Scientists

Scientists

1. Some personal qualities
2. Styles
3. (Ethics) -- later

Personal qualities

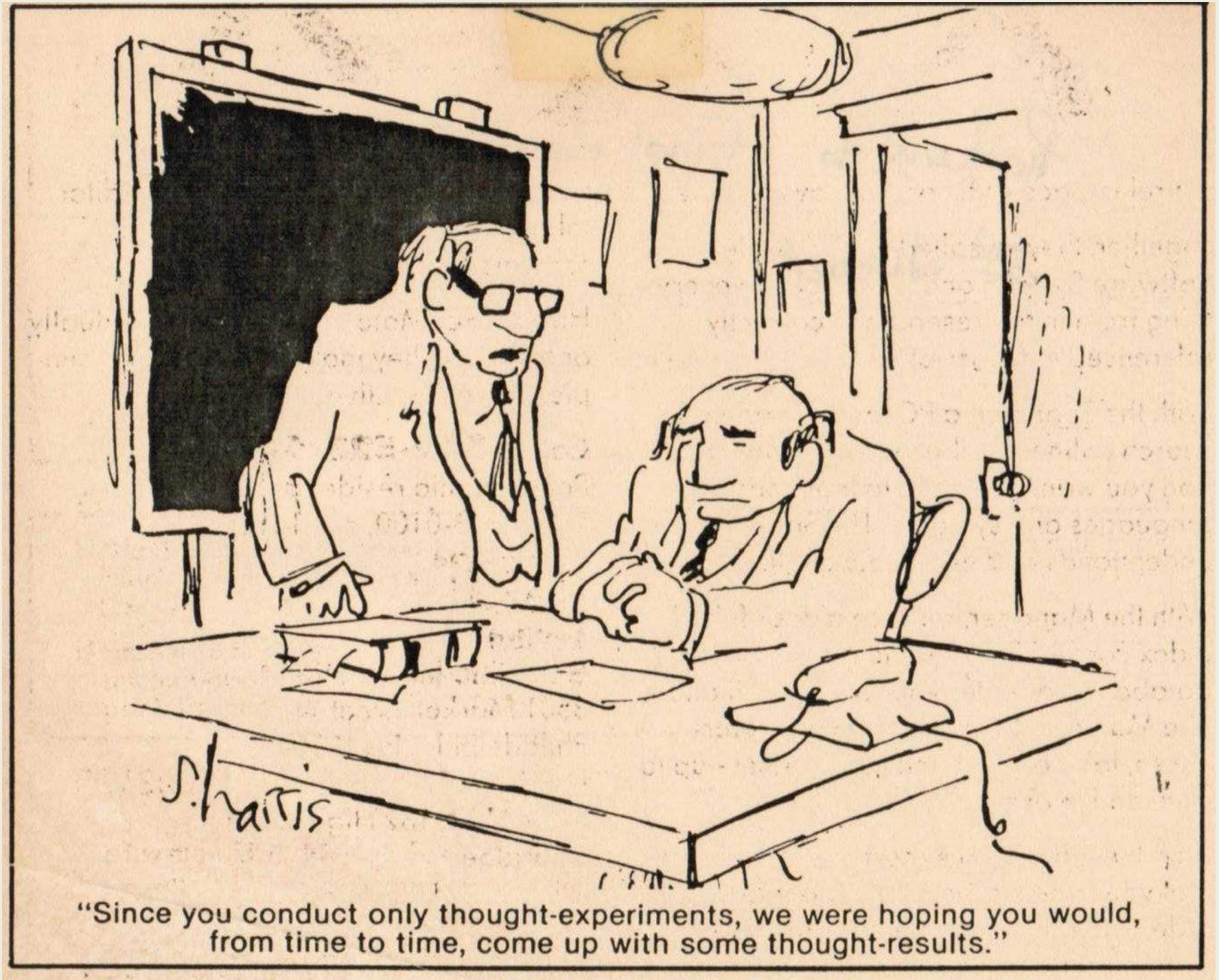
- Beveridge (The Art of Scientific Investigation)
- Medawar (Advise to a young scientist)

Personal qualities (Beveridge)

1. Good intelligence
2. Internal drive & Willingness to work hard

Personal qualities (Beveridge)

1. Good intelligence
2. Internal drive & Willingness to work hard
3. Tenacity of purpose & Confidence in one's judgment.
4. Imagination and capacity for thought experiments



"Since you conduct only thought-experiments, we were hoping you would, from time to time, come up with some thought-results."

What is your favorite ‘thought experiment’ -- either your own or one you’ve read about.

Personal qualities (Beveridge)

1. Good intelligence
2. Internal drive & Willingness to work hard
3. Tenacity of purpose & Confidence in one's judgment
4. Imagination ….
5. Not too humble

5. Not too humble

Audacity in conjecturing.
Cautiousness in testing.

M. Bunge 1967

BUT

Humility in reporting.

ral

Personal qualities (Beveridge)

1. Good intelligence
2. Internal drive & Willingness to work hard
3. Tenacity of purpose & Confidence in one's judgment
4. Imagination
5. Not too humble
6. Courage , e.g., "cold fusion"

Personal qualities (ral)

1. Level of abstraction

Schnute's equation states:
The relative growth rate of the relative growth rate is a nonlinear function of the relative growth rate. (Ziede's suggested modification)

2. Ability to ‘tell a compelling story’

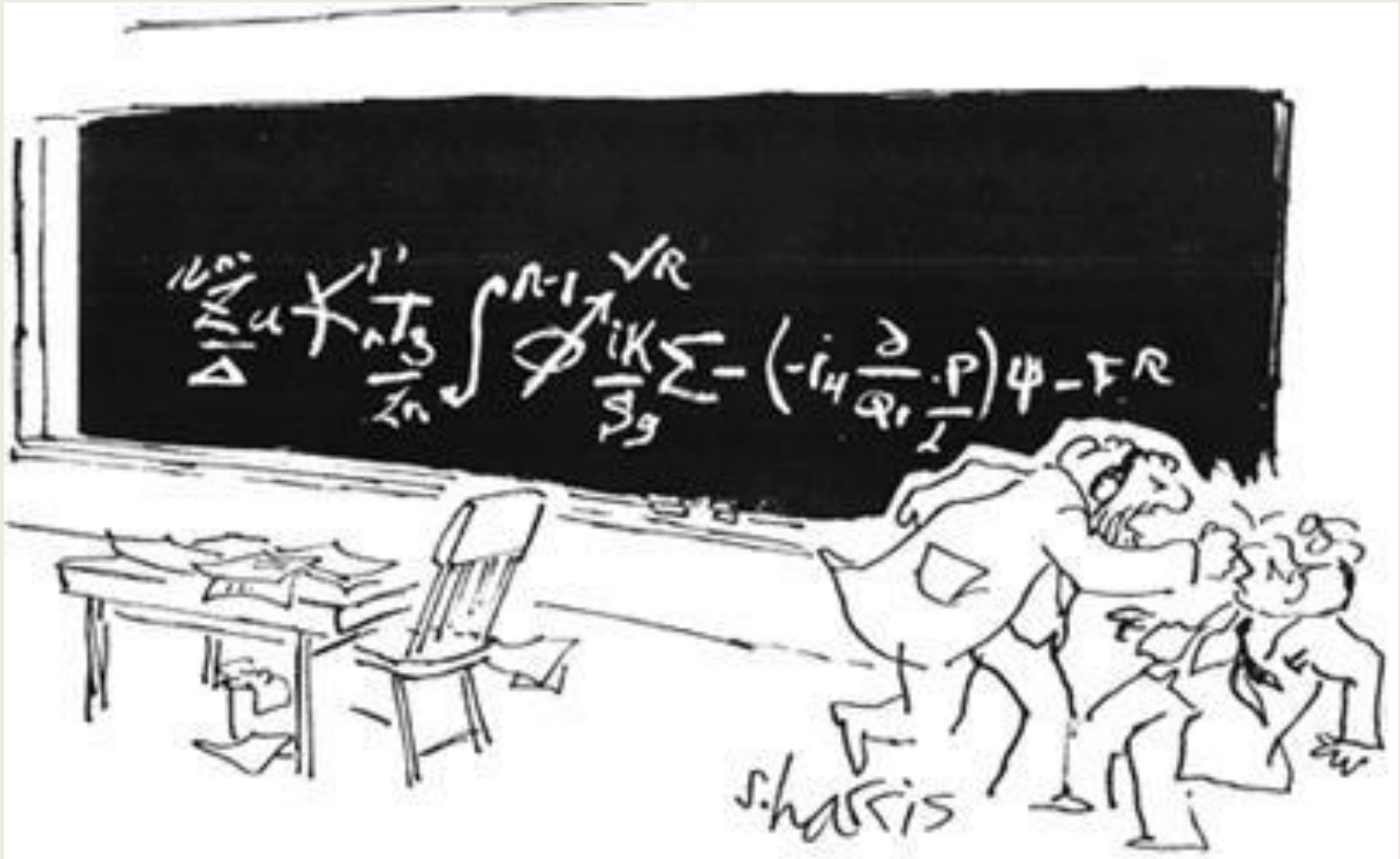
Learning something new takes effort (time + energy).

Some scientists have an unusual capacity/ability to convince others that it will be worth their effort to ‘listen up’ // ‘pay attention’ to the story they are telling.

Personal qualities (ral)

1. Level of abstraction
2. Willingness and ability to ‘tell a story’
3. Toughness

Science can be a contact sport – more like rugby than football (soccer)!!



"You want proof? I'll give you proof!"

“The fact is, Mr. Wetherby, we’re looking for someone who can take it. We’re already well supplied with those who can dish it out.”
(ral: source lost)

Personal qualities (ral)

1. Level of abstraction
2. Willingness and ability to ‘tell a story’
3. Toughness
4. Idealism

Personal qualities (ral)

1. Level of abstraction
2. Willingness and ability to ‘tell a story’
3. Toughness
4. Idealism
5. Desire to continue to learn
6. Well developed sense of ‘enough for now’

Personal qualities (ral)

1. Level of abstraction
2. Willingness and ability to ‘tell a story’
3. Toughness
4. Idealism
5. Desire to continue to learn
6. Well developed sense of ‘enough for now’
7. Ability to juggle several complex jobs at once, i.e. do *‘parallel processing’*
8. Good organizing skills (stacks on floor vs. file drawers)

Styles of scientists

Accumulators Speculators

continuum of ‘styles’

- fact oriented
- cast ‘finer nets’
- analysis driven?
- induction disc. method ?
- often part of sci. comm.
- add solid small increm’ts

Styles of scientists

Accumulators — Speculators

continuum of ‘styles’

- fact oriented — idea / construct oriented
- cast ‘finer nets’ — cast ‘coarser nets’
- analysis driven? — synthesis driven?
- induction disc. method — analogy/metaphor disc. meth
- often part of sci. comm. — may be outside sci. comm.
- add solid small increm’ts — may add large jumps in know.

Advice to young scientists

Accumulators Speculators

continuum of ‘styles’

- Begin career as accumulator
- Begin with analysis. Later move to synthesis?
- Learn the history of important constructs in your field
- Avoid induction being your discovery method
- Work to become part of scientific community
- Begin with solid small increm’ts. Later try for ‘jumps’.

Styles in three (interesting) scientists …

Accumulator

Prof. Egolfs V. Bakuzis,
University of Minnesota,
St. Paul, MN

@ office in 'Deadwood' Hall
mid 1980s

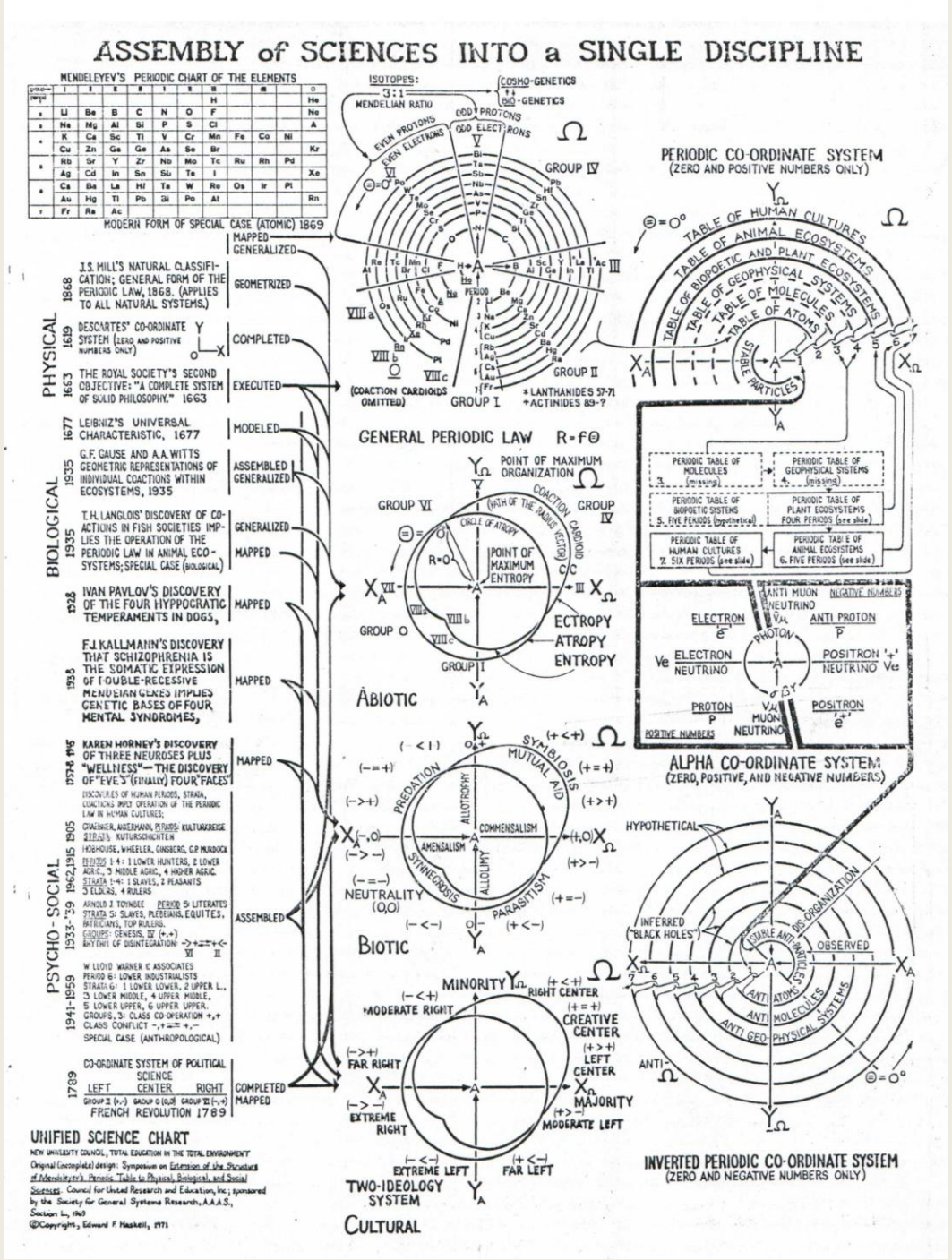
Prof. Egolfs V. Bakuzis
Foundations of Forest Ecosystems:
Lecture and Research Notes
U. Minnesota Libraries

1. Scientific method (137p)
2. Mathematics, measurements, and statistical methods (118p)
3. Concepts of systems in general (278p)
4. Systems theories (177p)
5. Systematics (92p)
6. Physical, biological, and ecological theory (297p)
7. Genetics and Evolution I & II (928p)

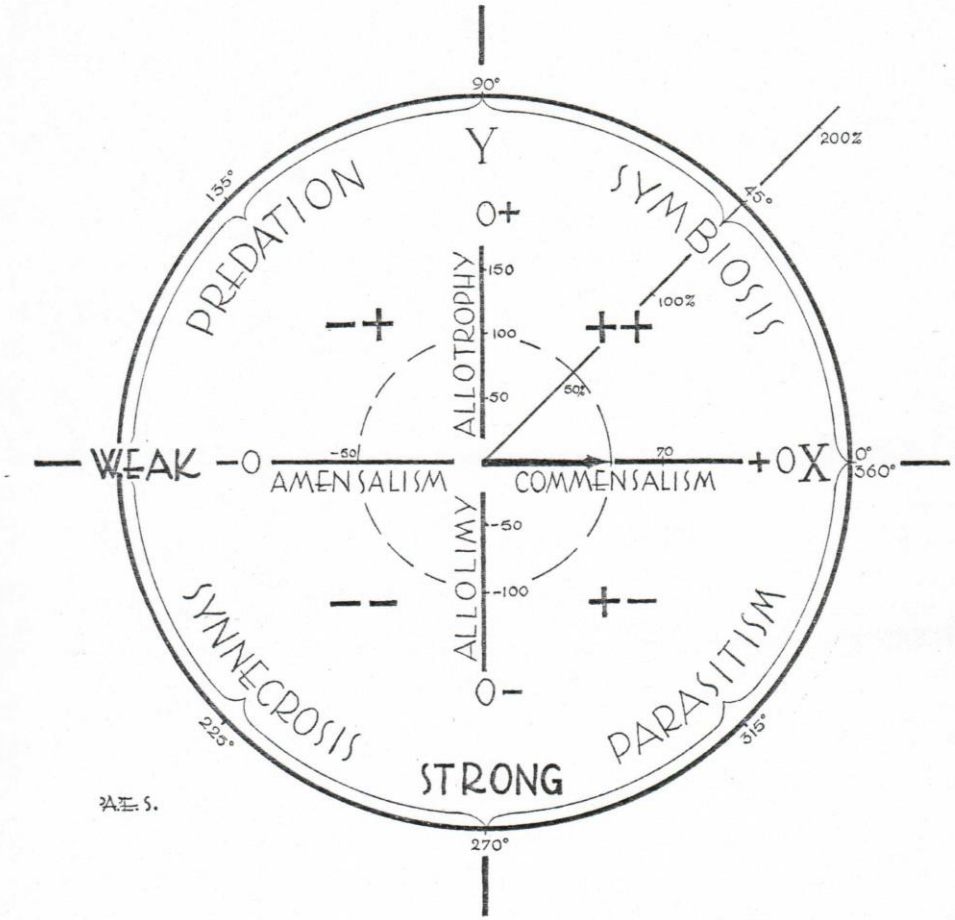
Speculator

Edward F. Haskell, independent researcher
Fred Cassidy, Linguistics, U. Wisconsin
W. V. Quine, Philosophy/Mathematics, Harvard
Harold G. Cassidy, Chemistry, Yale

Oberlin Alumni Magazine, 1980

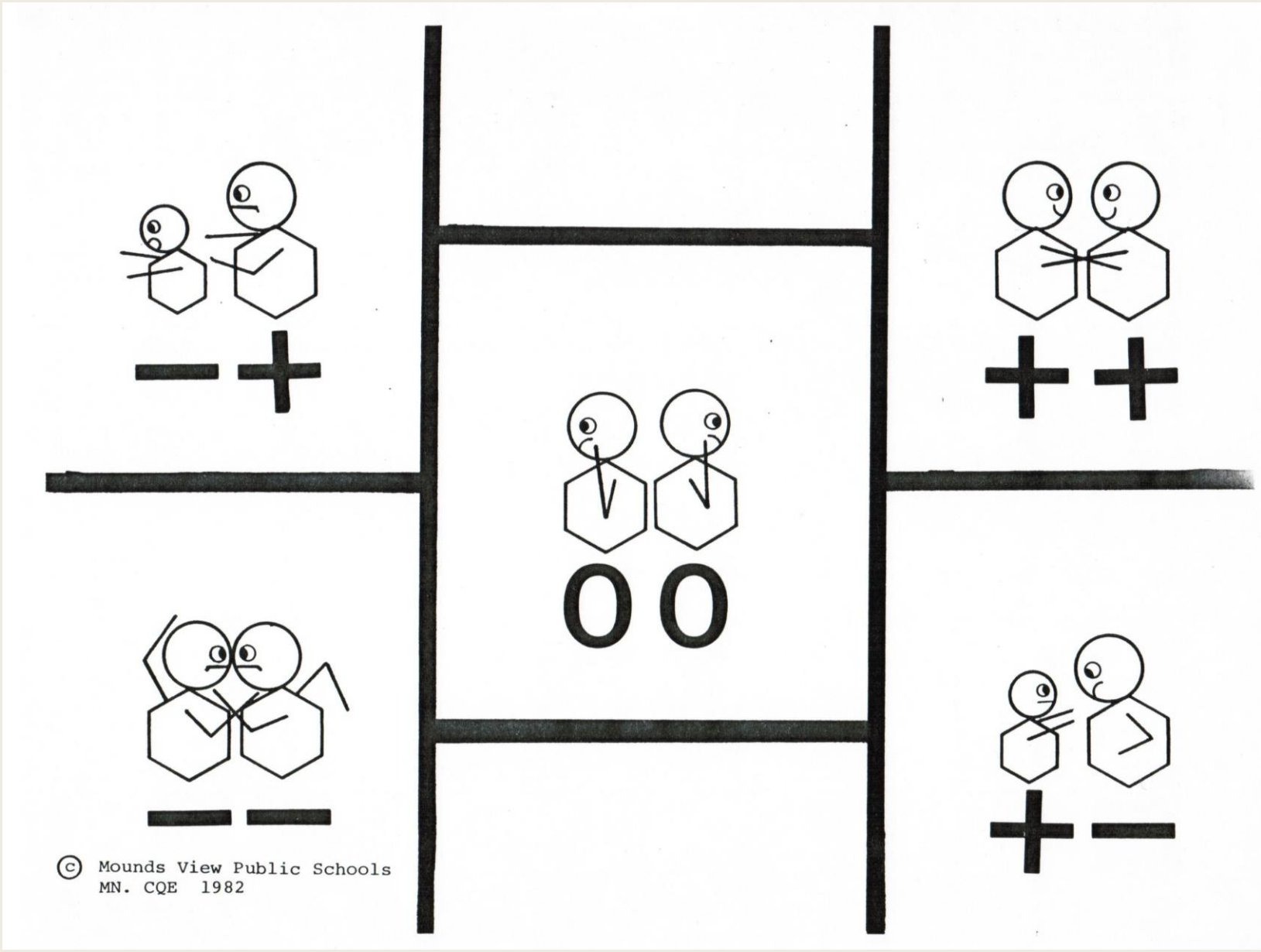

ASSEMBLY of SCIENCES INTO a SINGLE DISCIPLINE
MENDELEYEV'S PERIODIC CHART OF THE ELEMENTS
MODERN FORM OF SPECIAL CASE (ATOMIC) 1869
PHYSICAL
BIOLOGICAL
PSYCHO - SOCIAL
MAPPED
GENERALIZED
1868 J.S. MILL'S NATURAL CLASSIFICATION; GENERAL FORM OF THE PERIODIC LAW, 1868. (APPLIES TO ALL NATURAL SYSTEMS.)
GEOMETRIZED
1619 DESCARTES' CO-ORDINATE SYSTEM (ZERO AND POSITIVE NUMBERS ONLY)
COMPLETED
1663 THE ROYAL SOCIETY'S SECOND OBJECTIVE: "A COMPLETE SYSTEM OF SOLID PHILOSOPHY." 1663
EXECUTED
1677 LEIBNIZ'S UNIVERSAL CHARACTERISTIC, 1677
MODELED
1935 G.F. GAUSE AND A.A. WITTS GEOMETRIC REPRESENTATIONS OF INDIVIDUAL COACTIONS WITHIN ECOSYSTEMS, 1935
ASSEMBLED GENERALIZED
1935 T.H. LANGLOIS' DISCOVERY OF COACTIONS IN FISH SOCIETIES IMPLIES THE OPERATION OF THE PERIODIC LAW IN ANIMAL ECOSYSTEMS; SPECIAL CASE (BIOLOGICAL)
GENERALIZED
MAPPED
1928 IVAN PAVLOV'S DISCOVERY OF THE FOUR HYPPOCRATIC TEMPERAMENTS IN DOGS,
MAPPED
1938 F.J. KALLMANN'S DISCOVERY THAT SCHIZOPHRENIA IS THE SOMATIC EXPRESSION OF DOUBLE-RECESSIVE MENDELIAN GENES IMPLIES GENETIC BASES OF FOUR MENTAL SYNDROMES,
MAPPED
1938 1965 KAREN HORNEY'S DISCOVERY OF THREE NEUROSES PLUS "WELLNESS" — THE DISCOVERY OF "EVE'S" (FINALLY) FOUR FACES
DISCOVERIES OF HUMAN PERIODS, STRATA, COACTIONS IMPLY OPERATION OF THE PERIODIC LAW IN HUMAN CULTURES:
1805 CHAENGER, ASSERMANN, PFISTER: KULTURKREISE STRATA KULTURSCHICHTEN
1962, 1915 HOBHOUSE, WHEELER, GINSBERG, G.P. MURDOCK
PERIODS 1-4: 1 LOWER HUNTERS, 2 LOWER AGRIC., 3 MIDDLE AGRIC., 4 HIGHER AGRIC.
STRATA 1-4: 1 SLAVES, 2 PEASANTS 3 ELDERS, 4 RULERS
1933-'59 ARNOLD J TOYNBEE PERIOD 5 LITERATES STRATA 5: SLAVES, PLEBEANS, EQUITES, PATRICIANS, TOP RULERS.
GROUPS: GENESIS, IV (+,+) ANTITHI OF DISINTEGRATION: -,+,=,=,+,- VI II
ASSEMBLED
1941-1959 W. LLOYD WARNER & ASSOCIATES PEAKS 6: LOWER INDUSTRIALISTS STRATA 6: 1 LOWER LOWER, 2 UPPER L., 3 LOWER MIDDLE, 4 UPPER MIDDLE, 5 LOWER UPPER, 6 UPPER UPPER. GROUPS, 3: CLASS CO-OPERATION +,+ CLASS CONFLICT -,+,=,=,+,-
SPECIAL CASE (ANTHROPOLOGICAL)
1789 CO-ORDINATE SYSTEM OF POLITICAL SCIENCE
LEFT CENTER RIGHT
GROUP II (+,-) GROUP 0 (0,0) GROUP III (-,+)
FRENCH REVOLUTION 1789
COMPLETED
MAPPED
UNIFIED SCIENCE CHART
NEW UNIVERSITY CONCIL, TOTAL EDUCATION IN THE TOTAL ENVIRONMENT
Original (incomplete) design: Symposium on Extension of the Structure of Mendeleyev's Periodic Table to Physical, Biological, and Social Sciences. Council for United Research and Education, Inc.; sponsored by the Society for General Systems Research, A.A.A.S., Boston, Dec. 1960
©Copyright, Edward F. Haskell, 1971
ISOTOPES: 3:1 MENDELIAN RATIO
COSMO-GENETICS
GEO-GENETICS
EVEN PROTONS
EVEN ELECTRONS
ODD PROTONS
ODD ELECTRONS
GROUP IV
GROUP II
GROUP I
(COACTION CARDIOIDS OMITTED)
* LANTHANIDES 57-71
+ ACTINIDES 89-?
GENERAL PERIODIC LAW R=fΘ
POINT OF MAXIMUM ORGANIZATION
GROUP VI
GROUP IV
GROUP O
GROUP I
(PATH OF THE DAMPED VECTOR)
COACTION CARDIOID
CIRCLE OF ATROPY
R=0
POINT OF MAXIMUM ENTROPY
ECTROPY
ATROPY
ENTROPY
ABIOTIC
SYMBIOSIS
MUTUAL AID
PREDATION
ALLOTROPHY
COMMENSALISM
AMENSALISM
SYNNECROSIS
ALLOLMY
PARASITISM
NEUTRALITY
BIOTIC
MINORITY
RIGHT CENTER
MODERATE RIGHT
CREATIVE CENTER
LEFT CENTER
FAR RIGHT
MAJORITY
MODERATE LEFT
EXTREME RIGHT
EXTREME LEFT
FAR LEFT
TWO-IDEOLOGY SYSTEM
CULTURAL
PERIODIC CO-ORDINATE SYSTEM
(ZERO AND POSITIVE NUMBERS ONLY)
TABLE OF HUMAN CULTURES
TABLE OF ANIMAL ECOSYSTEMS
TABLE OF BIOPOETIC AND PLANT ECOSYSTEMS
TABLE OF GEOPHYSICAL SYSTEMS
TABLE OF MOLECULES
TABLE OF ATOMS
STABLE PARTICLES
PERIODIC TABLE OF MOLECULES 3. (missing)
PERIODIC TABLE OF GEOPHYSICAL SYSTEMS 4. (missing)
PERIODIC TABLE OF BIOPOETIC SYSTEMS 5. FIVE PERIODS (hypothetical)
PERIODIC TABLE OF PLANT ECOSYSTEMS FOUR PERIODS (see slide)
PERIODIC TABLE OF HUMAN CULTURES 7. SIX PERIODS (see slide)
PERIODIC TABLE OF ANIMAL ECOSYSTEMS 6. FIVE PERIODS (see slide)
ANTI MUON NEUTRINO
NEGATIVE NUMBERS
ELECTRON
ANTI PROTON
PHOTON
ELECTRON NEUTRINO
POSITRON
PROTON
MUON NEUTRINO
POSITIVE NUMBERS
ALPHA CO-ORDINATE SYSTEM
(ZERO, POSITIVE, AND NEGATIVE NUMBERS)
HYPOTHETICAL
INFERRED ("BLACK HOLES")
OBSERVED
ANTI ATOMS
ANTI MOLECULES
ANTI GEO-PHYSICAL SYSTEMS
INVERTED PERIODIC CO-ORDINATE SYSTEM
(ZERO AND NEGATIVE NUMBERS ONLY)

MAIN CURRENTS
IN MODERN THOUGHT



THE COACTION COMPASS

Discussed on pages 45-57



Interaction place map used to teach social skills to children with learning disabilities. Barbara Leary, 1982

Speculator

Edward F. Haskell, independent researcher, U.Chicago
Fred Cassidy, Linguistics, U. Wisconsin
W. V. Quine, Philosophy/Mathematics, Harvard
Harold G. Cassidy, Chemistry, Yale

Oberlin Alumni Magazine ~ 1980

Speculator

"hitchhiking to Oberlin?"
= 1 Google hit.

Edith Reynolds (1908)

Edward F. Haskell, independent researcher, U.Chicago
Fred Cassidy, Linguistics, U. Wisconsin
W. V. Quine, Philosophy/Mathematics, Harvard
Harold G. Cassidy, Chemistry, Yale

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$100/month for life

Prof. Egolfs V. Bakuzis,
University of Minnesota, St. Paul, MN

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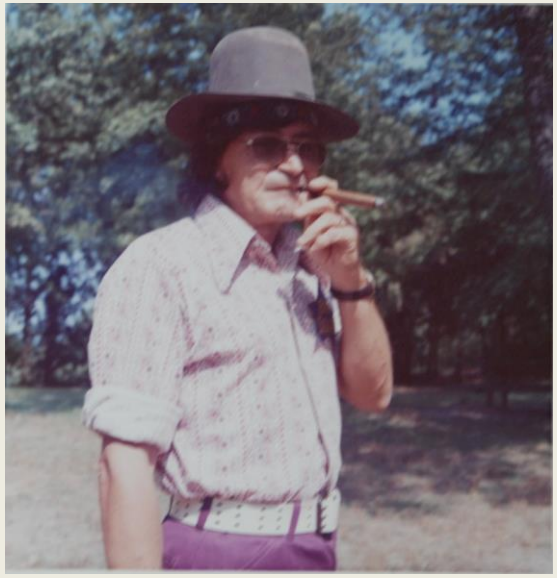
Fred Cassidy, Linguistics, U. Wisconsin
W. V. Quine, Philosophy/Mathematics, Harvard
Harold G. Cassidy, Chemistry, Yale

Oberlin Alumni Magazine

You don’t have to be a PhD from Harvard or a European university to make a mark in science.

- Just invent a concept – something really new!!



John Krajicek
Scientist, USDA Forest Service
GS-7,9? (when concept invented)

John Krajicek was awarded a

Certificate of Merit

by USDA Forest Service in 1980 for 'inventing a concept' – crown competition factor (CCF) (the only known award USFS has ever made for 'inventing a concept').

Krajicek, J. and K. Brinkman. 1957. Crown development: An index of stand density. Central States For. Exp. Station Note #108. 2p.

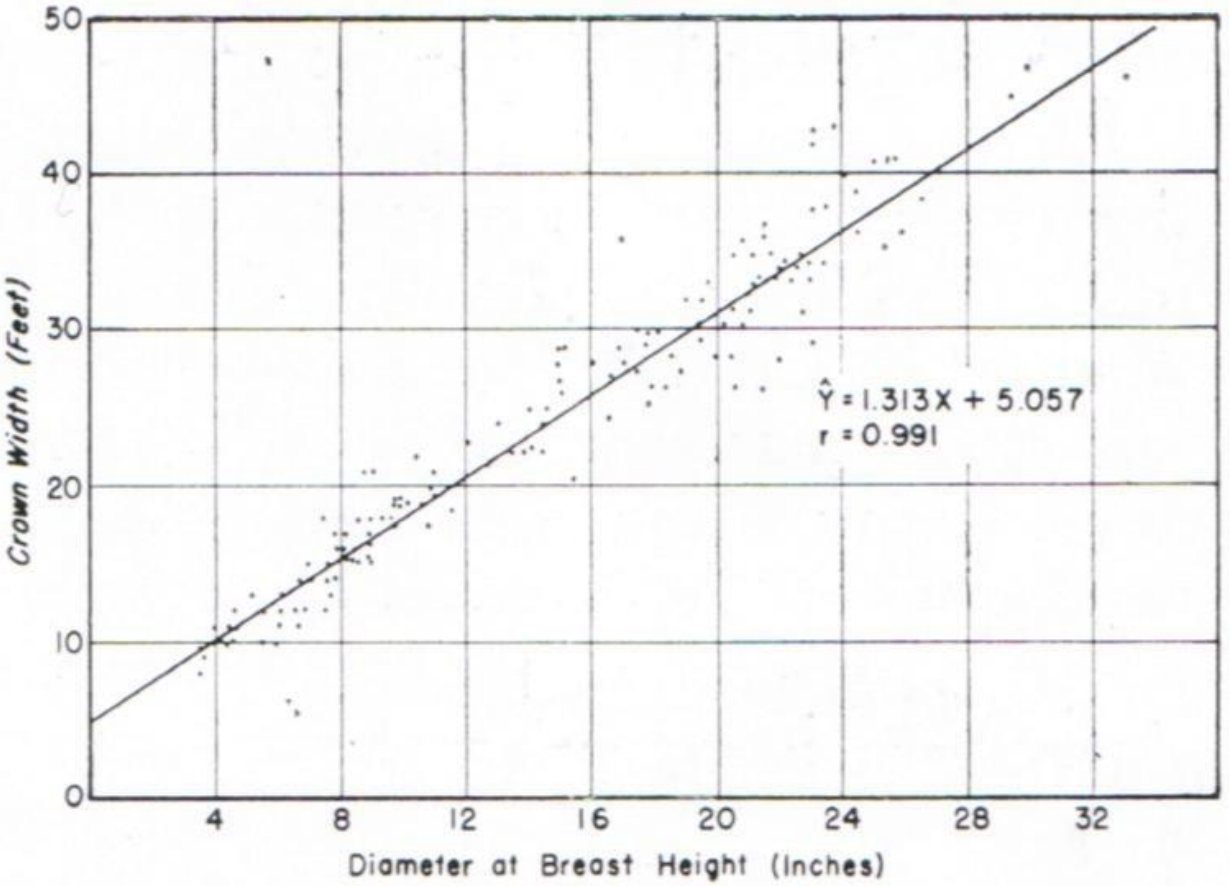


FIGURE 3. *Relation of crown width to d.b.h. for open-grown Norway spruce.*

Table 3.3. A Classification of space occupancy measures.

subjective — objective

based on human ideal, e.g.,
full stocking
well stocked

absolute — relative

(without reference to another stand)

based on

diameter, e.g., basal area

height, e.g., Wilson's

diameter and height, e.g., bole area (Lexen)

(with reference to another stand)

based on

induced change

1) number of trees *vs.* mean dbh, e.g., stand density index (Reineke)
2) mean tree volume *vs.* trees/acre, e.g., relative density index (Drew and Flewelling)
3) relative basal area, e.g., (actual)/(normal) = .5

spontaneous change

1) open grown tree dimensions e.g., CCF (Krajicek) CW/H (Honer)

www.coldspringsranch.net/house050700.htm

Leary, R. A. 1985. Interaction theory in forest ecology and management. Martinus/Nijhoff.

waynesboroughhistoricalvillage.com

Krajicek, J. and K. Brinkman. 1957. Crown development: An index of stand density. Central States For. Exp. Station Note #108. 2p.

Krajicek, J., K. Brinkman, S. Gingrich. 1961. Crown competition: A measure of density. Forest Science 7(1):35-42.

Krajicek, J., et.al 1961. Crown competition: A measure of density. Forest Science 7(1):35-42.

Take Aways:

- Scientists ‘march to many different drummers’.
- Science enterprise is sufficiently large there is room for many ‘styles’.
- Doors can be opened for you by being mentored by a ‘wide thinker’.
- You don’t have to invent a Theory (or even a Proposition (Law)) to earn an important place in the history of *(your)* science.

Thank You