

Before Butterfly

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Metamorphosis Insectorum Surinamesum (1705) left an impression on me before I had seen it.¹ Lifting the heavy calf-skin bound cover on this arm length folio reveals 60 stories, 60 micro microbiomes, across 60 double page spreads. One half contains a textual recollection of the time spent with a group of critters-who are painted in vivid color and detail on the other half.² 59 of these microcosms contain 3 stages of a butterfly's development, an animal Maria Sybille Merian (1647-1717) had felt passionate about since childhood. The penultimate page breaks this theme, its star is a metamorphosing frog. It is an all too familiar transition of egg through tadpole to frog that generations have seen in primary level textbooks. But in this book, amongst the winged insects it is famous for, the frog's presence is an intriguing statement that elevates this folio beyond being a catalogue of pretty foreign specimens.



Merian grew up in an engraving and publishing workshop. She saw up close the many stages of labour that brought knowledge to consumers. She had access to Natural Histories, amongst them the investigations into insect metamorphosis by Thomas Moffet (1553-1604), Johannes Goedaert (1617-1668) and Jan Swammerdam (1637 - 1680).³ The standard practice of engravers was to copy illustrations already made by naturalists. Instead, Merian took her daughters to the Dutch colony of Suriname, where she brought African and Amerindian slaves on treacherous, near lethal treks for two rainy and two dry seasons (1699-1701). All before returning to Amsterdam to imprint her experiences in the most impressive way available. Why go to such lengths?

In this essay I will recover some of the breadth of the way of seeing Merian that engraved in the history of science.⁴ What remains are the oversimplified life cycles we show children. Metamorphosis is not an inevitable cyclical change, but an intricate-indeterminate-contingent *process*. The frog is not a species-thing that changes from one life-stage to the next autonomously, but in concert with an ecological *community*.⁵ Making a distinction between these perspectives follows from overcoming a timidity in reading theory from art.

I am not claiming to see something new in Merian's work, but will engage in critical comparisons with the work of her peers, which I haven't seen much of. Another deficiency in contemporary historical accounts are the numerous attempts to valorise Merian by making a monument of her in the same way physicists are lauded for their 'firsts', or, 'genius', or 'groundbreaking achievements'. But as my essay shows, these deployments of typical frameworks for assigning recognition are ineffective and incorrect- her theory was developed with other practitioners and with the subject matter itself.

In the early modern Netherlands, 'kunst' and 'wetenschap' had interchangeable meanings. "Any claim to know something about God's creation had to be matched with the skill to show it to others."⁶ So I ask, **what is the theory that *Metamorphosis Insectorum Surinamesum* carries?** By taking the view that Merian's images are not "a direct transference of information, but a transformation and translation of observations into images," I propose the book's ambition is to communicate a process ontol-



ogy of biological entities.⁷ To show this, I will explore the process of this book's becoming on three levels: §1 visually, §2 practically and §3 interpersonally. Each level will intertwine in the way process do.

1. Maria's Motives

Besides Merian's books there are few materials from which to glean the intentions behind her picture making practices. A letter to James Petiver of the Royal Society helps with tracing her character and intent:

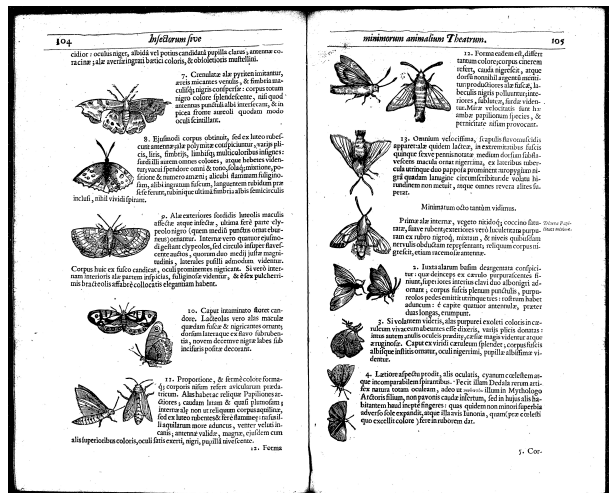
I have received animals [insects].. from the gentleman [Petiver] on two occasions.. But I was in search of no other animals, but [only wished to study] the generation and reproduction and transformation of the animals, and **how one emerges from the other**.. Therefore, I would ask the gentleman not to send me anymore animals, for I have no use for them.⁹

Petiver "tirelessly leveraged influence among the men (and occasionally women) of his epistolary web" to sell them foreign specimens.¹⁰ He was an esteemed dealer, trusted with lining the curiosity cabinets of the privileged, satiating their material desires (consumerism isn't new!) Merian's response to his gesture would have been perceived as a sleight. She sought not to be a mere collector at the end of a supply chain, but a sensitive observer of the lives of her subjects. Of course, she benefited from these antiquarian activities.¹¹ She's grateful to Witsen, Ruysch and Levinus Vincent for their displays of "beautiful decorations," but the all important **how** "was missing."¹²

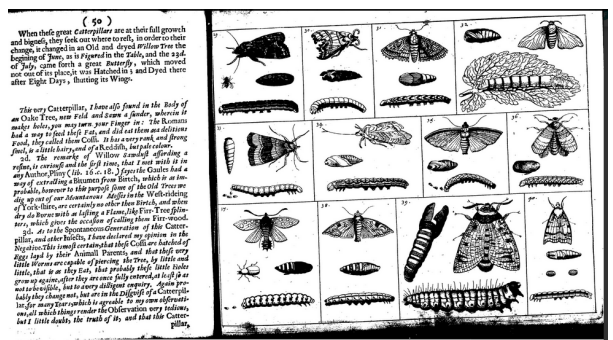
Merian's dissatisfaction with the way embalmed life forms were presented also applies to the work of her fellow naturalists. Moffett literally "wrenches life stages from each other" by separating into chapters the Caterpillar from its final form.¹³ Goedaert makes a huge advance on this stylistic decision. By placing each stage in the same box he ensures that the connection is apparent that they are the same *individual*. This innovation is one that Merian had adopted early in her naturalist career, each stage is always presented together in *Raupen*, her 1674 folio of plants and insects from the surroundings of Frankfurt and Nuremberg (see next page). Another stylistic decision present in *Raupen* is



Levinus Vincent's cabinet⁸



Moffett



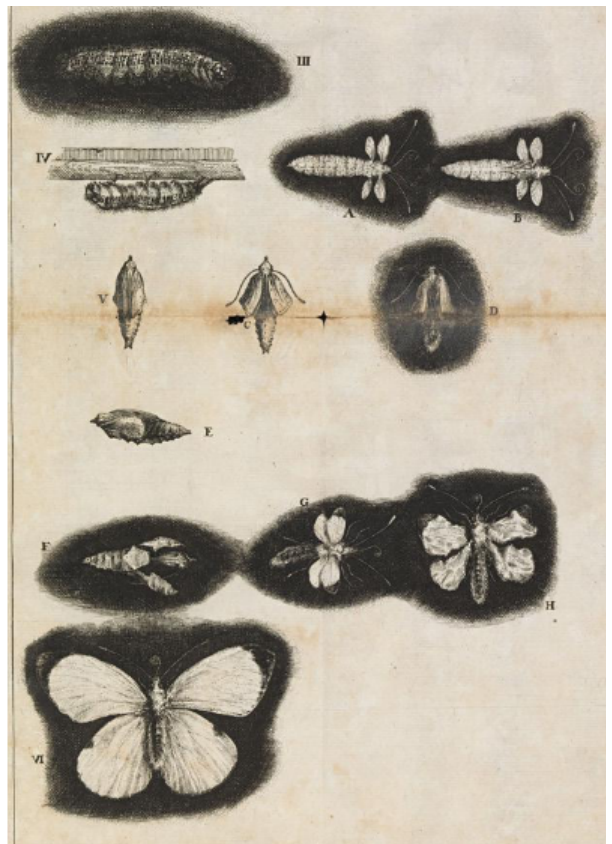
Goedaert

“the Ephemeron [fly] is produced out of an egg.¹⁵ Curiosity coupled with skill in dissection gave Swammerdam the confidence to lambast ancient theories and, despite espousing a commonplace asceticism, propose his own.¹⁶

An admiration of Descartes propelled him to explicate a fascination with ‘Change’ in mechanistic terms. Although there were “innumerable miracles of nature surrounding the changes of these animals,” he reckoned: “it would be much more useful to have described one single change... then to depict all the changes of caterpillars, with their colours.¹⁷ With this reductionist move, Swammerdam presents change as a miraculous mechanism intrinsic to every individual. He vouches for the theory of ‘preformation,’ which held that the final life form and even later generations were already present in the nucleic zygote.¹⁸ On the basis of a series of dissections Swammerdam insists there is no metamorphosis -where one life form changes into another- but it is the same individual that undergoes “astonishing transformation.¹⁹ Swammerdam prefers to attribute to the individual an impressive autonomy which, despite his interest in change, draws him closer to a thing ontology.

By layering transformations of multiple species Merian obfuscates the individual. Instead of seeing God methodically at work inside of each of his creations, Merian’s spiritual hardships and naturalistic explorations instilled a respect for other agencies involved in change.²¹ She depicts metamorphosis as highly contingent and signifies each life form’s inescapable relationality to a *community*. Each critter faces it’s concern: green buds are sun-bound, aged leaves droop towards the soil and the caterpillar looks toward leaves they haven’t yet beset with holes. Where there are holes there must be a caterpillar. Where there are holes a caterpillar can exist and the butterfly becomes possible. The moth clings to a premature fruit, waiting and watching over a pupa bulging with the vigor and improbability of incoming life. There’s no way to detach an ‘individuals’ from an environment.

By placing change not just in the one that transforms but in every element of the scene, the processual character of life is manifest. The myriad ways of relating with other relata become the focus; the **how** is not found inside but in the in-between. If the correct companion processes are not there the potentiality for the final form is diminished. Denied life as in Levinus’ cabinet.



Swammerdam²⁰



Merian 1705

The indeterminacy of this flux contrasts with God's sustaining of a constant change.^[22] Change is not a steady preordained development but a matter of entwining processes, as precarious as predicting which waves will combine. Like waves, the origins of change are also difficult to pinpoint. Opposing preformation in the seventeenth century were the 'epigenesists' who held that development involves intensive creation, not unfolding, of new structures from primordial materials. In the images, time is collapsed but many moments are missing. The intermediate steps are not precisely distilled as in Swammerdam's diagram - in fact, many animals would die in his practice so the continuity he purports to have captured is an imposed imagination.^[23] The discontinuities in each development shun simple explanations, the becoming of a butterfly is meant to be bewildering, and the dynamism of each composition invites the viewer to wonder how each step might be filled in.

Rather than calcifying change through theory or recourse to theology, Merian nurtures its ongoingness and precarity by being an attentive and humble participant. Seeking replicable descriptions exposes Swammerdam's tendency to abstract. His dissections are performed on a stage of '*terra nullius*' - "nature without entangling claims."^[24] But Merian found it important to record, disseminate and serve up for consideration a breadth of experiences and relations.^[25] Many caterpillars are painted in all their colour. In the final section I will highlight the *concrete* in Merian's praxis.

3. Between Abstract and Concrete

In the words of anthropologist Marilyn Strathern, Merian is "someone who might have appreciated a discrimination between dissimilarity and difference."^[26] For Swammerdam, an insect's transformation is one kind of change for which there is an archetype - each instantiation is just dissimilar to another. By showing us that metamorphosis can manifest through the entwining of such radically different sets of relations, this book invites us to wonder how similar metamorphosis is to itself. The bud that becomes fruit, the gelatinous bead that becomes frog or fly, the maggot into moth and the zygote into human. Confronted with such difference, the possible answers for **how** become seemingly endless.



Each development requires its own process of discovery. When Merian asked **how** for each winged insect she found or was shown in Suriname, a network of agents were engaged in answering. I wonder why books like this were printed as being 'by' one author and its worth mentioning that Merian tries to make amends for this convention in her foreword:

The work consists of sixty plates on which are shown ninety experiences.. all in America after life painted and experienced by me, except a few, which I have added on the testimony of the Indians.. The names of the plants I have kept, as they were given in America by the natives and Indians.

My essay has tried to diffuse Merian's role in creating the book by showing how her practices are responsive to those of (only some of) her naturalist peers. But **how** to articulate the other processes involved in this books becoming? The other threads that entwined with and assisted Maria Sybille Merian - undoubtedly talented but surely "hopelessly ignorant of a foreign locale, utterly dependent on the locals for information."²⁷ To conclude, I propose two directions to look in asking what else is to be learnt from this book.

The **epistemic influence of locals** is made clear at several points. In the foreword their presence is established and also in the pictures. On one spread:

The black caterpillar hanging on the seeds has yellow spots and they hang there just like Indians in their hammocks. And if they are looking for food, they carry their house with them like the snails. Their houses look like the leaves of trees. And if they want to stay somewhere they change into a hammock.²⁸

This blending of experiences shared with local people and critters exemplifies how shared experiences can invade objectivity. It is testament to the *sympoiesis* that is *Metamorphosis*.²⁹ How she would have spent hours, days, staring at the tops of swaying trees, hoisted above the ground by slaves and passed drawing utensils and specimen jars by her daughter. How she would have sat with locals and heard their stories and learnt the names, locations and

uses for plants. How this data was accumulated, tied together and sent back.³⁰ "Knowledge constructed in open air science has specificities which distinguish it from others constructed in other open airs" and the negotiations between Dutch-German passerby and the unnamed locals deserves attention.³¹ The conditions by which ones becoming manifests is to be found in *community*.

The **aesthetic agency of nature** seems to be an epistemic virtue in image creation during that period.³² In the work of vitalism's archetypal illustrator and Swammerdam's friend, Otto van Schrieck, real insect wings were layered into paintings. In becoming experts of observation, painters and microscopists had to become experts in receiving information that nature incrementally reveals to the gaze.

I would argue that Merian supersedes Schrieck on the basis of her concrete participation. The scenes Schrieck created were fantastical, the random parties of animals and inclusion of insects was for the sake of creating a '*lebending*' (lively) scene to hand on the walls of his *Medicii* hosts. In *Metamorphosis*, exotic morphologies were not simply decorations but sincerely portrayed, according to experience, and accompanied by their scars and strifes. The inclusion of a abortion inducing plant is a much discussed feature of this book, the text is imbued with Merian's pity for the enslaved women on Suriname who wanted anything but to reproduce another generation of slaves.³³ Merian shows how attuned dwelling with others (interspecies and interpersonal) enables us to be responsive to their conditions and needs. We'd do well to inspire children to ponder the breadth of processes involved in any frog or butterflies becoming. Why some lives pan out differently to others.

Notes

1. Paintings copied from the book are plate: 59 on p1, 43 on p4, 55 on p5, 30 on p7.
2. Borrowing philosopher Donna Haraway's term for human and non-human alike (Haraway, xi).
3. (Merian 1705, foreword)
4. The images were taken seriously throughout the eighteenth century by scientists as prominent as Linnaeus (1707-1778), but their significance has since been whittled away, having been lousily but successfully "damned into oblivion" in

the nineteenth century. (Valiant) and (Todd, 202) contain descriptions of the errors that were pointed out in Merian's work- some were not in fact errors.

5. Valiant announces Merian as a "singular individual who established much of the foundation of modern zoology" (Valiant, 470). Neri decrees Merian "the first to provide images of tree-top dwellers, to know that life was different up there" (Neri, 4). Etheridge declares Merian as "the first ecologist" because she was "the first to elucidate through word and art what we now think of as food chains and interactions within ecological communities" (Etheridge 2011, 22).
6. Art and Science came to be treated as distinct expressions of culture with the separation of academic disciplines in the nineteenth and twentieth centuries. By identifying the interplay between "words and things, nature and art, art and technique", contemporary historians of art realise that understanding the "physical appearance, epistemological background and metaphysical connotations" of early modern images challenges disciplinary boundaries by necessitating the input of histories of science (Jorink and Ramakers, 8-11).
7. (Neri, 8)
8. Copied from (Jorink, 205).
9. Fragment reproduced in (Neri, 159), my formatting.
10. (Coulton, web)
11. Distancing herself from the antiquarian activities of Natural Historians didn't mean that she was denouncing their work. Merian owes much to the collecting culture because it meant that she was able to see, in the flesh, the preserved morphology and phenotypic features of animals that she could never find in the Netherlands. Growing up in her fathers, and then stepfather's, engraving workshops and publishing houses meant that she had exposure to many of the scientific volumes of the day. This proximity to Knowledge wasn't an unbridled privilege, however. Merian was able to train alongside the male pupils of her stepfather who would have rights she didn't - only they could depict the nude female or create large-scale historical images. What was readily available to her was the outdoors and, with the luck that came with being part of a Protestant-Labadist community that had land in colonised Suriname, an opportunity to learn about different ecosystems. See (Davis, 142) for more biographical information.
12. (Merian 1705, foreword)
13. (Todd, 46)
14. See (Dupre, 97) for contemporary philosophical characterizations of process and process ontology.
15. (Swammerdam, 5)
16. One ancient theory- Spontaneous generation proposes that living creatures could arise from dead matter, lice crawled out from the heads of dirty children or moths from shabby wooden shawls (Todd, 55). Swammerdam sarcastically wrote: "As if such a chance-Productor had the power to produce a Creature

in all Ages to be admired, and hardly by the most Ingenious and Wise to be described." (Swammerdam, 2). *As if* by chance something as mysterious and complex as God's creation could be born from dirt.

Regarding his asceticism- Swammerdam pronounced speechlessness "in view of the contours of the shadows of the wonders of God, we cannot explain them" (Quoted in Jorink, 228). Yet performed skilled and elaborate dissections of caterpillars in front of crowds to convince them that the butterfly existed all the time. From (Todd, 55): "He dropped a caterpillar about to turn into a pupa into boiling water, then jerked it out and peeled off the skin. To harden the internal organs, he soaked the animal in a mixture of vinegar and wine, then separated each part from the mass, claiming to have revealed the butterfly latent within the caterpillar body. It became his favorite party trick, and in 1668 he performed it for the Grand Duke of Tuscany."

17. (Klerk, 6) explains that Swammerdam conformed to a version of induction whereby detecting similarities between particulars was sufficient to make 'general rules' about what had not yet been reviewed.
18. This view on Swammerdam's belief can be complicated. (Cobb, 124) accounts for how: "he admitted in the "Book of Nature" these structures are partial, extremely fragile and can only be seen in caterpillars that are close to pupation."
19. (Cobb, 124)
20. Copied from (Jorink, 223).
21. (Davis) describes the difficulties in Merian's marriage and how she sought protection from her husband from a different community of Christians.
22. God becomes transcendent, outside of or simply amongst - rather than feigning veneration, Merian prefers having "admiration for his handiwork" (Davis, 182).
23. (Klerk, 20)
24. A term borrowed from anthropologist Anna Tsing (Tsing, 55).
25. With typical humility/sparsity Merian writes: "I could have extended the Scripture longer, but as the present World is very delicate and the feelings of scholars are various, I have wanted to stick simply to my experiences, and there by give matter to the hand, from which everyone after his own sense and opinion can make reflexions, and apply the same to his own pleasure" (Merian 1705, foreword).
26. (Strathern, 121)
27. (Hochstrasser, 64) questions whether Merian was a passive part of a 'knowledge extraction network' or a unique individual that forged a new network.
28. Thanks to Drs. Frans Sellies of the UU special collections for the translation (Merian, plate 30 "Olyboom").
29. Sympoieses is another Harawayian term (Haraway, 58).
30. (Hochstrasser, 63)

31. Concept of "rechercher de plein air" from Kapil Raj (Raj, 24).
32. I mention Schrieck to justify this supposition but am also thinking of Vermeer, Leeuwenhoek's friend, who would -looking through a lens to eliminate imagination- would compose and paint the same scene at different times to see how the variations in daylight would modify the experience.
33. (Davis)

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