ELEMENTS OF ELECTRO-BIOLOGY, OR THE VOLTAIC MECHANISM OF MAN; OF ELECTRO-PATHOLOGY, ESPECIALLY OF THE NERVOUS SYSTEM; AND OF ELECTRO-THERAPEUTICS

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ALFRED SMEE

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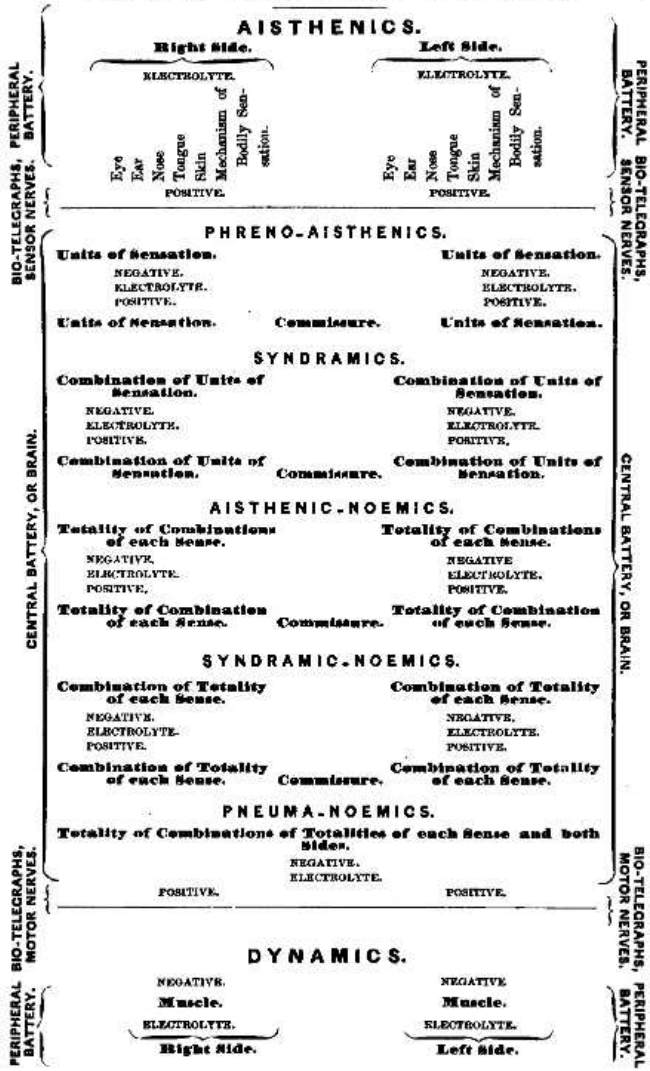
ELEMENTS

OF

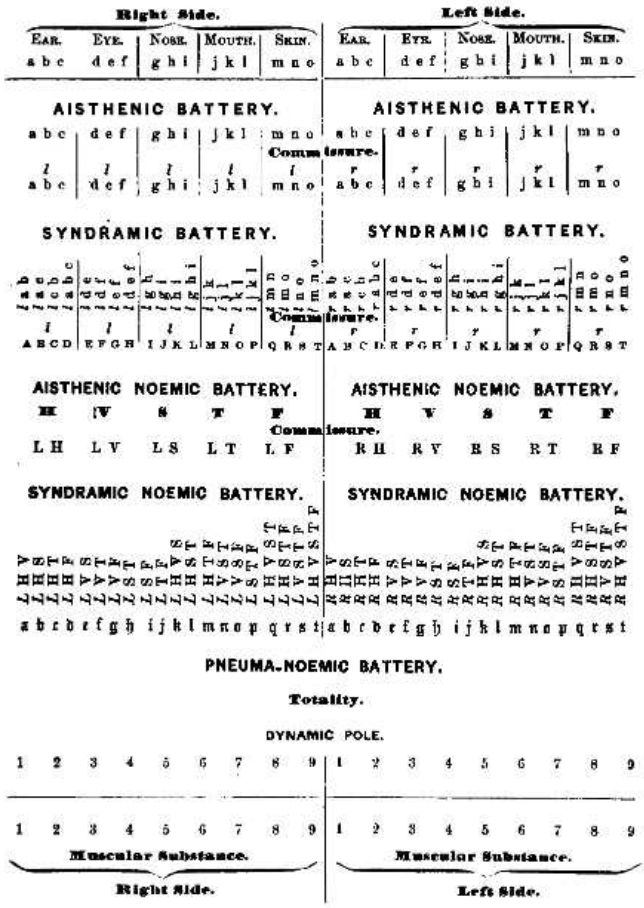
ELECTRO-BIOLOGY,

ETC.

ELECTRO-BIOLOGICAL MAP (No. 1).



ELECTRO-BIOLOGICAL MAP (No. 2).



ELECTRO-BIOLOGY;

OR,

THE VOLTAIC MECHANISM OF MAN.

CHAPTER FIRST.

ELECTRO-BIOLOGY.

1. Definition of Life.—2. Specific Actions of Life.—3. Organic Life.—4. Nerve.—5. Ganglia and Brain, General Functions of.—6. Nature of Life.—7, 8. Vital Phenomena purely Physical.—9. Immortality.—10. Requisites for Life.—11. Analogy between the Vital Apparatus and Voltaic Battery.—12. Extent of this Analogy.—13. Liebig's Arrangement.—14. Animal Battery.—15. Conditions necessary for.—16. Hydro-Voltaic Circuits; Induced Circuits.—17. Electro-Voltaic Circuit.—18. Current developed by Muscular Action; Experiment.—19. Deduction from.—20. Conditions for Experiment.—21. Peripheral Battery.—22. Structure of, in the Animal.—23. Central Battery.—24. Electro-Biological Circuit; Conditions necessary for.—25. Causes of Death; Electro-Biologically considered.—26. Sub-division of Biology.

(1). LIFE is a condition difficult to define, because it does not denote one constant state in the body to which it appertains, but refers to a series of changes continually occurring. The illustrious Bichât considers it to be "the sum of the functions by which death is resisted"; but this, to my mind, is not an intelligible definition. If we regard the state of a living animal, we find that it consists of two parts, a solid and a

fluid. Between these two parts changes are continually occurring. Life, therefore, comes under our notice only as an idea which we form of a solid and fluid body in a state of action, and thus may be defined to be—"The idea of the performance of certain specific actions between the parenchyma and blood or fluid of an organised being."

(2). The certain specific actions of life are those of growth, nutrition, and excretion, in certain cases, the generation of a particular temperature; in others, as in the glow-worm, of light; in others, as in the electric eel, of electricity. We observe sound to be produced in many organised beings; as, for instance, in the singing of birds; and, lastly, the power of generating force extends to a greater or less degree over the entire animal creation.

(3). Assimilation, growth, nutrition, excretion, and perhaps, the generation of a certain temperature, are common to all organised bodies, and may be termed the vegetable life; or, speaking more generally, the organic life—phenomena which in this work it is not my purpose to consider in detail.

(4). Besides the phenomena, classed together as the phenomena of organic life, there are yet others, which we find in the higher animals in great perfection, and which, by analogy, we may infer to belong to the lowest creature in the scale of creation. The phenomena to which I allude require for their manifestation, a more complex apparatus than that of the simple fluid and tissue to be found in all plants. We find that animals, to exhibit these phenomena, require a central parenchyma supplied with blood, a peripheral parenchyma supplied with blood, and a connection between the two, consisting of a peculiar tissue, called "Nerve-Fibre."

(5). The central parenchyma constitutes the ganglia of lower animals, the brain of higher. The peripheral parenchyma comprises the organs of sensation and motion. A proper supply of bright arterial blood to both situations is requisite for the manifestation of the phenomena of life. By this apparatus the