Cognitive Processes in Navigation: the Pacific and the Mississippi

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RÉSUMÉ

Les descriptions de la navigation dans le Pacifique par Thomas Gladwin sont comparées à celles de Mark Twain portant sur le Mississipi. La similitude essentielle des processus à l'œuvre dans les deux cas est expliquée par les caractéristiques de la pensée dans les sociétés traditionnelles. On suggère des conséquences possibles de cette analyse dans le domaine de l'éducation.

Thomas Gladwin, in his interesting and thought-provoking article "Culture and Logical Process", explores the ways of navigation in the Pacific island of Truk as compared with those of modern European navigators. In his book "East is a Big Bird" he returns to this subject at greater length and gives a detailed description of the ways of navigation as learned and practiced in another island in the same area, Puluwat. By means of investigating the ways of navigation in these islands, Gladwin tries to uncover the processes of thinking characteristic of the Pacific navigator, and reflected in his ways of learning and action. The purpose of Gladwin's study, as stated in the opening pages of his book, and again in chapter 6, was to use the knowledge gained to throw new light on the problem of class-differences in cognitive functioning. By describing navigation as it is studied and practiced in the Pacific, Gladwin shows clearly that behavior which is undeniably intelligent, such as finding the way to distant islands and back,

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can be the outcome of cognitive processes essentially different from those accepted in the West. Gladwin contends that this fact has important implications for the education of lower-class children in modern industrial societies.

Looking, as Gladwin says in his introduction, "to another culture for perspective on processes which are at work in our own", is common procedure in anthropology. In this article I shall try to show, that this other culture is not necessarily located at the far corners of the earth. Sometimes it may be found quite near to home. In his book, Gladwin mentions "the Mississippi river pilots of Mark Twain's day" (E, p. 152)*; it is but a fleeting allusion to an expressive image used by Twain. But happening to re-read Mark Twain's "Old Times on the Mississippi" after having read Glawin's "East is a Big Bird", I was struck by the close resemblance, in general as well as in many details, between navigation in the Pacific and on the Mississippi. It may be interesting as well as profitable to compare Gladwin's descriptions to those of Mark Twain.

Before starting on a point by point comparison of the two descriptions, it will be useful to mention some of the differences between the two texts. Gladwin is an anthropologist; he went to Puluwat to study the theory (not the practice) of native navigation, and his book is a systematic description written according to the standards of scientific composition. Mark Twain's text is a work of literature. He wrote it for a wide public, intending to recall the glories of the past, when huge steamboats carried freights and passengers along the Mississippi, guided by the sure hand of the pilot. Stress is given to the action, to the practice of piloting. But as the description is quite detailed, most of the points in Gladwin's book can be matched by similar ones mentioned by Mark Twain, as is shown in the following table.

As the table shows, the study of navigation and its practice, as well as the basic cognitive processes involved in them, are essentially the same, despite the great difference in cultural setting

* The following abbreviations will be used: C — Gladwin's "Culture and Logical Process"; E — Gladwin's "East is a Big Bird"; MT — Mark Twain's "Old Times on the Mississippi".

and period (Mark Twain wrote his description in 1875). Of course, there are some differences; part of them are to be explained by the difference between navigation on the open sea and on a river.

A COMPARISON OF PACIFIC AND MISSISSIPPI NAVIGATION ACCORDING TO GLADWIN AND MARK TWAIN

	Pacific	*Mississippi*
Reliance upon a large body of organized knowledge	Formal lectures on shore: "navigation stars, star courses, wave systems and navigation when tacking" (E, p. 203). *Difference:* inclusion of esoteric knowledge, such as mythical, sea-marks, thought important although useless in practical seafaring (E, p. 130).	All learning on board, but besides seeing and doing, presentation of rules in short lectures, e.g. on the height of banks, effects of a rising of the water-level (MT, pp. 29-32).
Learning by listening	"most of the instruction was verbal" (E, p. 138).	(MT, passim).
Learning by doing	As Gladwin did not actually learn to navigate (E, p. 141), there is no description of performance. But obviously, "a slight increase or decrease in pressure on the steering paddle" (C, p. 171) can only be learned through guided practice.	The master-pilot: "...'Stand by — wait — wait — wait ... *Now* cramp her down! Snatch her! snatch her!' He seized the other side of the wheel and helped to spin it around..." (MT, p. 23).
Use of study-aids	Employment of charts and diagrams of stars and islands, made of pebbles on the sand (E, p. 129).	Use of a note-book to help in memorizing lists of names and facts (MT, p. 13, p. 16a).
Memorization the central part of the learning process	"Formal instruction ... demands that great masses of factual information be committed to memory" (E, p. 128).	"There is only one way to be a pilot, and that is to get this entire river by heart. You have to know is just like ABC" (MT, p. 13).

	Pacific	*Mississippi*
— memory of details	The navigator has to know by heart the stars, their positions and courses, the shapes of waves, the look of reefs in light and shadow, the habits of homing birds used for location of islands (E, pp. 130, 140, 197). He should be able to "rattle off the stars both going and returning between that island and all the others" (E, p. 131).	The pilot had to learn every name and every detail in the river and on its banks; to know the form of each bend and bar and the location of every sunken wreck (MT, pp. 10-16 d). He should be able to "reel off a good long string" of names of islands, towns, bars, etc. along any stretch of the river (MT, p. 17).
— great mass of information	Knowledge of all the special marks for 55 different searoutes, some of them several days long (E, p. 131). All details, such as sea reefs or sun positions	Knowledge of every detail on the route from St. Louis to New Orleans — about twelve hundred miles long (MT, pp. 26, 29). All details, such as the form of river banks and the position of plantations
	had to be learned in both directions, at all times of day and night, in all kinds of weather.	
	(E, pp. 130-131, 165).	(MT, pp. 11-22).
— not simple rote-learning	"all this information is learned so that each item is discretely available" when required (E, p. 131).	When the relieving pilot came up for his watch, he was expected to know the position of the boat immediately, even in the middle of a dark night (MT, p. 20).
— manner of instruction	Much time was devoted to repetition and testing. (E, p. 131).	(MT, pp. 11-12).
Training of other faculties of thought: Comparing	Every situation had to be compared with all learned facts and with all remembered observations of the navigator (C, p. 172).	Comparing the height of bank to its remembered height on a past trip enabled determination of the water level at points to be passed, a long distance ahead (MT, pp. 29-30).

	Pacific	*Mississippi*
— close attention to details	The navigator should constantly watch the direction and the rate of the current, the form of reefs or islands as they appear to his eyes from various distances or angles of approach (E, pp. 160-162).	The pilot should discern every faint mark, though it be a black object against a black background (MT, p. 16c).
Importance of sense impressions	"Puluwatans steer by the feel of the waves under the canoe"; they sense the speed of the wind and the direction of the waves (E, pp. 171, 128, 143). The motion of the canoe at night indicated the presence of reefs. Verification was effected through sounding. (E, pp. 177, 162)	Many things on the river could not be explained by words: the pilot had to sense them (MT, p. 26). He had to watch the movements of the boat at night, in order to detect low places. (MT, pp. 23, 39)
Continuous calculation of position	"... while on the way ... the canoe must be held steady on its course and a running estimate maintained of its current position" (E, p. 147). "Each bit of information... is integrated into a cumulative but changing knowledge of position and travel thus far" (C, p. 173).	The 'cub' pilot asks, in exasperation: "... 'what I ... want to know is, if I have got to keep up an everlasting measuring of the banks of this river, twelve hundred miles, month in month out?' — 'Of course!' (MT, p. 30). The signs to be watched in order to determine position include chutes, cracks, stumps, etc. (MT, p. 31).
Need for judgement	Weighing of alternatives, interpretation of marks (E, p. 204).	Deciding whether to take a risk (MT, p. 16d). "Good and quick judgment and decision" are higher qualities even than memory (MT, p. 49).

Various techniques used by the Pacific seafarers, involving appropriate mental operations and constructs (e.g. E, pp. 181-189), are necessary in sea travel unaided by instruments, because of the always threatening danger that the island of destination may be totally lost. Not so on the river, where the banks constantly give direction and furnish many clues to the determination of position. Other, minor differences can be accounted for by the fact that Gladwin did not actually go through the whole, practical, course of training, and therefore omitted some points mentioned by Mark Twain, such as the kinesthetic element in the teaching process; or by the relative brevity of Twain's description. If Gladwin writes of the pragmatic bent of the Puluwat navigator, and his lack of interest in theoretical problems or systematic thought without practical implications (E, pp. 141-143, 153), whereas Mark Twain does not mention a similar attitude, the reason seems to be not in any difference between the two cultures, but in the difference between the two texts: Gladwin gives a fuller and a more methodical account of cognitive functioning than does Twain, who after all did not try to write a treatise in cognitive anthropology. One point on which the two writers do not seem to agree regards transfer of training. According to Gladwin, Pacific navigation "depends upon features of sea and sky which are characteristic only of the locality in which it is used". In other areas other principles of navigation have to be used (E, pp. 144, 146); it would follow that transfer of training is restricted. Mark Twain tells about a Mississippi pilot, who went to work on the Missouri, "and learned more than a thousand miles of that stream with an ease and rapidity that were astonishing" (MT, p. 47). Comparison between the two descriptions is difficult, on account of their different aims and manners of writing. Firstly, Gladwin generalizes, whereas Twain gives a particular instance. Moreover, the situations may be different, as it is quite possible that the divergences between various parts of the Pacific Ocean are greater than those between the Mississippi and the Missouri. Lastly, Gladwin's statement is an inference, based on his knowledge of conditions of navigation in different parts of the Pacific, but not on an actual experiment involving, for example, the transference of a Puluwat navigator to the island of Truk. Whereas Twain's example is, or purports to be, a statement of fact.

The essential similarity of thought processes reflected in navigation in two societies so different from each other is not accidental; nor does it arise out of the very nature of navigation, as is shown by Gladwin in his comparison of the ways of Trukese and modern European navigators (C, passim). The reliance on orally transmitted knowledge, on memory and repetition, on sense impressions; the attention to details, the lack of innovation — all are characteristic of thought in traditional societies. Much the same qualities can be shown to exist in the modes of thought of primitives peoples, of medieval Europeans and of the lower classes in Western countries today. Gladwin's procedure was to study a very distant culture in order to learn something about cognitive functioning in the modern West. Such a roundabout way has its uses, as it is often easier to look in an unprejudiced way at cultural and sociological phenomenae not involving one's own society. But it may be even more useful to show that processes at work in the lower class in our time, are essentially the same as those of former generations in Western society. After all, many of the forefathers of the American middle class thought along the same lines as the pilots described by Mark Twain, whether they were sailors or farmers, miners or craftsmen. The direct influence of education and reading, and the more indirect effects of living in a literate culture, changed traditional ways of thought in the middle class (Cf. Stahl). The same processes are now exerting their influence upon the lower class; the study of cognitive processes characteristic of people living in the pre-industrial West may be equally enlightening as studies of more remote groups, and perhaps more directly relevant.

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