membrana tectoria and the subjacent field of hair-cells. In place of any analysis of the consonation by any particular radial fibres, it may be imagined that varying combinations of sound give varying pressure-patterns, comparable to the varying retinal images of external objects" ("Introduction to Human Physiology," 1896). By a kind of divination—or rather common sense—based presumably on the "obvious" facts of human histology, he arrived at the only view that is consonant with the facts—a view that has been utterly neglected in favour of the Helmholtz theory.

I cannot forbear noting the analogy to the Helmholtz theory that the vowels are composed of tones harmonic to the voice tone, which pushed aside the Willis theory that the vowels consist of independent vibrations aroused by puffs from the larynx. After years of oblivion the Willis theory has been shown to be true for German vowels by Hermann and for English vowels by myself (see NATURE, January 13 and 20, 1921). Yet there are people who still maintain the discredited theory. There must be some psychological reason deep in the unconscious that forces people to believe in and cling to the series of numbers 1, 2, 3, etc., that lie at the basis of the harmonic theory of the vowels and the resonance theory of hearing.

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Photoelectric and Selenium Cells.

THE prevailing impression, expressed by Dr. Slater Price in NATURE of March 8, p. 351, that photoelectric cells are less trustworthy than selenium, is, we believe, due to the practice of using gas-filled cells with the active surface sensitised by the discharge in hydrogen. Cells prepared with untreated surfaces of the alkali metals in a high vacuum are perfectly trustworthy instruments; they show neither time-lag nor fatigue, and can readily be prepared differing in absolute sensitivity by a factor of not more than two. They are, of course, less sensitive than the Elster-Geitel gas-filled cells, but their sensitivity is ample for all ordinary photometric purposes with very simple electrical measuring apparatus. If greater sensitivity is required, we believe that it may be attained far more conveniently by amplification outside the cell than by amplification within it—unless possibly when the cells are required for astronomical purposes and the whole apparatus has to be mounted on the telescope.

Cells of the type we advocate are made in these laboratories for our own purposes. We have supplied some in response to outside inquiries, and have no doubt that arrangements could be made to supply them generally if sufficient demand were forthcoming.

THE RESEARCH STAFF OF THE G.E.C., LTD.
Research Laboratories of the
General Electric Company, Ltd.,
Wembley, April 7.

The Three-Colour Process and Modern Painting.

VERY much so-called art, defended as "modern," appears to represent an irrational cult, having no more justification than the chaotic mental concepts which are so often opposed to the progress of science. There is, however, a method of painting which at first seems anarchistic and contrary to Nature, but on closer examination (metaphorically) or more distant examination (literally) appears significant and interesting, amounting to a real discovery in art. Just now we have on exhibition at the University of Colorado a collection of paintings by Robert A. Graham, a rather well-known artist in the United States, in which the method referred to is employed. At close range the pictures appear to be merely arrangements of spots of colour, mainly red, yellow, and blue. It seems impossible that they can represent anything natural. But at the distance of ten feet or so an extremely soft and natural landscape appears. The method is exactly the same, essentially, as that of the three-colour photographic process, which in the hands of experts gives us pictures exquisitely true to Nature, or to our optical impression of Nature. Such prints (*e.g.* in Taylor's "Monograph of British Mollusca") are so natural that I have found myself at times using a lens to make out finer details, of course with the result of losing the whole impression. These matters may have been fully elucidated and appreciated in artistic circles, but they throw light on our process of vision, and are of interest to scientific men as well.

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Discovery and Research.

IN the leading article in NATURE of April 5, on "Medical Research in Great Britain," dealing with the Report of the Medical Research Council for the year 1922–23, you seem to regard it as a sign of failure that the Report contains no record of a first-class medical discovery made in Great Britain during the year in question. The work of the Medical Research Council does not need support from me, but I am concerned that NATURE should adopt the exaggerated idea of the merit of 'discovery' which is held by the 'man in the street.' Every discovery, however important and apparently epoch-making, is but the natural and inevitable outcome of a vast mass of work, involving many failures, by a host of different observers, so that if it is not made by Brown this year it will fall into the lap of Jones, or of Jones and Robinson simultaneously, next year or the year after.

One or two examples will illustrate my point. Bayliss and I once had the good fortune to make a 'discovery'! It was of no practical use to any one, but a source of much gratification to ourselves, since it seemed to open up a new chapter in our knowledge of the body. But there were at that time half a dozen workers skating along the edge of the discovery, and it is difficult to comprehend why, for example, Wertheimer and Lepage did not take the one further step which would have made them and not us the discoverers of *secretin*.

The same thing applies to other discoveries which have been of paramount importance for the welfare of mankind. Ross's discovery of the transmission of malaria by mosquitoes had been prepared by the work of many other men on the part taken by insects in conveying disease both to men and to the lower animals. If Ross had never lived, it is improbable that this great discovery would have been deferred by more than a few months or years. Similarly, the preparation of *insulin* by Banting and Best, an admirable piece of work, is but the last step of an arduous journey, in which hundreds of workers have taken part. In the history of insulin, the greatest achievement was probably that of Minkowski, when he showed that diabetes could be produced by extirpation of the pancreas. If tradition may be believed, this discovery was due to an accidental observation of the old laboratory servant, who tasted some crystals left on the floor of the laboratory by the evaporation of urine voided by the operated animals, and found them sweet. The actual discovery of insulin waited, however, forty years, until an easy and accurate method was devised for the