Positive Instances of Reinstatement

Dawson and McGaugh (*1*) have reported data that do not confirm that of Misanin, Miller, and Lewis (*2*). Their experiment seems an exact replication, except in one detail. They report that fear conditioning was given to rats in a light grey box and reinstatement in a black box. Our experiment used very different chambers for these two operations, and we went to considerable lengths to make these differences greater than that between grey and black. Dawson and McGaugh state that they are aware of the importance of these differences, yet they fail to maximize the difference between fear conditioning and reinstatement. However, the importance of this failure is not clear.

Failures to replicate an experiment can occur for a variety of reasons, and a single such failure is not convincingly negative to the phenomenon in question. If the phenomenon, or one like it in principle, has been found in other laboratories, then the idiosyncrasies of a negative effort are not important. Fortunately, the phenomenon of reinstatement has been seen in other laboratories. Sherman and Schneider (*3*), for example, found that they could obtain amnesia 6 hours after learning if the foot shock—the occasion for original learning—was reinstated immediately before the convulsive shock. Davis and Klinger (*4*) found that amnesia was produced by intracranial administration of puromycin, acetoxycycloheximide, or potassium chloride 24 hours after learning, if their subjects were replaced in the experimental situation for a brief period just before being injected. An experiment by Robbins (*5*) also found a strong reinstatement effect.

The notion of reinstatement is finding therapeutic application. Rubin (*6*) has reported considerable clinical success in eliminating neurotic symptoms by pairing the evocation of the symptom with a single convulsive current. Success was obtained with patients who had previously undergone a long series of electroconvulsive treatments but without the essential reinstatement of the symptom immediately prior to convulsion. The phenomenon is still a new one, but the confirmations outnumber the denials in *Science*.

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References

1. R. G. Dawson and J. L. McGaugh, *Science* **166**, 525 (1969).
→ J. R. Misanin, R. R. Miller, D. J. Lewis, *ibid.* **160**, 554 (1968).
3. W. Sherman and A. M. Schneider, *ibid.* **159**, 219 (1968).
→ R. E. Davis and T. D Klinger, *Physiol. Behav.* **4**, 269 (1969).
5. M. J. Robbins, thesis, Ohio State University (1969).
6. R. D. Rubin, R. Fried, C. Franks, *Advan. Behav. Ther.* **1968**, 37 (1968).

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Canterbury Cathedral: An Alternate Explanation of Its Plan

Borst (*1*) has given an interesting explanation for some of the skewness and geometry found in the plan of Canterbury Cathedral. He proposes that (i) the Trinity chapel preserves the shape and orientation of a megalithic monument originally located under the chapel and that this monument had its main axis aligned with the rising point of Betelgeuse (Alpha Orionis) in 2300 B.C.; (ii) the axis of the choir preserves the alignment of a second, more westerly, and more recent monument aligned on the rising point of Betelgeuse in 1900 B.C.; (iii) the axis of the nave preserves the alignment of yet a third monument aligned on the rising point of Betelgeuse in 1500 B.C. Unfortunately, there are some difficulties with this thesis.

Borst suggests that the present Trinity chapel preserves the shape of an ancient megalithic monument similar to Woodhenge (which is based on a Pythagorean triangle with sides of 12 and 35 and hypotenuse of 37 when measured in megalithic yards; 1 megalithic yard = 0.829 m) but based on a near Pythagorean triangle with sides of 12 and 72 and hypotenuse of 73 megalithic yards. This is a slender triangle, having a ratio of the hypotenuse to the short side in excess of 6.0. Thom (*2*) has surveyed a large number of the megalithic sites in Britain. While many of the sites display the use of Pythagorean triangles, there is not a single example of one with a ratio of hypotenuse to shortest side as great as 3.6.

Further, taking the plan of the crypt printed by Borst and using the inner columns, one finds this ratio of hypotenuse to short side to be about 36. Yet the same ratio for the outer walls is about 21. If we look at the plan of Trinity chapel printed by Clapham (*3*) we obtain for these ratios 38 and 12, respectively. If the plan of the chapel were based on a Woodhenge-type oval, the same triangle would be used throughout. It is also clear that published plans vary, and one would be hard pressed to say which, if any, is sufficiently accurate for the purpose at hand.

Concerning the pillars *p*, *p* in Fig. 1, Borst incorrectly states that (i) they serve no structural purpose, and (ii) they were placed there by William the Englishman about 1180 or 1181. He also believes that their position was dictated by and served only to accent the geometry of the new Trinity chapel. On the contrary, they are very necessary because they support a pair of the main columns in the constricted end of the choir above—a function to which the vault of the aisle of the crypt would be unequal (*4*, p. 62). They were surely in place before these columns, which were erected in the 4th year of the construction (1178) by William of Sens. Their position is dictated by the position of the columns in the choir. According to Gervase the Monk (*4*, pp. 57–58), these columns in the choir are placed so that the aisles maintain a satisfactory width while passing the towers and so that the choir could be smoothly joined to the somewhat narrower chapel.

Betelgeuse was chosen by Borst as the star whose rising point is marked by the alignments in the cathedral ". . . because its declination was −6° in 2300 B.C.; −4° in 1900 B.C.; and −2° in 1500 B.C.; . . ." However, Hawkins (*5*) lists the declination of Betelgeuse as having these values at considerably different dates. Graphic interpretation of the values tabulated gives the declination as −6° at 2690 B.C., −4° at 2280 B.C., and −2° at 1845 B.C. The date 2690 B.C. is six centuries earlier than the oldest megalithic site containing stellar alignments listed by Thom (*2*), if we accept Thom's technique of dating by the indicated declination of stars. Also, there doesn't seem to be any evidence for megalithic man being interested in the rising of Betelgeuse. In Thom's book (*2*), table 8.1 lists those alignments that