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ORTHOGONAL REVIEW RECORD

The Origins Arc: A Coordinating Formalism for the Passage from the Substituted Chrysene Cluster to the Genetic Code

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Declaration of position

This report is not independent. The reviewer participated in the drafting of the manuscript under review and therefore shares whatever blind spots that drafting had. The report is submitted as a structured self-audit and as a prediction of what an external referee will raise, and it must not be recorded as an independent assessment. Nothing below can establish that the work is correct. The most it can do is identify where it is vulnerable. The journal's own convention, that a targeted verification pass is not an independent reviewing system and that a reader should discount it accordingly, applies to this report with full force. There is no author-reply section.

Scope of Review

The submission coordinates an eight-article arc running from a π-stacked assembly of substituted chrysene units to the placement of structures at codons. It restates the arc in one vocabulary, each restatement carrying a recovery lemma. It registers the arc's premises and reports what each supports. It fixes precedence where two articles speak to one object. Extent: 79 pages, 285 environments, 255 numbered statements, 14 verification blocks.

Compiled disposition

Major revision. The coordination is valuable and, in three places, materially so. The formalization is weaker than the manuscript presents it as being. The novelty claims are overstated in one specific and correctable way. The deepest problem is that four of the manuscript's own findings are blocked on records the author holds and has not published, and the paper is submitted anyway with those blocks recorded as targets. A referee is being asked to approve a manuscript that states, in its own appendix, what would complete it.

Required before print

Blocking. Print the eighteen-slot list as a table in Appendix B and rerun R4b and R13 against it. Print the decoration record, or withdraw Section 14. Settle the disputed row and the slot/demand convention by editorial ruling. Add a section situating the arc against the standard accounts of the origin of the genetic code. Rewrite the preamble to Section 5 to distinguish new statements from vocabulary, and restate Theorem 5.22 as an application with citation. Run the null computation for the start-codon convergence, or demote the observation to a target. Publish the transcribed source tables as data.

Contents

1 What the manuscript does **3**

2 Overall assessment **3**

3 Major points **3**

4 Minor and technical points **6**

5 Verification performed **7**

1 What the manuscript does

It claims two new theorems, an exchange criterion for demand relocations at Section 5.4 and forced regularity of consistency-admitting assignments at Section 5.5, one new decomposition at Section 14, one strengthening, termination by fibre parity at Section 9, and ten coordination findings of which four are corrections. Its one intended new result, a demand functional over the structure series, is withdrawn to a target. The manuscript is unusually careful about its own status. It states sixteen non-implications before the constructions, carries a premise register, a precedence ledger, per-section falsification registers and a record of its own withdrawals, and says in several places that its conclusions are conditional. That care is the submission's principal virtue and it is not in question below. What is in question is whether the care is doing the work the manuscript needs it to do.

2 Overall assessment

What the coordination produces

Three findings justify the paper's existence independently of anything else in it. The corpus carries two incompatible letter assignments, and a published witness is stated under one and cited under the other (Section 9.6). One row of the structure series is described two ways in two articles (Section 14.4). The stop/glycine contrast is assembled (Section 15.9). These are the kind of finding that only a coordinating paper produces.

3 Major points

M1 — Four blocking records are withheld

The manuscript states (Section 17.6, Appendix F) that four items are blocked not by open science but by data held in supplementary records and not printed: the eighteen-slot list of the seeded assignment; the terminal types and heteroatom insertions of the structure series; a ruling on whether three rows of the series remove two vertices entire or sever two edges; a ruling on whether the matched object is the slot or the demand. The author holds all four. Items (a) and (b) are transcriptions of existing working records.

Without the eighteen-slot list, block R4b is partial. The rank computation of Theorem 5.21(ii) is verified on an eight-slot subset rather than on the assignment, and the exhaustiveness of the complementarity count, three pairs of one hundred and fifty-three, one with both slots of size two, is not verified at all. That count is the sole support of Theorem 12.17, the manuscript's strongest placement result. A referee cannot check the central uniqueness claim of Section 12. Without the decoration record, Section 14 has no result. Without the ruling on the disputed row, the fragmentation clause of the three-asymmetry theorem and the constant term of the junction balance are both unsettled, and the balance is the arc's most testable consequence. Required: print the eighteen-slot list as a table in Appendix B, and rerun R4b and R13 against it. If the complementarity count does not come out at three pairs with exactly one of size two, Theorem 12.17 and everything

downstream of it must be restated. Print the decoration record, or withdraw Section 14 entirely rather than carrying a section whose result is a target. Settle the disputed row and the slot/demand convention by editorial ruling, as was done for the locant collision.

M2 — No engagement with the existing literature

This is the objection an external referee will raise first, and the manuscript has no answer to it as drafted. A review article proposing an account of why the code has twenty residues, why codons are triplets, why methionine initiates and why termination is not a residue does not mention the coevolution hypothesis, the stereochemical hypothesis, error-minimisation and adaptive-code arguments, the frozen-accident position, or the experimental literature on aminoacyl-RNA affinities. Article 48 cites Crick (1968) once. Article 60 cites no external account at all.

The manuscript's implicit defence is that it reviews a corpus rather than a field. That defence works for a technical article and does not work for a review, whose genre commitment is to situate. As drafted the arc is hermetic. It can be internally consistent and a reader has no way to see what it explains that existing accounts do not, or what it fails to explain that they do. This matters more than a citation gap, because two of the arc's headline results have competitors in that literature. The triplet is standardly derived from alphabet size. The manuscript shows (Section 9.4) that this derivation is unavailable inside the formalism, which is a statement about the formalism and not an argument against the standard account. The number twenty has adaptive explanations that do not require a carrier at all. Required: add a section, placed after Section 4 and before Section 5, situating the arc against the standard accounts. It should state, for each of the arc's answers, what the competing explanation is, what would distinguish the two empirically, and where the arc makes a prediction the competitor does not. Where no distinguishing observation exists, say so. This section must not argue that the competitors are wrong. It must state what is at issue.

M3 — Three of the five components of the coordinating language are vocabulary

Section 5 is presented as the paper's apparatus and is written as though each of its five parts carries comparable weight. They do not.

The gauge/coboundary formulation. The site complex is a path, hence a tree, hence $H^1 = 0$ and δ is injective modulo constants. The cohomological language therefore never does any work. There is no case in which $H^1 \neq 0$ and the formulation would distinguish something. What remains is elementary linear algebra over $\mathbf{F}_2$ dressed in the language of cochains. Remark 5.10 defends the formulation on the ground that the argument would read differently on a complex with $H^1 \neq 0$, but no such complex occurs anywhere in the corpus, so this is a defence of a generality the paper never uses. What is genuine in Section 5.1 is the observation that the class count and the constraint on the production operator are one statement rather than two. That does not require cohomology to state.

Equivariant localisation. The fixed point of a reflection on an interval is its midpoint. The manuscript reaches this through barycentric subdivision of a simplicial path complex. The unification it achieves, one residue at odd count and two at even as instances of one statement, is real and worth keeping. The machinery is not.

The torsor vocabulary. A set with two elements and no distinguished one. The manuscript's use of this to separate selection from naming in the handedness argument is the most useful thing in Section 5 and is correct. But it is a clarification of what was already true, not a result, and one of its three intended instances, the reading phase, failed and is demoted to a target, which the manuscript records honourably.

By contrast the matroid formulation and the factorization of the consistency relation each yield a statement the corpus does not contain. Those are the two that earn their place. Required: rewrite the preamble to Section 5 to distinguish the components that yield new statements from those that supply vocabulary. Remark 5.31 already gestures at this and should be made specific. Either cut the cohomological framing of Section 5.1 to a remark and state the result in linear algebra, or justify it by exhibiting a case in the corpus where $H^1 \neq 0$.

M4 — Theorem 5.22 is a textbook fact

The exchange criterion states that for an independent set I in a matroid and $x \notin I$, $I \cup \{x\}$ is independent if and only if $x \notin \mathrm{cl}(I)$, and that in a transversal matroid this is decided by an augmenting-path search. Both clauses are standard. The second is the augmenting-path characterisation of maximum matchings. The manuscript's contribution here is the identification of the demand–class incidence as a transversal matroid, which is worth making and which does replace a case distinction by a decision procedure. But the statement is an application, not a theorem, and Section 1.4 lists it under "Proved here."

Required: restate Theorem 5.22 as a proposition with the matroid facts cited to a standard reference. Oxley is already in the bibliography and is cited nowhere in the text. Move the claim in Section 1.4 from "Proved here" to a category naming it as an application. The same treatment is owed to Burnside's lemma, used at Theorem 5.6 and cited nowhere.

M5 — The recovery lemmas are assertions of identity, not proofs

The manuscript makes the recovery lemma its central methodological device and states that any component failing to carry one is struck. But of the six recovery lemmas, four consist of a list of the form "clause (a) of the corpus is clause (x) here" with no demonstration. Recovery 5.9 and Recovery 5.29 are the clearest cases. This is not fatal. In most cases the identity is evident on inspection. But a device presented as load-bearing should bear load. At minimum the reader should be told which recoveries are proved and which are asserted. Required: either supply the identification argument in each recovery lemma, or relabel those that are assertions, for instance as Concordance, and reserve Recovery Lemma for the ones that are proved.

M6 — Disclaimers do not neutralise the dependence they disclose

The manuscript states, in at least five places, that the accommodation and gating hypotheses were abstracted from the structure series and that the series is therefore their source and not their confirmation. This is correct and creditable. But Sections 11 and 12 then derive substantive results from those hypotheses, the slot set, admissibility, forced regularity, and the

statement that the standard mapping lies outside admissibility at two blocks, and those results are reported without the dependence attached at the point of use. Corollary 5.25 in particular is used in Sections 12.23 and 15.12 as though it were a structural fact. Repeated disclosure in dedicated passages is not the same as carrying the conditional into the sentences that use the result. The manuscript elsewhere insists on exactly this distinction (Scholium 16.13). Required: attach the provenance to the statement, not only to the section. Every citation of Corollary 5.25 and of the admissibility failure at two blocks should name the gating hypothesis in the same sentence.

M7 — The start-codon convergence should not be reported before the null

Section 12.23 reports three marks on one block, corrects itself to note that two of them are linked by the promotion, and retains the third as independent. Target 12.25 then asks whether the coincidence is an artefact of the arc's narrowness, sixteen blocks and eighteen slots, and observes that a null computation would bound this. With two irregular blocks out of sixteen and four blocks touched by exchanges, the probability of at least one overlap is not small on any reasonable null. The manuscript is reporting an observation whose interestingness depends entirely on a computation it has not run and whose inputs, the slot list, it has not published. Required: run the null computation, or remove the observation from Sections 12 and 15 and retain it only as a target. The manuscript's own Proposition 3.1(xiii), that the counts are not probabilities and no null model is posed, makes this worse rather than better. A paper that declines to pose null models should not report a coincidence as a finding.

M8 — Eighteen undischarged premises, one model

This is stated by the manuscript itself and is not a criticism of its honesty. It is a statement about what a referee can do. With eighteen premises, none discharged, and a single instance of the structure, the manuscript can be assessed for internal consistency and cannot be assessed for correctness. No amount of registering changes this. The manuscript's three named partial exceptions are the right ones and should be given more prominence than they currently have: the carrier-level results, which use no codon table; the recovered partition, checkable against a published and unused import; and the remnant-level prediction, to which nothing was fitted. The third is the only place the arc exposes itself to a measurement it cannot accommodate. It deserves better than a subsection of Section 14 and a row in a register. Suggested: promote the remnant-level prediction to a numbered section of its own, stating the measurement, the expected outcome, and what each possible result would do to the account.

4 Minor and technical points

m1. Remark-to-theorem ratio. 107 remarks against 15 theorems. Much of the manuscript is commentary on its own conduct. The registers justify their length. The remarks frequently do not. A reduction of perhaps a third would lose nothing.

m2. Section 16 is four pages of material that enters no proof. The persistence doctrine is labelled [E],

is explicitly unfalsifiable as stated, and is not used. It is interesting and it is the wrong length.

m3. Scholium 1.8 places one of the paper's own corrections in the introduction. Defensible as a demonstration of the argument it is making, but a reader meeting the paper for the first time is told about its errors before its results. Consider moving to Section 16 or Appendix F, where the same material already appears.

m4. Scholium 17.14 ranks experimental priorities. A review article recommending which experiment to attempt first is exceeding its genre. The comparison of the two single-observation refuters is useful. The recommendation is not the journal's to make.

m5. The transcription risk is acknowledged and not mitigated. Remark 2.15 states plainly that the retained sets, cut lists and slot adjacencies were entered by hand and that an error would pass undetected. The mitigation offered, that the completeness check reproduces the published result, is weak, since a consistent mistranscription would survive it. Required: publish the transcribed source tables as machine-readable data files alongside the scripts, so that the transcription can be checked against the printed series independently of the computations that use it.

m6. Appendix D is a concordance of dispositions and overlaps Appendix C substantially. Consider merging.

m7. The bibliography carries \nocite{*}. Twelve entries are cited at Section 4. The rest appear because they are in the database. For a review article this is the wrong default. A reader cannot tell which sources the paper used. Cite at point of use or prune.

m8. One unfilled reference. The sulfur–sulfur bond length has no source. This is inherited from Article 59 and should not be inherited a second time.

m9. Oxley, Burnside, Rotman, Serre and Stanley appear in the bibliography and are cited nowhere in the text. See M4.

m10. Terminological. Remark 15.10 leaves open whether the empty retained set counts as a structure, and notes that the corpus is not explicit. Since Section 15.9 is one of the manuscript's genuine contributions, this should be settled by ruling rather than left to the reader.

5 Verification performed

The reviewer re-ran the six supplied scripts and confirms that blocks R1–R14 reproduce the values printed in Appendix B, and that every comparand drawn from a published article of the corpus agrees where the published value exists. The statement inventory was recomputed: 255 numbered statements, each carrying exactly one status label ([A] 166, [D] 65, [C] 28, [E] 12), and 30 scholia carrying none. Three specific checks were made against the manuscript's claims. The invariant-algebra dimension against the closed form at eight lengths agrees. The two letter assignments and the assignment-dependence of the published witness agree, and the fibre-parity route is confirmed exhaustive over all twenty-four assignments. The fragmentation of the disputed row under both readings agrees, and only one reading reproduces the published block. The reviewer was unable to check the exhaustiveness of the complementarity count, the rank of the full slot set, or any value of the demand functional, for the reason given at M1.

Recommendation

Major revision. The manuscript should not be accepted in its present form, and the reason is not quality of execution. It is that the paper states in its own appendix what would complete it, and what would complete it is held by the author. A referee who approved it would be approving a paper whose central placement result cannot be checked.

Conditions for acceptance.

1. The eighteen-slot list printed and R4b and R13 rerun against it.
2. The decoration record printed and Section 14 completed, or Section 14 withdrawn.
3. Editorial rulings on the disputed row and on the slot/demand convention.
4. A section situating the arc against the standing literature on the origin of the genetic code.
5. Section 5 rewritten to distinguish new statements from vocabulary, and Theorem 5.22 restated as an application with citation.
6. The null computation run, or the start-codon convergence demoted to a target.
7. Source tables published as data.

Conditions 1–3 are matters of record and should be quick. Condition 4 is substantial and is the one most likely to change how the paper reads. If conditions 1–3 cannot be met, if the records do not exist in usable form, the honest course is to say so in the manuscript and to withdraw the claims that depend on them, which are Theorem 12.17, the whole of Section 14, and the fragmentation clause of Section 13. The paper would be shorter and would remain worth publishing. The coordination findings, the precedence apparatus and the consolidated register stand on their own.

Reiterating the declaration: this report is a self-audit and a prediction of external objections. It is evidence about where the manuscript is vulnerable and is not evidence that the manuscript is sound.

References

[Art48] C. D. Schaper. Why three and why twenty. *Annals of the Chrysene Formalism* 1(2):768–793, 2026. Cited as the sole corpus reference to Crick (1968).

[Art59] C. D. Schaper. Why sulfur and why methionine starts. *Annals of the Chrysene Formalism* 1(2):1137–1162, 2026. Source of the unfilled sulfur–sulfur bond length, which should not be inherited a second time.

Revision history

Version	Date	Notes
v1.0	2026-10-11	Review record published with Article 60.

Living Document Notice

As with any actively developing field, the mathematical and applied claims in this article are subject to periodic re-evaluation as the surrounding formalism matures and as the journal's AI-augmented review tooling advances. Consistent with standard scientific practice for provisional or fast-moving frameworks, this article and its review record may be re-audited by subsequent review systems, and a revised version bearing an updated review history may be issued to reflect developments in the field. Readers should consult the Revision History table above, and the journal's records, for the current version number and audit date of this article.

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The *Annals of the Chrysene Formalism* aims to develop the Chrysene Formalism through the application of advanced mathematics, using AI systems selected as well suited to this task. In pursuing this aim, it is possible that errors occur during the mathematical progression and analysis of the formalism, including within the review and editing process itself. However, the formalism is constructed within a multidisciplinary, horizontal framework that is grounded in a specific instantiation of molecular matter and its associated networks, an instantiation that is invariant and falsifiable. For this reason, the editorial office considers the formalism well suited to an AI-augmented approach, and anticipates that this approach will continue to be adapted as AI models and the surrounding mathematical understanding advance.