***Note: I delivered this talk at a media arts festival in Seoul, Korea. To date, it has only been published in Korean, in a journal named* K.**

Algorithmic Art's Modernist Provenance: Kenner, Pound, Frampton

Whatever its merits, and it has many, the analogy between film and consciousness cannot be made completely general. The forms of many films resemble hardly at all the changing contents of consciousness. Frampton was acutely aware of the fact. For Frampton, film—all film that exists—constitutes a vast archive that chronicles, first, the possibilities of the cinema and, by doing so, the various modalities of consciousness. His work, then, is predicated on the conviction that cinema reflects the nature of consciousness, and that its different forms reveal the shapes and conditions that consciousness can assume. To understand the reasons for this, we can again go back to Frampton`s relations to Pound—in this case, his troubled relations. He remarked in an interview with Deke Dusinberre and Ian Christie

> The *Cantos* have . . . always been a particular kind of thorn in my side because there is, it seems to me, a real disparity—well, the work is *not* rigorous. It has a certain kind of architecture; it's possible, let us say, to separate it out into massive blocks. In due course, one way or another, Pound even manages to inform us that there is a kind of subtext to the *Cantos*, as there is to [James Joyce's] *Ulysses*, and that subtext is the *Divine Comedy* in a general sort of way. But it doesn't wash too well to have spent two *Cantos* on the *Inferno*, separated by a very short distance in the poem from the first incursion of Pound's orientalism (at that point in an almost pre-Raphaelite or Swinburnian form); it is, without being very detailed about it, a hell of a long way from the use *Ulysses* made of the sub-text of the *Odyssey*, to keep returning to those examples. The *Cantos*, of course, stands in ruins, repudiated by its author for reasons that one can only guess. I suspect, in fact, that one of the reasons it was repudiated was that Pound perceived in one way or another that the very thing the poem needed, since it was and is an essay about history, was some controlling view of what history is. Pound seems, literally, to subscribe to the view that history is just one goddam thing after another; that there is not, say, a vector within it (or that the vector is relatively simple, not multiple, and has a downward direction), but that there is a bugbear—so to speak—in the works, and the identity of the bugbear changes from time to time. And at a certain point the poem, for all its extraordinary local inventiveness, begins to teeter.
> Okay, I'd like to make something that is simply not in pieces, one after another, in the order that I happen to be able to make them. Which, again, is Pound's problem. Joyce, as he worked on the text of *Finnegans Wake*, of course, did not write it from beginning to end. He wrote *at* the whole book, as it were, until the whole book was written. That seems to be a more useful model (ELH: 113).

Continuing his commentary on his work—Frampton expressly connects this comment to his uncompleted film cycle, *Magellan*, but I believe its point applies more generally to Frampton's work—he extends his reflection on the nature of montage, which brings the viewer to see one thing after another.

> In the *Odyssey*, for instance, there's no particular reason why, having escaped the enchantments of Circe, Odysseus should then next come drifting ashore and

> become Nausicaa's lover. There's no direct causal link between that; it's a model of history which at least questions the notion of causality. There may or may not be causal links. What those links are—the nature of why, say, one shot follows another, or one segment follows another—is at all times under construction, as is the nature of the passage of the energy of attention from one segment, one shot —one frame, even—to another (ELH:108–9).

Frampton protests against arbitrariness of the sequence of the elements that constitute the work. He demands the elements in an artwork be organized according to principles that are universal, that reflect the order of being, not the vagaries of momentary feeling. He admires works that make it possible to give an account of why one element follows another, and why attention shifts from one segment to another, and he wants to formulate compositional methods that will make it possible to give an account why one shot follows another, or why one shot, one segment, or even one frame follows another. We are making progress, Frampton suggests: our thinking about the cinema has evolved to the point that we are now

> able to give examples from film of any given category or any operative principle that we can discern as applying to the making of other works of art. If we are at the incipience of a period of precision, then we are at its very first moments. So it would have taken me, let's say, ten years to write the other part of ["Notes on Composing in Film"] (ELH:110).

The idea of composing by work following universals is interesting enough. As interesting in the comment above is the fact that Frampton believes that any operative principle that applies to literature, say, or to painting can as well apply in film.

Frampton committed himself early to the core principle he articulates in the passage just given. Starting in October 1962, the precocious, twenty-six-year-old engaged in some written dialogues with the sculptor Carl Andre, another young artist he met in Phillips Academy. Andre was twenty-seven and at the time was still working as a freight brakeman and conductor for the Pennsylvania Railroad in New Jersey, though he was beginning to make his mark on the artworld—within two years, he would have his first solo show, at the renowned Tibor de Nagy Gallery in Manhattan.

One model for these exchanges was likely writings of Fontenelle that Ezra Pound had translated as the T*welve Dialogues of Fontenelle*. Bernard le Bovier (sometimes le Bouyer) de Fontenelle (1657–1757) was a figure who resembled Frampton in many ways: Fontenelle was both of them were, also referred to as Bernard le Bouyer de Fontenelle. Both of them were enthusiastic lay observers of the science of their times. Both embraced Enlightentment values. Most significantly, both of them proposed a remarkable taxonomy of the art of their time (Fontenelle in his short "Description de l'Empire de Poesie" of 1678), which was offered in a seemingly light-hearted manner that made extensive use of puns and *double entendres*, and (what is most important) used a cartographic analogy—indeed, Fontenelle's work the source of what became something of a vogue, viz. the literary form of allegorical cartography (and thus of an aspect of Hollis Frampton's work). France in Fontenelle's time was riven between Protestant and Catholicism. Fontenelle's solution was project that resembles Frampton's Magellan: he proposed a catalogue of types of knowledge: various workers would work individually on some particular area of study (of, say Tony Conrad, Michael Snow and Stan Brakhage have pursued their own particular ways of understanding) and out of these different partial understanding would emerge a synthesis that was the unified survey of knowledge itself. Matthew Edney sets out the underlying beliefs that gave rise to Fontenelle's synoptic cartography.

> The one aspect of the Newtonian system to last into the nineteenth century was the principle of a unified terrestrial-celestial physics organized by the inverse-square law of attraction so that, as the best proof of that law, geodetic measurements continued to be intellectually significant . . . The intellectual justification of mathematical cosmography—why should astronomy and eography be interrelated?—and accordingly the intellectual foundations of mapmaking lie in the general epistemology of the eighteenth century. The so-called Enlightenment was never a coherent intellectual, religious, economic, social, and political movement, yet it was based on some basic ideas about the creation of knowledge. Critical and logical thought based on experience and observation—reason in the period's understanding—would lead to greater and more perfect knowledge of the physical world and the human condition, and so allow improvements in both. Human logic was treated as analogous to geometry, in which propositions are sequentially derived from fundamental axioms, so that a subject could be presented in an ordered, structured, and comprehensive manner. This is the essence of Bernard de Fontenelle's 1699 advocacy of an *esprit géométrique*, or 'quantifying spirit,' which was defined as "the spirit of computation and of slow and careful arrangement, which examines all parts of an object one after another and compares them among themselves, taking care to omit none." That is, all data are comparable and all conflicting observations are reconcilable, as long as they are combined and arranged properly, no matter the respective circumstances of the data's creation. This is the essence of encyclopaedism, the idea that rational enquiry can reduce all ideas and data to a common and understandable basis.

Edney notes as well

> The map was widely used as a metaphor for knowledge—and mapmaking a metaphor for knowledge creation—because of the quintessentially geometrical manner in which maps were held to structure, order, systematize, and comprehend space. Ephraim Chambers called his 1728 classification of the various branches of human enquiry a "map of knowledge." Denis Diderot and Jean d'Alembert described their *Encyclopédie* (175I-65) as
>
> > kind of world map which is to show the principal countries, their position and their mutual dependence, the road that leads directly from one to the other. This road is often cut by a thousand obstacles, which are known in each country only to the inhabitants or to travellers, and which cannot be represented except in individual,highly detailed maps. These individual maps will be the different articles of the Encyclopédie and the Tree or Systematic Chart will be its world map.

Mary Ellen Birkett offers these remarks on cartography's place in the West's imagination.

> This rhetorical figure by which [Fontenelle] transposes natural elements selected, composed, and visually apprehended into literature is that of a particular kind of landscape drawing: the map. . . . If "la carte" [the map] can stand for landscape at all, it is because both are products of the structuring of space and topography by perspective. One of the great discoveries of the Renaissance, perspective is a set of invisible structures, determined optically and geometrically, that permit

> representation of spatial depth on a plane surface. Historically speaking, it is perhaps more than merely coincidental that cartography, linear perspective, and the words “landscape” and “paysage” all rise to importance in Western Europe shortly after the formulation of this theory of geometric projections. But the artistic concept of landscape and the scientific processes of mapping rest on different interpretations of their commonlyheld structures of perspective.
> Landscape, dependent upon a viewpoint that is a simple, unaided act of perception, constitutes an ordering of three-dimensional nature that is highly relative. Any alteration in angle of vision, for instance, changes the configuration that each topographical feature assumes in relationship to the others. Even when landscape is organized by a view from a vantage point that grants a relative measure of stability to the distance separating observer and spectacle-such as a hill or a prospect-obstruction, foreshadowing, and optical illusion modify perspective. Without even considering the influence that an observer's emotions may have upon his visual acuity, limitations imposed by atmospheric conditions and eyesight keep the actual perspective from which landscape arises a partial perspective.
> Maps, on the other hand, represent a refinement of the physically credible ordering of three-dimensional space and limited perspective associated with landscape. Mapping presupposes certain additional parts or acts. When “la carte” is used figuratively to stand for “le paysage,” these elements have the role of the “idees accessoires” that according to the Logique de Port-Royal-the century’s most influential grammar book give words more than one meaning.
> The first of these “idees accessoires” presupposed by a map, in comparison to a landscape, might well be its more highly controlled structure. Strictly regulated procedures of transcription govern the composition of maps; the rules of cartography aim to eliminate much of what is temporally relative, unstable, and mobile in the perspective system reducing three dimensions to two. Obstructions, foreshadowing, and optical illusions are effaced in an attempt to remove the limits imposed upon topography by physical sense perception.

Frampton’s *Magellan* also wanted to overcome the historical relativity of understanding and survey knowledge from an absolutely standpoint. Fontenelle, too, lamented that France had no great epic poem to revile the work of dramatists—and Frampton’s circumnavigation of the realm of knowledge was an epic in the manner of Ezra Pound’s *Cantos*.
Birkett continued.

> What results might be termed the second of the “idees accessoires” brought to landscape by mapping, namely its more intellectual point of view. A map implies a viewpoint that is immobile, absolute, omniscient, and that permits all the main features of a geographical locality that would take hours to traverse to be grasped in a single glance. Because maps display what we cannot see as drawings, as contours rather than contents, they appeal less to our sense of sight than to our mind's eye. To the extent that this mental viewpoint organizes a spatial field methodically and objectively, it is an unreal one, shutting us out in a way from the world represented by the map. Excluded in a sense from the spectacle of nature, when we look at a map we become like a surveyor or an engineer who uses instruments under optimal conditions to measure, delineate, and construct a plan. Thus viewers and makers of a map come to have the same attitude toward the value of the natural world: above all, it is to be made

> intelligible (Ironic Cartography: 159–160).

This description of Fontenelle's interest in finding a form that offers more a survey than an conventional representation and, by doing so, transforms the audience's response from sight to intellectual insight apply remarkably well to Frampton's work.

> For the functioning of Fontenelle's landscape as irony this shared mental viewpoint that brings viewer and maker into conjunction is perhaps the most importanto f the "idees accessoires" brought to landscapes figured as maps. The strategy of irony requires readers to complete or to reconstitute an author's intention: not only must readers recognize usual literary codes, they must be aware as well that their reading is an evaluative, distanced one. The identification of a text as ironic depends upon the coincidenceo f the reader'sv iewpoint with the author's attitudes in regard to whatever subject is under discussion. Since mapping adds the intellectual perspective of a creator to the notion of viewpoint inherent in landscape, mapping becomes a sort of guarantee that we will interpret Fontenelle's literary landscape in an ironic manner.
> Fontenelle intends, doubtless, that once won over to his point of view, his readers continue the exercise of wits upon which his irony is based (Ironic Cartography: 160).

Frampton, too, was a great ironist, and deployed irony to encourage the play of the intellect ("wit").

The dialogues the Frampton and Andre engaged surveyed the arts and by January 1963, the interlocutors had reached the topic of film. In "On Movies and Consecutive Matters." Frampton wrote, "Hugh Kenner has said that for the purposes of understanding a work of art, it is often helpful to think of it as though it followed certain rules, like a game." In April of the same year, Frampton writes to his friend Reno Odlin (who, like Frampton, had attended the so-called "Ezruversity," listening to the poet's discourses on various and sundry topics): "Might I paraphrase Kenner thus: 'Poetry (and the arts at large) is not a *subject* to be studied and certified in, but an enterprize [sic] to be inquired into." He adds, "It seems to me that Kenner wd/ have the reader move his consciousness out of the pathetic and into the operational view of art (n15)."

Kenner's ideas on the modern turn in art influenced Frampton enormously, and it behooves us to examine them. In a very fine piece of commentary, among the best that has been written on this very difficult artist, Federico Windhausen makes much of Hugh Kenner's influence on Frampon. He argues that Kenner provided Frampton with a different way of understanding art different from (and arguably more radical than) the Romantic model art that was commonplace in the 1960 and 70s.

As Windhausen notes, Frampton expressed his anti-Romantic animus when he came to discuss P. Adam Sitney's historiography encapsulated in "The Idea of Morphology" and fleshed out in *Visionary Film*. Sitney has acknowledged the impact that Harold Bloom's writings on Romanticism had on him. The central argument of *Visionary Film* is that the American avant-garde film is a Romantic cinema and that whatever beliefs American avant-garde filmmakers have shared—and Sitney argues convincingly that these filmmakers have had more in common than they would ordinarily care to admit—derives largely from the Romantic tradition.

Kenner provided Frampton with an alternative to these Romantic affiliations—Kenner, Windhausen notes, treated the Generation of the 80s as miltantly anti-Romantic. An implication one could from Windhausen's article is that Frampton deployed the idea that art-making is like a game in his anti-Romantic campaign (or what Frampton likely thought of as his anti-Romantic

campaign). For Windhaused connects Frampton's notion that making and (more to the point) understanding art is an operational process for which rules can be educed to an article that Kenner that published in 1962, an article titled "Art in a Closed Field." Frampton's letters to Reno Ohlin suggest that Frampton might have the filmmaker-to-be had read "Art in a Closed Field" when it appeared in the Virginia Quarterly—he certainly read Kenner's book *The Stoic Comedians: Flaubert, Joyce, Beckett* which includes (in a slightly modified form) and as a whole deals with many of the same ideas as "Art in a Closed Field" covered at greater length and in greater detail.

"Art in a Closed Field" propose that poets and novelists of the modern era redefine the boundaries of their respective practicees by selecting specific elements from the culture and ordering them according to laws or rules of their own devising. Kenner actually describes this method as involving the arrangement of a finite set of elements within a closed field; he acknowledges this "sounds like a game," but the game analogy receives only occasional mention, since the closed field is presented as "the dominant intellectual analogy of our time" (ACF:599, 605). For Kenner, then, the modernist aesthetic is based on the linguistic paradigm of a combinatory process within a closed field, where what is important is the relations of elements with each other.

Kenner begins "Art in a Closed Field" by pointing out out that the closed field analogy develops from the notion of a field in general number theory (actually group theory). The second paragraph reads:

> I am going to argue (1) that the recent history of imaginative literature—say during the past 100 years—is closely parallel to the history of mathematics during the same period; (2) that a number of poets and novelist in the last century stumbled upon special applications of what I shall call, by mathematical analogy, the closed field; (3) that this principle has since been repeatedly extended, to produce wholly new kinds of literary works; and (4) and that it is worth knowing about, and of general applicability, because it helps you make critical discoveries; by which I mean, that it helps you to think more coherently and usefully about the literature of both our own time and times past. (ACF:597–8)

We should consider the impact this passage would have had on the filmmaker-to-be trying to find his way in the New York City art-world in the early 1960s. In navigating through that world, Frampton encountered the work of Stan Brakhage. At first, his letters home expressed unalloyed admiration. In time, the respect he had for avant-garde film's dominant figure became mixed with other feelings (that, ironically, one could characterize best through recourse to Harold Bloom's *The Anxiety of Influence*). Frampton recognized the protean character of Brakhage's filmmaking activities and that he had worked in, and mastered, nearly every conceivable form. That left Frampton with the troubling question whether there was anything left for other filmmakers to do. Kenner's commentary on artists from the early modernist era and after might have provided him with a clue about how he could escape the seemingly near inescapable anxiety over the commanding role Brakhage had in the avant-garde cinema of the time. Brakhage is nothing if not an arch Romantic and Kenner's article might have shown Frampton a way that (he believed) would allow him to escape Romanticism altogether, including Romanticism of Brakhage's work. What is more, it showed Frampton how he could avoid that keystone of Romantic poetics, the association of voice and sensibility, and of the singular voice and the exquisitely developed sensibility, through the introduction of heterogeneity.

"Art in a Closed Field" lays out what he sees as a modern understanding composition, one Kenner relates to Joyce (though it is applicable to other writers). Kenner starts by describing a document that had been prepared at the University of Wisconsin, an alphabetical list of all the

words that appear in James Joyce's *Ulysses* and the number of times each appears. Kenner notes that, although we might deem it peculiar to prepare such a list for most novels, to prepare a lexicon for *Ulysses* does not seem at all peculiar. The reason it does not relates to the character of this work. He explains this by saying that the activity the research team at the University of Wisconsin engaged in when preparing the lexicon was "oddly similar" to what Joyce did when he composed *Ulysses* in the first place.

> The closed set of words which we call the book's vocabulary was most deliberatively arrived at. It was not simply Joyce's own vocabulary, but one that he compiled. And the rules by which the words are selected and combined are not the usual rules that used to be said to govern the novelist. The traditional novelist is governed by some canon of verisimilitude regarding the words people actually use and by a more or less linear correspondence between the sequence of his statements and the chronology of a set of events. In "Ulysses" the events are very simple, and are apt to disappear beneath the surface of the prose; the style, as the book goes on, complicates itself according to laws which have nothing to do with the reporting of the visible and audible; and again and again we find Joyce inserting a word, or a combination of words, precisely so that he allow it to carry a motif, as in music, by simply repeating it on a future page. System, in fact, sometimes took precedence over lexicography (ACF:598-9).

Before undertaking to analyze and to comment upon the importance of this conception of composition, let us first have some examples of works that exemplify Kenner's approach. Here is a passage from Gertrude Stein's Four Saints in Three Acts (1927–28)

> Tangle wood tanglewood.
> Four saints born in separate places.
> Saint saint saint saint.
> Four saints an an opera in three acts.
>
> My country 'tis of thee sweet land of liberty of thee I sing.
> Saint Therese something like that.
> Saint Therese something like that.
> Saint Therese would and would and would.
> Saint Therese something like that.
> Saint Therese.
>
> Saint Therese half indoors and half out of doors.
> Saint Therese know knowing other saints.
>
> Saint Therese used to go not to to tell them so but to around so that
> Saint Therese did find that that that and there. If any came.
>
> This is to say that four saints may may never have seen the day, like.
> Any day like.
>
> Saint Ignatius. Meet and met.
>
> This is to say that four saints may never have. Any day like.
> Gradually wait.

Anyone can see that any saint to be.

Saint Therese. Saint Ignatius.

Saint Martyr. Saint Paul.

Saint Settlement. Saint William.

Saint Thomasine. Saint Gilbert.

Or again, from *Tender Buttons* [Chicken],

CHICKEN.

Pheasant and chicken, chicken is a peculiar third.

CHICKEN.

Alas a dirty word, alas a dirty third alas a dirty third, alas a dirty bird.

CHICKEN.

Alas a doubt in case of more go to say what it is cress. What is it. Mean. Why. Potato. Loaves.

CHICKEN.

Stick stick call then, stick stick sticking, sticking with a chicken. Sticking in a extra succession, sticking in.

Or from the *magnum opus*, *Stanzas in Meditation*,

Part I

Stanza XIII

She may count three little daisies very well
By multiplying to either six nine or fourteen
Or she can be well mentioned as twelve
Which they may like which they can like soon
Or more than ever which they wish as a button
Just as much as they arrange which they wish
Or they can attire where they need as which say
Can they call a hat or a hat a day
Made merry because it is so.

Part III

Stanza II

I think very well of Susan but I do not know her name
I think very well of Ellen but which is not the same
I think very well of Paul I tell him not to do so
I think very well of Francis Charles but do I do so
I think very well of Thomas but I do not not do so
I think very well of not very well of William
I think very well of any very well of him
I think very well of him.
It is remarkable how quickly they learn
But if they learn and it is very remarkable how quickly they learn
It makes not only but by and by
And they can not only be not here
But not there
Which after all makes no difference
After all this does not make any does not make any difference
I add added it to it.
I could rather be rather be here.

And most telling, from Stein's great critique of capitalism, "Business in Baltimore,"

Yes and yes and more and yes and why and yes and yes and why and yes. A new better and best and yes and yes and better and most and yes and yes and better and best and yes and yes and more and best and better and most and yes and yes. And yes and yes and better and yes and more and yes and better and yes, and yes and yes and more and yes and better and yes and more and yes and yes and yes and more and best and yes and yes and better and most and yes and yes and more and better and best and most and yes and yes and most and better and yes and yes and most and more and yes and yes, and more and yes and yes and better and yes and yes and most and yes and yes and best and yes and yes and better and yes and more and yes and best and yes and better and yes and more and yes and most and yes and more and yes and yes and better and yes and yes and most and yes and yes and best and yes and yes and yes and yes and better and most and yes and yes and better and most and yes and yes and more and most and yes and yes and better and most and yes and more and better and yes and yes and yes and yes and more and best and yes and yes and more and best and yes and yes and more and yes and yes and best and yes and yes and more and yes and yes and better and yes and yes and best and yes and yes and more and yes and yes and better and yes and yes. And yes and yes and and more and better and yes and yes and better and yes and yes and more and yes and yes and better and and yes and yes and better and yes and yes and more and yes and yes and best and better and yes and yes and most and more and yes and yes and yes and yes and better and yes and best and most and better and more and best and better and yes and yes and yes and yes and yes and yes and yes and more and yes and yes and better and yes and yes and more and yes and yes. And more and yes and yes. And more and better and yes and yes and best

> and more and yes and yes and better and yes and yes and most and yes and yes and best and more and yes and yes and yes and yes and better and more and better and yes and yes and most and better and more and yes and yes and yes and yes. And better and yes and yes and more and yes and yes and yes and yes and more and best and better and most and best and better and most and more and more and most and better and yes and yes.

The events in Frampton's films are also very simple, and are apt to disappear beneath the form of the work. Furthermore, in his work, system sometimes takes precedence over lexicography. In short, composition has come to be understood as relying on a set of items and processes for arranging them. Kenner notes that though his exposition of this notion of composition began with commentary on James Joyce's writing, other advanced writers have shared that idea, and can be shown to the be the notion of composition that many modern writings have held.

> For it seems that one can multiply without effort out of the literature and criticism of this century example after example of the habit of regarding works of art as patterns gotten by selecting elements from a closed set and then arranging them inside a closed field (ACF:599).

As he goes on to expound his conception of a literature of a closed field and to explain its importance, he develops a number of points that suggest the influence that this article might have had on Frampton. In the first place, he stresses the importance that "separation" has in the process. Miss Elizabeth Sewell was among the first to understand this method of composition when she wrote about Lewis Carroll's "nonsense."

> Now the field of Nonsense, she goes on to show, is not blur and fusion but separation and control. Its field is, once more, the closed field, within which elements are combined according to specified laws. "The process," Miss Sewell writes, "is directed always towards analysing and separating the material into a collection of discrete counters, with which the detached intellect can make, observe and enjoy a series of abstract, detailed, artificial patterns of words and images. . . . All tendencies towards synthesis are taboo: in the mind, imagination and dream; in language, the poetic and metaphorical elements; in subject matter, everything to do with beauty, fertility, and all forms of love, sacred and profane" (ACF:599–600).

Frampton recounts that when he and Carl Andre were quite young (in their early twenties), Carl Andre began producing poetry through a method very similar to that which Kenner outlines.

> Carl had momentarily run out of money and sculptural opportunity. In the autumn of 1960 he again turned his attention to poetry. Earlier poems had been freely rhymed lyrics; now he began taking given texts and "cutting" directly from them as from timber, mapping upon words what he had learned from sculpture.

"Art in a Closed Field" continues with remarks on the modern notion of composition as depending on a finite number of separated elements and rules for the combination of these fixed elements, and specifically on the indentity of the separated elements that will subsequently be recombined. Flaubert (another of Frampton's favourites) took the step of identifying the elements of novel as words. Flaubert's novels – that is, the combinations of words he forges—

are so constructed that they make us see the common words they are composed of in a new light.

> Now Flaubert's interest in the isolated word is the residue of nearly two centuries of lexicography, which had virtually transformed the vocabulary of each written language into a closed field. The dictionary takes discourse apart into separate words, and arranges them in alphabetical order. It implies that the number of words at our disposal is finite; it also implies that the process by which new words are made has been terminated. Hence, the persistent lexicographical concern, from Johnson's day to nearly our own, with fixing the language. That Shakespeare had no dictionary and that he was less occupied with words than with a continuous curve of utterance are corollary phenomena. . . . Flaubert, the connoisseur of the *mot juste*, comes to terms with the fact that, whatever printed discourse may be modeled on, it is assembled out of the constituents of the written language; and the written language has been analysed, by a long process which took its inception with the invention of printing, into Miss Sewell's two desiderata: a closed field, and discrete counters to he arranged according to rules (ACF:600–1).

Early in *The Stoic Comedians: Flaubert, Joyce, Beckett* Kenner expands on this McLuhanite arguments on the effect of that printing press, by extolling an insight Walter J. Ong offered.

> The Rev. Walter J. Ong, S.J, has argued brilliantly that printing was the efficient cause of those intellectual movements which in the sixteenth and seventeenth centuries destroyed the hierarchies of knowledge and rearranged the things we know for the sake of pedagogic convenience. Certainly it was printing which led us to think of speech as being composed of interchangeable parts, if only because printing and its by-product lexicography enforced a uniformity of spelling which gave each separate word a stable identity to the eye, whatever its equivocal status for the ear. After that, writing becomes a matter of locating and arranging words, as Joyce spent his celebrated day trying out different arrangements of fifteen words:
>
> > "Perfume of embraces all him assailed. With hungered flesh obscurely, he mutely craved to adore" (FJB 37).

Extrapolating on this key idea, Kenner goes on to discuss the impact the Gutenberg Revolution and the Enlightenment had on the art of literature.

> We have grown accustomed at last not only to silent reading, but to reading matter that itself implies nothing but silence. We are skilled in a wholly typographic culture, and this is perhaps the distinguishing skill of twentieth-century man. The language of printed words has become, like the language of mathematics, voiceless; so much so that to meet the demands of writing that does imply the movements of a voice is itself a skill, highly specialized and grown increasingly rare. And simultaneously we have begun to encounter much theory concerning language a closed field. To program a translating machine, for example, you must treat each of the two languages as (1) a set of elements and (2) a set of rules for dealing with those elements. These rules, correctly stated, will generate all possible sentences of the language to which they apply, and of

> this concept the sentences in a given book may be regarded as special cases. It will be objected that this is a strange way to talk about the Gospel according to St. John. It is; and when we talk of a body of specifiable mass describing an elliptical path at one focus of which spins a globe of ionized atoms, that is an equally strange way to be talking of the earth on which we walk.
> *That* earth was invented in the seventeenth century, when much else was invented (FJB xv-xvi).

Following the comments Kenner made in “Art in a Closed Field” (remarks that led Kenner to introduce Elizabeth Sewell’s comment on Lewis Caroll and nonsense), “Art in a Closed Field” proceeds to a digression, precipitated by Kenner’s remarks on Flaubert, but essentially a set of McLuhaneque ideas on the difference between written language and spoken language. These remarks are, strictly considered, tangential to our theme, the idea of composition. Nevertheless, this digression seems so germane to Frampton’s frequently expressed enthusiasm for Flaubert that I propose that we accompany Kenner on his digression. Elaborating on the idea of composition involving the analyzing and separating the material of language into a collection of discrete counters, which are then arranged into patterns, following a set of rule, he notes

> though [this compositional procedure] obeys with clear-sighted fidelity the inherent laws of written discourse, laws which have struggled out of a long latency into explicit visibility, yet it affronts, satirizes, criticizes, frequently insults, the principles of the spoken language: the principles of the world in which language takes its origin and has its essential and continuing use: the world, we are apt to forget, where the written language has a very minor, and certainly not a dominant, place. Here is the fulcrum of that strain between fiction and what is called “life,” even the verbal part of “life,” which is explored with increasing freedom by a succession of writers from Flaubert to Beckett. Flaubert is especially fond of bringing the written and spoken language into each other’s presence, when his characters are talking; and what he exploits of the written language is its air of being synthesized out of little pieces. Books, it seems, can do nothing to human behavior except contaminate it; and contaminate it with cliché. A cliché is simply an element from the closed field. When Emma Bovary says that there is nothing so admirable as sunsets, but especially by the side of the sea, she is not feeling but manipulating the counters of a synthetic feeling, drawn from reading. And Flaubert, it is well known, in carrying such principles yet further, even made lists of clichés and proposed to arrange them in alphabetical order, by key words, defining, so, the closed field of popular discourse, the pieces of which are phrases as the writer's pieces are single words (ACF:601-2).

Kenner goes on almost immediately to make a remark about *Bouvard et Pécuchet* (a work that Frampton mentioned a number of times in his writing) that could be taken as a misfiring parody of a Frampton film, “Everything, throughout his novels, is menaced by the débâcle of the absolutely typical; “Bouvard and Pécuchct” does but repeat the same small cyclic motion, study, enthusiasm, practice, disaster, over and over until it has used up all the things that the curriculum affords us to study: a closed field of plot consuming a closed field of material” (ACF: 602).
In considering the implication of repeating the same cyclic motion (a closed field of plot) over and over, until it has consumed all available materials, Kenner arrives at a description of the new conception of artmaking that arises from these procedures.

> The notion of language as a closed field may be attributed to the dictionary and behind it to the printing press, which insists, as does its domesticated version the typewriter keyboard, that we have at our disposal less certainly the possibly infinite reaches of the human spirit than twenty-six letters to permute (ACF:602).

The idea of the twentieth-century artwork that Kenner announces here is very close to the understanding of artmaking that gave rise to *Zorns Lemma* or *Magellean*. Consider the remarks Hollis Frampton made about his *Surface Tension* (1970) in an interview with Michael Snow.

> I wanted to make a film out of a relatively small number of simple elements, which would be of a piece, to see how much resonance I could generate among those elements. As you know, the film fundamentally contains 3 shots—a man talking while his digital clock runs; a single dolly shot from the middle of the Brooklyn Bridge to the lake in Central Park; and a goldfish swimming very slowly back and forth in a tank outside the sea. Further, it contains only 2 quite simple sounds: one, the sound of the telephone ringing 37 times; and the other, a prose description which for the average speaker of English comes through as a single prolonged sound because it's in a foreign language—in this case, German (FIS: 10).

Compare this with P. Adams Sitney's description of with Frampton's *Artificial Light* (1969).

> *Artificial Light* repeats variations on a single filmic utterance twenty times. The same phrase is a series of portrait shots of a group of young New York artists informally talking, drinking wine, laughing, smoking. The individual portrait-shots follow each other with almost academic smoothness in lap-dissolves ending in two shots of the entire group followed by a dolly shot into a picture of the moon. In the following synoptic outline, this entire phrase, which lasts about one minute in black and white, will be called A:
>
> *Artificial Light*
>
> 1. A, upside-down and backwards.
> 2. A, in negative.
> 3. A, with superimposition of sprocket holes.
> 4. A, with eyes painted blue and mouths red.
> 5. A, scarred with a white drip mark.
> 6. A, covered with transparent stripes of red and green.
> 7. Still shots in sequence from A; a stroboscopic or flicker effect.
>
> 8. A, almost obliterated by scratches.
> 9. Shots from A, toned different colors by dye, in an asequential order.
> 10. A, with faces and hair outlined by scratches, dissolves marked with a scratched slash (/).
> 11. A, spotted with multicolor drops.
> 12. Superimposition of A, with a copy of A in which left and right are reversed.
> 13. A, with all faces bleached out.
> 14. A, with a flicker of colors (red, green, blue).

15. A, covered with art-type printers dots.
16. A, toned sepia.
17. A, superimposed over itself with a lag of one-and-a-half-seconds.
18. A, interrupted by two-frame flashes of color negative.
19. A, colored, as if through an electrical process, in a series of two primaries.
20. A, with a closeup of a moon crater substituted for the expected moon shots.

> It should be obvious from the outline that the filmic phrase functions like a tone row in dodecaphonic music and serial composition. Frampton has made two very interesting manipulations of the experience of this phrase. In the first place, by opening the film with a backwards and upside-down run of it, he dislocates the viewer for several repetitions; one comes *gradually* to realize that there is a fixed order or direction. That progression is rigidly fixed by the first third of the film. The ninth variation violently jars us with its elliptical disorder. The rest of the film proceeds logically until the last shot which has a feeling of finality both from its variation and from being held on the screen longer . . .
>
> There is a chasm between the phrase and its formal inflections. That chasm is intellectual as well as formal. Frampton loves an outrageous hypothesis; his films, all of them, take the shape of logical formulae. Usually the logic he invokes is that of the paradox (SFR 347–8).

Of *Heterodyne* (1967), Frampton writes:

> As I thought about the film, I wanted it to have a very open, resilient kind of structure with the maximum possible amount of rhythmic variety, both in terms of "count," "beat" and variety in the rhythmic changes of shapes and the rate of the rhythmic change. I used a debased form of matrix algebra to make up, in advance, the structure of the film, and tried out several arithmetic models for that structure . . . with very short film pieces, before I found one that seemed to suit me. As I came to make the film, it consists entirely of 240 feet of black leader into which are welded about 1000 separate events. Each consists of one frame, and there are 40 kinds of frame, ranging from a frame that consists entirely of red or green or blue to a frame which may consist of red leader with a triangle of blue leader welded into the middle of it. I say "welded" because the film was put together using three colors of leader and 3 ticket punches—a square, a circle and a triangle—which I felt to be constantly recognizable and also impersonal shapes—and where one color is let into another, or where a color shape is let into black leader, it is literally welded in with acetone. I was doing all of this under a magnifying glass with tweezers and brushes and so forth... they're disposed along the continuous line of film by a scheme roughly the following: in order to avoid a scheme in which certain types of frames would, by rhythmic recurrence, fall at the same spot in the film, or in the same exact frame, I decided to use prime numbers, that is, numbers divisible only by themselves and 1 as a starting-point, since they begin to share harmonics extensively only in their very high multiples—I further decided I could use no prime numbers less than 40, because 40 is the number of frames in a foot and I didn't want any single type of event to

> occur any more often than once every one and two/thirds seconds, and then I subjected my list of prime numbers over 40 to a series series of tests that involved the sums of their digits—casting out those that didn't meet the tests so that as it turned out the commonest event, a frame that is entirely red, occurs every 61 frames in absolutely regular repetition throughout the film; and the least common event, a red triangle on a black ground, occurs every 2311 frames—all of this necessitated an amount of arithmetic which I did over a period of 6 weeks —reduced it to a large stock of 3X5 cards and collated them, and sat down with my rewinds and splicer and simply put the thing together—altogether on the level of personal logistics, it . . . tied up my time and need to be making a film for about 3 months, at the end of which I found myself with a little more money for raw stock and I could go on and make other kinds of films (FIS:8-9).

Frampton had a penchant for lists and surveys. His circumambulation of Binghamton's campus for *Hapax Legomena IV: Travelling Matte* (1971) is a survey. So, in a sense is *Hapax Legomana V: Ordinary Matter* (1972). In an interview with Jonas Mekas, Frampton remarked, "*Ordinary Matter* is for me a kind of ecstatic, headlong dive." Mekas responds by highlighting the works character as a survey: "And it goes through nature, architecture, high peaks of contemporary civilization, and through the oldest monuments that we have—the scope of it in time and space is so wide. . ." (MEK:70–1). *Palindrome* (1969) contains a catalogue of variations on the Latin palindrome, "In Girvm Imvs Nocte Et Consvmimvr Igni" (By night we go (down) into a gyre/and we are consumed by fire). *Manual of Arms* is a sort of catalogue. *States* (1967) is also an inventory. Finally, of the shots in the middle section of *Zorns Lemma*, Frampton noted (in his handwritten notes on the film), "There are conscious references to every painting, drawing, and photographic style I could manage . . . There are hundred of shots that refer, secretly, to characteristic postures vis-à-vis space, color, etc. *within the history* of film; i.e., stylistic tendencies of other directors" (OCA 196).
Frampton made *Ordinary Matter* by shooting single frames from a television set, one frame for each shot in the sequence of programs he watched over two evenings; over that footage he inserted numbers, from 0 to 40, in five sets, with a graphic figure accompanying each 0 and 1. Here is Frampton's note on the film.

> A "baroque" summary of film's historical internal conflicts, chiefly those between narrative and metric/plastic montage; and between illusionist and graphic space. It incorporates 3 apposite "found" narratives, condenses 5 ways of making, a includes a "surprise" out of Hayden (or S. M. Eisenstein's *Ivan*, II) (NYFMC 172).

In *Eyes Upside Down*, Sitney comments on the almost characteristically arcane style of Frampton's note for the *Film-makers' Cooperative Catalogue* on *Ordinary Matter*.

> The five ways of making refer to the five systems of enumeration: The first appears to be irrational until we realize that there is a fixed progression from one to forty, although a random series of numbers—none equal to or higher than the next in the series—can intervene in the order sequence. . . . The second mode had no numbers at all. Instead, the third loop switches from black and white to color (as in the conclusion to Eisenstein's *Ivan the Terrible, Part Two*). When the fourth loop reaches the same point, it reverts to balck and white. As the only color portion *of Hapax Legomena*, this constitutes a surprise, motivating the allusion to Franz Josef Hayden's Symphony no. 97, known as the *Surprise Symphony*. The color loops reveal that the imagery had to be in color originally and therefore that

> the black-and-white repetitions of the loop had to have been made by a transfer to monochrome totalities. This suprise implies a mystery of origins for all of the black-and-white photography in the cycle.
> Frampton marked the third mode by repeating eleven times in a row, at regular intervals, the number and graph for 1. . . . The fourth, a nonsequential passage of unrepeated numbers, might be construed to schematize intuitive editing such as Frampton practices in *Ordinary Matter*. Finally, the fifth, descending from 40 to 0, evenly paced one number every five seconds, would account for any purely rational fixed order. . ..

Kenner's "Art in a Closed Field" laid out the aesthetic principles that led to such interest in lists, surveys, catalogues and inventories, as he comments on James Joyce's *Ulysses* (a book Hollis Frampton loved very much).

> Here we should return to Joyce. We may take "Ulysses" to specify one arrangement, and in the author's judgment the most significant arrangement [we shall have much more to say of this idea of the work of art being, ideally, the most significant arrangement], of all the ways its quarter-million words might be arranged. Were we to say the same of a novel of Walter Scott's, it would be merely a theoretical statement, but when we say it of "Ulysses," we feel we are saying something relevant to the book's nature. Joyce wrote in the midst of an economy of print, surrounded by other books on which to draw. He possessed, for example, Thom's Dublin Directory for the year 1904. He possessed dictionaries, in which to find the day's words and verify their spelling. He possessed other books in which he could find lists of all kinds: the colors of mass vestments, for instance, and their significance.
> Discourse, for Joyce, has become a finite list of words, and Dublin, 1904, in the same way has become the contents of Thom's Directory, in which it was possible for Joyce to verify in a moment the address of every business establishment or the occupancy of every house (he was careful to install the Blooms at an address which, according to Thom's, was vacant) (ACF:603–4).
> . . . To adduce lists, to enumerate or imply the enumeration of their elements, and then to permute and combine these elements: this, Joyce seems to imply, is the ultimate recourse of comic fiction (EU 120).

Frampton seems to have shared Joyce's comic sense. Indeed, the emphasis on marvellous, strange, and often comic collocations of elements in lists and catalogues gives the form of humour Kenner attributes to Joyce a penchant for assuming a Menippean character—a leaning towards intellectually humorous work characterized by miscellaneous contents, displays of curious erudition, and comical discussions on philosophical topics. Kenner likely drew idea of Menippean satire from his teacher, Marshall McLuhan. Donald Theall points out that "McLuhan embraced the concept of Menippean satire as early as The Gutenberg Galaxy, where he identified it in Pope, Swift and Joyce."
P. Adams Sitney offers this remark on Frampton's first film cycle.

> *Hapax Legomena* is a Menippean satire, a form as suited to Frampton's comic genius as it had been to Sidney Peterson's in the 1940s. Its allegorical structure describes the escape from psychic anguish, or from the dynamics of spiritual biography in all its forms, as the aesthetic achievement of systematic reductions. Each of the seven parts of the series posits a normatively creative subject and a

> system for voiding whatever intimations of a stable selfhood might be apprised by "certain mechanical changes" in the application of cinematic rhetoric. Emerson calls it the apprising of a "a dualism . . . between the observer and the spectacle – beween man and nature." Frampton postulates the polar oppositions of language and images, speaker and listener, frame and energy pattern, presence and memory, left and right hemispheres of the brain, only to generate filmic structures that question their stability (EU 122).

Sitney's remarks bear comparison with Kenner's commentary in "Art in a Closed Field" on Samuel Beckett's *Watt*, a novel, written 1943-45 published 1953, Beckett wrote, in English, while in hiding in Roussillon during World War II and very dark in its outlook. In presenting human drives as essentially absurb, the novel often treats human movement as extended series of permutations. It is that feature on which "Art in a Closed Field" comments.

> Beckett's second novel, "Watt," has for point of departure the great catechism in the seventeenth episode of "Ulysses"; and repeatedly it defines, with frigid deliberation, closed fields the elements of which it doggedly permutes through every change that system can discover.
>
> > Here he stood. Here he sat. Here he knelt. Here he lay. Here he moved, to and fro, from the door to the window, from the window to the door; from the window to the door, from the door to the window; from the fire to the bed, from the bed to the fire; . . .
>
> and so on, until each possible route between bed, door, window and fire has been traced in each direction (ACF:604).

The description could apply to cinematic crossing of *Manual of Arms* and *Ordinary Matter*. Kenner continued his commentary on *Watt*.

> Later in the book Watt commences some experiments of his own with the closed field. Given a brief vocabulary of English monosyllables, he first commences to invert the order of the words in the sentence, and later the order of the letters in the word, and later that of the sentences in the period; then he performs simultaneously each possible pair of inversions in this set of three, and finally he combines all three inversions simultaneously; thus subjecting his little store of monosyllables to every, literally every, possible process of inversion. With a little effort, we find we can get used to any of these conventions of discourse. None of them approaches a merely random sprinkling of vocables, though each of them reminds us sharply of the perilous random seas that surround our discourses (ACF:605).

Frampton's *Palindrome* is similar in important respects. Of that work, its maker remarked, "Anima is imparted to 12 variations on each of 40 congruent phrases, metamorphosed from the chemically mutilated flesh of color film itself (NYFC 168).
Here is Bruce Jenkin's description of *More than Meets the Eye* (1979)—a work (and a description) whose character should be familiar by now.

> Frampton travels to the purported birthplace of the Eisensteinian model of

> cinema, the fairground, with its 'montage of attractions'...ambulating wide-angled portrait of the fair, its throng of participants, its array of attractions (Belgian Waffles, Walk Away Sundaes, Flying Bobs, the Toboggan, a Hall of Health). Interpolated within this walking tour are nine optically reversed passages of texts which are briefly flashed on the screen andframed by a repeated image of a ride known appropriately as 'The Scrambler'."

More similar yet are the fragmenting and recycling of speech in Critical Mass and Frampton's use of the Wade-Gilles syllabary of the Chinese language in *Ordinary Matter*, which he described in his note on that film: "1) a 2) ai 3) an 4) ang 5) ao 6) cha 7) ch'a 8) chai 9) ch'ai 10) chan. . . ." (BH:208).

Kenner uses the examples of Flaubert, Joyce and Beckett to deliberate on the changes that occurred in consciousness in the early and middle decades of the twentieth century. His purpose in "Art in a Closed Field" (and in *Flaubert, Joyce, Beckett: The Stoic Comedians*) was to inquire into the changes taking place in the age's "paideuma." His real topic, he stated, was a way of thinking that is more pervasive than Flaubert, Joyce and Beckett—and, I suppose (though he does not say exactly this), the other advanced writers of the period of, say, 1850 to1950. Kenner the idea of closed field, drawn from general number, has become the dominant intellectual analogy of the time, and uses it rather as the people of the Enlightenment used Newtonian physics and people of the Victoria era used biology. "The closed field is a mathematical analogy," he states. "Let me put this as flatly as possible: the dominant intellectual analogy of the present age is drawn not from biology, not from psychology (though these are sciences we are knowing about), but from general number theory" (ACF:605).

Kenner goes on to develop some precisions about his use of the term "field," a key term of use in unpacking the epistemological and aesthetic implications of the present age's dominant analogy. He points out that for a mathematician, a field

> contains a set of elements, and a set of laws for dealing with these elements. [The mathematician] does not specify what the elements are. They may be numbers, and the laws may be the laws that govern addition and multiplication. But numbers are a special case; in the general case the elements are perfectly devoid of character, and we give them labels like *a*, *b*, and *c*, so as to keep track of them.

Near the end of this essay will consider the implications the contemporary ontologist and aesthetician, Alain Badiou, draws from this very observation. For now, let it suffice to draw attention to this statement by Badiou that explains the appeal of formalist theory.

> The laws, in the same way, are any laws we like to prescribe, so long as they are consistent with one another. T'he purpose of this manoeuvre is to set mathematics free from our inescapable structure of intuitions about the familiar world, in which space has three dimensions and every calculation can be verified by counting.

Mathematics at mid-twentieth century, Kenner suggests, understood itself as a formal system. It is a system liberated from our intuitions about the familiar world: of the world of three-dimensions or about counting processes. It is important to note it is not correct to say, with regard to the axioms of field theory, that axioms are "propositions that are regarded as true without proof." Rather, the field axioms are a set of constraints. If any given system of addition and multiplication satisfies these constraints, then one is in a position to instantly know a great

deal of extra information about this system. Futther, given a theory of fields, one can invent any number of systems (each comprising a distinctive set of elements and laws for manipulating those elements—or, even better, of undefined marks and laws for rewriting strings containing those marks). All that matters is that these systems be internally coherent—the system's relation to the real world is of no import whatsoever (though, we shall soon see, Frampton, suggests that a formal, combinatorial system does reflect reality). Given a theory of fields, one can invent any number of maximum systems (systems of elements and laws for manipulating those elements—or, even better, systems of undefined marks and laws for rewriting strings containing those marks). All that matters is that these systems be internally coherent – the system's relation to the real world is of no import whatsoever.

The analogy to developments in the arts from, say, 1850 to 1950 will be clear to all: art formerly was thought to be about the world, but by the early 1900s, most advanced thinkers and makers concluded that art-making is more like shifting around elements belonging to a closed field, rearranging them according to definite principles.

> It is very helpful, I find, to regard a work of art as proceeding according to certain rules (did not Coleridge say that it contains *within itself* the reason why each detail is so and not otherwise?). The rules may be changed beyond easy recognition by altering one postulate, and this is a common way for the arts to develop, although it is perhaps only now, with the assistance of field-theory and game-theory, that it is possible to see clearly that this is what has been going on. And the first business of the critic is to recover the rules of the game that is laid before him (ACF:608).

Isn't that almost exactly how Hollis Frampton understood the task of the critic: to recover the rules of the game that is laid before him (though shall soon see that Frampton had diverges from this sort of formalism in one key respect). Indeed, do not Frampton's remarks on the metahistory of film suggest an orderly developmental process in filmmaking—whereby one postulate may be changed (for example, one statement of the form film is X), resulting in massive change in the rules governing working in that medium. "The innovator," Kenner states "commonly changes a familiar law or two, and in so doing defines a closed field of possible works within which his own work finds its place " (ACF:608). This sounds exactly like the historical process with which Frampton saw himself working. In "For a Metahistory of Cinema," Frampton wrote "In the 1830s, . . . Évariste Galois died . . . leaving to a friend a last letter, which contains the foundations of group theory, or the metahistory of mathematics" (OCA 133). Considering that the piece from which I quote is said to be dedicated to laying the foundations for a metahistory of cinema, one would think that commentators on Frampton might have followed up on his allusion to the well-known, Romantic tale concerning the end of Galois' life and related that allusion to his suggestion that group theory provides the foundations for a metahistory of mathematics. They have not.

Loosely speaking, group theory is pretty much what Kenner describes the theory of closed field as being (although a considerable number of refinements and precisions have been introduced). A reasonably well-known primer of Galois theory I keep on a shelf above the desk where work on my software engineering projects begins

> A field is a set of elements in which a pair of operations called multiplication and addition is defined analogous to the operations of multiplication and addition in the real number system (which is itself an example of a field). In each field F there exist unique elements called 0 and 1 which, under the operations of addition and multiplication, behave with respect to all the other elements of F

> exactly as their correspondents in the real number system. In two respects, the analogy is not complete: 1) multiplication is not assumed to be commutative in every field, and 2) a field may have only a finite number of elements.

A little more exactly, but still very informally, a group is a set of elements that is closed under a binary operation (or, to put the point in different terms, that is associative, has an identity element, and an inverse. (An operation $\oplus$ is associative if (a $\oplus$ b) $\oplus$ c = a $\oplus$ (b $\oplus$ c); it has an identity element 'i' if there exists an i such that i $\oplus$ a = a). The elements of the group are undefined. A field is a restriction of a group (requiring two binary operators).
We can develop different algebras by specifying different operations that meet the conditions laid out above, or by supplementing that operation with others. So group theory defines the game whose development can be described pretty much in the way that Kenner described the development of recent art: "the rules may be changed beyond easy recognition by altering one postulate, and this is a common way for the arts to develop" (ACF:608).
Frampton's remarks on metahistory (both the metahistory of mathematics and the metahistory of cinema) suggest that the discipline develops much in the way Kenner described art as developing: by altering its postulates, one after another, in some systematic fashion. As an example of the difference between history and metahistory, Frampton provides the following example.

> In the 1830s, Georg Büchner wrote *Woyzeck*. Évariste Galois died, a victim of political murder, leaving to a friend a last letter which contains the foundations of group theory, or the metahistory of mathematics. Talbot and Niépce invented photography. The Belgian physicist Plâteau invented the phenakistoscope, the first true cinema.
> In the history of cinema, these four facts are probably unrelated. In the metahistory of the cinema, these four events may ultimately be related (OCA 133).

Let us examine this comment in the light of what we have learned about the background of Frampton's idea of metahistory. The comments I make regarding the metahistorical relations amongst the four events will be conjectural; whether or not they are actually what Frampton had in mind (we will never know), they will serve to give a sense of how Frampton's idea of metahistory might be construed.
To say that in the history of cinema, a set of facts are probably unrelated is simply to say that there is no empirical or causal connection between them—to use Frampton's example, Büchmer's writing *Woyzec*k had no demonstrable influence on Évariste Galois' founding group theory. However, we can discern the following logical connections amongst the events Frampton enumerateed. First Évariste Galois' group theory deals with the ideas of taking a finite number of elements and subjecting them to particular operations. Plâteau's phenakistoscope takes a finite number of elements and by presenting them in succession, at a rapid rate, creates the impression of movement. Mathematics processes reflect mental operations—becaue Galois' group theory is so fundamental to mathematic, it must model elementary mental operations. Since Plâteau's phenakistoscope operates on the same abstract principles as Galois' group theory, Plâteau's phenakistoscope, too, must model elementary menal operations. When those elements animated by the phenakistoscope, or some other apparatus that works by similar processes (such as the projector), become photographs, something the work of Fox-Talbot and Nièpce permitted, then this apparatus animates the world—hence we can say that the resulting medium (the cinematic apparatus) models the mind's experience of the real.
Büchner's *Woyzeck* is an hallucinatory work: Franz Woyzeck, a lowly soldier who is the

protagonist of the piece, experiences a nervous breakdown, which the audience watching the play comes to experience from Woyzeck's point of view: one of the best known examples is that they hear the doctor treating Woyzeck tell him that he must eat nothing but peas. So in Woyzeck, we see the mind's experience, though rooted in the real (Büchner presented the soldiers experience as the result of the poverty in which he was raised), it takes a turn toward the fantastic.

The connection amongst Galois' group theory, Plâteau's phenakistoscope, and Fox-Talbot and Nièpce's photography have to do with the way that a sequence of finite elements, appropriately presented, can give the illusion of the real. The transformation that Woyzeck's work effected (a transformation that had to do with its abnormal character—"abnormal" in the sense that the philosopher Alain Badiou's uses the term, which, as we shall see later, made its appearance an event) has to do with the transformation of the set of ideas into one that acquires the new character of being subjective.

In time, Frampton came to conceive that these rules, these operational procedures could be expressed algorithmically (that is, as rule-guided procedures)—and if they could be expressed algorithmically, they could be given mathematical form. Thus, Frampton continued

> No one knows [at this point in history] enough to write a book [on cinema] in three parts, the name of that book being *Principia Cinematica*. Part One is called 'Definitions', Part Two is called 'Principles of Sequence', Part Three is called 'Principles of Simultaneity' (ELH:110).

The model Frampton is likely alluding to is Bertrand Russell and Alfred North Whitehead's *Principia Mathematica*, a work in three volumes that begins with Definition, progresses to cardinal arithmetic and then to series. At this point Ian Cristie interrupted Frampton's exposition:

> A rationalist approach, which identifies your operation as an attempt at a modern *mathesis universalis*—the kind of enterprise that would have been entirely comprehensible to Descartes, or to any of the philosophers of the Encyclopédie period. That would seem to be your working model? (ELH:110).

To which Frampton replied.

> Right on the button. At the same time, of course, I know very much more than they did, because they are precisely what I know. What interests me among all those interactive, closed rational systems is the particular manner—the particular point in their operation—where they most begin to resemble the universe. And that is the point where, after they have been in operation for some time, they begin to generate discrepancies, irrational values, accumulations of error. Where the operations begin to interfere with themselves or with each other to such an extent that what is generated appears not to permute but to be absolutely smooth and continuous, becoming—if we believe in causality—causally seamless, but at such a level that it seems incessantly to just fail to dis-intricate the lines of self-interference from the system (ELH:111).

We opened this section by citing Frampton's account of why he believed Pound's *Cantos* to be a failure. He proposed that the Cantos were not conceived as whole, as Joyce's Ulysses was—and Joyce's method of composition provides a "more useful example." This leads him point out the similarities between *Cantos* and Homeric work that is a principal source of both Pound's Cantos and Joyce's *Ulysses*.

> In the *Odyssey*, for instance, there's no particular reason why, having escaped the enchantments of Circe, Odysseus should then next come drifting ashore and become Nausicaa's lover. There's no direct causal link between that; it's a model of history which at least questions the notion of causality. There may or may not be causal links. What those links are—the nature of why, say, one shot follows another, or one segment follows another—is at all times under construction, as is the nature of the passage of the energy of attention from one segment, one shot —one frame, even—to another (ELH:108-9).

Frampton wants to be able say why, "one shot follows another, or one segment follows another" In the end, he demandsthat the the order and length of every shot in a film should be accounted for by the underlying rules. In "A Pentagram for Conjuring the Narrative," he proposed that idea in an interesting form—of a theorem, that he dared to call "Brakhage's Theorem."

> For any finite series of shots ["film"] whatsoever there exists in real time a rational narrative, such that every term in the series, together with its position, duration, partition, and reference, shall be perfectly and entirely accounted for (OCA 144).

Frampton was tweaking Brakhage's nose: Brakhage dismissed narrative forms from film believed narrative forms were comparable in important respects to deep space, illusionary images: both narratives and deep-space images are organized around a focal element and the different elements that compose the forms have differing degrees of importance, determined by their functional relation to the focalizing elements. But the humour involved in attaching Brakhage's name to a theorem regarding narrative conceals deeper points. It can be shown that for any integer sequence, you can arbitrarily pick your own next number and find a polynomial that proves you correct: when asked to what the next number in the series 1, 2, 3, 4, 5 is you can put any number down—and, in some sense, be right, for a polynomial that will generate the series you enumerated (and so prove you have chosen "correctly").
However, what "Brakhage's Theorem" asserts is stronger than the mathematical analogy can justify: Frampton does not simply assert that a rational principle can be discovered that accounts for the position, duration, partition and reference of any finite series of numbers. He goes farther and asserts that the principle is narrative in character. He goes even farther yet, to propose that narrative is rational and what is more, that a narrative principle subtends all film, averring that it has been tested and been borne out on a range of cases, even difficult one as Kubelka's *Arnulf Rainer*, Conrad's *The Flicker*, and the films of Jordan Belson."All have responded," he notes. "At this writing, narrative appears to be axiomatically inevitable." (OCA: 144)
The ironic tenor of Frampton's discourse conceals the radicality of epistemological point he is making here. Frampton's epistemology rests on two fundamental principles. The first is the principle that order is not material, but ideal: the world of experience arises as we shape the manifold of precognized intuition (one might think of Immanuel Kant's "Mannigfaltig"). The second is that these fundamental principles can best be expressed in mathematical or, at least, algorithmic form. Consciousness swims in an ocean of pre-cognitive impressions, and we make sense of them by imposing a pattern on them. The rules that embody the procedures for constructing these patters are constitutive: they make the world of which we are aware. Frampton proposes that these procedures can be expressed in algorithmic form and that these algorithms often can be expressed as mathematical formula. The connection is easy to discern: among the ideas Kant advanced (and Frampton seems implicitly to assume) are that space and

time are pure forms of intuition. Because space and time are pure forms of intuition and therefore what we sense has spatiotemporal extension; whatever is extended is composed of a plurality but through an act of synthesis we form a commonality. The patterns perdure, even while their contents change. Moreover, Frampton also seems to refer this ideal pattern to a consciousness. The reason is easy to understand: if we are to be conscious of a single concrete entity each part of its extension must be given independently, and must combine in a transcendental apperceptive unity to which I may confidently ascribe the descriptor "self-conscious": the order of our various sensations arises from connections not beheld in sense alone; our self creates the rules of their relations and of this combination it is conscious as being its own. Thus, space and time are forms of our perception whereby sensation's synthesized in orderly array.

Frampton's claim that an algorithmic process (governing the operations of consciousness, gives rise to the contents of reality (mathematization of the fundamental principles of Kantian philosophy) will not seem so extreme if we remember that Kant's word "Mannigfaltig" (manifold) also appears in Georg Cantor's writing, where it unquestionably means "set" (the more common German term for that mathematical concept is "Menge"). When Frampton wrote, authors could take it for granted that readers understood no set exists unless a determining concept (or property) is stated. Cantor, for example believed exactly that: Cantor's first explicit definition of a set—properly speaking, a "manifold" (Mannigfaltig)—speaks of elements that can be linked into a whole by some law; this law entails the conceptual aspect, because what the law states explicitly determines the properties possessed by the elements that make up the set.

> By a manifold or a set I understand in general every Many that can be thought of as a One, i.e., every collection of determinate elements which can be bound up into a whole through a law, and with this I believe to define something that is akin to the Platonic ειδος or ιδέά.

Other terms help us to understand the importance of the Frampton's claim. A great Polish historian of aesthetics, Wladyslaw Tatarkiewicz, has summarized the ancient world's general theory of beauty, which he terms the "Great Theory of Beauty";

> The general theory of beauty formulated in ancient times declared that beauty consists in the proportions of the parts, more precisely in the proportions and arrangement of the parts, or, still more precisely, in the size, equality, and number of the parts, and their interrelationships. This can be illustrated with reference to architecture: thus, it would be said, the beauty of a portico stems from the size, number, and arrangement of the columns. And similarly with music, except that there the relations are temporal not spatial.

This view was developed by Pythagoreans and became widespread in the Classical Periods. As Tatarkiewicz pointed out, the Pythagoreans maintained that order and proportion are beautiful and fitting, and that thanks to numbers, everything looks beautiful. Plato adopted this idea. He declared that maintaining measure and proportion is always beautiful and that the absence of measure is ugly. Aristotle adhered to the same view asserting that beauty consists in magnitude and ordered arrangement and that the main forms of beauty are "order, proportion, and definiteness." As Tatarkiewicz points out, the theory that beauty is proportion was both universal and durable. The Pythagoreans and Plato in the fifth century B.C. E., Aristotle in the fourth century, the Stoics in the third, and Vitruvius in our own era—all accepted it." Boethius passed the doctrine on to the Medieval and Modern eras; beauty, he asserted, is simply *commensuratio partium*. The view was widely accepted in the Middle Ages: Augustine

proposes *aequalitas numerosa* (equality of number) as the supreme ideal of music, as well as his *modus*, *species*, *ordo* (measure, form and order), which are the general goods put in things by God imply that beauty always involves a *convenientia partium inter se et ad totum*. Robert Grosseteste was that "all beauty consists in the identity of proportions."
And then there is Frampton's remark in "A Pentagram for Conjuring the Narrative": "every term in the series, together with its position, duration, partition and reference, shall be perfectly and entirely accounted for" (OCA144). His aesthetic is part of the Great Theory of Beauty. That joins him with Robert Grosseteste.
Our goal now is to inquire into how Frampton related this principle, whose relation to Brakhage's theorem is clear, to narrative.

Principle, Structure, Object

Artmaking has often been understood as constituting a laboratory for exploring order. Frampton adopts this traditional view when he proposes that strong artworks are artworks for which we can identify the relation between a rich ordering principle that constitutes the art object and the object itself, a relation wherein the former provides a law that determines at least large portion (and ideally all) of the object's features. What Frampton called "Brakhage's theorem" proposes simple a sort of regulative ideal for that process of determination. Frampton's interview with Ian Christie and Dusinberre reveals his distress at artwork whose elements and their location (spatial or temporal) is not determined by a rule (or a very small number of rules). The central task of the analysis of an artwork is to identify the ordering principle or principles that give the work its form. Moreover, Frampton believes that these constitutive principles (presumably because, if they are strong principles, they are precise and exact) can expressed in mathematical terms. Thus, in the anecdote that begins "Preface" to *Circles of Confusion* he can describe the effort by which he comes to understand another maker's work as the effort to retrieve "the postulates of its montage . . . by a method that begins in imitation of a feral hunter, in search of the traces of its pry, lacing a terrain with its own invisible pathways, ...and culminates, it is imagined, in the exemplary historical certitudes of autopsy"(CC 7). The metaphor suggests that work is alive so long as its basis remains unknown—but once its axiomatic substructure has been discerned, it has been finished off.
Or again, Frampton begins "Notes on Composing in Film" by remarking that "in a letter of the year 1914, the poet Ezra Pound tells his correspondent that it took him ten years to learn his art and another five to unlearn it" (OCA 149). Approximately a page and half later, he states, "Since the learning, the understanding of an art consists in the recovery of its axiomatic substructure, we can begin to say that the 'unlearning' that Pound cites as indispensable to new creation consists in the excernment, castigation, and transvaluation of that axiomatic substructure. New composition, then, may be seen as an activity synonymous, if not coterminus, with the radical reconstitution of the embedding code" (OCA 150). And soon after, "The mode we call reading entails a correct extrapoloation of the axiomatic substructure from the artist's immediately apprehensible tradition. Once the set of axioms has been isolated and disintricated, the artists may proceed to modify it in any of four ways: by substitution, constriction, augmentation, or by displacement" (OCA 151).
The assertion models the production of new work on the methods composers (the essay concerns composing in film after all) composers traditionally had used variations on themes and on the ways that the twelve tone composers had identified used as the basis for a more systematic approach to composition. Arnold Schönberg had proposed a method of composition based on tone rows, a series of twelve tones, in which each note in a chromatic scale appears exactly once. The tone row is used to generate the composition, as some rule-determined variation of the tone row is used to constitute the remainder of the composition. Often these

tone rows were made up of an original cell, a subset of the tone row, or an inverted version of a cell, a retrograde version of the cell, the original cell played backwards, or a retrograde inversion. The tone row from Anton Webern's provides an example:

B, Bb, D, Eb, G, F#, G#, E, F, C, C#, A

The first three notes make up the original cell; the next three notes are its retrograde inversion (the notes are played backwards and upside down), the next three are the original cell's retrograde, and the last three are its inversion (upside down).
A technique that facilitates twelve-tone permutation is the use of number values corresponding with musical letter names. "Prime zero" is set entirely by a choice of the composer. Prime zero, is represented by 0. The rest of the numbers are counted half-step-wise such that: B = 0, C = 1, C#/Db = 2, D = 3, D#/Eb = 4, E = 5, F = 6, F#/Gb = 7, G = 8, G#/Ab = 9, A = 10, and A#/Bb = 11. Given a basic row, we can follow a set of simple rules to generate variations of the basic row. To create the "retrograde" of any given prime, the numbers are simply rewritten backwards. To create the "inversion" of any prime, one number value is subtracted from 12 and that number placed in the corresponding matrix cell. In the retrograde inversion, the values of the inversion numbers are read backwards. For our example, we take a tone row the notes that form the basis of Anton Webern's *Concerto*, Opus 24):

B, B ♭ , D, E ♭ , G, F ♭ , G ♭ , E, F, C, C ♭ , A.

We then take B as the root, and then give the number of half-tone steps between each successive note in the row.

0, 11, 3, 4, 8, 7, 9, 5, 6, 1, 2, 10

The retrograde of that series is:

10, 2, 1, 6, 5, 9, 7, 8, 4, 3, 11, 0

The inversion of the original series is:

0, 1, 9, 8, 4, 5, 3, 7, 6, 11, 10, 2

The retrograde inversion of the original series is:

2, 10, 11, 6, 7, 3, 5, 4, 8, 9, 1, 0

The procedure is rule-guided.
Two notions follow from Frampton's conviction that strong artworks are artworks for which we can identify the relation between a constitutive principle and the object, a relation wherein the former provides a law that determines at least large portion (and ideally all) of the object's features. The first is that a work of art gets put together in much the same way that experience does. The condition of experience is that the manifold of sensory intuitions is subjected to rules, which have the effect of constituting experiences. Furthermore, like the constitutive principles that give rules to a work of art, the principles that give rules to experience can be expressed in a mathematical or, at least, in an algorithmic form. It is the fact that both experience and a work of art are constituted by principles whose essential structures can be stated in mathematical (or algorithmic) form that allows artworks to reflect the structure of consciousness.
Frampton does not make the belief explicit, but he seems to believe that film's nature was

especially closely tied to the fundamental mathematical assumptions of the Newtonian/ Dedekind/Cantorian age, that is, the age of analysis and of set theory. Its character is Newtonian, because it represents movements as a succession of minutely resolved, but fixed, instants (frames). Film's character is much like that possessed by the objects that set theory describes— it resembles the character of those objects in several ways: a film is clearly itself a set, i.e., a collection of things (frames). In fact, ordinarily a film is a set of sets: a film is a set (a collection) of shots, and each shot is a collection of frames. A principle must govern how the elements (the frames) in a shot are selected and sequenced, and a principle must govern how the shots themselves are selected and arranged. The composition of a film highlights, in a particularly clear fashion, the fact that the constitution of a film is governed by a constitutive law. At the beginning of this section, we remarked that Frampton shared with Kenner and operative concept of form. That conception of form-building accords closely to the Classical notion hylomorphic conception of the constitution of entities: a rational operation imposes form on a nearly intractable, and utterly unrepresentable dark matter, and through this operations entities are summoned to being. In viewer's response to a work of art involves the converse operation: one perceives the concrete entity, and that reception gives rise to the converse operation, as the viewer attempts to identify the rational procedures (the rules of the game the artist used) that gave rise to work--indeed the procedure is similar in most respects to the reverse procedure that has been used in so much recent mathematics, of identifying which parts of set theory (which is commonly used as a base for mathematics taken as a whole) are necessary for a given mathematical theory.

If one believes that an artwork is understood by identifying the regulatory principles that give rise to the sensuous form we see (or hear) in a work of art, then those regulatory principles can be understood as a metalanguage that generates those forms that we perceive when experience here, and it is really those rational principles (not the perceived forms) that are principal subject of interest in the work. This priority is analogous to that development in modern mathematics through which the foundations of mathematics became formalized to such an that mathematical theories can be regarded as mathematical objects and the branches of mathematics concerned with foundations of mathematics, logic and recursive function theory (or computability theory) became themselves key fields of study. But there is more: the principles that undergird the work, its principles, in becoming self-reflexive (that is, in coming to comment on themselves and on their generative—or shall we say operative—powers), posits itself as absolute: it becomes the Logos. But no sooner do we make that connection than the mind reverberates towards another insight. Those fields of mathematics addressed by those who study the foundations of mathematics, but especially those areas which examine set theory, group theory, field theory and representation theory, deal with what seemingly are mathematics plain and simple objects. Following up on the analogies between the procedures of modern art and modern mathematics, we might say that these areas are at once the metalanguage of mathematics (that define the object of study) and the object of study itself—or, we might say, a metalanguage that is also an object language. When one stop to ponder analogues in the domain of modern art, one strikes first on three exemplary figures: Flaubert, Beckett and Hollis Frampton—Kenner's Stoic comedians, with, admittedly, a bit of twist. All these "comedians" adopted a principle of reflexivity, that is, of circularity. The work reflects on itself reflecting on itself reflecting on itself. The meta-layers are potentiality endless. And so all three proposed the idea of an infinite work.

Frampton goes the distance with these Stoic comedians in adopting procedures that are analogous to those of the modern mathematician. But Frampton diverges from the Formalist paradigm, for he believes that the reality itself is produced by permutations and combinations of basic elements. It is this that explains Frampton remarkable comment that "a self-enclosed system of sufficient complexity takes on the density of reality— including the seemingly irrational

moments that seem to violate the mechanical perfection of a rational system." But if reality is produced by generating permutations, there is reason to believe that Creation can be generated by an abstract, combinatorial process. Thus, formal mathematics will reconnect with Being. We shall soon explore the historical background to this extravagant idea that permutations and combinations of basic elements generate reality.

This leads us at long last to understand why Frampton would have proposed that "narrative appears to be axiomatically inevitable" (OCA:144). Drawing a parallel to the predicament of Beckett's Malone, Frampton proposes that from time to time the unspeakably intricate network of colloidial circuits we call "I" occasionally looks outside the domed chamber it occupies. The resulting "glimpses are confusing: the sensorium reports a fractured terrain whose hurtling bits seldom coalesce, "make sense," as the pregnant idiom has it—and the sense they make is itself fugitive and randomly dispersed throughout an unguessable volume of nothing in particular" (OCA:145). These necessities of the animal spirit, of making sense of the hurtling bits that occupy the sensorium, produces connections that inescapably have a narrative structure. This explanation, Frampton states, "is no invention of [his] own"—that is the Logos determined that it would be so.

> But I must prefer it [this explanation] to any matrix I might chose myself to generate (from more cheerful [less Beckettian] assumptions) in the hope of dealing with the predicament of consciousness, because it locates the genesis of story-telling among the animal necessities of the spirit. Whereas received opinion always seems to represent the storyteller as insinuating his views into the mind of another party, preferably for commercial purposes (OCA:145).

Conclusion

.There is much more to say—many consecutive topics remain unaddressed. Among the most important is the traditional relation between permutational structures and cosmogenesis. There is also the issue of the traditional relation between the archive and cosmology. But those issues must be left for another time.