Heraldry and Blazon: A Graphic-Based Information Language

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ABSTRACT

EXAMINATION OF THE VARIOUS descriptive conventions used by heralds over the last 700 years to blazon armorial devices reveals several patterns that can be adapted to form a generalized algorithm to describe trademarks, logos, and other types of graphic designs. The key assumption used in the algorithm is that the graphic design is to be treated as a glyph that is to be painted onto a surface with some form of opaque media. The different design elements of the glyph are described in the order in which they are applied to the surface as one works from the background to the foreground. The algorithm is in the form of a faceted description. Each of the facets of the algorithm deal with a specific function, attribute, or design use. In addition to being able to search for a specific design element, the faceting feature will provide the user with the capability to search for a specific functional use of a glyph.

INTRODUCTION

Graphically based information systems that arose out of twelfth-century Europe and Japan have grown and developed into the institutions of heraldry and family crests that we know today. Metzig (1983) has defined heraldry as "a 'language' used to visually communicate not only a bearer's identity, but many other facts about him" (p. 6). The written or verbal description, the blazon, was used to provide records of the heraldic devices. The blazons allowed the easy transmission of painting instructions so that the graphic designs of the heraldic device could be accurately reproduced at other locations.

HISTORY

The period between the tenth and twelfth centuries in both Feudal Europe and Feudal Japan was a time of continuing battles between shifting alliances of competing warlords and princelings. The communication problem that needed to be solved was how to identify the various combatants' status and authority across a field of combat that was a swirling confusion of men, animals, equipment, and dust. The solution that evolved to solve this problem led to the development of the Institution of Heraldry in Europe and the System of Family Crests in Japan (Brooke-Little, 1978, pp. 2-7; Dennys, 1982, pp. 29-31; Fox-Davies, 1978, pp. 17-18; Gies & Gies, 1979, p. 183; Pine, 1963, pp. 11-12).

When true heraldry does appear around the twelfth century in Europe, the conventions used in depicting heraldic shields and describing them verbally are derived from the cliches of earlier artists and craftsmen (Brault, 1972, p. 5). The pattern of the description is in the form of painting instructions describing the order in which the elements are to be painted onto the shields. The development of the precision in the blazon around 1250 most likely came about because of the growing legal consequences of the blazon (Brault, 1972, p. 6). The standardization of the blazon patterns in the thirteenth century partly came about to aid the heralds' needs for a mnemonic system to aid in the execution of their professional duties—i.e., in identifying individuals, transmitting verbal or written records of the appearance of the devices to other heralds located in other locations, and consequently for use in legal cases over time to identify heredity and legal claims (Brault, 1972, pp. 6-7).

The most important innovation during this period was the development of the heraldic phrase which specifies the nature of certain charges and lines and indicates the position of all the charges on the shield (Brault, 1972, pp. 10-18). By the mid-thirteenth century, the blazon's lexicon is well established with a rigorous syntax (Barstow, 1974, p. 75). The ordering of the blazon had become established as first the field, followed in order by the principal ordinary, the secondary charges, and finally the marks of difference (Barstow, 1970, p. 87). Later in the medieval period, the counterchange, where colors from the ordinary and field were exchanged, was developed thereby increasing the variety of devices available. Also during this period, the addition of charges on the bands of the ordinaries came about. Subordinaries become defined, and specific terms are introduced to identify precisely the more than 100 combinations of predetermined positions of an animal's body, paws, head, and tail (Metzig, 1983, pp. 25-27, 34).

In the fourteenth century the descriptive phrases became magnified to indicate a distinctive feature. The absolute position of

multiple charges or their direction are specified in some cases, and there was a trend to increasing the combinations of charges on the field (Barstow, 1970, pp. 81-82). By the fifteenth century, differences were added to indicate family relationships or feudal ties (Barstow, 1970, p. 83).

In the sixteenth century, with the change in military armor, heraldry was no longer a necessity for recognition in the field of combat. Released from the restraints and simplicity that practical aspects of visibility and clearness across the battlefield had imposed on it, heraldry entered a period of elaboration. The marshaling of several coats of arms onto a single shield was developed far beyond the original purpose of indicating a union of lordships. Heraldry moved from being a practical ancillary for the warrior to a decorative art form (Brooke-Little, 1978, p. 10). The blazon entered a period of unnecessary elaboration, complicated nomenclature and language, unnecessary rules and conventions, and hermeticism that was to last until the Victorian revival in the nineteenth century (Brault, 1972, p. 3; Brooke-Little, 1978, pp. 10-11).

In modern blazoning, the coat of arms is described in the following order: (1) the field of the shield with its divisions and tincture; (2) the principal charge, or group of charges, on the field; (3) the secondary charge, or group of charges, on the field; (4) the objects placed on the charges already mentioned; (5) important charges resting on the field but not occupying a central position; (6) objects placed on the charges mentioned in number 5; (7) cadency marks; and (8) description of the crest, supporters, and mottoes (Brooke-Little, 1978, p. 15; Dennys, 1982, p. 9; Fox-Davies, 1978, pp. 99-105; Metzig, 1983, p. 124). The general rule of a good blazon is that the nomenclature and descriptive terms be correct, and be clear and concise in construction (Brooke-Little, 1978, pp. 15-18).

DESCRIPTIVE ALGORITHM

Examination of the various descriptive conventions used by heralds over the last 700 years to blazon armorial devices reveals several patterns that can be adapted to form a generalized algorithm to describe trademarks, logos, and other types of graphic designs. The key assumption used in the algorithm is that the graphic design is treated as a glyph that is painted onto a surface with some form of opaque media. With this assumption in mind, the different design elements of the glyph are described in the order that they are applied to the surface as one works from the background to the foreground.

The algorithm is in the form of a faceted description and is designed for use with some type of mechanical processing. Each of the facets of the algorithm deals with a specific function, attribute,

or design use. In addition to being able to search for a specific design element, the faceting feature will provide the user with the capability to search for a specific functional use of a glyph.

The first part of the algorithm, the field facet, is used to describe the shape of the external form of the field or background of the design as a whole. The second part of the algorithm, the principal charge facet, is concerned with the description of the charges or major design elements that rest on the field. The third part of the algorithm, the principal objects facet, is concerned with the description of the objects or minor design elements that are complete in themselves that are located on the charges. The fourth part of the algorithm, the secondary charge facet, is concerned with the description of the charges that are located on the various divisions of the field. The fifth part of the algorithm, the secondary objects facet, is concerned with the description of the objects that rest on the secondary charges. The sixth and last part of the algorithm, the embellishment facet, is concerned with the description of the embellishments or auxiliary design elements associated with the glyph but are not actually a part of the design (see Appendix A for a further description of all facet descriptions).

One or more of the facets may be embedded within another facet when the graphic design being described is extremely complex. Additionally, each facet may be repeated as often as necessary in the description of a design.

Each of the description facets will contain the following segments: (1) a location description segment that is used to describe where a particular graphic element is located in relation to the design as a whole or to a smaller unit of the design; (2) a glyph description segment that is used to describe the shape or form of the particular graphic element; and (3) a color description segment that is used to describe the color of the particular graphic element. One or more of the facets may contain additional description segments that describe other associated attributes (see Appendix A for a description of these description facets).

Vocabulary Control

Over the last 900 years the heralds have developed a rich descriptive language that includes terms for different types of field patterns and divisions, types of lines and objects, and positioning of animal and human bodies. This rich historic tradition provides a strong base on which to build a standardized technical language for the description of graphic forms. The addition of new terms to cover modern developments and non-Western forms, and the use of heraldic *proper* (a term which means to render the object as it is in real life), will provide a controlled vocabulary that will, when

combined with this faceted algorithm, make it possible to classify graphic designs so that related design elements, either in part or in entirety, can easily be brought together and compared. The use of symbols to indicate the notation system being used to describe the location, glyph, and color will make the algorithm highly flexible and easily adaptable to various user populations.

The advantage of a mechanical system is that tables of equivalences can be set up to allow the machine to do the comparisons between different systems of notation automatically. This way it is possible to retrieve items described by different notational systems without having to develop search terms in each of the systems. With these three descriptor segments (location, glyph, and color), it is possible to set up a series of correspondences that will automatically search for all search term variants without regard to the descriptive system used originally to describe the object.

DESCRIPTIVE APPLICATIONS

This algorithm, with the associated controlled technical vocabularies, will allow the description of trademarks, logos, and other forms of graphic designs in the form of descriptive strings so that they can be accessed by use of online string searching methods. This will make it possible for trademarks, logos, and graphic designs to be located by conducting a search pattern that is based on individual design elements. Because each design element is designated as to location and importance in the overall design, it is possible to compare entire classes of glyphs for design likeness. This type of comparison will be of immense value in rapidly locating similar looking trademarks, logos, or graphic designs.

By the way the description is formulated, it is possible to determine the relative degrees of likeness and/or difference between designs. If you want to compare the design elements in a trademark or logo for possible conflicts, this algorithm will make it very easy to locate any designs that have similar elements in the same locations. For example, if the principal charge of the trademark or logo you are interested in is a red tudor rose, and you enter a global search for red tudor roses, you could get back several different types of responses. One type of response using this algorithm could be descriptions that have a red tudor rose described in the principal charge facet. This is an indication that the described designs need to be examined more closely to see how similar they are to the trademark or logo of your interest. However, if the red tudor rose is described in the secondary object facet, then there is no need to compare the designs for the likeness of the red tudor roses because they do not serve the same design function in the trademark or logo. By a more sophisticated use of the algorithm, i.e., where the string

search is made only in the principal charge facet, only the designs that use the red tudor roses as the major design element would be included in the response to the search, making the search effort even more efficient.

The development of trademark, logo, and graphic design databases using this type of descriptive algorithm will allow individuals to use automated online systems quickly to locate designs with similar graphic elements. The descriptive patterning in the algorithm does allow comparisons of how elements are used in different trademarks, logos, or graphic designs. It is possible to compare degrees of similarity and/or differences between designs by assigning numerical weights based on the algorithm's facets and segments. If the design element in question is located in the same facet, a value of 1 is assigned to the design. If located in different facets, a value of 2 is assigned to the design. Within each facet a value of 0.1 can be assigned if the designs are of the same color and a value of 0.2 can be assigned if they are of different colors. Designs with a numerical rating of 1.1 would be more similar to the target design than designs with a numerical rating of 1.2. Designs with a numerical rating of 2.1 or 2.2 would be even more different than the target design. Using a weighting system such as this, numerical comparisons can be developed to give an indication of the design similarity between trademarks, logos, and other graphic designs based on the glyphs, location, and color of the design elements. This type of system has potential uses in comparing designs for trademark or logo conflicts.

In another application, art teachers or graphic artists, can use this system to locate quickly graphic designs that express the use of design elements in the patterns that they want. By being able to specify the type of location and relationship among design elements, this algorithm will allow scholars and students to locate examples that show the wide variety of uses which can result from the combination of glyphs.

SUMMARY

Adapting the principles that have evolved in the development of the heraldic blazon to current needs, an algorithm has been developed to aid in the description of graphic designs. Making use of the flexibility of faceted systems, this descriptive algorithm provides an efficient method of describing trademarks, logos, and other graphic materials so that they can be located quickly using mechanical searching techniques. The faceted divisions allow the development of numerical weighted systems to aid in determining the degree of similarity between trademarks, logos, and other graphic designs. Because the algorithm will be used in a mechanical search

environment, the complexity of the algorithm will be transparent to the casual user (see Appendix B for examples of the description algorithm).

APPENDIX A. DETAILED EXPLANATION OF THE DESCRIPTIVE ALGORITHM

The first thing that must be described is the background or field of the design. In the heraldic tradition, the assumption is made that the shape of the background will be in the form of a shield for a man, or in the form of a lozenge (diamond) for a woman, and therefore there is no mention made of the external shape of the field. In describing nonheraldic designs, this assumption is not valid, so allowance must be made for a wide variety of field external shapes. The second assumption made by heralds is that the descriptive directions are always given from the point of view of the individual holding the shield. When directions are given from this point of view, the heraldic terms *sinister* (left) and *dexter* (right) will be used. When the description is given from the point of view of the individual facing the design, the directions left and right will be used.

The algorithm is in the form of a faceted description. The facets are: Field Description, Principal Charge Description, Principal Object Description, Secondary Charge Description, Secondary Object Description, and Embellishments Description. Each of the description facets consists of the following segments: location description segment, glyph description segment, and color description segment. One or more of the facets may contain additional description segments. In addition,one or more facets may be embedded within another facet.

SEGMENT DESCRIPTIONS

Location Description Segment

The symbol used to designate this descriptive segment is the "colon backslash" (:\ ). This segment is used to describe the location of the particular graphic element in relation to the design as a whole or to a smaller unit of the design. When using this segment, any one of several different notations may be used to designate location. Traditional heraldic location terms like *chief* (i.e., the upper portion of the shield [design], usually the upper one-third), *fees point* (i.e., the center point of the shield [design]), and *base* (i.e., the lower portion of the shield [design], usually the lower one-third) can be used to designate locations of glyphs on the design. The insertion of the letter "*h*" after the colon backslash (:\ ), will indicate that heraldic terminology is being used (e.g., :\ *h chief*).

A second notational method is to use common descriptive terminology to indicate the location of the glyph. Location can be indicated by using common location terms like *upper, right,* and *diagonal* bisection. The letter *p* inserted after the colon backslash (: \ *p*) will indicate that common descriptive terminology is being used (e.g., :\ *p upper right*).

A third notational method is to use a 10 × 10 grid square to describe the location of the different graphic elements. The letter *g* will be inserted after the colon backslash (:\ *g*) to indicate that a grid square is being used to describe the location of the design elements. In this case the following conventions need to be followed: (1) the graphic design is enlarged to fill the grid without distortions; (2) the origin or 0.0 point is located at the lower left corner of the grid; (3) the *x*-axis is the horizontal axis; (4) the *y*-axis is the vertical axis; (5) the graph location points will consist of two decimal numbers in the following order: *x*-axis location, *y*-axis location; (6) when these numbers are transcribed into the algorithm the following form will be used: *x*-axis number—*y*-axis number (e.g., :\ *g* 5.3—3.4);

(7) the decimal number can range from 0.0 to 10.0 (the decimal extension can be carried out to the right of the decimal point as far as necessary). In the vast majority of cases, one decimal place will be all that is necessary. Because these are decimal numbers, at a minimum, a .0 will be required after each number); (8) a point location will consist of a single set of x-y axis points and will represent the center of mass of the glyph (e.g., : \ g 4.0—5.4); and (9) an area location will consist of at least three points and will be listed as x-y axis pairs with a space comma space separating each pair of points (e.g., :\ g 2.3—3.4 , 5.6—9.2 , 7.1—4.6).

A fourth notational system that can be used to describe locations is coordinate geometry. The letter c will be inserted behind the colon backslash (:\ c) to indicate that the coordinate system is being used to describe the location of the design elements. When using coordinate geometry, the following conventions will be used: (1) the origin or 0.0 is located in the center of the design; (2) the x-axis and y-axis will be sized to cover the entire design with maximum values of ±/ —10.0 units; (3) the x-axis is the horizontal axis; (4) the y-axis is the vertical axis; (5) the coordinate positions will consist of two decimal numbers in the following order: x-axis location, y-axis location; (6) when these numbers are transcribed into the algorithm, the following form will be used: x x-axis number—y y-axis. number (e.g., :\ + 5.3—y + 3.4); (7) the decimal numbers can range from -10.0 to +10.0 (the directional signs, "+" and "-" must be included when transcribing these numbers; (8) a point location will consist of a single set of x-y axis points and will represent the center of mass of the glyph (e.g., :\ x — 4.5—y —3.1); (9) an area location will consist of at least three points and will be listed as x-y axis pairs with a space comma space separating each pair of points (e.g., :\ x —2.3—y X3.4 , x X5.6—y —9.2 , x X7.1—y X4.6); and (10) a second method of designating area is to indicate the quadrant involved by using the Roman numerals I (+x, +y), II (—x, +y), III (—x, -y), IV (+x, -y) (e.g., :\ I) indicates that the glyph is in the upper right hand quadrant of the design, and also that it has a positive x-axis and a positive y-axis).

Glyph Description Segment

The symbol used to designate this descriptive segment is the period backslash (.\ ). This segment is used to describe the shape or form of the particular graphic element. There is a large technical descriptive vocabulary that the heralds have built up over the last 700 years that provides compact names for many design motifs. The inclusion of the letter h after the period backslash will indicate that heraldic terminology is being used to describe the design element—e.g., .\ h checky indicates a checker-board pattern produced by the combination of a barry field [divided into horizontal divisions] and a paly field [divided into vertical divisions] and .\ h gyronny indicates that the field is divided into gyrons [triangular pieces] radiating from a central point. The heralds have also developed a set of terms to describe how human, animal, and plant elements are displayed (e.g., .\ h lion rampant guardant double-queued indicates that the lion is drawn in profile with the body pointed toward the dexter side of the design, in an erect posture resting upon its sinister hind-paw, with the head of the lion turned to face the spectator, with two distinct tails issuing from the hindquarters). Additionally, a strong vocabulary has been developed dealing with inanimate objects (.\ h mullet of six points is a star with six straight rays, and .\ h estoile of six points is a star with six wavy rays).

There also have developed over the last several hundred years technical vocabularies to describe graphic design elements used by artists. A good example of the variations of forms that can be described by combinations of several basic shapes is found in the *Handbook of Designs and Devices* (Hornung, 1946). The inclusion of the letter *g* after the period backslash will indicate that graphic terminology is being used to describe the design element (. \ *g triquetra*) [a three-pointed motif derived from three equal arcs of circles arranged in continuous fashion (Hornung, 1946, plate 64)], and . *g monad* [a plane, geometric figure of a circle divided by two equal tangential arcs with opposite centers (Hornung, 1946, plate 166)].

In addition, there are standardized sets of symbols and glyphs developed by different sciences and fields of enterprise that can also be used in descriptions of the graphic elements of a design. The inclusion of the letter *p* after the period backslash will indicate that proper name terminology is being used to describe the design element—e.g., from the field of biology, the . \ *p DNA molecule* or . \ *p double-helix molecule* (a ladder shape that is twisted into a spiral). There are also common forms that can be described by stating their name (e.g., from the field of aviation, . \ *p aircraft*, that can be made as specific as possible to provide the necessary detail to correctly identify the design element (e.g., . \ *p jet aircraft*, and more specifically . \ *p Boeing 747*, and still more specifically . \ *p United Air Lines Boeing 747*).

Color Description Segment

The symbol used to designate this descriptive segment is the comma backslash (, \ ). This segment is used to describe the color of the particular graphic element. There are many different systems in use today to describe or identify different shades of color. The color elements can be described using a generalized color scale similar to one used by the heralds. The heralds have traditionally used seven color indicators, five dark hues referred to as colors, and two light hues referred to as metals. The inclusion of the letter *h* after the comma backslash will be used to indicate that the heraldic color descriptors are being used (e.g., , \ *h gules*, the heraldic term for red "color" shades, and , \ *h or*, the heraldic term for gold or yellow "metallic" shades). In addition to the seven traditional hues, heralds also used the term *proper* to indicate that the object is to be colored in its natural colors.

The more common method of specifying color shades that provides a wider range of discrimination is by use of generally accepted color names in popular use. The inclusion of the letter *p* after the comma backslash will be used to indicate that popular usage color descriptors are being used (e.g., , \ *p burnt orange*,) or , \ *p candy apple red*).

A more specific color scale like the Inter-Society Color Council—Natural Bureau of Standards (ISCC—NBS) System that describes the color shade in terms of its three perceptual attributes of hue, lightness, and saturation and its Munsell color notation that describes color by use of numerical scales of hue, value, and chroma can be used instead. The ISCC—NBS System divides the color spectrum into 267 color blocks, each of which defines a specific color name. The inclusion of the letter *i* after the comma backslash will be used to indicate that the ISCC—NBS System is being used to describe the color (e.g., , \ *i reddish orange* or , \ *i greenish blue*).

There are several other specialized color description systems that can be used in this color descriptor segment by providing an identifying symbol immediately following the comma backslash.

FACET DESCRIPTIONS

Field Facet

The first part of the algorithm is the field facet. This part of the algorithm is used to describe the shape of the external form of the field or background of the major portion of the design as a whole. The symbol that is used to designate this facet is F backslash backslash $(F\backslash\backslash)$. This facet consists of five separate parts: (1) the external shape of the field, (2) the partition of the field, (3) the location of each partition, (4) the type of partition, and (5) the color of each field partition. The direction of the description is, in the case of a partitioned field, in a clockwise direction from the upper left hand corner of the field as the describer faces the design. The external form of the field is described immediately after the facet symbol $F\backslash\backslash$). The symbol # backslash $(\#\backslash)$, is used to designate the number of partitions in the field. The location description segment is used to describe the location of each of the partitions, the glyph description segment is used to describe each type of partition, and the color description segment is used to describe the color of each partition. When there are two or more partitions, the descriptive set relating to each partition is grouped together between parentheses.

$$F\backslash\backslash \text{ external form } \#\backslash \text{ partitions } (:\backslash \text{ location}_1.\backslash \text{ type}_1,\backslash \text{ color}_1) \ldots$$
$$(:\backslash \text{ location}_n.\backslash \text{ type}_n,\backslash \text{ color}_n)$$

An example of this facet follows:

$F\backslash\backslash$ circle $\#\backslash$ 2 $(:\backslash$ p upper right. $\backslash$ p diagonal bisection, $\backslash$ p red) $(\backslash$ p lower left.$\backslash$ p diagonal bisection,$\backslash$ p white)

Principal Charge Facet

The second part of the algorithm is the principal charge facet. It is concerned with the description of the charges or major design elements that rest on the field, the central character of the design. The designation for this facet is PC backslash backslash $(PC\backslash\backslash)$. It consists of three separate parts: (1) the location of principal charge, (2) the type of charge, and (3) the color of the charge. The location description segment, the glyph description segment, and the color description segment are used to describe the principal charge. When there are two or more principal charges, the descriptive set relating to each principal charge is grouped together between parentheses. When describing each charge, the ordering of the description is with the major element of the charge mentioned first, followed by the lesser elements in order of their color being applied. If there is no obvious ordering, as in the case of the field description, the description is in a clockwise direction from the upper left hand corner of the charge as the describer faces the design. The sequence $:\backslash$ location $.\backslash$ glyph $,\backslash$ color is repeated as each separate part of the charge is described. If there is more than one major charge in the design, then the ordering to be followed is upper left to lower right or top to bottom. Each group of descriptive elements associated with each charge is to be grouped between a pair of square brackets. If the charge is complex enough to require several levels of description, then additional sets of brackets can be used to group the descriptive elements into units—i.e. {[] []} or {[] [] [] [] [] []}.

$$PC\backslash\backslash (:\backslash \text{ location}_1 .\backslash \text{ glyph}_1 ,\backslash \text{ color}_1) \ldots \{[\backslash \text{ location}_{n1} .\backslash \text{ glyph}_{n1}$$
$$,\backslash \text{ color}_{n1}] [:\backslash \text{ location}_{n2}\backslash \text{ glyph}_{n2} ,\backslash \text{ color}_{n2}]\}$$

An example of this facet follows:

PC\ (:\ p circle's midpoint .\ p square ,\ p black)

Principal Objects Facet

The third part of the algorithm is the principal objects facet. It is concerned with the description of the objects of minor design elements that rest on the charge. These are design units that are complete in themselves but are located on the charges. The symbol that is used to designate this facet is *PO* backslash backslash (PO\\ ). This facet consists of three separate parts: (1) the location of the principal object, (2) the type of object, and (3) the color of the object. The location description segment, the glyph description segment, and the color description segment are used to describe the principal object. When there are two or more principal objects, the descriptive set relating to each principal object is grouped together between parentheses. When describing each object, the ordering of the description is with the major element of the object mentioned first, followed by the lesser elements in order of their color being applied. If there is no obvious order, as in the case of the field description, the description is in a clockwise direction from the upper left hand corner of the object as the describer faces the design. The sequence *:\ location .\ glyph ,\ color* is repeated as each separate part of the object is described. If there are several major objects in the design, then the ordering to be followed is upper left to lower right or top to bottom. Each group of descriptive elements associated with each object is to be grouped between a pair of square brackets. If the object is complex enough to require several levels of description, then additional sets of brackets can be used to group descriptive elements into units—i.e. {[] []} or {[] [] [] [] []}.

$$PO\backslash\backslash (:\backslash \text{ location}_1 .\backslash \text{ glyph}_1 ,\backslash \text{ color}_1) ... \{ [:\backslash \text{ location}_{n1} .\backslash \text{ glyph}_{n1}$$
$$,\backslash \text{ color}_{n1}] [:\backslash \text{ location}_{n2} .\backslash \text{ glyph}_{n2} ,\backslash \text{ color}_{n2}] \}$$

An example of this facet follows:

PO\\ (:\ p centered on square .\ p PAX ,\ p gold)

Secondary Charge Facet

The fourth part of the algorithm is the secondary charge facet. It is concerned with the description of the charges or major design elements located on the various divisions of the field. The designation for this facet is *SC* backslash backslash (*SC* \ \ ). This facet consists of three separate parts: (1) the location of principal charge, (2) the type of charge, and (3) the color of the charge. The location description segment, the glyph description segment, and the color description segment are used to describe the secondary charge. When there are two or more secondary charges, the descriptive set relating to each secondary charge is grouped together between parentheses. When describing each charge, the ordering of the description is with the major element of the charge mentioned first followed by the lesser elements in the order of their color being applied. If there is no obvious ordering, as in the case of the field description, the description is in a clockwise direction from the upper left hand corner of the charge as the describer faces the design. The sequence *:\ location .\ glyph ,\ color* is repeated as each separate part of the charge is described. If there is more than one secondary charge in the design, then the ordering to be followed is upper left to lower right or top to bottom. Each set of descriptive elements associated

with each charge is grouped between a pair of square brackets. If the charge is complex enough to require several levels of description, then additional sets of brackets can be used to group the descriptive elements together into units—i.e., {[] []} or {[] [] [] [] []}.

SC\\ (:\ location$_1$.\ glyph$_1$,\ color$_1$) ... {[:\ location$_{n1}$.\ glyph$_{n1}$,\ color$_{n1}$] [:\ location$_{n2}$.\ glyph$_{n2}$]}

An example of this facet follows:

SC\\ (:\ p upper right bisection .\ p lily ,\ p white) {[:\ p lower left bisection .\ p rose ,\ p red] [:\ p lower left bisection beneath rose .\ p bowl ,\ p green]}

Secondary Objects Facet

The fifth part of the algorithm is the secondary objects facet. It describes the objects or minor design elements that rest on the secondary charges. These are design units that are complete in themselves but are located on the charges. The designation used for this facet is *SO* backslash backslash (*SO*\\ ). It consists of three separate parts: (1) the location of the principal object, (2) the type of object, and (3) the color of the object. The location description segment, the glyph description segment, and the color description segment are used to describe the secondary object. When there are two or more secondary objects, the descriptive set relating to each secondary object is grouped together between parentheses. When describing each object, the ordering of the description will be with the major element of the object mentioned first, followed by the lesser elements in the order of their color being applied. If there is no obvious ordering, as in the case of the field description, the description will be in a clockwise direction from the upper left hand corner of the object as the describer faces the design. The sequence *:\ location .\ glyph ,\ color* will be repeated as each separate part of the object is described. If there is more than one secondary object in the design, then the ordering to be followed is upper left to lower right or top to bottom. Each group of descriptive elements associated with each object is to be grouped between a pair of square brackets. If the object is complex enough to require several levels of description, then additional sets of brackets can be used to group the descriptive elements together into units—i.e., {[] []} or {[] [] [] [] []}.

SO\\ (:\ location$_1$\ glyph$_1$\ color$_1$) ... {[:\ location$_{n1}$.\ glyph$_{n1}$,\ color$_{n1}$] [:\ location$_{n2}$.\ glyph$_{n2}$,\ color$_{n2}$]}

An example of this facet follows:

SO\\ (:\p upper right bisection in center of lily .\h mullet of five points ,\p black) {[:\p lower left bisection on left side of rose .\p lady bug ,\p gold] [:\p lady bug's wings .\p 5 dots ,\p black]}

Embellishment Facet

The sixth and last part of the algorithm is the embellishment facet. It is concerned with the description of the embellishments or auxiliary design elements associated with the design but not actually a part of the design. The symbol used to designate this part of the algorithm is *E* backslash backslash (*E*\\ ). Examples from heraldry are the crests, helms, mantles, supporters, and mottoes associated with a heraldic device but not actually an integral part of the design. These are design units that are complete in themselves but are located externally to the design field. The location

description segment, the glyph description segment, and the color description segment are used to describe the embellishments. When there are two or more embellishments, each embellishment's descriptive set is grouped together between parentheses. When describing each object, the ordering of the description will be with the major element of the object mentioned first, followed by the lesser elements in order of their color being applied. If there is no obvious ordering, as in the case of the field description, the description will be in a clockwise direction from the upper left hand corner of the object as the describer faces the design. The sequence $:\backslash$ *location* $.\backslash$ *glyph* $,\backslash$ *color* will be repeated as each separate part of the object is described. If the embellishment is very complex, it may be necessary to make use of the previous five facets in describing the embellishments. In this case these facets are to be enclosed within the parentheses that enclose the descriptive elements associated with the embellishment. If there is more than one embellishment in the design, then the ordering to be followed is upper left to lower right or top to bottom. Each group of descriptive elements associated with each embellishment is to be grouped between a pair of square brackets. If the object is complex enough to require several levels of description, then additional sets of brackets can be used to group descriptive elements into units—i.e., {[] []} or {[] []} {[] [] []}.

$$E\backslash\backslash \ (:\backslash \ location_1 \ .\backslash \ glyph_1 \ ,\backslash \ color_1) \ ... \ ) \{[:\backslash \ location_{n1} \ .\backslash \ glyph_{n1}$$
$$,\backslash \ color_{n1}] \ [:\backslash \ location_{n2} \ .\backslash \ glyph_{n2} \ , \ color_{n2}]\}$$

An example of this facet follows:

$$E\backslash\backslash \ (:\backslash p \ below \ the \ circle \ .\backslash \ p \ scroll \ ,\backslash p \ gold \ [.\backslash p \ inside \ scroll$$
$$.\backslash p \ MORTE \ ,\backslash p \ red])$$

Using the descriptive designator symbols, the complete generalized algorithm for graphic descriptions is:

$$F\backslash\backslash \ \#\backslash \ (:\backslash .\backslash .,\backslash) \quad PC\backslash\backslash \ (:\backslash .\backslash .,\backslash) \quad PO\backslash\backslash \ (:\backslash .\backslash .,\backslash)$$
$$SC\backslash\backslash \ (:\backslash .\backslash .,\backslash) \quad SO\backslash\backslash \ (:\backslash .\backslash .,\backslash) \quad E\backslash\backslash \ (:\backslash .\backslash .,\backslash)$$

Each of the different descriptive designator units can be expanded as needed by the use of grouping brackets: [...], {[...]}.

Over the last 900 years the heralds have developed a rich descriptive language that includes terms for different types of field patterns and divisions, types of lines and objects, and positioning of animal and human bodies. This rich historic tradition provides a strong base on which to build a standardized technical language for the description of graphic forms. The addition of new terms to cover modern developments and non-Western forms and the use of heraldic *proper* will provide a controlled vocabulary that will, when combined with this faceted algorithm, make it possible to classify graphic designs so that related design elements, either in part or whole, can easily be brought together and compared. The use of the system symbols to indicate the notation system being used to describe the location, glyph, and color will make the algorithm highly flexible and easily adaptable to various user populations.

Appendix B. Examples of the Description Algorithm

The first series of examples will be of simple heraldic devices described first by blazon and then by the descriptive algorithm. In these instances, the algorithm may appear awkward as compared with the blazon format; however, the algorithm is designed for mechanical processing and the blazon is not. Another item of difference is that in the algorithm all individual facets are presented whether or not there is any graphic element to fill them. The blazon is a shorthand representation that assumes the reader understands how the graphic elements are positioned without extensive details being given (e.g., it is assumed that all graphic elements are centered in their particular space unless otherwise indicated). This assumption cannot be made with the algorithm, and therefore more detail is required.

Figure 1

Blazon: Azure, a bell with a pull argent (Metzig, 1983, pp. 69, 128)

Algorithm: F\\h half-round shield #\ (:\ .\ ,\h azure) PC\\ (:\p centered .\p a bell with two rope pulls ,\h argent) PO\\ (:\p centered on bell . \h cross fleuretty ,\h argent [:\p centered on cross fleuretty . \h cross fillet , \h sable]) SC\\ (:\ .\ ,\) SO\ \ (:\ ,\ ,\) E\\ (:\ .\ ,\)

In this example, an examination of the algorithm reveals that it is much more specific in the quantity and quality of details than is the blazon. The blazon assumes that much of the unstated information is known and will be applied by the heralds at the correct spot in the translation of the description into a graphic image. The algorithm does not make any such assumption. Where the blazon makes the assumption that the external field shape is that of a shield, the algorithm does not and describes the shield shape. Another blazon assumption not made in the algorithm is that the principal charge (i.e., the bell) is centered on the shield unless otherwise stated. The algorithm requires that each item in the description have a stated location. A third difference between the blazon and the algorithm is that the algorithm specifically details the number of the pull ropes associated with the bell and also the ornamentation on the bell, whereas the blazon leaves this to the herald's imagination. A fourth item to be noted is that the algorithm allows the mixing of different description systems to provide a clearer descriptive picture of the icon.

Figure 2

Blazon: Azure, a quill in pale covering a book open under three crowns
             argent (Metzig, 1983, pp. 69, 128)
Algorithm: F \ \ h half-round shield # \ (: \ . \ , \ h azure) PC \ \ (: \
             h base . \ p open book , \ h argent) PO \ \ (: \ h in pale from
             base through fess . \ h quill , \ h argent) SC \ \ (: \h chief
             . \ h leaf crown , \ h argent) (: \ h left flank . \ h leaf crown
             , \ h argent) (: \ h right flank . \ h leaf crown , \ h argent)
             SO \ \ (: \ . \ , \) E \ \ (: \ . \ , \)

The above example demonstrates one way to describe how one icon
is superimposed over another (i.e., the quill laying over the book). It also
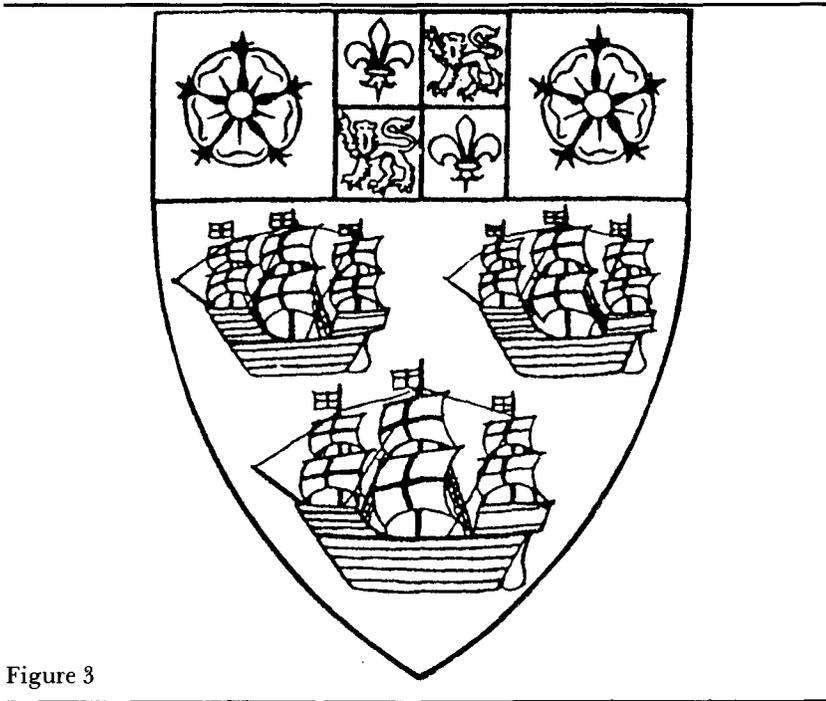shows how secondary charges are described (i.e., the leaf crowns).

Figure 3

Blazon: Azure, three ships gold, under all their sails garnished with crosses gules, and upon a chief or between two roses proper an additament out of the Arms of England, quarterly azure and gules in the first and last one flower de luce or, and in the second and third a lion passant guardant of the same (Dennys, 1982, pp. 48-49)

Algorithm: F\\ p Shield #\ (:\ .\ ,\h azure) PC\\ (:\ h dexter flank .\ p ship under full sail ,\ h or) (:\h sinister flank .\ p ship under full sail ,\ h or) (:\ h middle base ,\ p ship under full sail ,\ h or) PO\\ (:\ p on sails .\ h crosses ,\ h gules) SC\\ (:\ h chief .\ h chief ,\ h or) SO\\ (:\ h dexter canton .\ h rose ,\ h proper) (:\ h middle chief .\ h Arms of England [F\\ 4 (:\ p upper left quarter .\ p quarter , \ h azure) (:\ p upper right quarter .\ p quarter ,\ h gules) (:\ p lower right quarter .\ p quarter ,\ h azure) (:\ p lower left quarter .\ p quarter ,\ h gules) PC\\ (:\ p upper left quarter .\h fleur-de-lis ,\ h or) (:\ p upper right quarter . \ h lion passant guardant ,\ h or) (:\ p lower right quarter .\ h fleur-de-lis ,\ h or) (:\ p lower left quarter .\ h lion passant guardant ,\ h or PO\\ (:\ .\ ,\) SC\\ (:\ .\ , \) SO\\ (:\ .\ ,\) E\\ (:\ .\ ,\)\] ,\ proper) (:\ h sinister canton .\ h rose ,\ h proper) E\\ (:\ .\ ,\)

This example provides an illustration of how to describe a design that includes, as part of the larger overall design, another separate complex design. In this design granted to the East India Company, the Arms of

England are embedded in the upper middle of the design. The way this problem is handled with the algorithm is illustrated in the italicized portion of the description. The Arms of England is a secondary object in the overall design, and described in the secondary object facet. After the name of the design object (i.e., the Arms of England) is mentioned, square brackets are used to set aside a separate complete set of the algorithm that is used to provide a complete description of this design. Following the closing square bracket, the color description segment has the notation *proper* to indicate that the arms are to be colored as described in the preceding description. The algorithm description of the Arms of England has been inserted into the algorithm description of the Arms of the East India Company at the point where Arms of England are named as a graphic element of the design. This type of nesting can be done to whatever level or degree is necessary to provide an adequate description of the design in question. The next group of figures is a series of company logos that present difficulties in being blazoned because they are not based on a shield design but are easily described using the algorithm.

Figure 4

Algorithm: F\\ #\ (:\ .\ ,\) PC\\ (:\ p centered .\ p script "Coca-Cola" ,\ p red) PO\\ (:\ p lower right side .\ p ® ,\ p red) SC\\ (:\ .\ ,\) SO\\ (:\ .\ ,\) E\\ (:\ .\ , \)

The Coca-Cola® logo does not have a prescribed background field so no field is described. The logo itself is a fancy scripted version of the terms Coca-Cola. The ® is a standard graphic mark that indicates the logo has been legally registered and is protected.

Figure 5

Algorithm: F\\p Circle (:\ c radius of 8 units .\ p circle ,\ p orange rimmed in black) PC\\ (:\ c x-10—y + 3 , x-10—y-3 , x+10—

$y+3$, $x+10-Y-3$. \ p fess extended beyond circle rim , \
h argent) PO \ \ (: \ h fess . \ p block letters "Gulf" , \
h sable) SC \ \ (: \ . \ , \) SO \ \ (: \ . \ , \) E \ \ (: \ . \
, \)

In this example, the use of coordinate geometry is illustrated as a method to describe the location of design elements. First, the size and shape of the field is defined as a circle with a radius of eight units. Then the fess structure, which extends beyond the circumference of the circle, is also described by the use of coordinate geometry.

Figure 6

Algorithm: F \ \ p Rectangle # \ 3 (: \h chief . \ h chief , \ h azure)
(: \ h fess . \h fess , \ h argent) (: \h base . \ h base , \h or)
PC \ \ (: \ h fess . \ p block letters "VISA" . \h azure)
PO \ \ (: \ . \ , \) SC \ \ (: \ . \ , \) SO \ \ (. \ , \) E \ \
(: \ . \ , \)

This example illustrates the division of the field into several parts—i.e., the chief, fess, and base. In this case, the use of heraldic terms for the division fits the structure of the design nicely. This also emphasizes that heraldic terms are not restricted to heraldic devices or blazons.

Glossary of Heraldic Terms

argent: silver or white
azure: blue
base: bottom third of the figure
chief: top third of the figure
cross fillet: a plain line cross
cross fleuretty: an ornamental
  form of the cross
fess: middle third of the figure
flank: side of the figure between
  the base and the chief

quadrant: profile showing full face
gules: red
or: gold or yellow
pale: vertical middle third of the
  figure
passant: walking position
sable: black

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