History of Computer Art

URL: http://iasl.uni-muenchen.de/links/GCA_Indexe.html

Part I: Cybernetics

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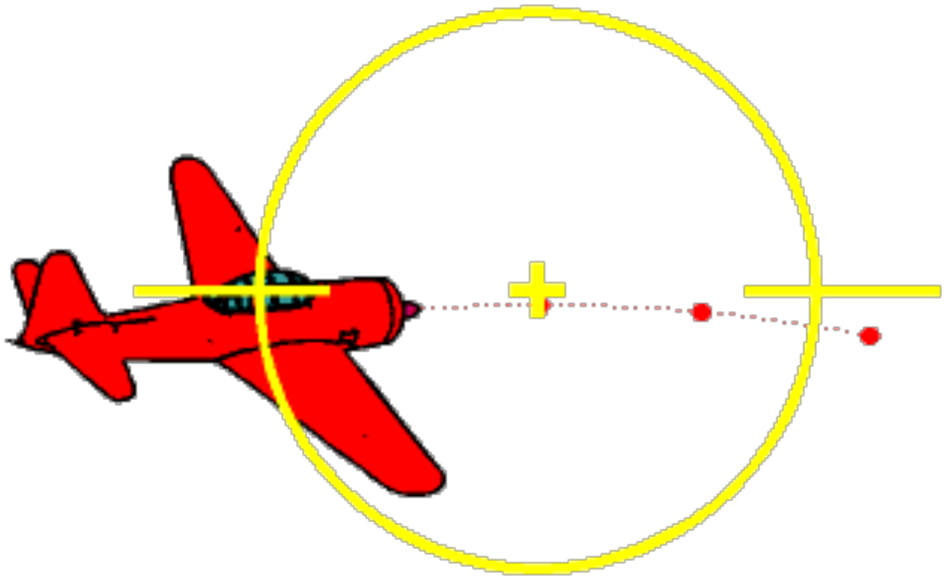
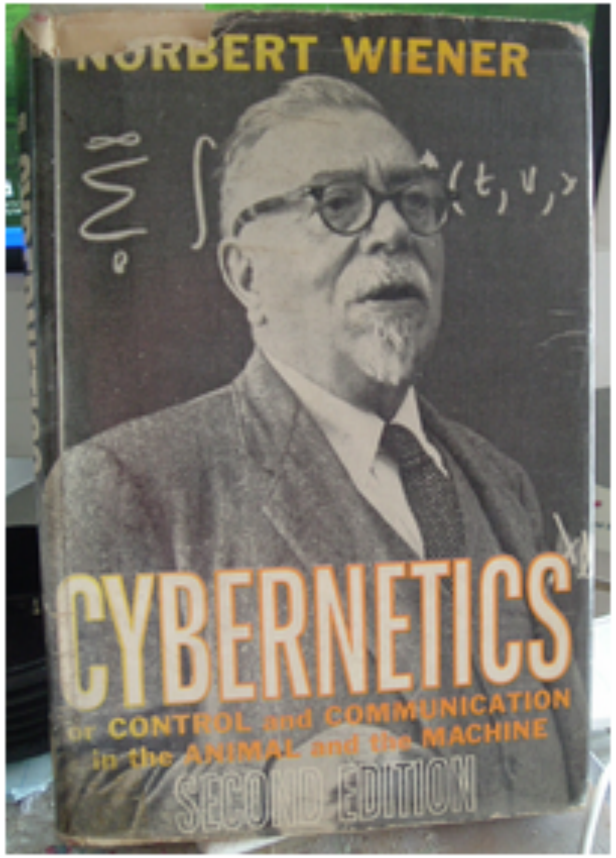
Ballistics WWII



If the target moves across the course of the fighter, a certain amount of lead has to be taken into account: One has to fire at the point in space where the target will be when the projectiles arrive. The fighter therefore has to fly a curve while firing, i.e. it is turning at some rate. Evidently, there would be no problem if the projectiles arrived instantaneously. Of course they do not, but it is advantageous to reduce the time of flight as much as possible, by using guns with a high muzzle velocity.

(Source: Gustin, Emmanuel: The WWII Fighter Gun Debate (1998-99). Chapter Ballistics. In: URL: http://users.telenet.be/Emmanuel.Gustin/fgun/fgun-th.html)

The Founders of Cybernetics



Norbert Wiener (Cover of "Cybernetics", second edition, 1962).

Claude Elwood Shannon with "Theseus" (1952) and the mouse navigating itself through the labyrinth.

(Credit: MIT Museum, Boston / Nixdorf MuseumsForum, Paderborn)

Image source: https://www.flickr.com/photos/arselectronica/5056388921/

Information

The alternative between two values is measured as 1 "bit". The relais of calculating machines and computers switch between the two values "0" and "1". The possibilities to select are calculated as 2_n. "n" stands for a number of decisions to choose one of the values "0" and "1". "Probabilities of selection" p_1, $p_2 \ldots p_n$ belong to any independent, selectable sign. The probability of selection specifies the probability of an element´s occurrence. The probability of selection is multiplied by the logarithm with the base 2 of the probability of selection ($p_n \log_2 p_n$). The products calculated with each probability of selection are added. The sum is negated to obtain the negentropy resp. the information "I”:

$$I = - (p_1 \log_2 p_1 + p_2 \log_2 p_2 + \ldots p_n \log_2 p_n)$$

$$I = - \Sigma\, p_n \log_2 p_n \;(\Sigma = \text{sum for } n = 1 \text{ until } n)$$

(Shannon/Weaver: Theory 1949/1998, p.14,32s.)

Feedback

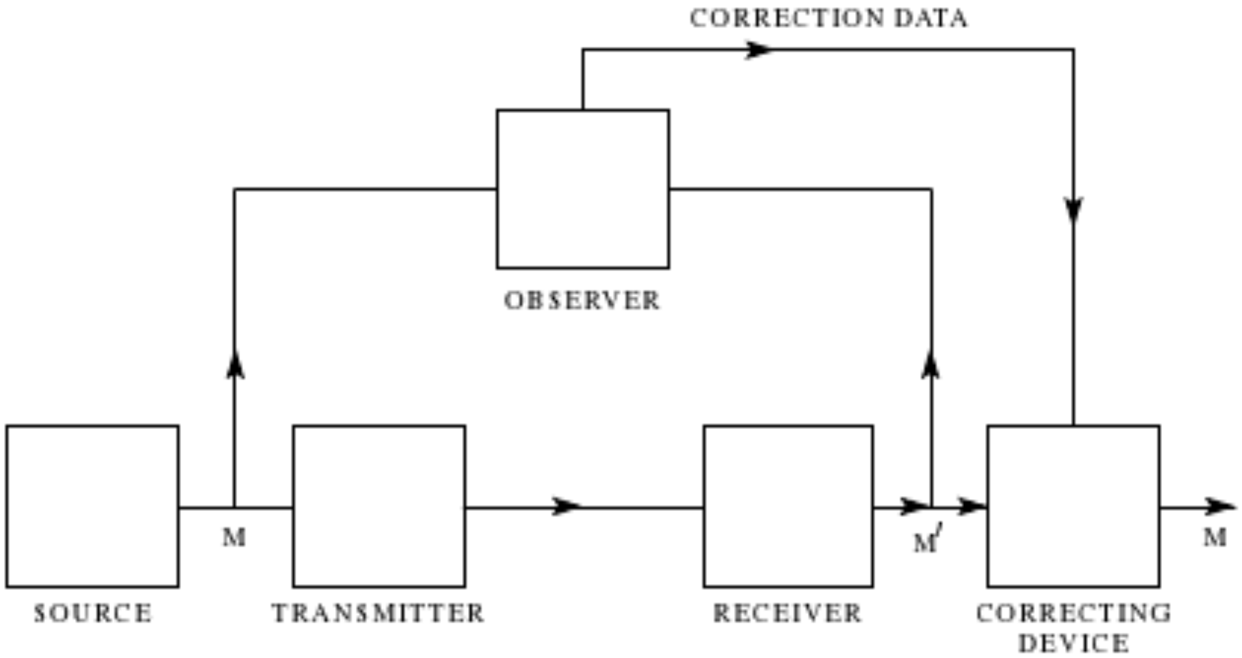


Fig. 8 — Schematic diagram of a correction system.

Shannon, Claude Elwood: A Mathematical Theory of Communication. In: Bell System Technical Journal, Vol. 27/Nr.3, 1948, p. 409.

Cybernetic Model: Homeostat

William Ross Ashby beside the "Homeostat", realised in 1946-47.

Image source: URL: http://www.rossashby.info/gallery/images/WRA %20+%20Homeostat.jpg

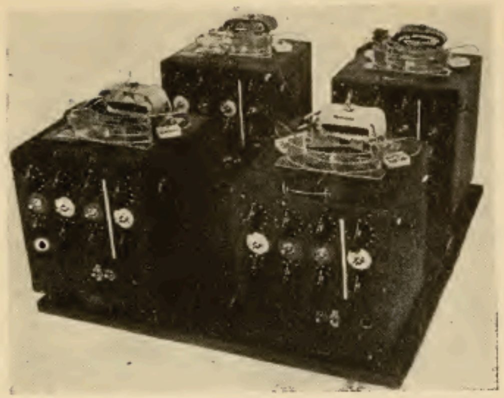


FIGURE 8/2/1 : The Homeostat. Each unit carries on top a magnet and coil such as that shown in Figure 8/2/2. Of the controls on the front panel, those of the upper row control the potentiometers, those of the middle row the commutators, and those of the lower row the switches *S* of Figure 8/2/3.

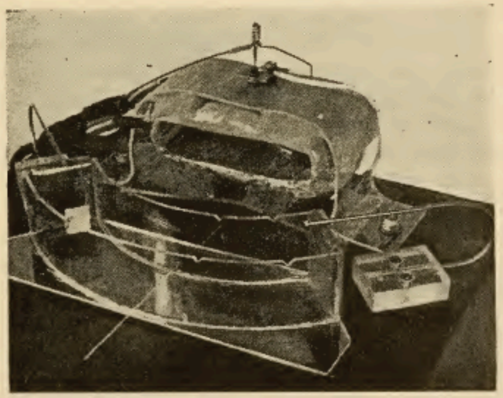
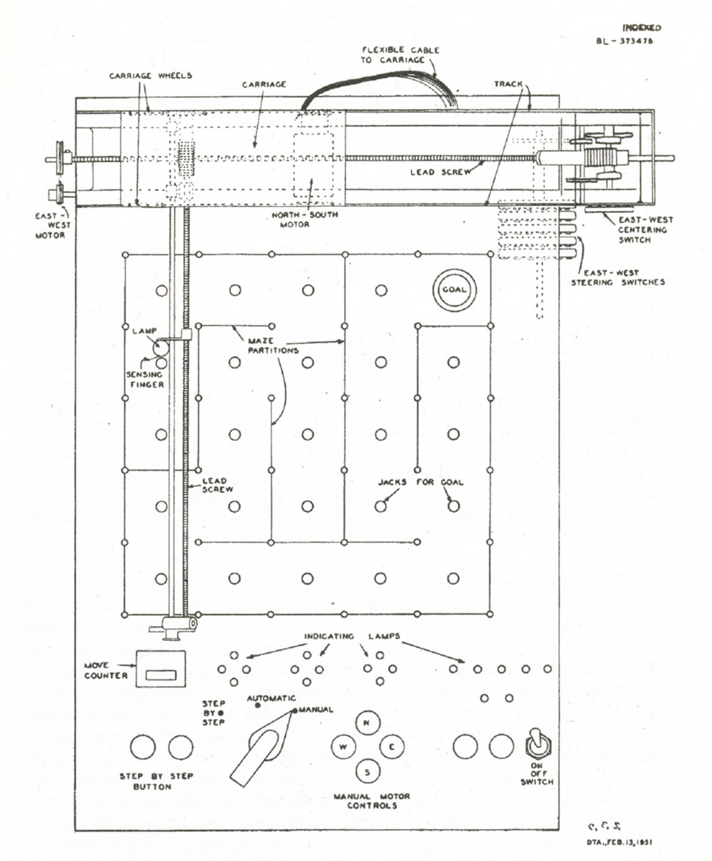


FIGURE 8/2/2 : Typical magnet (just visible), coil, pivot, vane, and water potentiometer with electrodes at each end. The coil is quadruple, consisting of *A*, *B*, *C* and *D* of Figure 8/2/3.

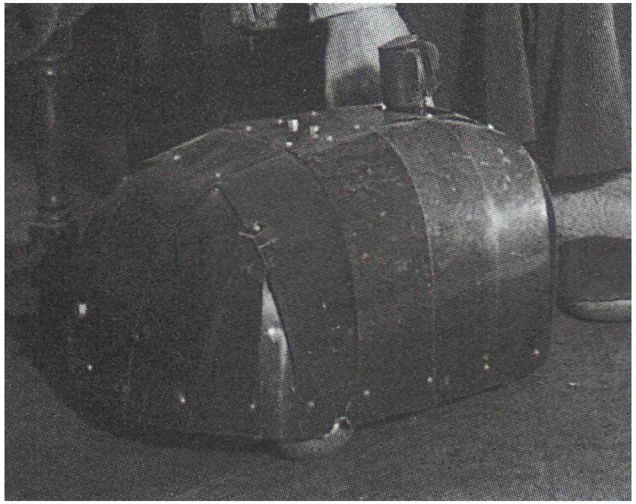
Ashby, William Ross: Homeostat, 1946-47 (Ashby: Design 1960, p.101).

Cybernetic Models



Left: Shannon, Claude Elwood: Maze-Solving Machine, plan (Shannon: Presentation 1951, p.174, figure 8).

Right: Walter, William Grey: Elmer, 1948.
Image source: URL: http://cyberneticzoo.com/wp-content/uploads/2009/09/ElmerHiRes_p3-1024x813.jpg.



Below: Walter, William Grey: Cora, model for demonstrations on a table, 1951 (constructed by Bunny Warren for the Festival of Britain in London, Exhibition of Science, Science Museum, South Kensington, 1951).

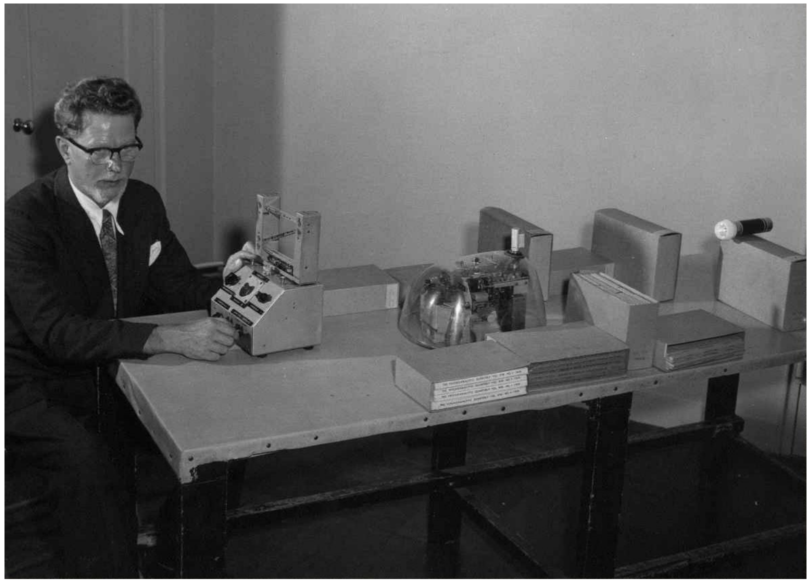


Image source: URL: http://cyberneticzoo.com/wp-content/uploads/WGW-NewYork-p1.JPG

Bibliography with informations about the abbreviations used in the captions:

Dreher, Thomas: History of Computer Art. Chapter Bibliography. In: URL: http://iasl.uni-muenchen.de/links/GCA-IXe.html