Chapter VIII: Darwinism and Holism

COMPREHENSIVE ANALYSIS

SECTION 1: CHAPTER POSITION IN THE OVERALL ARGUMENT

Chapter's Role in the Book's Overall Argument

Chapter VIII represents a crucial pivot in Smuts's exposition. Having established the philosophical foundations of Holism in Chapters V-VII (the concept of the whole, holistic functions and categories, and the mechanism-holism relationship), Smuts now applies his theoretical framework to the dominant scientific paradigm of his era: Darwinian evolutionary biology. This chapter demonstrates that Holism is not merely an abstract philosophical principle but a necessary corrective to the mechanistic interpretation of evolution that had come to dominate biological thinking.

The chapter serves multiple argumentative functions: (1) it critiques the Neo-Darwinian mechanistic orthodoxy exemplified by Weismann, De Vries, and the Mendelians; (2) it rehabilitates Darwin's original, more nuanced vision of evolutionary adaptation; (3) it introduces the crucial concept of 'Holistic Selection' as complementary to Natural Selection; and (4) it demonstrates that Holism resolves difficulties that mechanistic biology cannot address—particularly the problems of co-ordination, the survival of small variations, and the origin of organic beauty.

High-Level Summary of Central Claim

The chapter's central proposition is that Darwin's evolutionary theory has been distorted by mechanistic interpretations that fragment the organism into independent parts and treat Natural Selection as operating on isolated variations. Smuts argues that evolutionary advance is fundamentally *holistic*—organisms evolve as integrated wholes, not as collections of separately varying characters. The organism itself performs a prior 'Holistic Selection' that shapes, coordinates, and nurtures variations before Natural Selection operates. Furthermore, the inner (Variation) and outer (Selection) factors of evolution collaborate far more intimately than Neo-Darwinism recognizes. This holistic reinterpretation recovers Darwin's original vision of universal adaptation while resolving difficulties that mechanism cannot address.

Relationship to Preceding and Subsequent Chapters

Preceding Context: Chapter VII ('Mechanism and Holism') established that mechanism and holism are not opposites but degrees on a continuum, with holism as the more fundamental feature. This provided the conceptual foundation for Chapter VIII's critique of mechanistic biology. Chapter VI established holistic categories (creativity, freedom, individuality) that Chapter VIII applies to evolutionary processes. The 'field' concept introduced in Chapter V becomes central to explaining how modifications eventually become hereditary variations.

Subsequent Development: Chapter IX ('Mind as an Organ of Wholes') builds directly on the evolutionary framework established here, examining how mind emerges as the supreme expression of holistic evolution. The creative, coordinative principles demonstrated in

biological evolution are shown to reach their highest development in consciousness and personality. Chapter VIII thus bridges the purely organic with the psychic phases of holistic evolution.

SECTION 2: KEY CONCEPTS INTRODUCED OR DEVELOPED

1. Variation (Inner Factor)

Definition: The internal creative factor in evolution, 'operating spontaneously and somewhat mysteriously inside organisms and modifying their hereditary structures and functions in very slight degrees' (p. 181). Variation is 'positive and creative, producing all the variations which are the raw material for progress' (p. 187).

Terminological Note: Smuts distinguishes between 'variations' proper (hereditary changes in germ-cells transmissible to offspring) and 'modifications' (changes in the individual organism during its lifetime due to use, disuse, or environmental conditions). This distinction, common in early 20th-century biology, must not be confused with the modern usage where 'variation' often refers broadly to any phenotypic difference.

2. Natural Selection (Outer Factor)

Definition: Darwin's external factor, 'which operates selectively on these slight variations, weeding out those organisms whose variations were less suitable to their environment, and leaving the organisms with suitable variations to multiply and develop' (p. 181). Smuts characterizes it as 'essentially negative and destructive, eliminating the harmful or less fit or useful variations' (p. 187-188).

Critical Note: Smuts argues Darwin 'over-emphasized' this factor, leading to mechanistic distortions. Natural Selection operates only at the 'maturity' of variations; it cannot explain their origin, coordination, or early survival.

3. Modifications

Definition: 'Changes due to the functional activities and experiences of the individual in its own life, and not to inheritance from parents or ancestors' (p. 191). Includes effects of use and disuse, environmental conditions, and individual habits. Contra Weismann, Smuts argues modifications are 'partly the material from which variations have been formed' (p. 200), operating through the concept of the 'field.'

4. Mutations

Definition: Following De Vries, 'large well-marked [changes] occurring very occasionally' (p. 181), as distinguished from Darwin's small, continuous variations. Smuts criticizes the over-reliance on mutations, arguing it 'made it still more difficult to understand slow age-long adaptation, for instance, to habitats and ecological conditions' (p. 181).

5. The Field (of the Germ-Cell)

Definition: 'The milieu of interwoven influences, of internal and external stimuli and responses, in and around the cell or the organism' (p. 190). The field represents 'that part of

the germ-cell which has not crystallised and hardened into sensible structure.' It is 'the area of becoming, of creativeness, the growing surface of the structure' (p. 190). The field concept explains how modifications can eventually influence hereditary variations without violating the Weismannian barrier.

6. Holistic Selection

Definition: Smuts's major conceptual innovation. 'It is thus the organism as a whole which in the first instance "selects" the winning variation or series, and confers on it support and survival value. "Holistic Selection" is therefore in operation at the birth and through the early nursing stage of the variation, and it is only at its maturity that Natural Selection takes over' (p. 183). Holistic Selection is 'much more subtle in its operation, and is much more social and friendly in its activity' (p. 209).

Key Distinction: Natural Selection operates *between* organisms (struggle for existence); Holistic Selection operates *within* organisms, coordinating and supporting variations.

7. Holistic Variation

Definition: Variations do not appear singly but as integrated complexes. 'Variation A when closely scanned will be seen to be really more like A + b + c + d, where b, c and d represent minor variations which adjust A in various respects to the organism' (p. 207). The advance is 'holistic and the variation is only the most striking item of a whole series' (p. 183).

8. Co-ordination and Co-adaptation

Definition: The harmonious functioning of multiple organs and structures within organisms. Smuts argues 'it is impossible without [Holism] satisfactorily to explain all the innumerable co-ordinations and co-adaptations in structure and functions which constitute the action of a living organism. No merely mechanical explanation of co-ordinated animal movements or action has ever been given' (p. 183).

9. Repression of Variations

Definition: 'Holism not only includes variations, but just as much repression of variations. It is as often inhibition as creation. Certain features are held in check, while others are released and pushed forward in organic evolution. Thus the balanced whole of the Type is achieved' (p. 183). This repressive aspect becomes ethical restraint at the psychical level.

10. The Friendly Universe

Definition: Contra the emphasis on struggle, Smuts argues 'this world is at bottom a friendly universe, in which organised tolerant co-existence is the rule and destructive warfare the exception, resorted to only when the balance of Nature is seriously disturbed. Normally Natural Selection takes the form of comradeship, of social co-operation and mutual help' (p. 214).

Inter-relationships Between Concepts

The concepts form a systematic whole: The *field* mediates between *modifications* and *variations*, explaining how individual experience can eventually influence hereditary structure. *Holistic variation* ensures that changes come as coordinated complexes, not

isolated units. *Holistic Selection* operates within the organism to nurture promising variations before *Natural Selection* operates between organisms. Both *co-ordination* and *repression* are expressions of holistic control maintaining the balanced whole of the Type. The whole picture yields a *friendly universe* rather than one of unregulated struggle.

SECTION 3: DIALECTICAL CONTEXT

Views Being Critiqued or Rejected

A. Mechanistic Neo-Darwinism

The primary target is the mechanistic interpretation of evolution that arose after Darwin. 'Darwin's over-emphasis of the second or external factor had one very unfortunate result: it directly and powerfully reinforced and exaggerated the mechanistic conception of the universe' (p. 188). The conception of 'Entwicklungsmechanik' (developmental mechanics) exemplifies this distortion.

B. Weismann's Germ-Cell Isolation

Smuts rejects Weismann's doctrine that acquired characters cannot be inherited, arguing it 'made it difficult to understand how organisms through their experience and habits of life become gradually fitted and adapted to their environment' (p. 181). While acknowledging Weismann's contributions, Smuts contends 'the current theory goes too far' in insisting on complete isolation of germ-cells (p. 198).

C. De Vries's Mutationism

De Vries 'eliminated all small variations from the account and attributed all specific advance to large well-marked "mutations" occurring very occasionally. This made it still more difficult to understand slow age-long adaptation' (p. 181). Smuts recovers Darwin's emphasis on small, continuous variation.

D. Mendelian/Geneticist Mechanism

The Mendelians 'developed the conception that in organisms there are well-marked stable unit-characters whose combinations in crossing follow a certain definite law' (p. 181). Smuts criticizes this as leading to 'the idea of more or less mechanical combinations [taking] the place of the idea of creative variations' (p. 182). He warns against the 'gene theory' being 'far too deeply tainted with mechanistic elements' (p. 216 n).

Thinkers Engaged

Charles Darwin: Largely vindicated. Smuts quotes Darwin's famous closing passage from the *Origin of Species* at length, calling it a 'vision of the unity of life which perhaps has never been surpassed in its fullness and grandeur' (p. 186). Smuts aims to recover Darwin's original holistic vision from mechanistic distortions.

August Weismann: Critiqued for germ-plasm theory's excessive isolation, but acknowledged for turning attention to the inner factor of variation.

Hugo De Vries: Critiqued for mutation theory; quoted for the formulation that 'the inner factor explains the arrival, and the external factor the survival, of the fit or useful variation' (p. 188).

Gregor Mendel: Acknowledged for discovering laws of hereditary character combinations, but followers criticized for mechanistic interpretation.

T.H. Morgan: Criticized (in footnote, p. 216) for gene theory's mechanistic elements.

Lamarck: Partially vindicated: 'in that sense Weismann was wrong, and Darwin—and further back, even Lamarck—right' (p. 183) regarding the influence of modifications on heredity.

F.O. Bower: Cited (p. 204 n) as supporting the view that modifications become variations in plant evolution.

J.W.H. Harrison: Cited (p. 199 n) for experiments showing chemical environment influencing hereditary variations.

The Problem the Chapter Addresses

The chapter confronts a crisis in evolutionary biology: 'The combined effect of these three advances [Weismann, De Vries, Mendelians] on the Darwinian theory might appear largely destructive of Darwinism itself. If, following the Mendelians, we hold that the interchange of definite pre-existing unit characters is all there is in the process of Evolution, real advance becomes impossible and creative Evolution disappears' (p. 193). Mechanism cannot explain: (1) how small variations survive before acquiring survival value; (2) how coordinated variation complexes arise; (3) how organisms achieve universal adaptation to environments; (4) why beauty transcends mere survival utility.

SECTION 4: MAIN ARGUMENTS AND THEIR STRUCTURE

Argument 1: The Mechanistic Distortion of Darwinism

Premise 1: Darwin proposed two factors: Variation (inner, creative) and Natural Selection (outer, eliminative).

Premise 2: Darwin over-emphasized Natural Selection, treating Variation as merely mysterious raw material.

Premise 3: This over-emphasis 'directly and powerfully reinforced and exaggerated the mechanistic conception of the universe' (p. 188).

Premise 4: Subsequent Neo-Darwinians (Weismann, De Vries, Mendelians) deepened the mechanistic distortion.

Reasoning: The external, eliminative factor operating on isolated variations resembles mechanical forces acting on discrete particles—hence the mechanistic interpretation seemed plausible and was reinforced by subsequent developments.

CONCLUSION: Contemporary evolutionary biology has lost Darwin's original holistic vision and requires correction through the concept of Holism.

Argument 2: Modifications Become Variations (Against Weismann)

Premise 1: Weismann claims germ-cells are completely isolated from somatic influences.

Premise 2: However, the organism includes a 'field'—the area of becoming that has not crystallized into structure.

Premise 3: 'Changes due to habitual behaviour or to environmental or chemical or ecological pressure affect the "field" of the germ-cells, and if sufficiently long-continued and intense, sooner or later penetrate the structures of these germ-cells' (p. 215).

Premise 4: The universal close-fitting adaptation of species to ecological conditions is inexplicable without some influence of environment on heredity.

Reasoning: The field concept provides a mechanism whereby modifications can influence variations without violating the continuity of hereditary structures—modifications become the 'rough material' of later variations.

CONCLUSION: 'Modifications are to variations what variations are to specific characters' (p. 200). Weismann's absolute barrier is untenable.

Argument 3: Holistic Selection Precedes Natural Selection

Premise 1: Small variations lack immediate survival value and cannot be preserved by Natural Selection alone.

Premise 2: 'The organism is simply maintaining its own advance in the variation; the variation issues from it and is in conformity with its whole trend and movement' (p. 183).

Premise 3: The organism's habitual practice, pressure of needs, and whole developmental trend support promising variations.

Reasoning: Before a variation is strong enough for Natural Selection to 'get a grip on' it, the organism itself must nurture it—'the whole weight of the organism [is] behind them; they are nursed and cared for, figuratively speaking' (p. 209).

CONCLUSION: 'Holistic Selection is therefore in operation at the birth and through the early nursing stage of the variation, and it is only at its maturity that Natural Selection takes over' (p. 183).

Argument 4: Variation is Holistic, Not Singular

Premise 1: 'Variations do not come singly but in complexes, involving many minor and consequential modifications and variations' (p. 183).

Premise 2: If variations are isolated units, we must explain how each minor adjustment is independently selected—an impossible task.

Premise 3: 'The organism as a whole is on the march, and while the variation may be the first and most significant indication of the inner movement, the advance is not confined to a single point, but is represented by a curve of progress' (p. 207).

Reasoning: The holistic nature of the organism ensures that variations arise as coordinated complexes (A + b + c + d), where the main variation carries with it the necessary minor adjustments.

CONCLUSION: 'The advance is holistic and the variation is only the most striking item of a whole series' (p. 183).

Argument 5: Holism Explains Co-ordination

Premise 1: Living organisms exhibit 'innumerable co-ordinations and co-adaptations in structure and functions.'

Premise 2: 'No merely mechanical explanation of co-ordinated animal movements or action has ever been given' (p. 183).

Premise 3: 'The animal acts as a whole, with a unity and effectiveness of action which is no mere mechanical composition of its movements' (p. 183).

Reasoning: Mechanism treats parts as independent, their combined action a mathematical sum. But organic coordination shows parts acting in unity, their coordination inexplicable without the whole's directive influence.

CONCLUSION: 'Holism not merely as a concept, but as a real feature, is necessary to account for this unique unity of organic or psychic action' (p. 183).

Argument 6: Repression is Essential to Holism

Premise 1: Darwinism focuses only on positive variations that are selected.

Premise 2: But 'Holism not only includes variations, but just as much repression of variations' (p. 183).

Premise 3: 'Certain features are held in check, while others are released and pushed forward in organic evolution. Thus the balanced whole of the Type is achieved' (p. 183).

Reasoning: Types and stable organic forms require not just creative advance but also restraint—the inhibition of variations that would disturb the balanced whole.

CONCLUSION: 'This repressive aspect of progress is neglected by Darwinism, but it is just as real as the active variation' (p. 183).

Argument 7: Inner and Outer Factors Collaborate

Premise 1: Mechanism posits independent inner and outer factors: variations arise spontaneously inside, selection operates eliminatively outside.

Premise 2: 'The interaction between the inner and the outer factors in Evolution is far more close and subtle than one would infer from Darwinism' (p. 215).

Premise 3: 'The inner creative factor in a measure acts directly under the stimulus of the external factor, and the variations which emerge are the result of this intimate interaction' (p. 215).

Reasoning: Inner and outer factors 'collaborate in the closest manner as the stimulus and response which we find distinctive of all organic action' (p. 215-216).

CONCLUSION: Evolution involves not independent factors but intimate collaboration—'the lesser whole in harmony with the greater whole of Nature' (p. 215).

Argument 8: Beauty Transcends Survival Value (Holistic Values)

Premise 1: Darwinian factors (survival, sexual selection) explain only utility and fitness.

Premise 2: But 'Beauty in Nature is holistic, is of the whole, comes from Holism, and is explicable on no other principle' (p. 183).

Premise 3: 'Everywhere we see the great overplus of the whole. So little is asked; so much more is given' (p. 219).

Premise 4 (Example): 'The peahen has no discriminating understanding of the wondrous colouring of the peacock, which far transcends even our human powers; but in some inscrutable way something of an emotional nature in her takes it all in and is satisfied. It is deep calling unto deep; it is the whole appealing to the whole' (p. 219).

Reasoning: Beauty exceeds what utility requires—the whole creates values beyond survival needs.

CONCLUSION: 'The inexhaustible whole is itself at work, that Holism is an active factor influencing and interacting with the particular Darwinian factors, that not only its trend but also its output far exceed the immediate present utilities and needs of organic Evolution' (p. 219).

SECTION 5: EVIDENCE AND EXAMPLES USED

Empirical Evidence Cited

Harrison's Experiments (p. 199 n): Dr. J.W.H. Harrison's experiments showing that moths reared on food charged with manganese, iron and other metals developed melanism 'which was transmitted to their offspring in the Mendelian ratios.' This supports 'that chemical changes in the environment of organisms may more readily lead to hereditary variations.'

Bower's Fern Studies (p. 204 n): Professor F.O. Bower's work on ferns showing evolutionary structures that suggest 'characters acquired by a direct impress upon a succession of individual lives should have been imposed hereditarily upon each race.'

Kammerer and Durkhen's Experiments: Cited (p. 204) as tending in the direction of showing modifications becoming variations, though Smuts notes 'they require further corroboration, and have been called seriously in question.'

Ecological Evidence: 'The sameness or close resemblance of the growth-forms under the same physical conditions, as seen, for instance, in the general characters of formations and associations in the vegetable kingdom' (p. 203-204) supports environmental influence on heredity.

Mendelian Genetics: Smuts presents Mendel's law (the algebraic formula for character inheritance in crossing) as empirically established, while critiquing its mechanistic interpretation.

Illustrative Examples

The Horns of a Wild Beast: Used to illustrate coordinated variation—'The evolution of the horns of a wild beast, for instance, means minor and consequential adjustments to its head, its neck, its muscular system, the development of the forepart of the body, and its relation to the back parts' (p. 205).

The Peacock: Beauty transcending utility—the peacock's 'wondrous colouring' exceeds what sexual selection can explain (p. 219).

Mechanical Analogy: A mechanical system given a push demonstrates how all elements adjust to reach new equilibrium—but this happens 'much more intensely and intimately and organically' in living wholes (p. 207-208).

Obsolete Organs: Compared to small variations—'Both are carried forward by the organism as a whole, perhaps for millions of years, without being in either case directly useful to the organism' (p. 210).

Scientific Sources Invoked

Darwin's *Origin of Species* (closing passage quoted in full, pp. 185-186); Weismann's germ-plasm theory; De Vries's mutation theory; Mendelian genetics; Morgan's gene theory; Bower's botanical work; Harrison's entomological experiments; the science of Ecology ('built up since Darwin's time,' p. 214); Roux's concept of *Entwicklungsmechanik* (developmental mechanics).

SECTION 6: KEY QUOTATIONS FOR REFERENCE

1. On Darwin's Vision (p. 186)

"I am free to confess that there are few passages in the great literature of the world which affect me more deeply than these concluding words of Darwin's great book. They have a force and a beauty out of all proportion to their simple unadorned phrasing. They are the expression of a great selfless soul, who sought truth utterly and fearlessly, and was in the end vouchsafed a vision of the unity of life which perhaps has never been surpassed in its fullness and grandeur."

2. On Holistic Selection (p. 183)

"It is thus the organism as a whole which in the first instance 'selects' the winning variation or series, and confers on it support and survival value. 'Holistic Selection' is therefore in operation at the birth and through the early nursing stage of the variation, and it is only at its maturity that Natural Selection takes over, and the variation begins to fend for itself, so to say."

3. On the Friendly Universe (p. 214)

"This world is at bottom a friendly universe, in which organised tolerant co-existence is the rule and destructive warfare the exception, resorted to only when the balance of Nature is seriously disturbed. Normally Natural Selection takes the form of comradeship, of social co-operation and mutual help."

4. On the Organism as a Whole (p. 206)

"The root of the error lies in our disregard of the individual organism as a living whole, and in our attempt to isolate characters from this whole and study them separately, as if they were mere mechanical components of this whole. The fatal mistake involved in this procedure has already been fully exposed in previous chapters. The whole is not a mechanical aggregate indifferent to and without influence on its parts. It is itself an active factor in controlling and shaping the functions of its parts."

5. On Beauty and the Overplus of the Whole (p. 219)

"Everywhere we see the great overplus of the whole. So little is asked; so much more is given. The female only asks for a sign to recognise the male, and to help her to select him and enjoy him in preference to others. And for answer she gets an overpowering revelation of beauty out of all proportion to her modest request."

SECTION 7: TIER 1 CONCEPT DEVELOPMENT

Holism

Development: Chapter VIII applies Holism to evolutionary biology, showing it is not merely a philosophical concept but an operative factor in nature. Holism becomes 'an active factor influencing and interacting with the particular Darwinian factors' (p. 219).

Contemporary Flag: Denis Noble's work on biological relativity; the Extended Evolutionary Synthesis; niche construction theory; evo-devo emphasis on developmental constraints—all demonstrate that evolution operates on organized wholes, not isolated genetic units.

The Whole

Development: The organism as whole is shown to be the primary unit of evolutionary change: 'It is the organism that advances on a certain more or less limited front; the "variation" is only the most conspicuous point of advance' (p. 182-183). The whole has priority over parts in evolutionary explanation.

Contemporary Flag: Michael Levin's work on regeneration and morphogenetic fields; Stuart Kauffman on self-organization; West-Eberhard on developmental plasticity as evolutionary driver—all showing organisms as integrated wholes that shape their own evolutionary trajectories.

Fields

Development: The 'field' concept becomes crucial for explaining how modifications influence variations: 'Changes due to habitual behaviour or to environmental or chemical or ecological pressure affect the "field" of the germ-cells' (p. 215). The field is 'the area of becoming, of creativeness, the growing surface of the structure' (p. 190).

Contemporary Flag: Michael Levin's bioelectric morphogenetic fields; epigenetic inheritance systems (Jablonka & Lamb); niche construction creating selective environments—all demonstrating that organisms operate within and modify fields of influence that mediate between experience and heredity.

Creative Evolution/Synthesis

Development: Smuts rescues creative evolution from mechanistic reduction: 'It becomes most difficult to understand how the new variation arises, and how it is that Evolution is really progressive and creative, and not a more or less stationary regime of casual character combinations' (p. 182). The holistic view restores genuine novelty to evolution.

Contemporary Flag: Armin Moczek on developmental innovation; Andreas Wagner on arrival of the fittest; complexity theory on emergence—all showing how genuinely novel forms arise through organizational dynamics, not just selection of random mutations.

Mind

Development: Though Mind is the focus of Chapter IX, this chapter prepares the ground by showing how the repressive aspect of Holism 'becomes much more conspicuous on the

psychical level, where it operates as ethical restraint, so essential in the formation of the Personality as a moral whole' (p. 183). Evolution is shown to be trending toward mind.

Contemporary Flag: Terrence Deacon's work on constraint-based emergence; enactivism's mind-life continuity thesis; Michael Levin on cognitive biology—all showing mind emerging from, and continuous with, the organizational dynamics of living systems.

CONCLUDING OBSERVATIONS

Chapter VIII represents a masterful application of Smuts's holistic philosophy to the central scientific paradigm of his era. By showing that mechanistic Neo-Darwinism cannot explain coordination, the survival of small variations, or organic beauty, while Holism can, Smuts demonstrates that his philosophy is not mere speculation but scientifically necessary.

The concept of 'Holistic Selection' is perhaps Smuts's most significant contribution to evolutionary thought—anticipating by nearly a century the Extended Evolutionary Synthesis's emphasis on developmental bias, organismal agency, and non-genetic inheritance. His insistence that 'this world is at bottom a friendly universe' of cooperation rather than unrelenting struggle anticipates Kropotkin's *Mutual Aid* tradition and contemporary work on cooperation in evolution.

For *Holism Rising*, this chapter provides ideal 'bracketing' material: contemporary evolutionary biologists (Laland, Jablonka, West-Eberhard, Noble, Levin) are independently arriving at holistic conclusions without knowing Smuts anticipated them. The Extended Evolutionary Synthesis's core commitments—organismal agency, developmental bias, inclusive inheritance, niche construction, and multi-level selection—read as systematic vindications of Smuts's Chapter VIII. The chapter demonstrates that the 'Smuts-convergent while Smuts-ignorant' pattern holds powerfully in evolutionary biology.

— END OF CHAPTER VIII ANALYSIS —