

INFLUENCES OF THE IDEAS OF JAY HAMBIDGE ON ART AND DESIGN

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Abstract—The system of dynamic symmetry, as an approach to decision-making in design, by Jay Hambidge in the early 1920s had a strong influence on industrial design as well as upon the work of painters.

This paper will review the design theories of Jay Hambidge and dynamic symmetry in terms of the use of proportions in design which are humanistically based upon the proportions of the human body. Recent research in the general area known as *the golden section hypothesis* will be reviewed as a means of justification not only for Hambidge's theory of proportions in design but as a validation for recent ideas in design, especially those of Robert Venturi. The paper will demonstrate the utility of studies from the behavioral sciences for questions of design history as well as for present-day design theory and practice.

The work of contemporary artists and designers will be shown to demonstrate that these ideas, the golden section and dynamic symmetry, while popular in the 1920s, have a renewed sense of relevance to current ideas and approaches in design theory. The influence upon industrial design, while it may not be clear as say the influence of dynamic symmetry or the work of Bellows or Rothko, is nevertheless also quite clear. This influence is most evident in the work of Jay Walter Teague senior and in the well-known book *Design This Day*. The Hambidge design system of dynamic symmetry was used by designers at Tiffany's in the early 1920s and Jay Hambidge in his writings argued for an industrial design based upon the proportions of the golden section. The Hambidge system is employed today at the design department of Ohio State University and by Professor Lee Payne in the industrial design program at Georgia Tech in Atlanta.

INTRODUCTION

My intention when I first began the literature search upon which this paper is based, was to prepare a single review of the published material that would focus upon the uses of the golden section in recent twentieth century art and design, as reflected in the recent art literature as presented by a computer data file, *Art Modern (1972-1983)*. My original intention was not to move beyond that specific data base, since it represented the more recent shows and articles relative to this topic. I have tried to keep with those basic intentions in the materials that I have developed for this paper.

The volume of published material caused me to decide to prepare two separate reviews of this material. I have tried to group the materials for the first review in terms of articles on the visual art, painting, sculpture, architecture that used the golden section and the principles of dynamic symmetry as a direct result of the work of Jay Hambidge [1].

The second review, the subject of this presentation, focuses upon a wider collection of materials, aesthetic concerns and a greater range of media used; all however, are still within the general topic of the use of the golden section and dynamic symmetry in works of twentieth century art and design.

That the golden section has become an obsession for many creative artists throughout history is a matter of record. This writer is no exception! There is something about these proportions which has fascinated many of us. This review will only cover some of the more recent experiments. We leave it to others to go back in time and into history.

If one begins, as I have now learned to do, to go about an art museum and look for the golden rectangle or any of the five basic root rectangles outlined by Jay Hambidge (1867-1924) [2] in his system of dynamic symmetry; one will find to their surprise that they will come to see golden rectangles almost everywhere. I recently toured an exhibition of nineteenth and early twentieth century small French paintings at the National Gallery of Art, Washington, D.C. Almost all of the paintings show influences of the use of one of the root rectangles in their design and composition. One of the laws of pictorial composition that the artist of the nineteenth century learned, was to, within the plane or rectangle of the picture surface itself, locate and find the square of that area and its leftover segment which Hambidge called "the recopical". In almost every work

in that exhibition, which is really quite a good random cross section of nineteenth century French painting, important compositional events occur at the critical point which defines the square [3].

PRINCIPLES OF DYNAMIC SYMMETRY

Who was Jay Hambidge? He was an obscure American illustrator who lived in the first two decades of the twentieth century and who formulated a theory of symmetry that was based upon his own studies of Greek vases and architecture.

He conducted research on the measurement of the human figure at the Harvard Medical School in 1918–1919 and many years before Le Corbusier wrote about his more famous *Modular*, Hambidge developed a clear theory about the relationships of order and proportion in art and design with the human figure itself.

What is the golden section or the divine proportion? Notions of ratio and proportion are among the fundamentals of mathematics and technology. The former is defined as the quantitative comparison between two things or aggregates belonging to the same kind of species, and latter as the equality of two ratios (A is to B and C is to D).

Of considerable interest, for centuries, has been a fundamental ratio variously called the ratio of Phidias, the golden section, the golden rectangle, the divine proportion, or simply Φ (phi) from the initial letter of the name of the Greek sculptor, Phidias. It is expressed mathematically as the ratio 1:1.618, derived from $1 + \sqrt{5}$ (Jordan) [4].

In addition to its application in mathematics, Φ also appears in the structure of plants and shells and in the proportions of the human body; in Egyptian, Greek, Roman and Gothic architecture; in the Renaissance masterpieces of Leonardo da Vinci, Botticelli, Hals, Turner and other artists; in the composition of music, delightfully in the interval of the minor sixth; and as recently as March 1984, at the University of Maine, in choreography, in an exercise described as an experiment in spatial relationships.

What has been described by Professor Jordan is a joint workshop that he did with Fran Merriet of Deer Isle in which students acted out the basic root rectangles of the Hambidge system as dance or body movement. The music measurements of the rectangles of the golden section were placed upon a dance studio floor and the workshop participants acted out these dimensions in the movements of their bodies.

Jordan argues that psychological studies attest to the aesthetic acceptance of the divine proportion as a ratio based in nature. Thus, both technologists and humanists, it is contended, are ruled by a dynamic symmetry according to a pre-existing system of ratio and proportion. The humanist readily acknowledges his debt to science, and the technologist concedes but for (such) harmony beautiful to contemplate, science would not be worth following [5]. The ubiquity of Φ , and its roles as a bridge linking technology, art and the humanities, is a part of the theme of this study on the influence of Jay Hambidge.

Many psychologists as well as artists have become involved in golden section research. D. D. Stuhl [6] has reported some recent developments in terms of the development of visual language. Research at the University of Kansas, Department of Design, is using classical symmetry theory to explore whether a formal framework can be established for the study of the relationships present in visual and artistic forms. Such a framework could be extensively applied and might bring about the formation and conventionalization of a visual language. It was always Jay's intentions to apply dynamic symmetry to a wide range of artistic problems and while he used analysis of classical art as examples to demonstrate his theories; he really was not that concerned with the analysis and study of Greek art.

Many artists have conceptualized the golden section as a means to establish order. But the events of the twentieth century artistic forms have taught us that order can come in many forms, assume many shapes and have different looks. Many artists have explored the golden section within a cubistic context. Part of its versatility as a compositional as well as design construct, lies in the fact that the golden section and the other root rectangles in the Hambidge system, may be employed in a wide range of art from realistic to abstract.

One of Jay Hambidge's associates, the painter George Bellows used the system of dynamic symmetry to compose his action-filled paintings of the fight scenes in New York City in the 1920s.

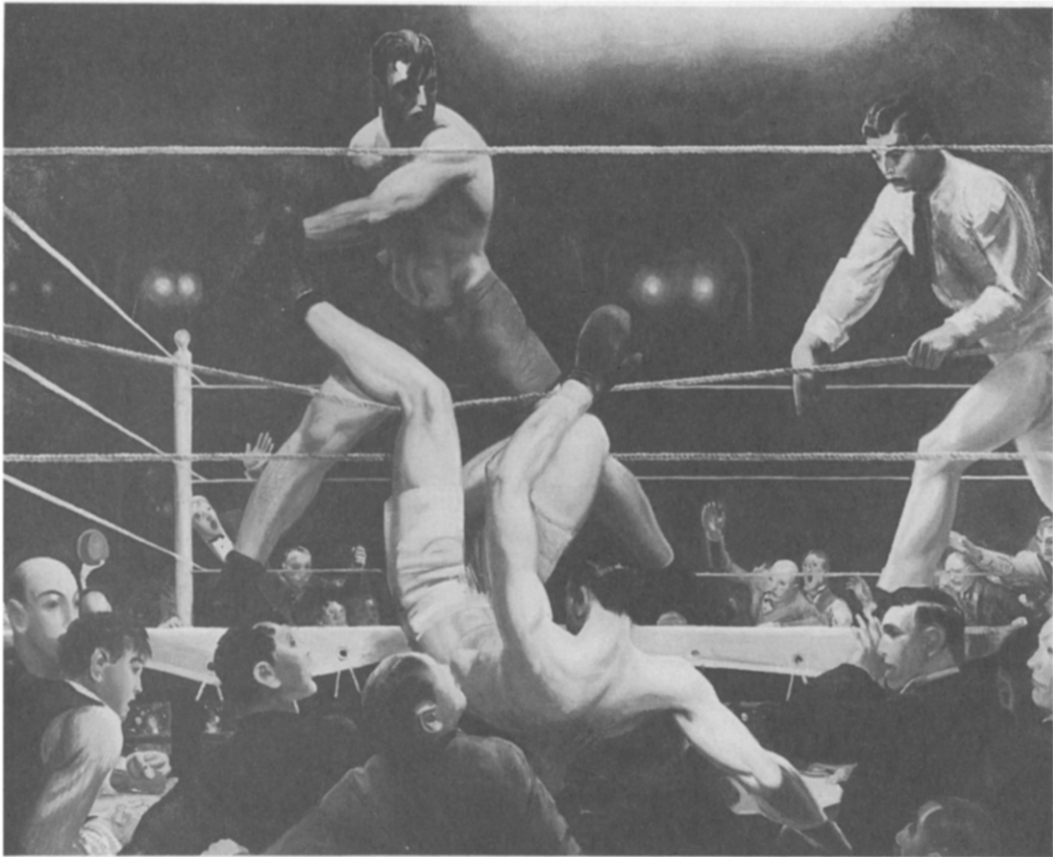


Fig. 1. George Bellows, *Dempsey and Firpo*. Oil, $51 \times 63\frac{1}{4}$ ", 1924. (Collection: Whitney Museum of American Art, New York, Acq. No. 31.95.) One of the late paintings of Bellows based upon the Hambidge system of dynamic symmetry. Almost every line and slope in the composition falls at a precise joint in a Hambidge root five rectangle.

This painting (Fig. 1) is only one of many examples which used the system to create dramatic tensions of movement in the composition.

THE GOLDEN SECTION AND HUMAN MOVEMENT

I am not at all sure the properties of the square have been well-understood. The square and not the rectangle is the basic formal property of much of contemporary art. Most painters use rectangles as their picture surfaces, since the square is felt to be so static a shape; but it is still the basis of compositional formats and forces even within the traditional rectangles upon which most of us paint.

Some of the more interesting and recent work in the use of the golden section has been achieved in multi-media presentations, in dance and in human movement works. Massine in an interview speaks of his 1917 work parade [7]. That work introduced cubism into the theatre. Cubism for Massine held the key to the manipulation of groups of dancers. He orchestrated them as though their movements were harmonies, their postures, chords. He built a symmetry on counterpoint and was always composing in the third dimension. Classic forms have their own basic vocabulary and symmetry and structure, as in cubism. The use of the golden section undergirded their effects.

It has been very interesting for me to note that one does not find too much discussion of the golden section in the literature in reference to sculpture or other three-dimensional art forms but one does find it as a vital concept in movement and dance. This is certainly an area for which one could do a considerable amount of additional research. Why has the golden section and dynamic symmetry been so limited to work of two-dimensional art? An account of the performance entitled

"787" staged by students of the advanced design course at the Department of Art, California State University at Humboldt, is important to consider [8]. In this respect, the primary aim of the performance was to produce multi-media presentations through which the golden section might be experienced directly. It was conceived in terms of a ritual of about 16 min in a darkened room. This performance started slowly and simply and moving with increasing speed and complexity to a climax. In this paper, the golden section is first analyzed for its mathematical values. The planning of the project and the performance of the event are described in this article in some detail. From the discussion it was not possible to establish the extent of the viewers' grasp of the aesthetic or other significance of the golden section as a result of the performance. But the conception of using the section as a basis for stimulation of the imagination was very useful. One only wished that there was a follow-up to this study and some way to demonstrate that this method was, in fact, a useful learning experience within the design education. Much additional research could be conducted which explores the golden section in terms of human movement relationship.

I have already noted in this paper that more recently Fran Merritt of Deer Isle, Me, in the spring of 1984 conducted some workshops in dynamic symmetry in which he had his students act out in human movement, the proportions of the various root rectangles including the golden section. His was an attempt for them to understand the basic proportions used in dynamic symmetry and to practice these through the use of kinesthetic cues as well as through purely visual exercises [9].

THE MODULAR

One cannot discuss the golden section in twentieth century art without considering the work of the French artist and architect, Le Corbusier. A recent study of Le Corbusier's method of developing a pictorial idea through several versions with particular reference to the tapestry *La Femme et Le Moneau*. This work is one of a series produced in the period 1946-1964. Its geometrical framework is based on the square and golden section and derived from the juxtaposition of found objects. This study showed how pictorial motifs in the tapestry can be traced back to his earliest work as a painter when he still used his family name, Jeanneret. At that time he was working in the purist style with particular reference to his development of an interlocked glazes motif. His use of a limited number of pictorial words is shown to have been carried through to his architectural designs.

It is, of course, Le Corbusier's development of his *Modular*, the use of the golden section as a comprehensive system of proportions entered into the history of twentieth century architecture [10]. Unfortunately for Jay Hambidge, when one discusses dynamic symmetry in art today, it is Le Corbusier and not Jay's own efforts that are remembered and noted. We have seen, I hope in this short review, that the golden section is a far more universal idea and it cannot really be ascribed to one's discovery. Many have been refreshed and nourished by these conceptions in their own creative efforts, not only in our century but throughout art history as well.

To put it another way, the golden section becomes the image itself and is used for the symbolic power it seems to possess regardless of any subject matter. I hope in these reviews of the work of other artists who have used dynamic symmetry in their works, to show that it can be used within the full range of artistic style, from the representative to the abstract. (In July 1985 the Hambidge Center hosted a symposium at Rabun Gap, Ga, on dynamic symmetry, the golden section and the work of Jay Hambidge.)

The modern American artist Randall Craig also uses the principles of symmetry in the composition of the proportions of his sculptures. Even the formulas themselves are alluded to in the works as metaphors of his system of design.

It is almost impossible to consider the golden section without getting into questions of design as a basic visual language. The utility of the golden section has been demonstrated as a powerful candidate for the basic structure of visual language. If we look at St Uhr's article, he takes up the theme of William Huff's study *An Argument for Basic Design* [11]. In that book, the activity of planning is an activity of structuring, and that consequently the study of structure is in fact a definition of basic design. This critic aims to bring Huff's study up to date with the addition of new items and terms within the definition of design as it is understood today. By selecting individual

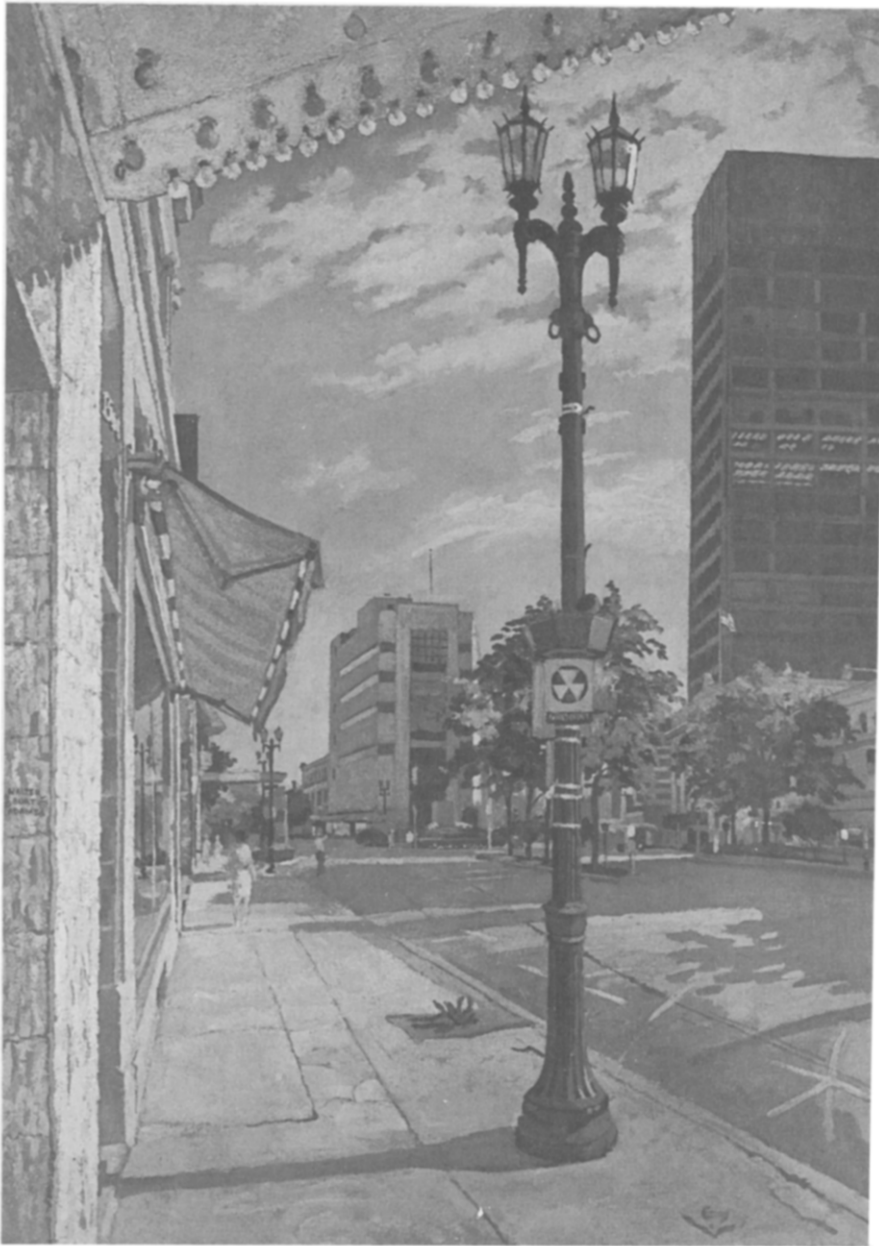


Fig. 2. Walter Burt Adams, *Evanston Today*. Oil, 20 × 24", 1970. (Collection: Joseph Levy Jr, Chicago, Ill. Photo: Willard Nickerson, Evanston, Ill.) Walter Burt Adams published a book on dynamic symmetry and has made use of these methods for many years in his own work. (Reproduced by permission of the artist.)

terms such as perspective, symmetry and the golden section; he goes on to analyze what terms signify in current design methodology and praxis with reference to a number of distinct fields of art. Jay Hambidge back in 1922 in a lecture at the Art Institute of Chicago, Ill., postulated that, in fact, his system of dynamic symmetry could, in fact, serve as a basic structure for much work in design [12]. We have, I feel, almost come full circle in our voyage of discovery of visual structure and artistic language. Did it not all begin so far as Western art is concerned with the ancient Greeks?

Lee Payne of the Industrial Design Department, Georgia Tech in Atlanta, recently completed a Master's Thesis on the general subjects of the implications of Jay Hambidge, dynamic symmetry and golden section upon American industrial design including 25 years of his own work. Payne's research focused upon the nature of and importance of the human frame of reference in matters

of design and proportion [13]. Many of his insights were based upon the work of a Russian, Boursalavitch, whose book *The Golden Number* (1958) opened up important insights from the general field of vision and perceptual research [14]. It may be that the field of vision itself may be the vital factor, the missing link.

He found that:

- (a) the human visual limit comes to 1.5661 (which is close to the golden rectangle);
- (b) the field of color vision comes to 1.61018 (golden mean)
- (c) proportion of human binocular vision (golden mean).

Stone and Collins showed that in general the human field of binocular vision is 1.665 and that our general field of vision is delimited by the golden section.

Payne, as a part of his research, surveyed 60 industrial design firms to assess any possible influences from golden section research [13]. Out of the 60 questionnaires, 18 responded and indicated in their forms they could document no such influence. Only four design educators responded positively in Payne's study. These were from:

Ohio State University, Columbus, Ohio.
 Syracuse University, N.Y.
 Georgia Tech in Atlanta, Ga.
 Western Washington State College, Bellingham, Wash.

Payne also noted and documented some golden section influences upon:

Archibald Weldon whose 1938 design for Revere Ware is in perfect proportion to the golden section.
DNA Standards for Paper and Type Design of Black & Decker Products.

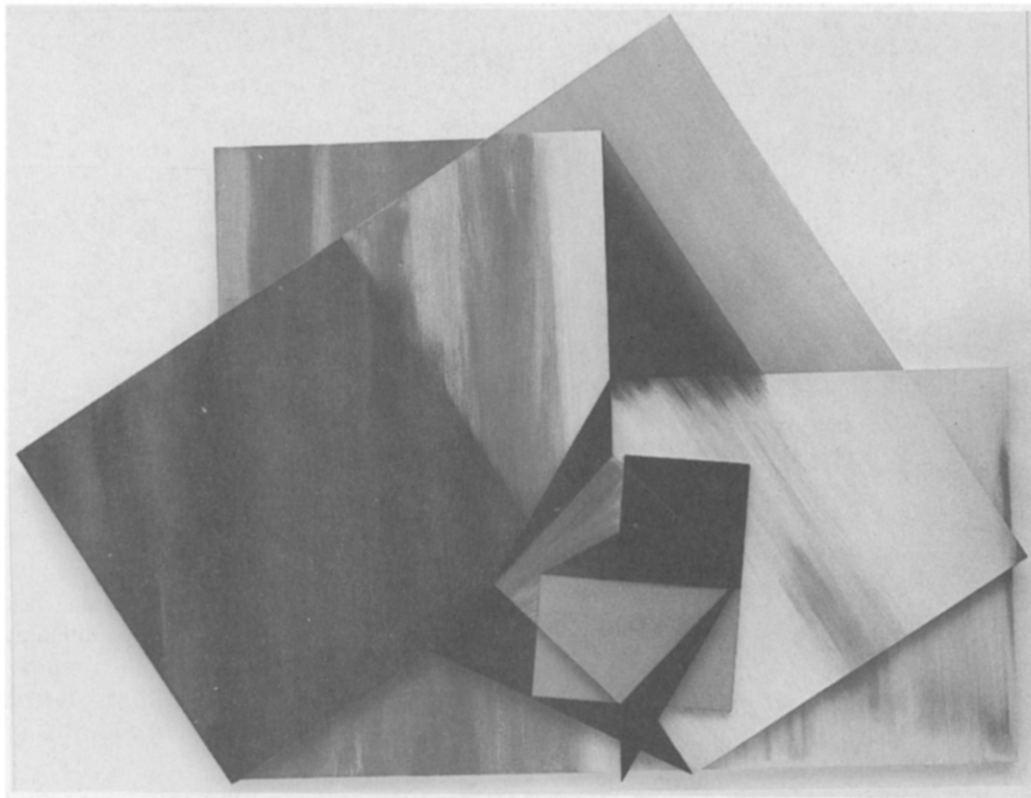


Fig. 3. Dorothea Rockburne, *Narcissus*. Three panels, oil on gessoed linen, $97 \times 123 \times 6\frac{3}{8}$, 1984. (Gallery: Xavier Fourcade, Inc., New York. Photo: John Ferrari.) Rockburne uses the motifs of the methods of dynamic symmetry directly as construction guidelines in her work. (Reproduced by permission of the Fourcade Gallery, New York.)



Fig. 4. Randall J. Craig, *Dynamic Circle*. Resin and fiberglass, 42" dia \times 1½", 1984. (Collection of artist.) Randall Craig uses the construction lines of dynamic symmetry as background. In this work, the basic structure can be seen applied to a circle as well as to a square. (Reproduced by permission of the artist.)

Payne observed that the modern anthropometric charts that industrial designers now employ use more recent and scientific methods in the determination of proportions and yet most of those measurements come close to the golden mean.

CONCLUSIONS

Some artists such as Dorothea Rockburne use the structural proportions of dynamic symmetry as the subjects of their paintings (Figs 3 and 4).

The use of a system of symmetry seems to provide in the work of art an essential order which is necessary for the human appreciation and expression. It provides the artist with a structure of reality or with a model of the world that can be transformed into a personal artistic expression and yet can also communicate a general and more universal expression.

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