A Thousand Years of Non-Linear History

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Chapter 1: Geological History 1000-1700 AD (25-56)

I. Introductory concepts (25-29)
- A. Structures: shaped accumulations of materials; interactions generate new structures
- B. Mineralization
  1. endo and exoskeletons as flow regulators of far from equilibrium systems
  2. Body politic: both somatic and civic considered as interacting material systems
- C. Principles of urban morphogenesis
  1. Intensification of nonhuman energy:
     a. Plants trapping solar energy (cereals)
     b. Animals used in cereal production
     c. Water power (p 34)
  2. Cities arise from increased flow, but then their institutions react back upon flow
     a. [but for DG they are also presuppositions of agriculture – V. Gordon Childe]

II. Medieval European urbanization [1000-1300] (29-49)
- A. Key insight: autocatalysis: agriculture, monasteries, towns form autocatalytic webs
- B. Types of cities
  1. Planned, bureaucratic, hierarchical [hierarchies]
  2. Spontaneous, interconnected, markets [meshworks]
- C. Hierarchies and meshworks:
  1. always de facto mixes and becomings:
  2. hierarchy of meshworks; meshwork of hierachies
- D. Size differences
  1. Small market towns
  2. Regional capitals
  3. Great cities
- E. State vs city competition in Islam and China as stifling autocatalysis
  1. McNeill and Braudel: the “Why Europe?” question
- F. Money as catalyst of all flows
  1. Political origin of money
  2. Standard vs. nonstandard monies
  3. Advanced Islamic financial system
  4. Intensification of money flow itself
- G. Flow intensity breaching a threshold and triggering self-organizing effects is key to European explosion, not any psychic property (“thrift”; “rational calculation”)
  1. [This is THE principle of critique: you can never appeal to the property of a substance to explain an underlying process. Rather, you have to provide an explanation of the morphogenesis of the substance exhibiting that property. In this case, we have to show how inhabiting a structured flow of matter and energy at a particular threshold necessitates the inculcation of “rational calculation” in European town dwellers. In other words, after a certain point, you have to have good bookkeeping, or you go bankrupt.]
  2. Transaction costs handled by new institutions [Douglas North]; so that high transaction costs [long-distance trade] are “incubators” of new institutions.
  3. Methodological note by DeLanda (37): types of cities provide analysis of emergent wholes below level of “society”: ecologies of ecologies: interlocking levels of institutions and cities. Homogeneity is to be morphogenetically explained.
- H. Central Place vs Gateway City
  1. Central place:
     a. funneling inward of agricultural surplus
     b. hierarchy
     c. conservation of native tradition
  2. Gateway city:
     a. node in trading network
     b. meshwork
     c. transmission of foreign innovation

d. sequence of core cities (see 39n37 on DeLanda / Braudel vs Wallerstein)
e. psychological structures produced from and reacting back on flows

I. Classical locational theory in geography [Christaller] assumed rational decision making arriving a maximal efficiency [neoclassical economic model] for city location: linearity and absence of friction

1. Nonlinear dynamical models of city development [and markets] assume friction, uncertainty, information costs as important effects: "bounded rationality" calls for morphogenetic explanation

2. Bureaucracies also function with bounded rationality in uncertain world; must analyze not simply the rationality of individual decision makers, but the dynamics of interacting populations of decision-makers along with their institutional forms [cultural materials: rules of thumb, skills, routines] and urban placements: levels of interacting nonlinear dynamic systems

J. Towns as reservoirs of cultural materials

1. The argument here about embodied skills vs abstract rationality is as old as Plato and new as AI (Dreyfus critique).

2. Guilds and new specialities

K. Trade dynamics

1. Import substitution triggering autocatalysis for mid-range cities (Jane Jacobs)
2. Luxury trade and big firms leading to capitalist anti-markets [economy of scale]

L. Braudelian critique of equation of corporations, capitalism, and free markets (and of stages of capitalism)

1. Corporate capitalists have always been anti-market:
2. Oligopolistic rivalry is not market competition (see 47n58)
3. City monopolies (Venice, Hanseatic League)
4. Critique of left teleologies as linear progressions: need to see capitalist firms as result of contingent triggering of a virtual bifurcation; and as being part of total social ecology, existing alongside markets

a. DeLanda here specifies that he equates capitalism with anti-markets

b. Here we need to clarify: for Marx, it is conditions of production, not market power, that is characteristic of capitalism: commodification of labor power and extraction of surplus value are the key: realization of that surplus value can occur in a variety of different exchange systems (ranging from pure markets to pure monopolies)

5. Strategies of pre-industrial anti-markets: warehousing, long-distance trade (separating information competencies of producer and consumer by middleman)

6. Credit as accelerator of anti-markets

III. Slowing down of European urbanization (1300-1700) (49-55)

A. Selection pressure for larger towns

B. Consolidation of nation-states impinged on autonomy of Gateway cities

1. Arms races between nation-states as another autocatalytic web
2. Changed forms of mineralization: walls vs landscape fortifications

C. Europe vs Islamic and Chinese empires (Kennedy, Braudel, McNeill)

1. Contingent flow intensities rather than property of a substance ("rationality" of European "peoples")

2. Empires depend on skills of elites (and the production process of these elites is fallible, because often nepotistic rather than meritocratic) to manage flows

3. [Can't we also say that once consolidated empires tend to convert from positive feedback [growth] to negative feedback [homeostasis]?

4. Central Place-dominated nations in Europe {France: Paris; Spain: Madrid; Austria: Vienna} also had slower growth due to consumption by courts and bureaucracy [here again, DeLanda ignores DG's "anti-production" analysis: courts are positive structures for warding off capitalist axiomatic decoding of flows]

5. Cities like London and Amsterdam as joint Central Place and Gateway were better suited as engines of imperial growth because of contact w/ sea: tap into oceanic and atmospheric energy via navigational skills.

6. [differences between French vs English slave systems as examined by Blackburn an interesting point in showing that states are not the root of all evil: relative ability of English free enterprise / civil society to influence state policies to support them, but also leave them alone enabled English slave system to be much more productive than Spanish or French]

IV. Conclusion (55-56): how nonlinear science can help social analysis

A. Energy flows at certain thresholds enable access to natural self-organizing powers

B. Structures generated by these powers react back on flows as catalysts or inhibitors

1. Mineral infrastructure
2. Institutions
3. Cultural materials
   a. Embodied skills
   b. Money and credit
   c. Rules and norms

4. Wars, arms races, oligopolistic rivalries, state vs city dynamics, etc

C. Naturalism: autocatalysis occurs in chemical, biological, and social registers

Chapter 2: Sandstone and Granite (57-70)

I. Introductory concepts: meshwork and hierarchy

A. These are not metaphors, but common physical processes in different registers

B. Engineering diagrams [DG: “abstract machines”]: e.g., heat engine

C. Abstract machines for hierarchies [stratification] and meshworks [consistency]

II. Stratification (59-62)

A. Mechanism: double articulation:

1. sorting/sedimenting:
    a. begin w/ heterogenous collection [matter],
    b. then sort into homogenous layers [content]
2. cementing/consolidation [expression]
    a. formation of new substances
    b. with emergent properties of their own

B. Examples

1. Geological: sedimentary rock (sandstone)
2. Biological: speciation
    a. Sorting by selection pressures
    b. Consolidation by reproductive isolation
3. Social: class formation
    a. Sorting by occupational / role prestige (cf. David Grusky on class)
    b. Consolidation by theological and legal codification

III. Consistency (62-67)

A. Preliminary discussion of Maturana and Varela’s research on autocatalytic loops

1. Catalysts
2. Stable states
3. Growth by drift
    a. Immanent development of new attractors / bifurcators
    b. Environmental constraint rather than prescription

B. Mechanism

1. Articulation of superpositions (interlocking of heterogenous elements)
    a. Interconnection of diverse but overlapping elements
    b. In autocatalytic loops, this is joining by functional complementarity
2. Intercalary elements (e.g., chemical catalysts)
3. Capable of generating endogenous stable states

C. Examples

1. Geological: igneous rocks (granite)
    a. Interlocking of heterogenous elements: interlocking crystals
    b. Intercalary elements: nucleation events, etc: anything that brings about local immanent articulation
    c. Endogenous stable states
2. Biological: ecosystems
    a. Interlocking of heterogenous elements:
        (1) animals and plants by functional complementarity
        (2) food webs: predator/prey and parasite/host
    b. Intercalary elements: symbiotic relations aid in building food webs
    c. Endogenous stable states
3. Social: markets
    a. Interlocking of heterogenous elements: people w/ different need brought together by price mechanism
    b. Intercalary elements: money, property rights, contract enforcement
    c. Endogenous stable states

IV. Linear vs nonlinear thought patterns (67-70)

A. Simple vs complex causal relations have been preferred area of study

1. Is this because of methodological limitations? [internalist]
2. Or because military projectiles need only linear formulas? [externalist]

B. Norbert Weiner and cybernetics: negative feedback: hierarchies / homogenization

C. Positive feedback: diversification: must become meshwork to avoid explosion

D. Experimentation and evaluation: it's not the case that meshworks are "better" than hierarchies: they're always mixed and becoming in any case: the point is to experiment and find proper ratio of tendencies toward either pole.

E. DeLanda admits to a preference for heterogenization and meshworking because of modern dominance of centralized hierarchies. Is he already outdated in this preference [cf. Empire]? Or should we be more nuanced? His warnings about increasing biological homogeneity seem well-founded, but not necessarily at the cultural level.

Chapter 3: Geological History 1700-2000 (71-99)

I. Introductory concepts: (71-77)
  A. Replacement of agricultural intensification by fossil fuel
    1. first coal / steam
    2. then oil / electricity
  B. Industrial age not stage of development, but bifurcation
    1. Change also in form of anti-production)
    2. Same principle of structure formation and back-regulation:
      a. energy flow changes towns
      b. which then react back on energy flow
  C. Types of towns
    1. [Old towns: Gateway networks and Central Place hierarchies]
    2. New towns: mining and factory towns explosively grow and form conurbations
  D. Types of industrialization
    1. Economy of scale: large industries; anti-market firms
    2. Economy of agglomeration: small, skill-intensive industries
  E. Cities as transformers of matter and energy (as open, dissipative systems)
    1. Positive feedback loops closed into autocatalytic systems (meshworks)
    2. [Negative feedback loops seeking homeostasis (hierarchies, bureaucracies, courts)]

II. English system (78-81)
  A. Early English attempt at takeoff (1560-1640) did not reach critical threshold
    1. Later anti-market investment in agriculture was critical
    2. [Marx / Blackburn analysis of national debt / slave system needed: e.g, p. 94]
  B. Skilled labor reservoirs: "catalytic information" contra labor theory of value
    1. [This needs nuancing: pure proletarianization / deskilling is limit]
    2. [Embodied nature of skills allows for capitalist use of starvation threat]
  C. Creation of markets for realization of industrial output / surplus value
    1. Mercantilism and creation of national markets
    2. Central bank and national debt: Meshwork of hierarchies growing by drift
  D. Urban morphogenesis
    1. Elements of both Gateway and Central Place systems
    2. Use of cast iron in factories
    3. Railroad and telegraph: land transport

III. US system (81-94)
  A. Import substitution in American coastal cities: meshworks
  B. Command hierarchies: importation of military discipline
    1. Relation of military and anti-markets: Venetian and French arsenals
    2. American system: deskilling and routinization of processes
    3. Non-military anti-market sources of deskilling and discipline
      a. Mines
      b. [Plantations: cf Mintz, Sweetness and Power]
  C. Command vs meshwork
    1. Company towns benefitting from economies of scale:
      a. homogenization of economic function:
      b. anti-market corporate control
    2. Heterogenous cities yield economies of agglomeration
      a. NB: DeLanda combines both "informal know-how" and "formal knowledge" as "information" here: but this misses different relations to the body: skill is essentially embodied, but formal knowledge can be syntactically encoded (usual sense of "information") and hence put into a long range electronic network
    3. Command economy holds back innovation but decreases transaction costs
      a. Incentive for corporate growth (internalizing supply allows escape from market)

b. Decrease in labor bargaining power from deskilling and discipline
4. State intervention to formalize and routinize transactions to lower their costs
5. Joint-stock companies and creation of professional managerial class
a. [See Henwood, Wall Street, for 1980-90s rentier counterattack on managers]
b. Corporate growth: replacing markets w/ hierarchies
c. US vs England difference in growth of joint-stock companies
d. Different forms of corporate integration forming oligopolies / monopolies

D. Electrification
1. Internalization of economies of agglomeration (corporate research labs)
2. Economies of scale in production/transmission/consumption (new uses)

E. Changes in cities:
1. Centripetal: electrification and metallization (skyscraper)
2. Centrifugal: automobile [also land development, "white flight," TV, fast food]
a. 'City-killing': Jane Jacobs: internalized economies of agglomeration allowed mobility of industrial production
b. Actually, I think this holds more for material vs immaterial production
(1) In other words, what about gentrification?
(2) suburbs are only a draw for a certain type of person:
(a) 50s organization man
(b) vs 90s creative affective work
(3) FIRE needs cities: NY, London, Tokyo
(a) geography debates about role of global cities (cf. Nigel Thrift)

IV. Growing role of information in production (94-99)

A. New institutions: corporate research lab and technical university

B. Formalized knowledge vs embodied skill
1. Corporate structure: limitation on command by reliance on tech committees
2. City / hinterland relations: economies of agglomeration
a. Silicon Valley: externalized networks of knowledge
b. Route 128: internalized networks of knowledge

C. Planned vs unplanned autocatalytic loops: stability vs resilience

D. Transnational corporations and distributed production / centralized management
1. Conflict w/ nation-states over flow control
2. EU / NAFTA / IMF as transnational administrative organizations
a. Here again, DeLanda's apolitical perspective comes through: the contingency of human history is not just the narrative of "missed opportunities to follow different routes of development" in converting matter/energy flows into "cultural products" but of struggles for control of control structures (where catalysts can be experimented with). Here the emphasis has to be on legal regulation of production processes: what can owners get away with re: labor?