

Alice Bee Kasakoff
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Chicago 45, Illinois

June 16, 1964

Dr. Jerome Bruner
Center for Cognitive Studies
Harvard University
Cambridge 38, Mass.

Dear Dr. Bruner:

I hope this is what you wanted and that it has not arrived too late. I left the manuscript in your mail box at home late last night before I went to the airport.

My social security number is *360-34-6154*. Please send the check to me care of the Laboratory of Anthropology, Museum of New Mexico, Santa Fe, New Mexico.

I hope you have a good summer and that we shall see each other next year. I enjoyed Soc Sci 8 very much.

Yours,

Alice

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June 15, 1964

Mathematics among the Kpelle Tribe of Liberia

By John H. Gay

John H. Gay, a teacher of mathematics at Cuttington College, Liberia, began his study of the Kpelle in order to find out why his students had difficulty learning mathematics. Intensive work was carried out last winter with the help of John K. Wealar, a Kpelle student at the College who provided linguistic data; W.E. Welmers, a teacher at the College, who also provided linguistic data; and D.W. Crabb, a teacher from Princeton, who collaborated with Mr. Wealar to develop some field methods to be used in testing hypotheses. A large part of the report is devoted to methodology and the aims of the project; the rest of it summarizes and brings together papers written by these men on various aspects of the problem - these are included as appendices, which are by far the most interesting part of the report - and describes research carried out in Gbanza, a small Kpelle village. There, psychological tests were given and some observations made, for a few weeks, on the place of mathematics and logic in the lives of the people.

As far as I know, no investigation has ever focused on this particular aspect of thought and life in a non-Western culture. Certainly none has ever used linguistic, psychological, anthropological, and educational techniques to reach its conclusions, as this project attempts to do. However, the report is disappointing, even taking into account its preliminary nature. It contains many facts needed for a description of Kpelle mathematics and logic, but, perhaps because of Gay's lack of sophistication in psychology and anthropology, the point of view is too ethnocentric and the basic problem of the relation of language to thought has not been thought out.

The terms "pre-mathematical" and "pre-logical" are used frequently to describe the subject of the report, yet I have not been able to find an explicit definition of them. These terms were current in an earlier generation of anthropology but they

and the type of evolutionary framework they imply are now outdated. This is not to say that Kpelle thought is not different from our own, but the use of these terms emphasizes the negative qualities of their thought by seeing the Kpelle continually in relation to **Western mathematics and logic**. The research would have been much more interesting if the Kpelle were looked at more from within, in their own right. As it is, it focuses too much on what we have which they don't (the inclusive or, for example). Interesting findings are phrased **negatively** and not followed up (for example, the Kpelle "dislike for straight lines and preference for irregular curves", page 113).

Related to this somewhat ethnocentric point of view is Gay's idea of Kpelle society as a "tribal society" which has not changed significantly in several hundred years (page 130) and in which decisions are made by tradition and authority. I cannot believe this view is correct. There may have been few technological changes, but certainly dances, magic, or religious cults must have come and gone. If so, these must be studied if one is interested in the importance of reasoning in the process of change. Gay has discovered that the Kpelle rely on tradition and authority in areas in which we do not; there must be other areas in which problems are not solved in this way. What is a "problem" to the Kpelle and what do they do about it? There must be some areas of choice, in which proofs would be required that could not be made "solely" on the basis of tradition and authority (page 130), just as there are many areas where we rely on tradition and authority as much as the Kpelle, though we may not be so ready to admit it. Gay suggests that comparable research be carried out in the USA; this would provide an important basis for comparison in these matters.

The report describes the Kpelle language in areas related to logic and mathematics, but, although it attempts to come to conclusions about Kpelle thought from it, the problem of inferring from language to thought is not confronted

The search for differences has distorted

the suggestion that magic important in reasoning

How can we study these?

Note justification of identification of concepts.

agree that cross-cultural needed

that difficulties arise ^{all we've concluded is}

explicitly. What does it mean for "thought" if there is no "simple" way (page 138) to express something in Kpelle that can be expressed easily in English? The answer is not as simple as the report indicates in some places, and certainly problems in this area should not be left vague and undiscussed. Psychological tests independent of language should be used to test the hypotheses about thought that have been derived from the language. Most of the psychological tests given tested space and geometry, however, not the inferences about logic, counting, etc., made from language. And linguistic data on how spatial relations are described in Kpelle is not given. This lack of coordination may be related to Gay's frequent division of chapters and sections into four parts, covering the linguistic, anthropological, psychological, and educational aspects of the research. If Kpelle thought were described without regard to the discipline into which the information would technically fall, ^{what gaps?} gaps would be more apparent and the methods of these disciplines could be used in a truly complementary way to fill them. Most needed are psychological tests to support inferences made from observation and the language. These would have to fit the problem to be investigated and the non-Western situation. (The results of the puzzle tests that were administered are difficult to interpret; they cannot be compared to Western performances since the test seems to be the first experience the subjects had with such a thing.) Observations are needed on daily life in all areas so that all contexts relevant for mathematical and logical thinking are known and described.

of course

predict these describe figs. ^{Q: Does this present diff}

non-sense

blems to suggest long term anthropological study

Isn't this a contradiction

As it stands, the reader of this report will discover many basic facts about Kpelle language and something about the types of mathematical processes that are most common in Kpelle life. But coordinated research using methods of the different disciplines, ^{excites} approaching the problem in order to find what interests and valid conclusion can be drawn.