AN EXAMINATION OF CLAIMS
CONCERNING SEURAT
AND " THE GOLDEN NUMBER "

BY

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A Eliane et Thomas Corneille qui m'ont appris que le monde n'est pas uniquement constitué par les mathématiques.

« On s'aperçoit que la division 5/8, toute banale et laïque, vaut le nombre d'or presque sacré ». Ozenfant, *Mémoires,* p. 572.

THERE have been numerous claims in the literature concerning the use of the "golden number" in Seurat's pictorial compositions. Not only are some of the arguments used rather tenuous, but they often leave out counter indications — some even occuring in the very works quoted. In view of this, and in view of the fact that many of these claims are being accepted as valid in various art history circles, we have decided to make a review of the question.

For our purposes it suffices to say that the golden number (nombre-section-coupe d'or etc.) — approximately 1.618 — is the common irrational ratio obtained when we divide a line segment AB at C such that $AB : AC = AC : CB$. The point C and sometimes the number, is called the golden section (point). A golden rectangle is one whose sides are in the ratio of the golden number. Sometimes the reciprocal, approximately .618, is also called the golden number. We shall use the term for either.

Let us first make sure that our problem is well defined. Since, to paraphrase Ozenfant's succinct statement, the golden number can not be distinguished in practice from the rational number 5/8, it is not possible to discuss these matters from the viewpoint of actual measurements. The only question of serious interest is whether a certain painter had the golden number in mind as a theoretical model; in other words consciously used a geometric construction to obtain the golden number or consciously used a simple proportion with the express intent of approximating the golden number. Prime reading on this question of the geometrical analysis of art is R. Carpenter's article [1] " Criticism of [J. Hambridge's theory of] *Dynamic Symmetry* "; in particular page 34 where it is shown that a "static" analysis of a vase can give just as good an agreement as Hambridge's "dynamic" analysis.

Thus the answer to the question "Did Seurat use the 'golden number' ?" lies outside the realm of mathematics and measurements; it is entirely art historical in nature.

The earliest claim that Seurat employed the golden number appears to be that of Lhote [2] concerning *La Parade*. Other golden number de-

compositions of this work are given by Gonse, Dorra and Marcou. [3] Rey, in a book [4] which, even with respect to Seurat, is completely "traditional" in its approach, does a rather involved golden number analysis of *Le Chahut*. Rey's diagram is reproduced in part along with a mitigated acceptance and further comments by Ozenfant. [5] There is a different analysis by Dorra. Dorra also uses the golden number in an analysis of *Le Cirque* as well as of several other paintings. Homer while making a detailed study of the relationship between Seurat's paintings and Henry's theories also accepts Dorra's claims concerning the golden number. [6]

The only non-pictorial support given to any of the above arguments is a statement by Dorra that Charles Henry recommended the use of the golden section in his *Introduction à une esthétique scientifique*. [7] The implication is that Seurat learned about the use of the golden number from Henry. However when we check what Henry actually wrote this is all that we find :

Esthétique scientifique : "In Germany Zeising, Fechner... published monographs on proportions of very different qualities" (p. 444). "... (harmonic proportion $a/b = (a - b)/(b - c)$. In the second the divine proportion of Paccioli $(a/b = (b/a+b))$ that the Germans still call the golden section and which basically is really only the philosophic definition of harmony. The solidarity of these two proportions with the most important mathematical theories promises a variety of applications to aesthetics; they are evidently a new particular case of this law of least effort of perception (p. 453).

Cercle chromatique (1888) : "The two proportions which present this characteristic [i.e. of being "proportions dynamogènes"] are evidently of the form $a/b = a/(a + b)$ known as the golden section... (harmonic proportion)". (P. 52).

In the *Rapporteur esthétique* (1888) there is no mention of the golden section.

The ossibility of an oral communication from Any doubts concerning Henry's views on whether or not artists should use the golden number and whether he thought that any painter of that period was using it are completely dissipated by the following statement written by Henry in 1890 [8] as part of a rebuttal to an article which,

among other things, criticized Henry's mention of the golden section : " I do not state anyplace that the golden section and the harmonic proportion are eminently remarkable, they are furthermore completely unknown to contemporary artists. These proportions play absolutely no role in the general rules that I outline concerning the harmony of forms. ... I point them out as being 'dynamogènes' because...".

Another writer who influenced Seurat was D. Suter (see e.g. the study by Rey). In his works *Esthétique générale et appliquée contenant les règles de la composition dans les arts plastiques* (1865) and *Philosophie des Beaux-Arts appliquée à la peinture* (1870) we found no reference to the golden number.

Not only could Seurat not have obtained a theory of the use of the golden number in art from Henry, Sutter or any of the other French writers of the period, he could not have obtained such a theory from the German golden number school either.

Consider for instance Zeising, the author mentioned by Henry. Zeising was in fact the co-originator of "golden numberism". As compared to the two-dimensional systems proposed for Seurat, Zeising's analyses only involve divisions of vertical heights. This is well illustrated by his analysis of a statue of Venus given in fig. 89 of his 1854 *Neure Lehre von den proportionen*.

The same situation, wherein only relatively unsophisticated use is made of the golden number in the analysis of works or art and architecture, continued throughout the period before Seurat's death in 1891. The state of development in 1885 can be ascertained from F. Pfeifer's *Der Goldene Schnitt*. Typically his plate XIII shows an analysis of churches, hands etc. based on a simple golden rectangle or linear golden number divisions.

Indeed most of the limited number of works on the golden number before 1891 dealt with analysis. We know of only three works in this period that indeed advance a theory of art based on the golden number. An obscure 1874, 32 page phamplet by T. Wittstein called *Der Goldene Schnitt und die Anwendung desselben in der Kunst*, proposes various combinations of divisions of a vertical height sometimes in connection with

a vertical golden rectangle. Aside from applications to furniture, windows, buildings and clothing design there are only two brief and "elementary" examples in painting, one by Piloty and a Madonna by Raphael. Somewhat more involved illustrations appear in *Die Regel von Goldenen Schnitt in Kunstgewerbe. Ein Handbuch fur Werkstatt, Schule und Haus* published in 1886 by J. Matthias and the 1889 work *Der Goldene Schnitt in Zeichnung und Schrift, insbesondere als goldenes Grundgestetz schöner Schriftformen* by O. Kalbe. But basically these too use simple divisions and golden rectangles and do not correspond to what has been ascribed to Seurat.

Henry, we have seen, also mentioned the German experimental psychologist G. Fechner. While Fechner's experiment dealing with people's choice of vertical rectangular shapes, in particular of the golden rectangle, is rather well known, it is less well known than that in his *Vorschule der Aesthetik* he also did a study of painting dimensions in various galleries. [9] Most of these paintings had ratios far removed from the golden number. This may be contrasted with statements such as that of Lhote that the lamplights in *La Parade* perform the function of turning the rest of the canvas into a horizontal golden rectangle.

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We must conclude that if Seurat used the golden number in the rather involved ways that have been claimed, he developed the theory of its employment on his own. That he would have done so and then not have mentioned it hardly seems possible. Yet in his letter to Maurice Beaubourg of August 1890, which was written after all of his works including *Le Cirque* had been started, there is no mention of the golden number. [10]

Furthermore, Herbert [11] informs us of an unpublished document in the Signac archives in which "Seurat tried to work out a ... which included a hesitant explanation of a theory of linear and geometric proportions".

Indeed it seems quite clear that when Seurat used a system of proportion it involved simple ratios. We have the following statement by Herbert : "A document recently brought to light [in the Signac Archives] contains a preliminary drawing for the architectural background of *La Parade* together with quotations from Henry's *Esthétique Scientifique* (Paris 1885). The architecture is marked off in simple mathematical relationships 1, 2, 3, 4, 1/3, 1/3, 1/3... and is related to Henry's number theory. [12]

Another example of the use of simple proportions by Seurat is evident in the unfinished *Le Cirque*. On the canvas one can faintly see part of a grid of diamonds formed by two series of equally spaced parallel lines making 45° angles with the horizontal. The total width of the canvas is controlled by eight of these diamonds. There are four vertical lines which correspond to spacings of one, two, two, two and one diamond. [13]

The third of these lines thus divides the eight diamond span into the simple ratio 5/8. Dora has simply taken the existence of this good approximation to the golden number to mean that Seurat consciously used the golden number. This is a perfect illustration of Ozenfant's comment.

There is another piece of pictorial information that is of interest here. In his discussion of *Le Cirque*, Dorra tells us how one of the supposed section lines "sets apart the dancer on horseback and the bulk of the clown in the foreground from the other figures on the ring".

The clown appears on one of the preliminary sketches that Seurat made. On this sketch, which is shown in both Dorra - Rewald and Hauk, [14] there are several numbers and lines. In the reproduction, one sees one of these vertical lines passing just about where "the golden section line" of Dorra is supposed to pass. Examination of the original shows however that the camera has merely captured — a fold in the thin tracing paper ! Thus on this preliminary sketch, [15] the clown is in no way involved with the distances of "guide lines".

The claims that Seurat used the golden number are thus not only contradicted by an examination of the writings of the period, but also by Seurat's own work, written, as well as drawn. [16]

<p style="text-align:right">R. H.-F.</p>

Résumé : *Seurat et le « Nombre d'Or »*.

Plusieurs auteurs ont soutenu que Seurat a utilisé le « nombre d'or ». Cependant un examen des sources d'inspiration connues ou possibles de Seurat, ainsi que de ses œuvres écrites et peintes, indique qu'il est très peu probable que Seurat s'en soit jamais servi.

NOTES

1. R. Carpenter, *Criticism of 'Dynamic Symmetry'*, in *J. Archaeological Inst. of America* 25, 1921, 18-36.

2. A. Lhote, *Composition du tableau*, in *Encyclopédie Française*, Paris, 1935, p. 16.30-6-30-12, in particular fig 2, p. 6, 7.

3. H. Gonse, *La Composition*, Paris n.d. plus slide collection, Paris, n.d. p. 69, 70, slides 9, 10. H. Dorra, *The Evaluation of Seurat's Style*, in H. Dorra, and J. Rewald, *Seurat*, Paris, 1959, p. xciii. P. Marcou, *La composition et le nombre d'or*, Paris, 1965.

4. R. Rey *La Renaissance du sentiment classique dans la peinture française à la fin du XIXᵉ siècle*, Paris, 1931. p. 124 ff.

5. Ozenfant, *Mémoires, 1886-1962*, Paris, 1968, p. 573 ff.

6. W. Homer, *Seurat and the Science of Painting*, Cambridge, Mass., 1964, p. 223, 240, 248, 251, 303. We are indebted to M. Bouillon of the Art History Department at the Université de Clermont for this reference.

7. Dorra, p. ixxxiii, fn 10, Homer, p. 248. C. Henry, *Introduction à une esthétique scientifique*, in *Revue Contemporaine*, 2, 1885, 441-469.

8. C. Henry, *Correspondance*, in *Revue Philosophique* 29, 1890, 332-336. The criticism by C. Sorel, who says "... every artist knows that they have no aesthetic value", appears in the article *Esthétique et psychophysique*, pp. 182-184. Nor did Henry change his mind in later years : "... two proportions which, without having any aesthetic importance, are of interest because..." (*L'Esthétique des formes IV*, in *La Revue Blanche* 8, 1895, 116-120); "These proportions provide us with an intellectual pleasure which has nothing to do with any aesthetic considerations". (*La lumière, la couleur, la forme*, Paris, 1922, 35).

9. G. Fechnerr, *Vorschule der Aaesthetik*, Leipzig, 1876. The discussion on picture shapes is in chapter XLIV.

10. C. Bouleau, in this *Charpentes, la géométrie secrète des peintres* Paris, 1963, p. 216 fn 22 says that in the letter " he would have claimed the honour for its revival ". Interestingly enough Bouleau himself finds the golden number where it does not exist; for example with regards to Mondrian. On the Bromberg letter see Rey and Homer.

11. R. Herbert, *Seurat in Chicago and New York*, in *Burlington Magazine*, 1958, 146-155, p. 152 fn 26. The *Catalogue raisonné de l'œuvre peint de Paul Signac* is being put together by Mme Cachin and M. Chambrin. In a letter dated October 4, 1982, M.-P. Durand (Secretary for the publication) informed us : "However preliminary scrutiny [of the Signac archives] indicates that you will not find any information concerning the golden number in Signac's writings. In particular Seurat's letters do not mention it".

12. Herbert, p. 152. Whether these simple proportions are related to the squares and rectangles visible in the study of *La Parade* in the Bührle collection, Zurich (C. de Hauke, *Seurat et son œuvre*, Paris, 1961. plate 186, Dorra and Rewald plate 180) we are unable to say. The simple layout is hardly suggestive of a complicated theory and in any case does not come close to coinciding with any of the suggested golden number decompositions.

13. Jeu de paume, Paris. We wish to thank Mmes Adhémar and Roguberte for their aid and comments and in particular for allowing a Tuesday inspection of the work ! There is a reconstruction in fig. 38 p.cv of Dorra, but note how the ringmaster's left arm is cut off.

14. Dorra and Rewald, plate no. 210e, Hauke, plate no. 710.

15. Cabinet de Dessins, Louvre. We wish to thank Mme. Viatte and the staff for their help and again for allowing a Tuesday inspection, especially on such a brief notice. The numbers that appear, read by mirror — as the tracing paper is glued to its holder —, are 1m. 46/79, 0.16½, 1 m. 82½ and 2 metres. Dora fn 47 mentions the numbers 1 m. 76 and 1 m. 85 and suggests that these are the dimensions of the original stretcher. It is not evident that this is the correct interpretation.

16. For discussions of other false claims see our *Juan Gris, son milieu et le nombre d'or*, in *Canadian Art Review* (*RACAR*) 7, 1980, 33-36 (on fn 3 see now Apollinaire, *A la Section d'Or*, in *L'Intransigeant*, Oct. 10, 1919, 2 who writes : "We are now at the Section d'Or this new exposition which took its name from the ancient Measure of Beauty..." — this confirms, despite the doubts expressed, the source of the name); *The Early Relationship of Le Corbusier to the 'Golden Number'*, in *Environment and Planning B* 6 (1979), 95-103; *On Applications of the Golden Ratio in the Visual Arts*, in *Leonardo* 14, 1981, 31-32, and our forthcoming book *The "Golden Number" : A Critical Examination*.