

"Variation," 331; Malthus, 332; "Struggle for existence," 333; Outdoor studies, 334; "Natural selection" and "sexual selection," 336; Meaning of natural classification, 336; Fertilisation of plants and "Mimicry," 338; The judicial method, 339; Darwin and Newton compared, 341; Unsolved problems, 343; Genetic view on a large scale, 345; Philosophical theories, 346; Herbert Spencer, 346; Haeckel, 347; Combines Darwin and Lamarck, 350; Philosophical problems, 352; Problem of life, 352; Genetic view strengthened by physics and chemistry, 355; The heat of the sun, 357; Spectrum Analysis, 359; Genesis of the cosmos—Faye and Lockyer, 360; Palæontology and geophysics, 363; Dissipation of energy, 364; Mystery of the actual processes of Nature, 366.

## CHAPTER X.

### ON THE VITALISTIC VIEW OF NATURE.

The cosmical and the terrestrial views, 369; Vagueness of biological theories, 370; Impossibility of prediction, 372; Oscillation of biological thought, 374; The unknown factor, 375; The purely scientific aspect, 377; Influence of medicine, 379; Practice urges the question: What is life? 381; Bichat, 381; His Vitalism, 383; His definition of life, 383; Vitalism and Darwinism, 386; The extreme vitalism, 388; Attack from the side of chemistry, 389; Change in organic chemistry, 393; Influence of Liebig, 394; "Stoffwechsel" and "Kreislauf des Lebens," 395; "Autonomy of the Cell," 395; "Division of Physiological Labour," 396; Johannes Müller, 397; Influence of doctrine of energy, 399; Mechanism, 399; Lotze and Du Bois-Reymond, 401; Liebig's vitalism, 405; Darwin, 406; Lotze and Claude Bernard, 409; Darwinism and final causes, 411; "Natural result" against "purpose," 413; Organisation and individuation, 415; Biology and economics, 415; The cellular theory, 417; Schwann, 419; Circulation of matter and energy, 420; "Metabolism," 422; Structural analysis of morphological elements, 423; Synthesis of organic substances, 425; The "physical" method, 428; Properties of the living substance, 429; Environment, 430; The "internal medium," 432; Natural selection within the organism, 435; Mobility of living matter, 438; Anabolism and Catabolism, 442; Reproduction, 443; The protoplasmic theory, 444; Spencer's law of limit of growth, 445; Fusion of two elements, 446; New problems, 448; Weismann on heredity, 450; Biogenesis, 451; The ubiquity of life, 452; The continuity of living forms, 453; "Pangensis," 454; Germ-substance and body-substance, 457; Germ-plasma and body-plasma, 458; Differentiation of germ-plasma, 459; Weismann *v.* Lamarck, 460; Two aspects of the problem of life, 462; Transition to psycho-physics, 464.