the physicist's 'atom', but both are only aspects, imperfectly understood, of a real material atom. As science progresses the gap between concept and reality decreases, but only ideally can they coincide. The uncertainty principle, for example, is a concept which has no bearing, as Dr. Langmuir would suggest, on the *reality*, which is that at any moment a particle has both a definite position and a definite velocity, and that both are determined by its external and internal conditions.

That physicists have been unable to find immediate causes for the emission of an alpha particle from a certain radium atom is no reason for asserting that such emission is without cause. It is at present impossible to predict which side up a penny will fall, but it is actually determined by which is the original side up and the number of somersaults the penny makes before coming to rest. Owing to man's common sense, he has searched for a cause for everything; where his knowledge has failed him he has substituted the supernatural. Dr. Langmuir would have us substitute nothing, and declares such phenomena to be beyond the bounds of science. This is not a very happy philosophy for the dawn of the scientific era.

Divergent phenomena are, by Dr. Langmuir's definition, large effects produced from small beginnings. We are told these phenomena do not obey the laws of cause and effect. The very use of the word 'produced' implies causation. The establishment of a mutation in a population through natural selection is an example of such a phenomenon. It can be seen that 'divergent' phenomena are merely the expression of improbable events due to their coincidence with the correct environment for that expression.

Classical and quantum physics are two aspects of the same reality studied on different scales. Mass effects are the statistical integration of an internal conflict between probabilities. This internal conflict is universal in all phenomena from the physical to the sociological. Just as the unit which shows heterogeneous behaviour is in physics the atom or energy quantum, so in sociology it is the individual, and one can induce laws of society, ignoring individual idiosyncrasies.

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[1] NATURE, **151**, 266 (1943).

Czechoslovak Medical Students at Oxford

IN connexion with the historic ceremony at Oxford on February 27 when Czechoslovak medical degrees were conferred on twenty-three Czechoslovak medical students, it is of interest to recall that on February 25, 1586/7, Wencelaus (Václav) Lavinius (that is, Lavický), a Moravian who had studied medicine for twenty years in France, Germany and Italy, and had been licensed to "incept in medicine" at Wittenberg "sub Pensero", was admitted as M.D. of Oxford on condition that he gave three "solennes lectiones" before his departure[1]. He had presented letters of introduction from Sir Francis Walsingham, and from Massionius Fontanus and J. Castolus, "pasteurs" of the French church in London. Castolus's letter stated that Lavinius had spent a year in London, had brought a letter of introduction from Beza of Geneva, and that he was "rector peregrinationum et familiæ præfectus" of Baron di Zerotini (that is, z Žerotin), a Moravian.

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[1] For references see R. Fitzgibbon Young, *English Hist. Rev.*, Jan. 1923.

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