TRANSPORTATION-MARKINGS GENERAL CLASSIFICATION

TRANSPORTATION-MARKINGS:
A STUDY IN COMMUNICATION MONOGRAPH SERIES

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TRANSPORTATION-MARKINGS: GENERAL CLASSIFICATION

Part H Second Edition

Volume II, Further Studies

Transportation-Markings: A Study in Communication Monograph Series

Brian Clearman

Mount Angel Abbey 2003

Dedicated To:

James Dwight Dana (1813-1895)
author of the *System of Mineralology*
and his familial and scientific
descendents who continue the System.

The seventh edition of the *System of Mineralology* (Volume I, 1944) with its numerical classification has been an especially notable influence on Transportation-Markings taxonomy.

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PREFACE

The first edition of Part H brought to a close the specifically descriptive and taxonomic modal phase of the Monograph Series. Part H while a short document has, nonetheless, a major role in T-M studies. It draws together the entire range of diverse and numerous T-M forms. It accomplishes this task by constructing a taxonomic matrix that unifies all Transportation-Markings in a twofold manner: through the transport modes and through the energy forms underlying the messages. Messages are arguably a third force in the study. The diversity of markings is further amplified by including a variant classification for each of the transport modes.

Taxonomies presuppose nomenclature or rules for classifying objects of whatever sort. The T-M nomenclature is included in Appendix I of this study. It includes both background information as well as the rules for the classifications. The first edition of Part H provided an index of classifications and of nomenclatures for Parts A-G. This second edition includes references to classification and indexes for the Database, Part Ii-iv.

During a sabbatical in Humboldt County (California North Coast) in 1991 this writer followed a dual regimen: research and writing in T-M (Part A, 2nd ed., portions of Parts F and G), and reading in the Theology of Creation. The two interests were tied together through the composition of a "psalm" (the term canticle is as accurate if not more so) that presented the panoply of T-M forms in a psalm format. That format was suggested by Biblical psalms and canticles both of which offer a rich and pregnant approach to the theology of creation. A second revision of that admittedly rough and pale imitation of a creation psalm concludes this study.

The T-M project had the form of a quarternity twice over (4+4) in the 1994 edition. Further monographs and

The T-M project had the form of a quarternity twice over (4+4) in the 1994 edition. Further monographs and additional editions of some of the studies (completed, in process, projected) have resulted in either a quadrapule quarternity (4x4) or a sextuplet quaternity (6x4). The original work (Vol I) contained Parts A, B and C/D and can be viewed as one study or three; a possible fourth edition of Part A adds a monograph for a total of 6 or 8 studies. Part E in Vol II is scheduled for revision after the reworking of Part H. Parts F and G bring Vol II to 6 studies. The Data-base (Part Ii-iv, Vol III) can be viewed as one study or as four. A possible second edition can be seen as one study or four or 2 or 8 studies for Vol III. Part J in Vol IV and the projected Part K, the final entry for that volume (and the Series), adds 2 studies. This results in either 16 or 24 monographs or 4 or 6 quarternities.

Part B offers a more detailed study of T-M by focussing on the markings of one nation: the U.S. Much of the early classification of Transportation-Markings (1969, 1970) is at the core of this study as well as all of the later studies. Extensive expansion of classifications in Part B can be applied to broader studies. A second edition of Part B appeared in 1992.

Parts C (Floating Aids) and D (Fixed Aids) constitutes a single work that focusses on marine aids. With hindsight a single part would have sufficed for marine aids with sub-parts for floating and land-based aids. A newer problem is that of spaced-based aids. Heretofore GPS, a spaced-based aid, is a component of other electronic aids which are land-based. A change is needed to more accurately reflect the character of space-based aids. Parts C & D were included in the first edition along with Part A and Part B. The 1988 second edition created a free-standing venue for the marine study, and it is the first of the mono-graphs to examine T-M forms in an international mode.

Part E centers on traffic control devices and constitutes the first free standing study in its original state as well as the initial entry for Volume II. The first edition was completed in 1988. A projected second edition may

forms. An additional edition would revert to the more traditional pattern.

Part F is devoted to railway signals and is the second unit of Volume II. While substantially completed in 1990 it underwent further revisions in 1991 and was published in 1992. It relies on national and limited regional materials since a more international scope of signal guidelines and codes is less available for railway signals. It contains a variant classification and is the first monograph to do so.

Part G, the aero navigation aids study, was completed in 1994 following research and writing over several years. It also includes a variant classification. It is the final unit of Volume II.

Part H in its first edition can be viewed as a post-transport mode work and balances the pre-mode work of Part A. This second edition is post-mode twice over: that of the descriptive modal studies, and now of the database modal studies.

Part I is divided into four modal-based components (Ii, Iii, Iiii, Iiv). It is a database comprised of entries for the individual T-M forms. Part I was incrementally completed over the years 1997-2001.

Part J, a historical survey (1750-2000) of T-M appeared in 2002. It offers a brief review of the development of major forms within larger historical issues.

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The total Transportation-Marking experience in it self can be viewed as a quarternity. The first of these elements has a tripartite structure: common impetus, common focus, common response. Safety problems occur thereby creating an impetus for safety aids. This impetus bears a substantial resemblance from one transport mode and aid to the next. Safety aids have a common focus since the requirements for meeting a safety need are also marked by a considerable measure of commonality. And the process of supplying

safety aids generate a response in the producer that is notably similar for all the modes of transportation.

The second element of the quarternity also exhibits three aspects. There is not only a parallel use of science, technology, and design but an overlapping and inter–twining use of those disciplines as well. Science applied to optics, acoustics and electronic impulses production finds uses throughout Transportation-Markings. The technical devices that create and emit message patterns are frequently not dissimilar and may be common to many forms of T-M. The principles of design and their application to markings are not confined to isolated entities within T-M but instead find a broadly shared use.

The third element of tools that can be applied to T-M studies forms a fourfold assemblage of taxonomy, semiotics, communications, and holarchy. Taxonomy is the focus of this study and notions of semiotics and communications influence -- sometimes implicitly, sometimes explicitly -- the monographs of this Series and both affect and and are affected by Transportation-Markings. More recently holarchic ideas from Arthur Kostler have been added to the earlier melange of taxonomy, semiotics and communications. The third edition of Part A reviews that topic as well as the older topics.

The quarternity's final element is singular in construction and content. That element is a possible convergence of Transportation-Markings forms through GPS. The development of Global Positioning Systems (GPS) was originally applied to marine and aero navigation. However, GPS is undergoing extension into rail and road navigation as well. Those extensions are accompanied by off-road pedestrian usage and other personal uses. If those developments becomes further actualized then on one level a single Transportation-Markings will become a reality.

Further development of GPS and various forms of Differential GPS may eventually require a fifth mode for the classification. Such a mode would transcend and include all other modes. It would center on satellite

navigation systems of all forms. A true convergence, a true unitary Transportation-Markings would be the result of this development with no more than secondary differentiation for specific applications.

A long-enduring interest in T-M by the writer has been joined by a newer interest in the theology of creation. While technology, including T-M, is only infrequently included in such a theology, there have been some efforts in this study to offer hint of the workings of such a theology for this technological interest. This has been done through the medium of selections from the theological literature that can be applied to Transportation-Markings.

References for Quotes

Note: A collection of quotes relating to creation, writing, semiotics, systems and taxonomy with implications for Transportation-Markings is included in this monograph. U.S. copyright law permits 'fair use' reproduction of copyrighted material. The use of quotes in this study conforms to fair use as described by Stephen R. Elias, J.D. in the work entitled, *Nola's Intellectual Property Law* (Berkeley (CA): Nola Press, 1985). The following list provides a credit line for those quotes.

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"I was driven to pursue connections
and enabled to perceive gaps and openings
which well-trained and -equipped craftsmen
did not notice, for they were busy with their craft."
Rosemary Haugton, *The Passionate God,* 1981, 4.

CHAPTER ONE

INTERNATIONAL CLASSIFICATION WITHIN TRANSPORTATION MODE CONTEXT

"Whereas for Augustine, all things, even in their material nature were to be referred for their truth to God who was their beginning and also their final goal, St. Thomas Aquinas, partly as a result of his assimilation of Aristotelian philosophy, was concerned with things as they were in themselves, without simply referring them to God. So it was important to acquire knowledge of things for themselves, beginning from sensory knowledge, and proceeding to define and understand for their own intelligibility, and only then finding their order in relation to God. Thus they retained their nature even while it was perfected when brought into relation with God, lest his work in grace conflict with his work in creation."

Hardy and Ford, *Praising & Knowing God*, 1985, 184.

"The universe would not be better if all things were of an angelic nature, for although an angel in itself is better than a rock, it is better that both should be rather than just the one ... . For individuals in the same species repeat the same essential perfection, whereas a multiplicity of species manifest a greater range of the divine perfection."

John H. Wright, *The Order of the Universe in the Theology of St Thomas Aquinas,* 1957, 6.

"We must compare things because that is the way our brains are constituted."

J.Z. Young in Dillistone's *The Power of Symbols in Religion and Culture,* 1986, 82.

"The entire universe for Teilhard is a divine milieu, a mystical milieu, wherein all things become diaphanous and transparent to reveal the divine presence. Through a mysterious and unexpected grace, the very heart of the universe ignites to disclose the divine fire permeating all things."

Egan, *Christian Mysticism: Future of a Tradition,* 1986, 296.

Chapter 1A Water & Air Transportation-Markings

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13 Unlighted Buoys
- 131 Forms with Variant Versions
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- 130 Standard Single Forms
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14 Sound Buoys
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  - 1402 Gong

16 Multi-Message Marine Floating Ais
- 160 Large Floating Aids, Single Types
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- 251 Radar Aids
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- 252 Hyperbolic Radionavigation Systems
  - 2520 Loran
  - 2521 Decca
  - 2522 Omega
  - 2523 Consol
- 253 Satellite Navigation Aids
  - 2530 Global Positioning System
  - 2531 Differential GPS

Notes

The Marine Aids to Navigation Classification was in an unitary form both in 1981 and 1988. There was no variant form of the classification until the first edition of Part H in 1994. Separating the core from the variant form has proven to be difficult since the available international standards, largely those of IALA, pertain almost entirely to buoys. Perhaps paradoxically, assigning non-IALA buoy forms was a relatively easy task. But fixed aids of all forms presented a significant problem. And the attempted solution was admittedly imprecise and uncertain: forms of aids that

are traditionally commonplace to marine aids are assigned to the main classification but only in their core form. Other forms are assigned to the variant classification. Guidelines for this process have included the references to fixed aids in IALA system, to the IALA dictionary, and publications of IHB. An additional reference is a survey by the writer of structural forms in DMA (now NIMA, formerly USNOO, USNHO) aids to navigation publications for the first edition of Parts C & D in 1981.

What does "core form" mean? In the case of fixed unlighted beacons there are many aids -- or at least terms -- for slender vertical objects: spars, spindles, poles, posts, etc. But they cannot all be assigned to the main classification since they represent essentially one form of aid, and the classification would become bogged down with numerous similar terms. Therefore, the core form includes concrete terms (including spar or pole), or more abstract terms (including slender vertical members). In that instance the more abstract term was employed.

The parent form, or most commonly employed form, is employed including those with variant forms or subforms (in the case of fog signals). Major and minor lights manifest non-standardized forms and the most common forms or an abstract summary term have been utilized. Parts C/D provide further details for this topic.

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Notes

A variety of changes have been made in the aero navigation aids classification. A number of aids have been conflated into core groups while more detailed and variant forms have been moved to the variant classification. The dual classification of signs has been replaced by signs in the partially-lighted and unlighted categories with details in unlighted. However, signs are often partially-lighted so that signs are both lighted and unlighted aids. A rebuilding of unlighted aids for the Database has affected the classification. Signs and surface markings not infrequently employ the term marker. Those aids now appear under marker but within the appropriate sign or marking group.

Chapter 1B Surface Transportation Modes

1B1 Traffic Control Devices

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4111 Pedestrian Signals
412 Special Signals
4120 Cyclist Signals
4121 Flashing Beacons
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4123 Lane Use Control Signals
4124 Movable Bridge Signals
4125 Emergency Signals
4126 Lighting Devices

42 Partially-lighted TCDs
421 Lighting Devices
4210 Warning Lights
4211 Steady-burning Electric Lamps
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Note

The Traffic Control Devices Classification lacked a variant classification in the 1984 study. The 1994 edition of

Part H added a variant classification though many more detailed forms remained in the main classification. This second edition reduces sign and marking forms in the main classification resulting in an increase in variant of classification entries.

1B2 Railway Signals, Signs, Markers

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5111 Color-light: Searchlight-lens
5112 Color-position Signal
5113 Position-light Signal
5114 Symbol Signals
512 Cab Signals
5120 Color-position Signals
5121 Position Signals
5122 Alphanumeric Signals
513 Dwarf Signals [Signals Governing Train Movements One Track to Another Track (SGTMFOTTAT)]
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5234 Pillar-Disc
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541 Signals with Variant Forms
5401 Track Crew Warning Signals

56 Multi-message Railway Aids
561 Lighted/Sound Signals
5610 Cab Signals [Audible Cab Signals]
5611 LC/GC Signals [Crossing Bells]

Note

The railway signals classification has undergone only limited changes. Sound signals, omitted in 1994, are added, as well as multi-message aids.

"The vision of God is glimpsed within the world of matter."
Leech, *The Social God*, 1981, 55.

"To Name Properly Implies Knowledge of Essence."
Bouma-Prediger, *For the Beauty of the Earth: A Christian Vision for Creation Care*, 2001, 73.

"Each truth is a fragment which does not stand alone but reveals connections on every side."
Sertillanges, *The Intellectual Life: It's Spirit, Conditions, Methods*, 1946, 30.

CHAPTER TWO

INTERNATIONAL CLASSIFICATION BASED ON MESSAGE ENERGY FORMS WITH VARIANTS

"That is where Umberto Eco comes into the story. Eco is a professor of semiotics, the science of signs. We have come to think of signs as lifeless abstractions, labels assigned arbitrarily to things in the world. But in medieval times, as Eco shows in his novel *The Name of the Rose,* signs were believed to resonate with magic. With the proper incantation one could invoke the powers of the universe. As a semiotician, Eco tries to restore some of this magic to twentieth-century linguistics, showing that signs are not empty labels--mere reflections of what we think of as hard- core reality--that they form a world unto themselves, a kind of cyberspace in which they take on a life of their own. When we buy a pair of Guess jeans or a Gap T-shirt, we are not merely buying cloth cut and sewn with thread, we are buying a symbol that stands for a whole world of messages we are trying to convey."

George Johnson, *Fire in the Mind: Science, Faith, and the Search for Order*, 1995, 252-253.

"There's a general attitude that I've insisted on having, that machines are sad and pitiful creatures also, and deserve a lot of compassion and help.... An attitude of superiority and hostility toward machines is just going to be bad luck for human beings, and it isn't going to help machines achieve their fullest potential either."

Gary Snyder in Thompson, *Outside,* November 1993, 62.

"Nature in its entirety has value for God. I refer to <u>all</u> of nature, both the living and the non-living; the human and non-human; plants as well as animals; sticks, air, water, stones: <u>everything</u>."

Baer, Ecology, Religion & the American Dream, *AER,* September 1971, 47.

"Santmire's employment of the term [nature] denies any suggestion that houses, automobilies, cities, and so on are 'not natural.' He deals with 'fabricated nature' as 'nature taken up into, or stamped by, the world of spirit.'"

Claude Stewart, *Natural in Grace: A Study in the Theology of Nature,* 1983, 51.

2A Main Classification

2A1 Visual Forms-All-Lighted

21 All-lighted Marine Aids
- 210 Single Forms
  - 2100 Traffic Control Signals
  - 2101 Sector Lights
  - 2102 High-intensity Marine Lights

31 All-lighted Aero Aids
- 311 Approach Lamps
  - 3110 Unidirectional Lamps
  - 3111 Omnidirectional Lamps
- 312 Final Approach Indicators
  - 3120 Visual Approach Slope Indicators
  - 3121 Precision Approach Slope Indicators
  - 3122 Pulse Light Approach Path Indicator
  - 3123 Tri-Color Visual Approach Slope Indicator

41 Traffic Control Signals
- 411 Standard Signals
  - 4100 Traffic Signals
  - 4111 Pedestrian Signals
- 412 Special Signals
  - 4120 Cyclist Signals
  - 4121 Flashing Beacons
  - 4122 Level (Railway) Crossing Signals
  - 4123 Lane Use Control Signals
  - 4124 Movable Bridge Signals
  - 4125 Emergency Signals
  - 4126 Lighting Devices

51 All-lighted Railway Signals
- 511 Trackside Signals [Signals Governing Train Movements on One Track (SGTMOOT)]
  - 5110 Color-light: Multiple-lens
  - 5111 Color-light: Searchlight-lens
  - 5112 Color-position Signal
  - 5113 Position-light Signal
  - 5114 Symbol Signals
- 512 Cab Signals

- 5120 Color-position Signals
- 5121 Position Signals
- 5122 Alphanumeric Signals
- 513 Dwarf Signals [Signals Governing Train Movements One Track to Another Track (SGTMFOTTAT)]
  - 5130 Color-light: Multiple-lens Signals
  - 5131 Color-light: Searchlight-lens Signals
  - 5132 Color-position Signals
  - 5133 Position-light Signal
  - 5134 Symbol Signals

2A2 Visual Forms--Partially-Lighted

12 Lighted Floating Aids
- 120 Standard Single Types
  - 1200 Can
  - 1201 Spherical
  - 1202 Conical
  - 1203 Pillar

16 Multi-Message Marine Floating Aids
- 160 Large Floating Aids, Single Types
  - 1600 Light Vessels
  - 1601 Large Navigational Buoys
- 161 Lighted Sound Buoys
  - 1610 Lighted Bell Buoys
  - 1611 Lighted Whistle Buoys
  - 1612 Lighted Gong Buoys

22 Lighted Fixed Aids
- 221 Major Structures (Lighthouses): Sea-girt
  - 2210 Towers on Rocks
  - 2211 Towers on Skeleton Structures
  - 2212 Towers on Special Marine Foundations
  - 2213 Houses on Special Marine Foundations
- 222 Major Structures: Land-based Towers
  - 2221 Tall Coastal Towers
  - 2222 Towers on Promontories & Headlands
  - 2223 Open Towers
- 223 Major Structures: Non-towers
  - 2230 Houses
  - 2231 Buildings

2232 Composite Structures
224 Minor Structures
2240 Single Vertical Members (Narrow)
2241 Single Vertical Members (Broader)
2242 Multi-member Open Structures
2243 Enclosed Structures
2244 Composite Forms
2245 Single Forms

32 Partly-lighted Aero Aids
321 Runway & Taxiway Inset (Inpavement) Lights
3210 Centerline Lights
3211 Edge Lights
3212 Transverse (Cross-Runway/Taxiway) Lights
322 Runway & Taxiway Elevated Lights
3220 Edge Lights
32221 Transverse (Cross-Runway/Taxiway) Lights
323 Beacons
3230 Aerodrome Beacon
3231 Identification Beacon (Code Beacon)
324 Obstruction Lighting
3240 Low Intensity Lights
3241 Medium Intensity Lights
3242 High Intensity Lights
325 Wind Indicators
3250 Wind Indicators
3251 Wind Tees
3252 Landing Direction Indicators
326 Aircraft Stand Aids
3270 Manoeuvring Guidance Lights
3271 Docking Guidance Lights
327 Heliport Lights
3271 Final Approach & Take-Off Areas Lights
3272 Touchdown Lift-off Area Lighting System
328 Partially-Lighted Signs

42 Partially-lighted TCDs
421 Lighting Devices
4210 Warning Lights
4211 Steady-Burning Electric Lamps
422 Signs [Special types of signs are listed in unlighted classsification; any signs that are lighted are

classsification; any signs that are lighted are designated by number 2 in second digit in place of number 3]

52 Partially-lighted Railway Signals
521 Trackside Signals -- Semaphores
5210 Blade-spectacle Fully-integrated
5211 Blade-spectacle Integrated Through Linkage
5212 Blade/Lens Partially Integrated
5213 Blade/Lens Separate
5214 Composite: Blade/Lens Integral
5215 Double: Blade/Lens Integral
522 Signal Boards
5220 Single-unit Signals
5221 Double-unit Signals
5222 Composite: Semaphore-signal Board
523 Dwarf Semaphore & Rotating Signals
5230 Dwarf Semaphores
5231 Disc-Open, with Signal Lamps
5232 Disc-Open, Indirectly-lighted
5233 Disc-Semaphore
5234 Pillar-Disc
5235 Miniature Graphic Symbol Indicators
524 Dwarf Revolving Signals
5240 Disc Signals
5251 Panels
5262 Graphic Symbols-enclosed
5273 Graphic Symbols-open
525 Railway Signals
5250 Single Forms, Lighted Signs

2A3 Visual Forms--Unlighted

13 Unlighted Buoys
130 Standard Single Forms
1300 Ogival
1301 Spindle
1302 Spherical
1303 Pillar
131 Forms with Variant Versions
1310 Conical
1311 Can/Cylindrical

23 Unlighted Marine Fixed Aids
231 Natural Marks
2310 Cairns
2311 Trees
2312 Stone Construction
232 "Artificial" Marks
2320 Unidimensional Forms
2321 Open Structural Forms
2322 Enclosed & Solid Construction Forms
233 Morphological/Physical Forms
2330 Daymarks
2331 Daymarks & Structures

33 Unlighted Aero Navigation Aids
330 Signs-Single Forms
3300 Aerodrome Identification Signs
3301 Aircraft Stand Identification Signs
3302 Road-Holding Position Signs
331 Signs with Variant Versions
3310 Mandatory Instruction Signs
3311 Information Signs
332 Signs Under Heading of Marker - Single Forms
3320 Distance-to-go Marker
3321 Aircraft Arresting Marker
3322 VOR Check-point Marker
334 Markings
3340 Longitudinal Markings
3341 Transverse Markings
3342 Graphic Symbols
3343 Alphanumeric Markings
335 Markings Under Name of Marker - Single Forms
3350 Barrier-Engagement Markers
3351 Fixed Distance Marker
3352 Runway Touchdown Zone Marker
3353 Aiming Marker for Turbojet Operations
336 Obstruction Markings
3360 Patterns
3361 Spherical Markers
3362 Flags
337 Elevated Markers
3370 Painted Forms on Horizontal Objects
3371 Reflective Forms
3372 Flags

3373 Structural Forms
3374 Natural Forms
3375 Geometric Forms
338 Low-Elevation Markers
3380 Reflective Forms
3381 Natural Forms

43 Unlighted TCD Signs & Markings
431 Warning Signs
4310 Roadway Alignment Signs
4311 Roadway Conditions Signs
4312 Intersection Signs
4313 Intermittent Moving Hazards Signs
4314 Construction & Maintenance Signs
4315 Level/Grade Crossing Signs
432 Regulatory Signs
4320 Priority Signs
4321 Prohibition & Restrictive Signs
4322 Mandatory Signs
4323 Standing & Parking Signs
433 Informative Signs
4330 Distance & Direction Signs
4331 Route Markers
4332 Mile Posts
4333 Signs of General Interest
434 Horizontal Markings
4340 Longitudinal Markings
4341 Transverse Markings
4342 Multiple-direction Markings
4343 Graphic Markings
4344 Alphanumeric Markings
435 Vertical Markings
4350 Barricades
4351 Channelizing Devices
4352 Delineators
4353 Object Markings

53 Unlighted Railway Signals, Signs & Markings
531 Targets & Track Indicators
5310 Color
5311 Shape
5312 Position

5313 Color-Shape
5314 Miniature Graphic Symbol Indicators
532 Signs - Other Than Speed Regulations
5320 Approach: Station, Yard, Crossing, Bridge & Whistle Posts
5321 Station, Yard, Track & Political Units
5322 Location Signs (Mileage Posts)
5323 Sign & Signal Identification & Signal Function
5324 Stop Boards
5325 Section & Block Signs
5326 Electric Traction Signs
5327 Safety Signs
5328 Maintenance of Way Signs
533 Signs - Speed Control
5330 Speed Limit Signs
5331 Speed Reduction Signs
535 Signs Under Other Names
5340 Flags
5341 Plates
5342 Stop Boards
535 Markings
5350 Pillars & Posts
5351 Small Posts (Petites)
5342 Marker Boards
5343 Sign-like Objects
536 Fixed Unlighted Signals

2A4 Acoustic Aids

14 Sound Buoys
140 Single Types
1400 Bell Buoy
1402 Gong Buoy
1401 Whistle Buoy

16 Multi-Message Marine Floating Aids
161 Lighted Sound Buoys
1610 Lighted Bell Buoy
1611 Lighted Whistle Buoy
1612 Lighted Gong Buoy

24 Fixed Fog Signals

240 Signals with Single Forms
2400 Whistle
2401 Bell
2402 Gong
2403 Reed Horn
2404 Siren
241 Signals with Variant Forms
2410 Diaphone
2411 Diaphragm Horn
2412 Explosives

44 Sound Traffic Signals
440 Signals with Single Forms
4400 Moveable Bridge Signals
441 Signals with Variant Forms
4410 Audible Pedestrian Signals

54 Railway Sound Signals
540 Signals with Single Form
5400 Detonators
541 Signals with Variant Forms
5401 Track Crew Warning Signals

56 Multi-message Railway Aids
561 Lighted/Sound Signals
5610 Cab Signals [Audible Cab Signals]
5611 LC/GC Signals [Crossing Bells]

2A5 Electronic Forms

25 Marine Electronic Aids
250 Electronic Aids, Single Form with Variants
2500 Radiobeacon
251 Radar Aids
2510 Racon
2511 Ramark
2512 Radar Reflectors
252 Hyperbolic Radionavigation Systems
2520 Loran
2521 Decca
2522 Omega

2523 Consol
253 Satellite Navigation Aids
2530 Global Positioning System
2531 Differential GPS

35 Aero Electronic Navigations
351 Final Approach & Landing Aids
3510 ILS
3511 MLS
352 En-Route Short-Distance Aids
3520 VOR
3521 DME
3522 VORTAC
3523 TACAN
3524 Non-Directional Beacon (NDB)
3525 En-Route: VHF Marker Beacon
353 En-Route: Hyperbolic Systems
3530 Loran-C
3531 Consol
3532 Decca
354 Satellite Navigation Aids
3540 Global Positioning System (GPS)
3541 Differential GPS

55 Railway Electronic Aids
550 Radio Aids - Single Forms
5550 Radio Token

Notes for Chapter 2A

21 All-lighted Marine Aids. While most marine aids to navigation are not continuously lighted there are some aids of more recent vintage that have such capability. The lst ed contained one such aid and two more are added in the 2nd ed. Pharos Marine, a major source of aids, provides the information which, in part, reflects IALA/IALP guidelines.

311 Approach Lamps. Only primary forms are listed in main classification. The variant classification now encompasses detailed forms that had been included in lst ed.

are now in variant classification. General terms (3122 and 3123) are in main with specific forms in the variant classification. 3123 was not included in the 1st ed.

4120 Cyclist Signal. This refers to UN 1968 signal for use of cyclists. Term is descriptive since UN does not so name the signal.

4124, 4125, 4126 Movable Bridge Signals, Emergency Signals, Lighting Devices. These signals were not included in the lst ed though in use at the time.

511 Trackside Signals. Part F employed an alternate formulation for mainline signals: Signals Governing Train Movements on One Track [SGTMOOT]. That phrase does not indicate whether signals were full-size or dwarf. However the expression is not entirely precise, and it presented a cumbersome appearance. The older term is therefore reintroduced though not fully precise.

5110, 5111. There are two forms of Color-light Signals. Possibly only one form should appear here with specific versions in variant classification. However, both are major forms and retained here.

5114, Symbol Signals. lst ed has graphic and alphanumeric symbol forms but those designations are assigned to the variant classification with a general term employed here.

512, Cab Signals. These signals were attached to mainline signals in the lst ed. But cab signals are now given a separate listing. Possibly the principal forms of these signals might be assigned to the variant classification though a decision was made to list them here.

513, Dwarf Signals. This traditional term replaces a term coined for Part F: Signals Governing Train Movements One Track to Another Track [SGTMFOTTAT]. Comments for 511 have application here.

12 & 22 are unchanged from the lst ed.

321 & 322. A more physical, less morphological format has been adopted. Runway and taxiway light forms have been merged.

3212 & 3222. The term transverse has been borrowed from TCD markings. It brings together a variety of aids that display cross-runway and -taxiway lights. Specific forms are now in the variant classification.

3230, Aerodrome Beacons. This is a morphological term though it incorporates a physical dimension. Heliport Beacon in the 1st ed is now a variant term since it is one form of the Aerodrome Beacon.

3251, Wind Tee. This is an older and obsolescent aid. It was omitted in lst ed but added here since it continues to find some usage.

326, Aircraft Stand Aids. The older name of Parking and Docking Aids has been changed since both forms refer to aircraft stand situations. The terms are morphological though also containg a physical dimension.

327, Heliport Lights. One aid, aiming point lights, has been moved to partially-lighted since it consists of an unlighted triangle augmented by appropriate light units.

328, Partially-lighted Signs. This pertains to signs in unlighted classification when lighted. Such signs, when lighted, begin with "3" rather than "4". The special dual classification in lst ed is replaced by separate though interrelated classifications.

42, Partially-lighted TCDs. The lst ed did not include this segment though some forms existed at that time. Lighted signs had been in the special dual classification while lighting devices were altogether omitted.

421, Lighting Devices. Two of these forms are partially-lighted while two other forms are all-lighted. Possibly specific forms should be seen as variants though the forms

have distinct appearances.

422, Signs. Signs are classified by forms in the unlighted segments. This truncated segment refers to those signs that have a lighted dimension. Such signs are preceded by a "4" instead of a "5".

521, Trackside Signals-Semaphores. Comments on reintroducing trackside is taken up in all-lighted signals, 512.

5210, Blade-spectacle Fully-integrated. UQ and LQ forms are now in variant classification.

5220, Single-unit Signals. Specific forms are now in variant classification.

523, Dwarf Semaphore & Rotating Signals. The term dwarf reintroduced here as was done in adjoining segments.

5230, Dwarf Semaphores. UQ & LQ forms are now variants.

5231 and 5232. Perhaps these forms are not sufficiently differentiated to qualify as main entries in this classification. Yet they may be sufficiently different to qualify as entries in the main classification.

524, Disc Signals. Individual forms formerly included are now variants.

5250, Lighted Signs. Unlighted signs with a lighted dimension assigned to this classification designation.

13 and 23. The lst edition employed an older and unrevised version of the classification that employed the number 4 for unlighted aids. The accompanying three and four-digit designation are also affected.

33, Unlighted Aero Navigation Aids. This segment has undergone a substantial overhaul. The terms are now more physical in nature. And markings and signs listed under marker are so designated. The accompanying database

entries also underwent substantial revision thereby better reflecting unlighted aero aids.

330, 331, 332, Signs. In the lst ed these were in a special dual classification outside of the unlighted aids categories. They are now rejoined to other unlighted aids. Partially-lighted categories include a lighted signs heading which is to be applied to signs when lighted.

431, Warning Signs. This segment has been overhauled. It reflects Canadian practice which offers a better organization for these aids. It is also employed in the Database.

432, Regulatory Signs. Several forms in the lst ed have been moved to the variant classification thereby reducing specific forms and introducing general groups for main.

433, Informative Signs. Specifc forms have been moved from this segment to variant classification and main forms are in now more general groupings.

434, Horizontal Markings. This segment replaces four segments in lst ed. Many entries -- often morphological in nature -- are now in variants.

435, Vertical Markings. This is a new segment. Only one four-digit entry was included in the lst ed. That entry, obstacle markings, is now termed object markings.

532, Signs -- Other Than Speed Regulations. This is retained from the lst ed. The many entries are often morphological in name though some measure of the physical is embedded in the entries. Reconfiguration of the entries to fewer categories and to more physical categories is not easily accomplished and has not been fully achieved.

533, Signs-Speed Control. Some entries from the lst ed have been moved to variants. Speed signs is the largest part of signs especially in Europe. There are many nuanced differences yet a classification seemingly has to choose between many signs with small differences or includes only a few broad entries.

535, Markings. Most of these entries have been altered. The compiler added the term markings to most entries which was inaccurate. If together these aids constitute a system of markings they are individually of a diverse and altered character.

536, Fixed Unlighted Signals. This is a new segment for the classification. The several entries are morphological though a less visible physical dimension is present.

537, Movable Signals. These aids were included in Part F though not classified. They include staff, tablets, tickets, and tokens. All of these objects are moved by the train crew between signal huts that mark off a block section.

14, Sound Buoys. The lst ed designated these aids under the number 15 which was correct for an older version of the classification though not in the revised version.

1402, Gong Buoy. This aid has been added here since it remains important though geographically restricted.

16, Multi-message Marine Floating Aids. This category encompasses combination aids. These aids are now located with mode-specific forms since there are few entries to make up an entire inter-modal combination aids category. They include 160, Large Floating Aids, Single Types, and 161, Lighted Sound Buoys. 160 had formerly been in a special combination aids group though not161. These aids, of course, are lighted aids as well as sound aids.

24, Fixed Fog Signals. Several forms have been added to those listed in the 1st ed. Those forms are only infrequently used yet included by some relatively new references. 24 was desiginated as 25 in the lst ed reflecting an older classification nomenclature.

44, Sound Traffic Signals. This segment was absent from the lst ed. However, Part J includes a broad range of sound signals thereby influencing this category.

54, Railway Sound Signals. Comments for 44 apply here.

56, Multi-message Railway Aids. This segment has been added to 2nd ed. Second digit (6) denotes combination aids.

561, Lighted/Sound Signals. This segment includes two very different aids: 5610, Cab Signals [Audible Cab Signals], and 5611, LC/GC Signals [Crossing Bells].

2500, Radiobeacons. Several formerly listed forms are now relocated in variant classification.

2531, DGPS. This is added as a main form since it has considerable significance in navigation in itself.

35, Aero Electronic Navigation Aids. This category has undergone a major overhaul. "Homemade" headings in lst ed are dropped in favor of more conventional headings. The 2nd ed is influenced by the Database.

3510, ILS and 3511, MLS. Components of these aids are listed in the variant clasification in contrast to the lst ed.

3540, GPS, and 3541, DGPS. These entries parallel marine use and could conceivably share a common numeration.

55, Railway Electronic Aids. The lst ed lacked this segment. Numerous terms seemingly describe a single aid: radio or electronic block.

"Hopkins was overcome all his life with 'despair at the multiplicity of phenomena unexplained and unconnected.'"
Sulloway, *Gerald Manley Hopkins & the Victorian Temper,* 1972, 90.

2B Alternate Classifications

Two alternate classifications accompany the international classification based on energy forms. The first of these (2B1) closely follows the first classification though in a schematic formulation rather than in an outline form. Transportation modes as well as energy forms shape its construction.

The second alternate classification is based on the nature of messages placed within a matrix of numbered entities undergirded by a foundation of energy and mode forms.

These classifications are alternate classifications rather than variants. They contain the same material though in different configurations.

"Mircea Eliade once made the point that many new intellectual breakthroughs in the modern would occur not in universities but outside them, through the cross-fertilization of minds and ideas drawn from different disciplines and backgrounds. New discoveries and syntheses are often born out of transdisciplinary encounters the bold embrace of diverse elements hitherto kept apart."
Ursula King, *Christ in all Things: Exploring Spirituality with Teilhard Chardin,* 1997, 39.

"Even the most material of realities, in his [Teilhard] view, have some consciousness, however diffuse. A pebble, for example, has a 'within,' however inert it might appear."
H.P. Santmire, *Nature Reborn: The Ecological and Cosmic Promise of Christian Theology,* 2000, 48.

2B1 Schematic Classification

	MARINE	AERO	ROAD	RAIL
ALL-LIGHTED	210 2100 2101 2102	311 3110 3111 312 3120 3121 3122 3123	411 4110 4111 412 4120 4121 4122 4123 4124 4125 4126	511 5110 5111 5112 5113 5114 512 5120 5121 5122 513 5130 5131 5132 5133 5134
PARTLY-LIGHTED	120 1200 1201 1202 1203 221 2210 2211 2212 2213 222 2220 2221 2222	321 3210 3211 3212 322 3220 3221 3222 323 3220 3221 324 3240 3241 3242	421 4210 4211 422	521 5210 5211 5212 5213 5214 5215 522 5220 5221 5222

	MARINE	AERO	ROAD	RAIL
PARTLY-LIGHTED	223 2230 2231 2232 224 2240 2241 2242 2243 2244 2245	325 3250 3251 3252 326 3260 3261 327 3271 3272 328		523 5230 5231 5232 5233 5234 5235 524 5240 5241 5242 5243 525 5250
UNLIGHTED	130 1300 1301 1302 1303 131 1310 1311 1312 231 2310 2311 2312 232 2320 2321 2322	330 3300 3301 3302 331 3310 3311 332 3320 3321 3322 333 3330 3331 3332 3333	431 4310 4311 4312 4313 4314 4315 432 4320 4321 4322 4323 433 4330 4331 4332 4333	531 5310 5311 5312 5313 5314 532 5320 5321 5322 5323 5324 5325 5326 5327 5328

	MARINE	AERO	ROAD	RAIL
UNLIGHTED		334 3340 3341 3342 3343 335 3350 3351 3352 336 3360 3361 3362 337 3370 3371 3372 3373 3374 3375	434 4340 4341 4342 4343 4344 435 4350 4351 4352 4353	533 5330 5331 534 5340 5341 5342 535 5350 5351 5352 5353 536
ACOUSTIC	140 1400 1401 1402 240 2400 2401 2402 2403 2404 241 2410 2411 2412		440 4400 441 4410	540 5400 541 5401 561 5610 5611

	MARINE	AERO	ROAD	RAIL
COMBINATION	160 1600 1601 161 1610 1611 1612			561 5610 5611
ELECTRONIC	250 2500 251 2510 2511 2512 252 2520 2521 2522 2523 253 2530 2531	351 3510 3511 352 3520 3521 3522 3523 3524 3525 353 3530 3531 3532 354 3540 3541		550 5550

2B2 Alternate Classification: International Classification Within Matrix of Nature of Messages

This classification is based on the nature of messages found in the subject monographs. Messages are arranged according to the form of energy and by modes. It assigns a category to each marking. The classification employs a number-only designations though the letter and word designations originally employed can be employed.

The formulation includes: 1. for changing messages, and 2. for unchanging; 3. for multiple messages and 4. for single messages. Two digit indicators include 14 which denotes changing yet single message (CMSM). 14 is divided into 14.1 for unitary messages, and 14.2 for variable messages. 13 indicates changing message, multiple message (C3M), 24 denotes unchanging message with single message (UMSM), and 23 indicates unchanging message with multiple messages (U3M). Category 23 has two subforms: a basic bifurcation into programmable markings and unitary markings (the former can be represented by .1 and the later by .2). Unitary exhibits one of three further subdivisions: variants A (23.2.1) which admits of no variations; variant B (23.2.2.) which can take one of several predictable forms; and variant C (23.2.3) which can take any number of forms. This results in these possible designations for the classification: Type 13, Type 14, and Type 23 divided into: 23.1 and 23.2.1, 23.2.2., and 23.2.3.

1 = Changing Message (CM)
2 = Unchanging Message (UM)
3 = Multiple Message (MM)
4 = Single Message (SM)

13 C3M (or CMMM)
14 CMSM (14.1 = Unitary/14.2 = Variable)

23 U3M (UMMM)
24 UMSM
Programmable 24.1
Unitary 24.2
subforms:
Variant A (No variations) 24.2.1
B (Several predictable forms) 24.2.2
C (Any number of forms) 24.2.3

Type 13:

326
411
4120
4123
440
441
2100
511
512
513
521
522
523
524
531
536

Type 14.1 :

4121 (Partial; see also Type 23)
4122

Type 14. 2:

4121 (Partial)

Type 23

161

4121 (Partial; see also Type 14.1)

Type 24.1

120
221
222
223
224
250
251
311
312
321
322
323
324
325
327
240
241
351
352
353
4315*
550

Type 24.2.2

330
331
332
333
334
335
336
337
431*
432
433**
434

435

Type 24.2.3

328
422
525
3311
422
433
4333**
525
532

* denotes an entry in 431 that is in a different category.

** denotes an entry in 433 that is in a different category.

"For persons engaged in scientific or scholarly fields, there is a readiness and a desire to under- the real order of all things. One knows that God has ordered the universe, but this order is still rather elusive. A lifetime uncovering this order is recognized as a worthwhile expression of divine faith, charity, and hope."
Tad Dunne, *Lonergan & Spirituality: Towarda Spiritual Integration*, 1985, 139.

"The second role of theology is an integrating discipline, settling the first-order of science, aesthetics, morality, and of religion itself, within a deeper and more comprehensive matrix of understanding. Theological metaphysics, as we may call this activity, aims to be a true 'Theory of Everything', based on the fundamental premise that the Mind and Will of a divine Agent lie behind the multi-leveled character of our encounter with reality."
John Polkinghorne, *Faith, Science & Understanding*, 2000, 27-28.

CHAPTER THREE

VARIANT CLASSIFICATIONS

"Art and technology can give cosmic realities a higher kind of sacramentality by imparting to them something of the luminous intellibility of the human mind.

Mullahy, *The Splendid Risk: An Existential Approach to Christian Fullfillment*, 1982, 147.

"Zizioulas's emphasis is on the dualism between humanity and nature that came to permeate all aspects of the Church's life, worship, and ministry. He notes that physical matter ceased to be celebrated as God's gift and was rejected as either insignificant or a source of evil. Matter thus became considered dangerous for those pursuing a genuinely spiritual life."

P.A. Fox, *God as Communion: John Zizioulas, Elizabeth Johnson and the Retrieval of the Symbol of theTriune God*, 2001, 234

"Everything that is in the heavens, on the earth, and under the earth, is penetrated with connectedness, penetrated with relatedness."

Hildegard of Bingen in Unlein/Fox, ... in Joranson, 1982, 100.

"All of nature is joined together like a huge multi-dimensional net in which any break or tear, regardless of how innocuous or insignificent it may seem, weakens the entire ecological fabric of life."

Lutz in Joranson, 1982, 254-255

"Every creature gives him voice, expresses him, proclaims him by its concrete essence as atom, stone, energy, or spirit. We all belong to the family of God, and in that family there are no second-rank members."

Jäger, *The Way to Contemplation: Encountering God Today*, 1986, 72.

Chapter 3A Aids for Water & Air Transportation

3A1 Marine Aids to Navigation

12 Lighted Buoys; 13 Unlighted Buoys; 14 Sound Buoys; 16 Combination Buoys

.1 Floating Aids
.10 Lighted Buoys-National Models
.100 Canada
.101 U.S.
.102 Greece A/ Thailand A
.103 Russia
.104 Thailand B
.105 Greece B
.106 Norway
.107 Germany (Beacon Buoy, Lateral & Cardinal Forms)
.108 All-lighted High Intensity Forms
.11 Unlighted Buoys: Conical
.110 U.S. (Nun Form)
.111 Denmark A
.112 Denmark B
.113 Italy
.114 Poland & France
.115 Canada
.12 Unlighted Buoys: Can/Cylindrical
.120 U.S.
.121 Denmark
.122 Germany
.123 Taiwan
.124 Sweden, Russia
.125 Canada
.13 Unlighted Buoys: Spars
.130 Modified Standard, U.S.
.131 Modified Standard, Norway
.132 Modified Standard, Canada
.133 Special, Spar on Can Base, Iceland, et. al.
.134 Special, Spar on Modified Can Base, The Netherlands, Poland
.135 Special, Spar on Conical Base-A, Iceland

.14 Miscellaneous Unlighted Buoys
.140 Beacon Buoy, Germany (Lateral & Cardinal)
.141 Barrel Buoys, Sweden, Russia
.142 Oil Drum Buoy, U.S.
.143 Cask
.15 Sound Buoys
.150 Bell, U.S.
.151 Whistle, U.S.
.152 Carillon, France
.153 Bell, France
.154 Horn Buoy
.155 Siren Buoy
.16 Combination Buoys: Lighted Sound
.160 Lighted Bell, Canada
.161 Lighted Whistle, Canada
.162 Lighted Bell, U.S.
.163 Lighted Whistle, U.S.
.164 Lighted Gong, U.S.
.165 Lighted Horn, U.S.
.166 Lighted Bell--Can, USB
.167 Lighted Bell--Conical, USB
.168 Lighted Bell--Spherical, USB
.17 Electronic Buoys
.170 Radar Beacon Buoy
.171 Radio Beacon Buoy
.18 Multi-Message Floating Aids
.180 Lightfloats
.181 Lighted Catamarans

22 Fixed Lights & 23 Daybeacons
221-223, Major Lights; 224 Minor Lights; 231 & 232 Daybeacons

.2 Fixed Aids
.20 Major Lights (Lighthouses)
.200 Towers on Skeleton Structures: Screw-Pile Towers
.201 Towers on Skeleton Structures: Off-Shore Platforms
.202 Skeleton Towers
.203 Framework Towers

.204 Composite: House on Structure
.205 Composite: Tower Attached to House/ Building
.206 All-Lighted High Intensity Forms

.21 Minor Lights: Multi-Member Structures
.210 Tripod
.211 Pyramid
.212 Pile Structure: Marine Site
.213 Pile Structure: Land-based Site
.214 Skeleton Structure
.215 Dolphin
.216 Tripodal Tower
.217 Tubular Tower
.218 Skeleton Tower
.22 Minor Lights: Single-Member Structures I (Narrow Configurations)
.220 Spindle
.221 Spar
.222 Pipe
.223 Post
.224 Pole
.225 Single Pile
.226 Stake
.227 Mast
.228 Buoyant Beacon
.23 Minor Lights: Single-Member Structures II (Wide Configurations)
.230 Column
.231 Pedestal
.232 Pillar
.233 Pylon
.234 Obelisk
.24 Minor Lights: Enclosed & Solid Constructions, & Composite Structures
.240 Hut
.241 Small House
.242 Cairn
.243 "Beacon"
.244 Cylinders
.245 House/Hut on Structure
.246 House/Hut on Pile Structure

.247 House/Hut on Tripod
.25 Minor Lights: Single Types of Structures
.250 Stand
.251 Arm
.252 Lighted Bank
.253 All-Lighted High Intensity Forms
.254 All-Lighted Range/Leading Lights
.26 Daybeacons: Natural Marks
.260 Cairn
.261 Small Tree/Petit Arbre
.262 Tree Branch: Natural State
.263 Tree Branch: Tied Down
.27 Daybeacons: Unidimensional Marks
.270 Spindle
.271 Perch/Pole
.272 Pile
.273 Post
.274 Stake
.275 Edgemark
.28 Daybeacons: Open Structures
.280 Dolphin/Multiple Pile
.281 Tripod
.282 Latticework
.283 Skeleton Tower
.284 Wooden Framework
.285 Beacon/Bake, Germany
.286 Pyramidal Structures
.287 Triangular Structures
.29 Enclosed & Solid Structures
.290 Small House
.291 Enclosed Structures
.292 Stone/Masonry Structures

24 Acoustical Signals

.3 Fog Signals
.30 Diaphone
.300 Regular
.301 Two-Tone
.31 Diaphragm
.310 Compressed Air
.311 Oscillator

.312 Nautophone
.313 Chime
.32 Explosive Signals
.320 Explosives
.321 Gun
.33 Submarine Signals
.330 Submarine Bell
.331 Submarine Oscillator

25 Electronic Aids

.4 Electronic Aids
.40 Radiobeacons
.400 Non-Directional: Circular, Omni-Directional
.401 Non-Directional: Sequence, Group
.402 Non-Directional: Continuous
.403 Directional: Sequence, Group
.404 Directional: Continuous
.41 Radar Aids, Passive Forms, Reflectors
.410 Corner Reflector, Trihedral
.411 Corner Reflector, Pentagonal
.412 Corner Reflector, Octahedral
.413 Dielectric
.414 Dihedral
.415 Luneberg
.42 Ground- & Spaced-Based Hyperbolic Systems
.420 Loran-A
.421 Dectra
.422 Toran
.423 Transit

3A2 Aero Navigation Aids

31 All-Lighted Aids
311 Approach Lights & 312 Final Approach Lights

.1 Light Fixtures/Functions/Systems: Approach
.10 Approach Light Equipment
.100 High Intensity Unidirectional Lamp (Halogen, Par 56)
.101 Medium Intensity Omnidirectional Elevated Lamp (Halogen, Par 38)

.102 Low Intensity Omnidirectional Elevated Lamp (Halogen)
.103 Omnidirectional Flashing Lamp
.104 Unidirectional Flashing Lamp
.11 Flashing Lights by Function
.110 Runway Threshold Identification Lights (RTILS)
.111 Runway End Identification Lights (REILS) (Omnidirectional, Unidirectional)
.113 Runway Identification Lights (RILS)
.114 Runway Alignment Identification Lights (RAILS)
.115 Lead-In-Lights (LDIN)
.12 Approach Lighting Systems: ICAO & NATO
.120 Simple Approach, ICAO
.121 Precision, Category I
.122 Precision, Categories II & III
.123 Approach Lighting, Type I, NATO
.124 Approach Lighting, Type II, NATO
.125 Military CAT II Lighting, NATO
.13 Approach Lighting Systems: U.S. FAA
.130 ALSF-I
.131 ALSF-II
.132 SSALS
.133 SSALR
.134 ODALS
.135 MALSR
.136 MALSF

.2 Light Fixtures/Functions/Systems: Final Approach
.20 Final Approach Equipment: Color Coding
.200 APAPI (2-Color/1 Projector)
.201 H-PAPI (2-Color/1 Projector)
.202 Mini-PAPI (2-Color/1 Projector)
.203 AVASIS (2-Color/2 Projector, 4 versions)
.204 SAVASIS (2-Color/2 Projector)
.205 3-Bar AVASIS (2-Color/2 Projector)
.206 CHAPI (Tri-Color/1 Projector)
.207 Glide Path Indicator (Tri-Color/1 Projector)
.208 T-PASI (Tri-Color/1 Projector)
.209 Angle of Approach Indicator (Tri-Color/1 Projector)

.21 Final Approach Equipment: Pattern, Pulse & Alignment Coding
.210 AT-VASIS (Pattern)
.211 PLASI (Pulse)
.212 HELI-PLASI (Pulse)
.213 HAPI-PLASI (Pulse)
.214 Optical Localizer (Pulse)
.215 Approach Azimuth Guidance System (SAGA) (Pulse)
.216 Mirror Deck Landing System (Alignment)
.217 Fresnel Lens Optical Landing System (Alignment)
.218 Glissada (Alignment)

32 Partially-Lighted
321 & 322 Runway & Taxiway Lights; 323 Beacons; 324 Obstruction Lights; 325 Indicators

.2 Light Fixtures: Selected
.20 Taxiway Inset (Inpavement) Lights
.200 Straight Sections & Caution Bars (Bidirectional/Unidirectional) (Category III & Other Than Cat III)
.201 Intersections (Bi/Uni) (Category III & Other Than Cat III)
.21 Elevated Lights
.210 Runway Edge (VFR, NP IFR, & P IFR)
.211 Threshold/End (VFR, NP IFR, & P IFR)
.22 Aerodrome Beacon Lights
.220 Medium Intensity
.221 High Intensity
.23 Obstacle/Obstruction Lighting
.230 Low Intensity Light (Incandescent Bulb, External Lens)
.231 Low Intensity Light (Incandescent Bulb, Internal Lens)
.232 Low Intensity Light (Mercury Bulb, External Lens)
.233 Low Intensity Light (Neon Tube, No Lens)
234 Medium Intensity Light (Fresnel Double Drum Lens)
.235 Medium Intensity Light (Multi-Cold Cathode

Tubes & Reflectors)
.236 Medium Intensity (Strobe Lights, Helical)
.237 Medium Intensity (Strobe Lights, Linear Flashtube)
.24 Docking Guidance Systems
.240 Numeric, Signal & Graphic Form
.241 Alpha, Signal & Graphic Form
.25 Vertiport Lighting
.250 Identification Beacon
.251 FATO Lighting
.252 TLOF Lighting
.26 Runway & Taxiway Transverse Lights
.260 Stop Bar Light
.261 Stopway Light
.262 Clearance Bar Light

33 Unlighted Aids
330 Signs-Single Forms, 331 Signs with Variant Versions, 332 Signs Under Heading of Marker-Single Forms, 333 Markings, 334 Markings Under the Name of Markers-Single Forms, 337 Elevated Markers, 338 Low-elevation Markers

.3 Signs
.30 Mandatory Instruction Signs
.300 Runway Designation Signs
.301 Cat I, II, III Holding Position Signs
.302 Runway-Holding Position Signs
.303 Road-Holding Position Signs
.304 No Entry Signs
.31 Information Signs
.310 Direction Signs
.311 Location Signs
.312 Destination Signs
.313 Runway Exit Signs
.314 Runway Vacated Signs
.315 Intersections Take-off Signs
.32 Signs Under Heading of Marker
.320 Air (Roof) Marker
.321 Distance Marker
.321 Landscape Marker
.322 Painted Highway Marker

.323 Safe Heading Marker Board
.323 Taxiway Ending Marker

.4 Markers
.40 Elevated Natural Markers
.400 Evergreen Trees
.401 Stones
.402 Hedges
.403 Flower Beds
.41 Elevated Assembled Markers
.410 Cones
.411 Cylindrical Markers
.412 Fences
.413 Flags
.414 Half Drums
.415 Plane Markers
.416 Tripods
.417 Vee Boards
.418 Vertical Boards
.42 Low Elevation Markers
.420 Bidirectional Reflective Markers
.421 Unidirectional Reflective Markers
.422 White Stones
.423 Concrete Slab

.5 Markings
.50 Runway Surface Markings
.500 Aiming Point Markings
.501 Centerline Markings
.502 Chevron Markings
.503 Designation Markings
.504 Edge Markings
.505 Shoulder Markings
.506 Side Stripes Markings
.507 Threshold Markings
.508 TDZ Markings
.51 Taxiway Surface Markings
.510 Holding Position Markings
.511 Centerline Markings
.512 Edge Markings
.513 Shoulder Markings
.52 Other Surface Markings

.520 Blast Pad & Over-run or Stopway Markings
.521 Closed Markings
.522 Fixed Distance Markings
.523 Geographic Position Markings
.523 Segmented Circle Markings
.524 Vertiport Markings
.525 Heliport Markings
.53 Surface Markings Under Heading of Marker
.530 Limed Marker
.531 Heliport Air Marker
.532 Taxiway Holding Position Marker
.533 Threshold Marker

"Of all the forces crackling through the cosmos, electricity most embodies the spirit of modernity. Investigators first began experimenting with electricity during the Enlightenment, and within two centuries the West had tamed and ruled its powerful mysteries. Technologies of communication and control now utterly depend on the electrical grid, and our minds have grown quite comfortable--perhaps too much so--with the electron's conquest of shadows, stars, and silence. Electricity feeds modernity; it is our profane illumination.

"But just as water molecules can move relatively slowly beneath fast-moving ocean waves, these electrons are also communicating their energy, and it this 'energy'--a pattern of current and voltage--that trucks along at the universal speed limit.

"In fact, the transformation of electrical current into a communicating medium, which took place in the mid-nineteenth century, represents its most remarkable mutation: from energy information."

Davis, *Techgnosis: myth, magic + mysticism in the age of information*, 1998, 39-41.

Chapter 3B Aids for Surface Transportation

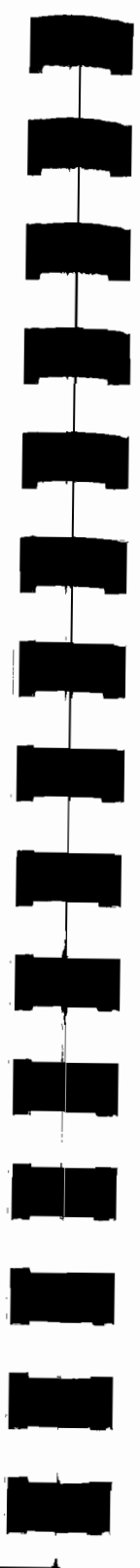
Chapter 3B1 Traffic Control Devices

1 All Lighted Signals
412 Flashing Beacons

.1 Traffic Signals
.10 Traffic Beacons
.100 Hazard Identification Beacon
.101 Speed Limit Beacon
.102 Intersection Control Beacon
.103 Stop Sign Beacon

43 Unlighted Signs
431 Warning Signs; 432 Regulatory Signs;
433 Informatory Signs

.2 Signs & Markings
.20 Warning Signs: Roadway Alignments & Roadway Conditions
.200 Crosswinds
.201 Bends (Four Versions)
.202 Descent
.203 Swing Bridge
.204 Roads Leading Onto Quay or River Bank
.205 Uneven Road
.206 Slippery Road
.207 Loose Gravel
.208 Falling Rocks
.209 Other Dangers
.21 Intermittent Moving Hazards Signs
.210 Pedestrian Crossing
.211 Children
.212 Cyclists Entering or Crossing
.213 Cattle or Animal Crossing
.214 Aircraft Crossing
.215 Two-way Traffic
.22 Railway (Level/Grade) Crossing Signs
.220 Warning of Level Crossing with Gates



or Half-Gates
.221 Warning of Other Level Crossings (Two Forms)
.222 Warning of Intersection with Tramway Line
.223 Signs to be Placed in the Immediate Vicinity of Level Crossings (Three Forms)
.224 Additional Signs at Approaches to Level Crossings (Three Forms)
.23 Prohibitory & Restrictive Signs
.230 No Entry (Two Forms)
.231 Closed to all Vehicles in Both Directions
.232 Entry Prohibited for Category of User or Vehicles (Ten Forms)
.233 Entry Prohibited for Several Categories (Several Forms)
.234 Entry Prohibited for Vehicles Whose Weight or Dimensions Excede Certain Limits (Five Forms)
.235 Distance Between Vehicles
.24 Prohibitive Signs
.240 Prohibition of Turning (Two Forms)
.241 Overtaking Prohibited (Two Forms)
.242 Overtaking by Goods Vehicle Prohibited (Four Forms)
.243 Speed Limits
.244 Use of Audible Warning Devices Prohibited
.245 Prohibition of Passing Without Stopping
.246 End of Prohibition or Restriction
.247 End of Particular Prohibition (Two Forms)
.25 Mandatory Signs
.250 Direction to be Followed
.251 Pass this Side
.252 Compulsory Roundabout
.253 Compulsory Cycle Track
.254 Compulsory Foot-Path
.255 Compulsory Track for Riders on Horseback
.256 Compulsory Minimum Speed
.257 End of Compulsory Minimum Speed
.258 Snow Chains Compulsory
.26 Markings
.260 Pavement Markings
.261 Curb Markings

.262 Objects-Within Roadway
.263 Objects-Adjacent to Roadway
.264 Objects-End of Roadways
.265 Delineators-Curb
.266 Delineators-Upright
.267 Barricades
.268 Channelizing Devices

Chapter 3B2 Railway Signals, Signs, Markings

51 All-Lighted Signals
511 Trackside Signals (Signals Governing Train Movements on One Track [SGTMOOT])
.1 Basic Shapes
.10 Rectangle/Rectangular Backplate: Vertical
.11 Rectangle/Rectangular Backplate: Horizontal
.12 Rectangular Backplate: Slanted [Lamp Configurations: Single Row (SR), Double Row (DR), Irregular (IR), Random (RN)
.13 Circles
[Lamp Configurations: Triangular Arrangement (3) Lamps, Single Lamp (Multiple Lenses), Circular Arrangement (8, 9 Lamps), Cluster Arrangement (4) Lamps)]
.14 Triangles
[Lamp Configurations: Triangular Arrangement (3) Lamps)]
.15 Octagons
[Lamp Configurations: Multi-Row Arrangement]
.16 Square Backplate
[Lamp Configurations: SR, DR, IR]
.17 Diamond Backplate
[Lamp Configuration: Single Lamp (Multiple Lenses)]

.2 Special Shapes: France & Algeria
.20 Inverted "L" (two rectangles fused together; one on a horizontal plane, one on a vertical plane).
[Lamp Configurations: "L"-shaped pattern (3, 4, 5, 6 Lamps)].

.21 Rectangles (Vertical dimension more prominent; joined together in a non-synchronic manner.
[Lamp Configuration: Assymetrical (3 Lamps)]
.22 Rectangle/Circle Fused Together
[Lamp Configuration: Assymetrical (3 Lamps)]
.2 Special Shapes: Other Nations
.23 Rectangular Backplates
[Lamp Configurations: Double Row (2, 4 Lamps)]
.231 Rectangles Fused Together (Off-centered "V", rounded ends), DSB
[Lamp Configuration: "V"-shaped Pattern (5 Lamps)]
.232 Rectangle with Rightward Triangular Extension, Rounded Ends, SNCB
[Lamp Configuration: SR/DR (5 Lamps)]
.233 Rectangle with Rightward Rectangular Extension, Cropped Corners, PKP,
[Lamp Configuration: IR (6 Lamps)]
.24 Truncated Parallelograms
.240 Single Basic Form, DR, PKP
[Lamp Configurations: Assymetrical DR (2, 4 Lamps)]

512 Dwarf Signals (Signals Governing Train Movements From One Track to Another Track, SGTMFOTTAT)

.3 Basic and Special Shapes
[Lamp Configuration: Generally SR; Some Irregular; also Graphic, Alphanumeric, Composite (1-3 Lamps and/or 1 or more other symbols)]
.31 Square-Shaped Signals
[Lamp Configurations: Double Row, Assymetrical, Circular, Graphic, Alphanumeric Symbols (3-7 Lamps, and/or 1 or more other symbols)]
.32 Triangle/Triangular Shaped Signals [Lamp Configuration: Triangular-Shape Frequently; some arrangements are assymetrical (1-3 Lamps)]

.33 Other Shapes
.330 Circles
.331 Octagon
.332 Arms
.333 Obround
[Lamp Configurations: Diverse (1 to nearly 20)]

52 Partially-Lighted Signals
521 Semaphore and 522 Signal Boards

.4 Basic and Special Shapes
.40 Blade-Spectacle Fully Integrated (BSFI): Rectangles
.41 Blade-Spectacle Fully Integrated (BSFI): Rectangular I (A)
.42 Blade-Spectacle Fully Integrated (BSFI): Rectangular I (B) (Slightly Tapered)
.43 Blade-Spectacle Fully Integrated (BSFI): Rectangular II (Broader, Less Elongated)
.44 Blade-Spectacle Integrated Through Linkage (BSITL)
.45 Blade-Lamp Partially Integrated (BLP)
.46 Blade-Lamp Separate (BLS)
.47 Special Shapes
.470 Propeller Arm
.471 Double Arm
.472 Lattice-Work with Opening in Blade (Circular)
.48 Signal Boards: Rotary Form
.49 Signal Boards: Hinged & Stationary

523 Partially-Lighted Signals: Dwarf Semaphore, Rotating Discs & Composite Discs

.5 Dwarf Semaphores, Rotating Discs & Composite Discs
.50 Semaphore, Dwarf
.51 Rotating Discs
.52 Composite Discs

524 Partially-Lighted Signals: Revolving Signals

.6 Revolving Discs & Enclosed Graphic Signals
.64 Revolving Discs
.65 Enclosed Graphic Signals
.7 Open Graphic Symbols (& 530)
.70 Mask-Shaped Vanes
.71 Arrow-Shaped Vanes
.72 Oval-Shaped Vanes
.73 Rectangle-Shaped Vanes
.74 Obround Vane
.75 Miscellaneous Shapes of Vanes
.750 Circle & Square
.751 Circle & Chevron
.752 Diamond/Single Vane
.753 Triangle (Truncated) & Oval
.754 Octagon/Single Vane
.755 Square & Square
.756 Square & Square (With graphics)
.76 Moveable Signals
.760 Staffs
.761 Tickets
.762 Tokens
.763 Tablets

533 Signs -- Speed Regulations

.8 Speed Signs
.80 Announcing of Restrictions
.81 Ending of Restrictions
.82 Within Categories of Restrictions: Nuanced Variant Forms
.820 Temporary/Permanent Differentiations
.821 Special Designation of Trackage: Branch Line
.822 Special Designation of Trackage: Main Line
.823 Designation of Train Speed Categories: Express
.824 Designation of Train Speed Categories Passenger
.825 Designation of Train Speed Categories: Freight
.826 Lighted Dimensions to Signs

.827 Distance Dimension to Restriction Signs

534 Markings

.9 Pillars, Petites, Boards & Sign-like Objects
.90 Pillars
.900 Straight-Line/Flat-top Forms
.901 Pointed-Top Forms
.902 Tapered Forms
.903 Forms with Visible Undergirding
.904 Lighted Forms
.91 Petites
.910 Cylinders
.911 Square Post -- Flat-Top
.912 Square Post -- Pointed-Top
.913 Rectangular Post
.914 Horizontal Slab
.92 Boards
.920 Tall With Visible Undergirding
.921 Tall Without Visible Undergirding
.922 Intermediate With Visible Undergirding
.923 Symbols for Board (Stripes [Two Forms], Zig-zags, Chevrons, Checks)
.93 Sign-Like Objects
.930 Forms With Primary Horizontal Dimension
.931 Forms With Primary Vertical Dimension
.932 Square Forms With Single Support
.933 Special Forms With Single Support

535 Movable Signals

.7 Movable Signals
.70 Staff, Ticket, Tablet & Token Forms
.700 Manual Staffs
.701 Staff & Ticket
.701 Electric Staff
.702 Electric Token
.703 Key Token
.704 Electric Tablet
.705 Tokenless System (Paper Ticket)
.71 Train Order & Time Interval
.710 Telegraph Train Order System

.711 Train Order System
.712 Time-Interval System
.713 Telegraph Block System

Chapter 3B3 Notes on Variant Classification

Variant T-M classifications were first included with the Aero Aids (1994) and Railway Signals (1992) monographs (accompanying notes for those classifications reduce need for notes here). Marine aids and road aids require more extensive comments since those monographs (Marine Aids 2nd ed in 1988; TCD 1984) lacked variant classifications. Separating T-M into main and variant forms and adding additional forms after the original unified classifications may possibly result in some anomalies and inconsistencies.

The two sub-modes of marine aids are placed together in this classification though floating aids form a distinct segment within marine aids. Many buoys are listed under the name of the sponsoring nation since many buoys have only a generic name. Part C and Part Ii have further information on buoy types.

Two specific comments can be made about buoys. Several forms of spar buoys, .13, are listed as modified standard forms. These are only slightly at variance with the main form yet they are visually different in appearance. The League of Nations proposed a single bell buoy with three variant shapes, .166-.167-.168. All three are listed though sharing a core form.

Fixed visual aids, both lighted and unlighted, can be included within .2. This is admittedly a broad grouping of aids yet the single category is sufficiently wide to encompass them. IALA does not give detailed coverage on fixed aids except for some simple fixed beacons. This coverage is therefore general in nature and not definitive in nature.

Most types of fog signals are listed in the main classification. As a result there are only limited peripheral

and, possibly, obsolete types for the .24 variant category. Some signals of these forms may possibly remain in use.

Classifying electronic aids proves to be a challenge in dividing aids into main and variant forms since there are only limited official documents for these forms. IALA statistics provide some clues to the topic. Since many of these aids are found in a variety of locations they have been assigned to main classification. Rarely used forms as well as actual variant forms of main aids are included in .25.

The Pharos Marine Aids to Navigation catalogue (1985) offers a variety of navigation aids that are outside of the main classification. These are now added though the problem of main versus variant forms is not fully resolved for these aids. Admittedly that is the case for many marine aids. Pharos includes two forms of light float which are listed under one heading as well as a lighted catamaran. Some forms of traffic control lights as well as other lights are capable of daylight operation. These are included in an all-lighted category. The case of the buoyant beacon very much blurs the distinction between lighted fixed aids and floating aids and it becomes difficult to resolve the taxonomic issue. The beacon has been placed with fixed aids though that interpretation can be questioned. USCG labels it an articulated beacon which more suggests a fixed aid.

The aero variant classification largely replicates that of Part G. One change has been made: Vertiport aids, which were placed in a form of dual classification in Part G (at the conclusion of the partially-lighted variant classification category) have been moved. They are more accurately viewed as belonging to separate partially-lighted and unlighted categories and are so located in Part H. A system known as Approach Azimuth Guidance System (Thorne Europhane) includes REIL and a kind of "Optical ILS" lights which are somewhat akin to the Optical Localizer (Devore). The system was not included in Part G but is to be found in Part H.

Traffic control devices consist of a brief category (.1)

for traffic signals and a longer category (.2) for signs. Various traffic signals consist of several forms of flashing beacons. Some of these are not recognized by the UN Conference yet are commonplace for a variety of nations. The plethora of signs prevents a definitive listing in the main classification resulting in categories of signs in the classification but not the actual signs. The individual signs are listed here. The U.S. (and to some extent the Western Hemisphere) employs other forms of pavement and related markings. These are all included in the variant classification.

Railway signals, signs and markings included both variant and main classifications in the 1992 monograph and that is replicated here. The first edition of Part H omitted many of the three-digit designations but they are restored in this edition.

Chapter 3C Variant Classification in a Different Key:
Transportation-Markings in One Nation: The United States

1 Floating Aids to Navigation: Marine Use
- 12 Lighted & Lighted Sound Buoys
  - 121 Most Exposed
    - 1210 Lighted Buoys
    - 1211 Lighted Whistle Buoys
    - 1212 Lighted Horn Buoys
    - 1213 Lighted Bell Buoy
    - 1214 Lighted Gong Buoy
  - 122 Exposed
    - 1220 Lighted Buoys
    - 1221 Lighted Whistle Buoys
    - 1222 Lighted Horn Buoys
    - 1223 Lighted Bell Buoy
    - 1224 Lighted Gong Buoy
  - 123 Semi-Exposed
    - 1230 Lighted Buoys
    - 1231 Lighted Horn Buoys
    - 1232 Lighted Bell Buoys
  - 124 Protected
    - 1240 Lighted Buoys
  - 125 Most Protected
  - 126 Discrepancy Buoy
    - 1260 Lighted Buoys
  - 127 Major Aids
    - 1270 Large Navigation Buoy (LNB)
  - 128 All-Lighted Forms
- 13 Unlighted Buoys
  - 131 Most Exposed
    - 1310 Can Buoys
    - 1311 Nun Buoys
  - 132 Exposed
    - 1320 Can Buoys
    - 1321 Nun Buoys
  - 133 Semi-Exposed
    - 1330 Can Buoys
    - 1331 Nun Buoys
  - 134 Ice
    - 1340 Can Buoys
    - 1341 Nun Buoys

- 135 Western Rivers
  - 1350 Can Buoys
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The U.S. classification exists in both main and variant forms. For this format only the main classification is included. The U.S. main classification can be regarded as a variant form in its relationship to the principal international classification. It should not be confused with the official variant form of the main U.S. classification.

The 2nd edition of Part B offered many classifications. The diversity of classifications was made possible in part because of the restricted nature of the study: T-M in one nation. The restricted nature of the study also permitted an integrated, horizontal approach that could encompass all forms of T-M. The range of classifications in Part B follows this outline:

I. Quadripartite Main Classification
A. Main form (Included in Part H)
B. Schematic Classification (Grid pattern with numerical format)
C. Pictorial Classification (Schematic form with grid and numerical format)

with grid and numerical format)
D. Multiple and Variant Classification (An extrapolation and expansion of the main classification with an alternate numbering system)

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"Then, if you're a writer, like me, you try less to impose a shape on the hodge podge than to see what shape emerges from it."
Buechner, Faith and Fiction in *Spiritual Quests*, 1988, 114.

"It is clear that sacraments can indeed helps us to understand and revere the giftedness and dignity of material things. This view was expressed powerfully by John Damascene: 'I honor all matter and venerate it. Through it, filled as it were with a divine power and grace, my salvation has to come to me ... . Is not the blessed table matter which gives us the bread of life? Are not the gold and silver matter out of which crosses and altarplates and chalices are made? And before all these things is not the body and blood of our Lord matter?'"
Hill, *Christian Faith and the* Environment: Making Vital *Connections*, 1998, 130.

APPENDIXES

"For Art and Science cannot exist but in minutely organized Particulars."
William Blake in Ginsberg, Meditation & Poetics in *Spiritual Quests*, 1988, 157.

"Just as matter and energy affect each other through the law of physics, signs affect signs--perhaps through the laws of semiotics. To a semiotician, signs, like matter and energy, are not human artifices but an integral part of the world. Perhaps this is just another way of saying that information is physical, a necessary ingredient for carving up the universe."
Johnson, *Fire in the Mind: Science, Faith, and the Search for Order*, 1995, 253.

"Global solidarity is no longer an ultimate vision; it is fast becoming a social, political, tical, and ecological necessity, because the world is becoming increasingly a holistic system of interdependant socio-economic systems, communications and transportation networks, and ecosystems."
Nash, Seeking Moral Norms in Nature: Natural Law and Ecological Responsibility in *Christianity and Ecology: Seeking the Well-Being of Earth and Humans* (Hessel and Ruether, eds), 2000, 240.

"But we know him from the arrangement of everything, because everything is, in a sense, projected out from him, and this order possesses certain images and semblances of his divine paradigms."

Pseudo-Dioynisus, *The Complete Works*, 1987 edition, 108.

". . . and because His goodness could not be adequately represented by one creature alone, He produced many and diverse creatures, that what was wanting to one in the representation of the Divine goodness might be supplied by another. For goodness, which in God is simple and uniform, in creatures is manifold and divided; and hence the whole universe together participates in the Divine goodness more perfectly, and represents it better than other single creatures whatever."

Thomas Aquinas, *Summa Theologica*, 1, Q-27-94, 255.

"The sacramental presence of the Spirit endows all of creation with a sacred value and dignity."

Nash, *Loving Nature: Ecological Integrity & Christian Responsibility*, 1991, 115.

APPENDIX I

NOMENCLATURE

A study of Transportation-Markings requires a bringing together -- in a manner both compact and comprehensive -- the varied and diverse elements that make up the field of Transportation-Markings. The lack of any existing integrative approach makes that 'bringing together' yet more imperative. The approach for providing that linkage for this study is that of classification. Classification can not only provide points of connection but it can also uncover pre-existing connections, and areas of commonality between and among markings. This segment of the monograph focusses on nomenclature which includes the threefold classification of main, variant, and adjunct forms.

i Main Classification

a) Background

T-M nomenclature and classifications are confronted with a problem: the surface appearance of a single Transportation-Marking system displaying a strongly unified pattern may not be entirely the case since the four modes of transportation and their markings have developed differently, and the classification requirements of different forms of markings do not have an identical content and form. There has been movement toward an integrated system but that is far from complete.

The classification of marine markings is twofold: buoys follows the IALA pattern in the main classification with national and regional patterns in the variant classification. However, other forms of marine aids to navigation lack IALA standards, or at least fully worked out guidelines. This has meant construction of a classification from available IALA information augmented by IHB source materials and the marine practices of nations heavily involved in a given form of marking. Norway, for example,

has the largest system of unlighted beacons and thereby influences the classification of daybeacons. The classification therefore partly mirrors international standards but it also includes less official though accepted practices. The result is a construction which may be, admittedly, inherently flawed though it retains coherence because of the means of construction.

The aero aids classification has the backing of ICAO standards and practices and reflects an agreed upon international system. The variant classification incorporates variant and additional forms from FAA, NATO, manufacturers and major national systems. It is not entirely imprecise to say that the aero classification does reflect international practice.

The railway signal classification is the antithesis of the aero model: there are only a few sources that go beyond national boundaries and these are limited. Much of this classification is a construction that draws on many different sources. Since it incorporates materials from most major railway systems augmented by manufacturing and regional association data it may well approximate the actual situation of railway signals. Nonetheless, it exhibits a provisional character.

The traffic control devices classification employs UN documents for its foundation, along with many older international and regional agreements that supplement the primary data. While the classification reflects the international traffic control device situation it may have negated, to some degree, the level of precision since many sources of information and numerous sign forms have been incorporated.

The end result of the T-M classification is a set of four different classification "families" within a single matrix. In some sense the classification "creaks and groans" and probably includes some flaws. But when the difficulties of creating a discipline of T-M have been considered the end result is more than a merely embryonic stage. The internal stresses and strains do not doom the classification but they

require alertness on the part of the user.

b) Nomenclature

The nomenclature, or rules, for naming and classifying Transportation-Markings were established in 1969 and 1970 with an alteration to the rules in 1984. The classification system has been greatly influenced by the Dana System of Mineralogy (1944 edition edited by Charles Palache). The Dana system uses numbers [newer editions have dropped the distinctive feature of numerical designations for minerals] as well as names for mineral specimens. The schema adopted is not a "natural" pattern since there is probably no natural Transportation-Markings arrangement as such. Nevertheless, the arrangement exhibits an orderly approach which is not altogether arbitrary.

The system has four levels (each represented by a single digit): the mode of transportation; the nature of the marking; the classes of markings (when applicable); and the individual marking. Because of the special nature of buoys and other floating aids to navigation the marine mode of transportation has been divided into two parts or submodes.

The buoy submode is represented by the number "1" and the fixed aids submode by "2". Aeronautical navigation aids adjoin marine and are alloted "3". The traffic control devices mode is represented by "4", and the rail signals, signs, and markings mode by "5".

Other arrangements by mode of transportation would be possible. Historically, road markings are probably the oldest, followed in chronology by marine, rail and aero. But there are ample reasons for the current arrangement. Marine can justify its central position by the complexity and diversity of those aids. Many aero aids are unlighted or partially-lighted; many aids are of an electronic nature for both modes. Many aero aids are less in a traffic control mode than road or rail; this is also true of marine aids. Historically key marine and aero aids shared a common

name. In addition, the "beacon" form is a commonplace of marine and aero aids while the "signal" form is a major form for many rail and road safety aids. Therefore, the taxonomic order of marine, aero, road, rail is a plausible arrangement for the primary classification.

The nature of the message number is denoted by the second digit following this pattern: fully-lighted visual messages are represented by "1" (for example, rail and road signals). Partially-lighted markings are listed under "2". The original classification attempted to distinguish between over 50% lighted, those exactly half-lighted, and finally, those less than 50% lighted. However, that is a difficult distinction to make. A complex computer configuration might be able to ascertain that a lighthouse, for example, is more than 50% (since the need may be greater at night than in daytime) and a railway target with switch lamp is exactly half-lighted and half-unlighted. But in a more preliminary study such distinctions are not feasible.

The number "3" denotes unlighted markings (signs, pavement markings, buoys without sound or lighted mechanisms). Acoustical signals are "4" in the classification and electronic devices are "5". Markings with messages from two different categories are listed under "6"; for example, a lighted sound buoy. Because of changes in the system, and in different monographs, it is necessary to examine and alter the numbers of some transportation-markings in older classifications as they appear in Part H.

The third digit number is not required for all markings. It is needed where two or more groups of markings are found within a message type. For example, there are several forms, or classes, of unlighted buoys: nuns, cans, spars, etc. Therefore the third digit or class designates the various groups. A "0" will occupy the third digit position when classes do not exist.

The last digit denotes the specific marking number which allows for up to ten members for a specific classification sequence.

A classification problem developed with traffic control devices. Traffic signs merge the type of sign (in a physical other-than-semiotic sense) with the message so that, instead of a single marking which can be programmed for many different specific message characteristics (such as a marine light), the traffic sign has a fixed and very narrow message. As a result there are many types of signs each with one message. (This classification is of types rather than messages but since traffic signs closely unite type and message they cannot be "broken" apart readily. This has meant that the last digit does not represent individual signs since they are more in the form of semiotic signs, in some sense and to some degree, than physical signs. Therefore the fourth digit refers to groups of signs. For example, under 432, regulatory signs, there are several categories of signs and these in turn are divided into sub-categories (listed in the variant classification). A message for a sign affects the physical appearance of the sign as a physical unit and is therefore within the nomenclature of the classification.

A retrospective of the system shows several changes. "0" represented fully-lighted markings in the earliest versions, while "1" so designated those markings from about 1981 on. An attempt to distinguish between gradations of less than fully lighted markings created sub-systems: "1" for more-than-half-lighted, "2" for half-lighted and "3" for less-than-half-lighted in early early versions (possibly the third element was not present in very early versions). By 1981 the less-than-half-lighted segment was dropped but the more-than-half-lighted was retained until omitted in the second edition of Part A in 1991. All less than fully lighted markings termed partially-lighted are designated by "2". Unlighted markings were formerly classified as "4" but are now "3".

In older versions "5" designated acoustic aids and "6" denoted electronic aids but the reduction in less than fully lighted segments caused acoustic to become "4" and electronic to become "5". Combination aids began as "7" and later became "6". Combination forms are infrequently employed and designates markings incorporating two

different basic forms of messages (visual and acoustic, etc., rather than different levels of visual). The 1981 edition included an "0" indicating a "dual message option" rather than a fully-lighted marking. That segment was added to cover similar shaped buoys emitting quite different forms of messages (for example, an unlighted conical buoy versus a lighted conical buoy). But it was subsequently dropped and similar shaped buoys were numbered according to their basic nature without regard to a shared shape.

There are four modes of transportation (though the classification has created sub-modes for marine due to the special nature and plethora of floating aids). The early forms of the principal classification added an additional sub-mode for marine: fixed marine aids located in water, as well as a pedestrian mode separate from traffic control devices for vehicles. The additional sub-mode was merged with other fixed marine aids, and the pedestrian mode, a very small segment, was merged with other traffic control devices.

In summary, the transportation-markings classification follows this pattern:

First Digit: mode of transportation: marine (in two parts), aeronautical, road and rail.
Second Digit: nature of the message (visual divided into all-lighted, partially, and unlighted; acoustical, electronic, combination).
Third Digit: classes of a given form of marking when applicable.
Fourth Digit: individual marking number (altered to group of closely united markings when numerous).

ii Variant Classification

The original classification did not include a variant classification. However, the decentralized nature of railway signal materials required the addition of such a classification. There were too many forms and subforms of railway signals to incorporate into the main classification

without choking and overwhelming the categories.

The aeronautical classification also contained a variant classification though, oddly enough, it did not contain a nomenclature to accompany it as was the case with railway signalling. And neither marine or road classifications originally had variant forms at all. It became necessary to include variant classifications for all of those transport modes and general rules for those variant classifications. This cannot be done with a high level of precision since the needs of the transport modes are notably different. Nonetheless, the nomenclature from the variant railway signals classifications as well as extrapolations from the aero classification and proposed variant classifications for marine and road can bring about general guidelines.

The variant classification has three levels marked off by one, two or three digits. Each category is preceded by a decimal point. .1 (and succeeding numbers) refers to a basic subdivision which can be: a) coterminous with a three-digit division of the main classification (for example, 510, Signals Governing Train Movement on One Track); b) or a special subdivision within a three-digit grouping (again from the railway study, the shapes of signals require a bifurcation into basic shapes and special shapes but within a three-digit category); c) or coterminous with two or more three-digit categories (for example, five categories of aero partially lighted aids are within one variant category, .2).

Two-digit designations (.10 and above) refer to primary segments within the basic subdivisions. These segments may consist of shape configurations, equipment types, functions of aids or systems that aids are part of.

Three-digit designations (.100 and above) refer to secondary shape configurations, and other features that define an actual marking.

The use of .1, .10, and .100 and beyond are found with each transport mode classification. This reuse of number is possible since the variant classification numbers are attached to the main classification designations. An analogy

to this practice is found with telephone numbers in which the final four digits can be used repeatedly since the first three digits are not replicated in a given area and area code designations are not reused at all.

Because of extensive international efforts for marine, aero and road safety there are fewer variants in those modes. Since railway transportation is more decentralized there are more variant forms. In fact, railway signals have more single, double and triple digit entries than the other three combined. Therefore, beyond the general description of the tripartite variant classification nomenclature, the focus of attention is on railway signals and rules. A second descriptive treatment will consider the more limited variant needs of the other three.

The marine variant classification centers on non-standard forms. Buoys that are notably different in shape from IALA forms, as well as fixed visual aids outside of the IALA system make up the bulk of the entries. There are four one-digit entries: floating, fixed visual, acoustic and electronic aids. Three-digit categories replicate those of the main classification though not with the same entries. IHB, IALA surveys, and national exhibits are the source of the entries.

Traffic control devices has only two two-digit categories: signals, and signs and markings. Sign entries are primarily UN in orgin. Their abundance prevented inclusion in the main classification. Therefore sub-forms rather than variant forms highlight the category. European and Western Hemisphere sources have influenced the signal category which includes additional and variant forms; some signs have also been added from those sources. Markings have a more unitary and limited configuration. As a result there is less need to provide a variant format for markings.

Only three one-digit categories are needed for aero aids. Nonetheless, a great measure of complexity is present. The multiple use of similar fixtures for multiple functions, the overlap in terminology for flashing lights, the close

affiliation of lights with systems, and the abundance of obsolete and obsolescent final approach indicators require an extensive classifitory schema. The main classification could not bear up under the weight of these many aids. The contents of the aero variant classification is therefore at variance with many of the entries of the other allied classifications since some entries could have been placed in the main classification if the volume and diversity of phenomena had been less. Nonetheless, the variant classification framework of three levels (one, two, and three digits) is present.

iii Adjunct Classification

T-M in the beginning consisted of one classification system though it grew into a multifaceted phenomenon. In 1991 it was joined by a variant classification created to meet the diversity needs of the railway signal classification. During the years 1997-2001 a four-part database was added to the Monograph Series. It was to be influenced by -- and to influence -- the classifications. However the range and chronology of the database precluded a close interrelation ship of classification and database. It became apparent further work on the classification was required to more adequately work with the database. That remains the case. However, it now appears that the database and its indexes (especially that of the category index) is a classification in its own right. That adjunct classification remains in the database rather than here. Though an introduction and some measure of rules have been added in this study.

It can be noted that classifications and database are two different kinds of entities. A classification defines -- hopefully with some precision -- objects. It organizes them according to some principle. It has a tendency to draw concepts together. A database may have an organizing principle but it defines less, and gathers up diverse data in a manner that may be expansive, sprawling, not tightly organized, arranged. It can become almost an explosion of terms. But there needs to be connections between classification and database. A primary connection may be the categories index of the database that can function as a

classification.

The category index of the database includes several kinds of material. It includes current, official forms of T-M. This is, of course, the focus of the main classification and also the variant classification of the main classification. But it also includes other materials:

1) Historic terms. In those studies that include terms before 1950 and those terms refer to entities not employed after 1950.

2) Obsolete/Obsolescent terms. These terms are no longer current yet they appear in the literature after 1950 and presumably have found some use since that date. Quite possibly some or many of these entities are in the main classification since a line between official and current and marginal and older T-M forms can be, at best, drawn only in a sketchy manner.

3) Rare terms. Terms used by one author, appearing in only one or two sources may have validity yet cannot be regarded as official, mainstream entities. These are unlikely to have found their way to the main classification.

4) Quasi-terms. There are uncertain terms which may be descriptions of a safety aid yet may appear to be a term or something approximating a term. These terms frequently appear in the database despite uncertainty about their status.

Even an alphabetical index is a classification since it reflects some principle of arrangement (e.g., the nationality of names, major topics, chronology of events; see S. Jevons, *The Principles of Science: A Treatise on Logic and Scientific Method,* Dover 1958, 680-681). The categories index can be seen as a classification for the same reason. The principle at work is that of categories of T-M forms. The database also includes an alphabetical index and that too is a classification.

The categories in both detailed and summary forms are

found with the database monographs (Ii, Iii, Iiii, Iiv) while a summary form is listed in the *General Table of Contents.* Categories include indexes, overarching terms, major forms of T-M, morphological, message, physical and historical terms. The categories vary with the type of safety aid and, in some instances, may be embedded into the name of the aid.

APPENDIX II

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APPENDIX III

TRANSPORTATION-MARKINGS PSALM/CANTICLE

I

All You Floating Aids Praise the Lord

i

Lighted Buoys with fixed,
flashing and occulting
messages,

Can, Conical, Pillar and
Spherical

Singular Forms from Russia,
America, Norway, Germany,
Greece, Canada and Thailand

ii

Unlighted buoys with silent
messages of color, letters,
numbers and topmarks

Conicals, Nuns, and Variations
from Denmark, Italy, Poland,
France, Canada, and America

Cans and Cylindricals, and
altered forms from Canada,
Denmark, Germany, Russia,
Sweden, Taiwan, and America

Spars, straight, tapered,
pointed, modifications from
Canada, Norway and the
United States

Variations atop cans and
triangles and composites
from Germany, Iceland,
The Netherlands, and Poland

Barrels, Beacon-buoys,
Ogivals, Oil drums, Spindles

iii

Sound Buoys with a message
often clamourous, clanging,
chiming, gonging, whistling
or of pure tone,

Bell, Carillon, Gong, Horn,
and Whistle,

iv

Buoys with sound and light,
Can, Conical, Spherical in
Form,

Singular forms from Canada,
America,

v

All You Large Floating Aids
Praise the Lord with lighted,
hooting, and silent messages

Lightships, Lightfloats and
Lightvessels, Lighted
Catamarans, and Large
Navigational Buoys

II

All You Daybeacons Praise the Lord
with shape and color and
symbol,

i

Bakes, Dolphins, Frameworks,
Lattice Works, Multiple Piles,
Skeleton Towers, Tripods,

ii

Edgemarks, Perches, Piles,
Poles, Posts, Spindles, and
Stakes,

iii

Cairns, Small Trees, Stone
Constructions, Tree Branches
tied and untied,

iv

Daymarks alone and Daymarks
with Structures

III

All You Fixed Fog Signals Praise
the Lord with Cacaphony of
Sound,

i

Diaphones, regular and two-tone,
Diaphragms, Compressed Air,
Oscillator, Nautophone and
Chime, Explosives and Guns,

ii

Bells, Gongs, Reed Horns,
Sirens, and Whistles,

Submarine bells and
Oscillators,

IV

All You Marine Electronic Aids to
Navigation Praise the Lord,
with pulsed generated visual
and sound messages

i

Radiobeacons, Racons,
Ramarks, Radar Reflectors

ii

Hyperbolic Radionavigation
systems, Loran, Decca,
Omega, Consul

iii

Satellite Navigation,
GPS, DGPS

V

All You Lighthouses Praise the Lord
with great structures and
piercing lights

i

Sea-girt Towers on rocks, submerged and above water, on skeleton structures, on off-shore platforms, and caissons

ii

Land-based Lighthouses on ocean-edged shore, on promontories and headlands, towers skeleton, framework and solid

iii

Non-tower and composite structures, houses, skeleton structures, houses on structures, towers attached to houses and buildings

VI

All You River, Harbor and Bay Lights Praise the Lord with small flashes and muted structure

i

Dolphins, Pile Structures marine and land, Pyramids, Skeleton structures, Skelton towers, Tripods, Towers skeleton, tripodal and tubular

ii

Arms, Buoyant Beacons, Columns, Masts, Pedestals, Pillars, Pipes, Obelisks, Poles, Posts, Pylons, Single Piles, Spars, Spindles, Stakes, Stands,

iii

Huts, Small Houses, Cairns, Cylinders, Houses and Huts on structures, and on tripods

VII

All You Lighted Aeronautical Navigation Aids Praise the Lord

i

Beacons with flashing and rotating messages

Code, Identification, Flashing, Hazard, and Rotating, Beacons at airports, heliports, seadromes, stolports and vertiports

ii

Runway and Taxiway lights with fixed lighted messages, omnidirectional, unidirectional, bidirectional in varied hues

Runway Inset Lights, Edge, Centerline, Threshold,

Touchdown and End Lights

Taxiway Inset Lights,
at intersections, on
straight and curved sections

iii

Runway and Taxiway Elevated
lights for edge, threshold,
holding position, stopway,
stop, caution and clearance bars

Helicopter Final Approach and
Take-off Area Lights, and
Touchdown and Lift-off Area
Lights

iv

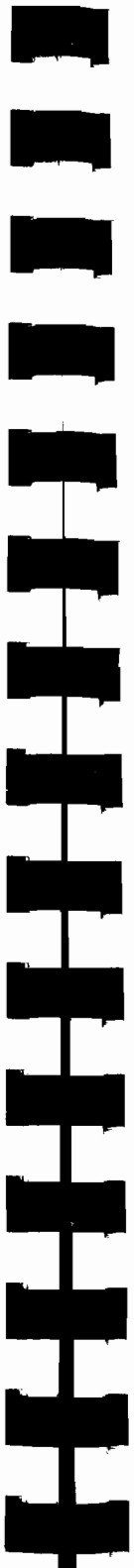
Approach lighting with fixed
messages in low, medium and
high intensity

Approach lighting in simplified
and precision modes, with
acronymic modes of ALSF,
SSALS, ODALS, MALS.
omnidirectional and
unidirectional forms,
halogen and PAR lamps

Joined by sequence flasher
lamps with rapid flashing
messages: RTILS, REILS,
RILS, RAILS, LDIN

v

Visual Glideslope Indicators,
with precise messages in two
colors, three colors, patterns,



pulses, alignments,
VASI, AVASIS, Three-bar
AVASIS, AT-VASIS, T-VASIS,
SAVASIS, TVG

PAPI, APAPI, MINI-PAPI,
H-PAPI

Heli-PlASI, Hapi-PLASIS,
Mini-PLASI

FLOLS, Glissada, MDLA,
Slopeline, PVG, T-PASI

Alignment of Elements,
Approach Azimuth Guidance
Glide Path Indicator, Optical
Localizer, SAGA

vi

Obstruction lighting with
fixed, rotating, and flashing
messages, in low, medium,
and high intensity, lamps
incandescent, cold-cathode,
mercury, neon, and strobe

vii

Aids with messages lighted
and moving

Wind Indicators, Wind Tees,
and Tetrahedrons

VIII

All You Aero Electronic
Devices Praise the Lord
with visual and sound

enhanced silent pulses

i

Consol, DME, Loran-C,
Enroute Marker Beacons,
Non-directional Beacons,
TACAN, VOR, VORTAC,

Satellite Navigation with
GPS and DGPS

ii

ILS with Localizer, with
Glide Path, and Marker
Beacons,

MLS with Azimuth and
Elevation Stations, and DME

IX

All You Aero Unlighted Aids
Praise the Lord with color
and stripes, bands, checks,
chevrons, solids and
alphanumeric graphics

i

Runway Surface Markings,
Aiming Point Markers,
Centerline, Designation,
Chevrons, Edge, Shoulders,
Threshold, Touchdown Zone,
Side Stripes Markings

ii

Taxiway and other surface Markings,

Centerline Checkpoint, Edge
Holding Position and
Intersection, Blast Pads,
Over-runs, Stopways,
Fixed Distance, Geographic
Position, Shoulder Markings

iii

Helicopter Markings,
for winching, identification
mass, final approach,
down, name, helideck,
taxiway

iv

Obstruction Markings, Solid,
Band, and Checkerboard
Patterns, Spherical and
Flag Markers

v

Mandatory Instruction signs,
Information signs, Aerodrome
and Aircraft Stand signs,
Identification signs, Holding
position signs, Signs under
the guise of markers, Signs
lighted for night use

vi

Markers for unpaved runway
and taxiway centerlines, edges,
boundaries, stopways,
snow-covered runway edges

Elevated markers, natural and
assembled, Trees, Stones, Hedges,

Flower beds, Cones, Fences,
Flags, Drums, Tripods, Boards

Low-elevated Markers, Inset,
Inpavement, Retro-reflective,
Stone, Concrete Slabs

X

All You Lighted Railway Signals
Praise the Lord with fixed and
flashing, simple and complex
messages,

i

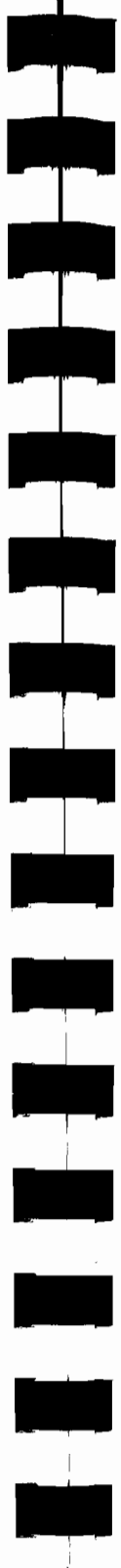
Color-light, multiple and
searchlight lenses, Position,
Color-position, Graphic and
Alphanumeric symbols, Full-
sized and dwarf, mainline,
siding and yard

ii

Cab-signals, light and sound,
colors, and numbers and
digital

XI

All You Mechanical signals
Praise the Lord
with messages rotating and
revolving, hinged, ascending
and descending



i

Semaphores straight and
tapered, with pointed
swallow-tailed, square and
rounded ends, with blade
and spectacle unified, and
split apart

ii

Board signals rotating,
hinged, and stationary, with
diamonds, triangles, squares
and circles

iii

Dwarf signals with discs,
blades and geometric facades,

Semaphores, Disc-semaphores,
Pillar-discs, and Panels

Discs with internal lamps and
flood-lamps, Rotating and
Revolving,

Graphics miniature and large,
internally and externally
lighted,

Targets by color, shaped,
position, single and double,
obrounds, diamonds, octagons,
circles, squares, triangles,
rectangles, masks, ovals,
arrows

iv

Movable signals, Staffs,
Tickets, Tokens and Tablets

XII

All You Signs and Markings
Praise the Lord
with silent messages of color,
shape, graphic and alphanumeric
symbols

i

Signs, lighted and unlighted,
Approach, Speed, Whistle Posts,
Mileage Posts, Location,
Station, Yard, Block and Traction,
Section, Sign and Signal
Identification, Flags, Plates,
Stop Boards

ii

Markings, Pillars and Posts,
Petites, Marker Boards and
Sign-like Objects

XIV

All You Traffic Signals Praise the
Lord, with color, graphic and
alternating messages

i

Traffic light signals and
Pedestrian signals

ii

Cyclist Signals, Lane use
Signals, Railway Crossing
Signals, and Bridge, Ferry
Landing, Fire, Low flying
Aircraft, Ramp Control and
School Signals

Flashing Beacons for Hazard
Identification, Intersection
Control, Speed Limits and Stop
Signs

Lighting devices, all-lighted
and partially-lighted, Warning
Beacons and Lights, Steady-
Burning Lamps

XIV

All You Traffic Signs Praise the
Lord with Silent Messages of
color, shape and symbol

i

Warning Signs for bends left,
right, singles and doubles,
narrowing roads, moveable
bridges, roads on quays
and river edges

Warning Signs for roads uneven
and slippery, loose gravel,
falling rocks and cross
winds

Warning Signs for pedestrians,
children, cyclists, cattle, animals
wild and domestic crossings

Warning Signs for road works, traffic signals, airfields, two-way traffic, cross roads, railway crossings, stop signs and yield

ii

Informative Signs for directions and advance directions, confirmatory, place identification and pedestrian crossings

Informative Signs for useful information for motorists, of faculties, about parking

iii

Regulatory signs, priority, prohibitory, and mandatory

Priority Signs for yield, stop, priority of road, oncoming traffic and priority over oncoming traffic

iv

Prohibitory and Restriction Signs for no entry at all, no entry for some, closed to vehicles in both directions

No turns right, left and "u" prohibitions on passing, no passing for freight

maximum limits on speeds, end of prohibitions, end of speed restrictions, and those for passing

v

Mandatory signs for direction to be followed, for passing this side

Compulsory signs for roundabouts, cycle tracks, foot-path, horseback riders, minimum speed, and end of minimum speed, for snow chains

vi

Signs for prohibiting and restricting standing and parking, for providing useful information on parking

XV

All You Traffic Markings Praise the Lord with graphics of color, line, word and line, word and number

i

Longitudinal markings for traffic lanes, carriageway limits, obstructions, and turning guide lines

Transverse lines for stop, yield, cyclists, and pedestrians

Standing and parking
markings, arrows, oblique
parallel lines, and
alphanumeric symbols

ii

Object Markings, within
roadways, adjacent to
roadways, end of roadways

Delineators, Barricades,
Channelizing Devices, and
Colored Pavements

XVI

All You Sound Signals Praise
the Lord
with bells, whistles,
bird calls, chimes,
buzzers, beepers

Movable Bridges, Audible
Pedestrian, Crossing Signals

NOTE

This "psalm" (or "canticle") was originally formulated during a 1991 sabbatical. It was an outgrowth of a joint focus on Transportation-Markings and theology of creation. It is influenced by the format and content of the creation canticles of the Book of Daniel 3:52-90. It includes many forms of markings though in a form well removed from formal classifications. It too classifies markings even if by a different principles. Some forms of Transportation-Markings in this psalm are not mentioned specifically in Chapters 1 and 2. However, they are found in the explanatory notes of other monographs of the Series.

Technology is often only infrequently included -- or even alluded to -- in the theology of creation. Some of those allusions and references are reflected in the quotes included in this monograph. This "psalm" is a portrayal of technical beings as participants in the universal praise of the Creator by creation. The psalm remains a tentative and provisional endeavor. Nonetheless, it provides an appropriate conclusion to the descriptive mode-specific monographs.

"Francis underwent a painful process of of inner purification such that his eyes could come to see the cosmic presence of Christ and God at the center of each created thing."
Boff, *God's Witness in the Heart of the World*, 1981,189.

"We communicate and navigate with a code of logos, symbols, emblems, and signs."
Yelavich, *Design for Life ...*, 1999, 171.

GENERAL INDEX

NAMES INDEX

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