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Melvin Randolph Gilmore, Incipient Cultural Ecologist: a Biographic Analysis

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MELVIN RANDOLPH GILMORE, INCIPIENT

CULTURAL ECOLOGIST: A BIOGRAPHIC ANALYSIS

by

David L. Erickson

A THESIS

Presented to the Faculty of

The Graduate College in the University of Nebraska

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Department of Anthropology

Under the Supervision of Professor Preston Holder

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FORWARD

This thesis is based largely on manuscripts found in the Nebraska State Historical Society archives. A number of individuals should be acknowledged for the assistance they rendered me in the research and writing of this paper.

Marvin F. Kivett, Director of the Nebraska State Historical Society, introduced me to the topic of Melvin Gilmore and informed me of much of the material available in the Historical Society archives. Paul D. Riley, Research Historian with the Society, also helped in my collection of information.

My major correspondent has been Professor Volney H. Jones of the University of Michigan, a former colleague of Gilmore. Professor Jones has proven an invaluable source on certain aspects of Gilmore's life and research. I also wish to thank him for the miscellaneous manuscripts he provided me.

My interpretation of Gilmore has been greatly aided by the advice of Dr. Preston Holder of the University of Nebraska Department of Anthropology. The timely suggestions made by Department Chairman Dr. Warren W. Caldwell were crucial to this study's completion.
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Chapter I

INTRODUCTION
BIOGRAPHY AND THE HISTORY OF ANTHROPOLOGY

The history of anthropology is a subfield which has only recently begun to receive adequate attention, largely through the efforts of George Stocking.\(^1\) Within this context the medium of biography has even greater incipiency. Jacob Gruber has stressed the importance of the instrument of biography in the history of anthropology and the decided lack of serious attempts along this line.\(^2\) The potential value of biography lies in its ability to illuminate certain historical problems which cannot be resolved from simply a consideration of the published material of the period.

What an anthropological biography should try to do is explain a scientist's research in terms of a biographic-historigraphic milieu. The bulk of anthropological biographies have failed to even attempt this goal, the most recent example being the volume on A. L. Kroeber.\(^3\) The biographical method undertakes questions that can best be attempted on this level of analysis, and consequently serves as a sound basis for broader historical generalizations.

\(^1\) Stocking 1968.
\(^2\) Gruber 1966: 10, 14.
\(^3\) Kroeber 1970.
Perhaps the best means of analyzing an individual's research is to focus on one broad problem, technique, or concept which epitomized the subject's works. The task is to document the sources of this research and the logic behind its development. A scientist may respond to such diverse factors as disciplinary fads, specific training, the influence of colleagues or superiors.

The history of anthropology is marked by a series of differing approaches to the problem of cultural diversity. The three basic methods of interpretation—evolution, diffusion, ecology—focused on distinctive sets of causal factors. Studying the origin and development of each respective methodology necessitates an examination of its premises vis-a-vis related ideas either intrinsic or extrinsic to anthropology. The history of any science deals largely with the process of intra- or interdisciplinary communication. To a certain extent the factors behind the biographic subject's research can be regarded as a microcosm of a larger ongoing process. However, the uniqueness of individual circumstances dictates a degree of caution in any attempt to equate idiosyncratic determinants with those which apply to the field as a whole.
ETHNobiology, Ecology, CulTURAL Ecology

In its biological sense "ecology is 'the mutual relations between organisms and their environment.'" The concept of ecology teaches that the totality of the environment is an integrated whole. The environment in this respect constitutes botanical, zoological, and inorganic features. Assessing the effect of one basic aspect without considering the other two would be deceiving as to the total impact of external conditions. Bioecology traditionally studied the problems posed by the differential distribution of biological species in environments of varying climatic and geologic conditions.

Cultural ecology is the study of the reciprocal relationship between man and environment. It is almost exclusively concerned with how culture adjusts to environment, though it sometimes considers the converse relationship of man on his environment. Cultural ecology basically aims at interpreting cultural phenomena by reference to the local environment. There are three components of culture, each with a different position in relation to the environment: technological, sociological, and ideological. The

\[\text{Steward 1955: 30.} \]
\[\text{Sahlins and Service 1960: 46; Steward 1968: 338.}\]
relationship of the technological component to environment is the most obvious correlation.

One early cultural ecological approach will be termed "ethnobiology." Ethnobiology has three variants—ethnobotany, ethnozoology, and ethnogeography—each interested in how primitive man utilized or conceptualized a respective aspect of the environment. Originally concerned with the material culture relationship, some later ethnobiologists also saw connections with the ideological sphere of culture.

In the sense that man's utilization of natural resources denotes an adjustment to the environment, ethnobiology is at least implicitly cultural ecological. Underscoring ethnobiology's status as cultural ecology are the premises and goals of some of its practitioners. Ethnobiology was the salvage ethnographer's approach to the culture-environment relationship.

Systematic ethnobiology was instituted in 1895 by botanist F. V. Coville. With roots in the botanical survey, ethnobotany served as the chief model and most practiced form of ethnobiology. Ethnobotany and ethnozoology are essentially interdisciplinary, usually requiring the eventual cooperation of an ethnographer.

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6Coville 1895.
and a biologist. The ethnographer is needed for his linguistic abilities, the biologist to identify plant or animal species.

Ethnobiology deserves some recognition as a nascent cultural ecological technique, particularly in the hands of a few ethnographers such as M. R. Gilmore and J. P. Harrington. In undertaking ethnozoology and ethnogeography, as well as the more popular ethnobotany, they carried this method to its logical extreme. Behind their holistic research was the assumption that ideological culture could be interpreted by reference to the environment.

MELVIN R. GILMORE

Melvin Randolph Gilmore (1868-1940) was an ethnographer and museologist whose chief distinction was the practice of ethnobiology. During his 30 year career at museums in Nebraska, North Dakota, New York, and Michigan he achieved his greatest fame for ethnobotanical research and innovations. He also conducted research into ethnogeography and ethnozoology, as well as the more traditional lines of ethnography. His monograph on the **Uses of Plants by the Indians of**
the Missouri River Region is probably the most cited work of its kind from the Plains area.

It is Gilmore's Nebraska tenure (1904-16) which is most interesting, for it was during this period that he developed the interest in ethnobiology which characterized his entire career. The little that has been written about Gilmore has been limited to two obituaries which only summarize his accomplishments and say virtually nothing of the factors behind his specialized research.

HARRINGTON'S ETHNOBIOLOGY

Gilmore's tripartite ethnobiology had one notable contemporary parallel. Linguist John Peabody Harrington (1884-1961) was the key ethnographer in broad interdisciplinary research into the relationship of Tewa culture to the environment. In 1910 and 1911 the School of American Archeology, under the direction of Edgar Lee Hewett, sponsored field work which aimed at understanding prehistoric Pueblo culture by reference to the living tribes of the region. The touchstone of this investigation was

7Gilmore 1919a; hearafter cited in text as Uses.
8Will 1941; Jones 1941a.
the environment as it affected culture. Harrington's ethnobotany and ethnozoology were undertaken with the cooperation of botanist Wilfred Robbins and zoologist Junius Henderson. Both of these natural scientists also contributed a separate monograph on the physiography of the region under study. Harrington's ethno-geography focused on aboriginal place names.

Linguistics was another criterion by which living cultures shed light on prehistoric ones. Consequently, the etymological rendering of Tewa specific names was the focal point of Harrington's ethnobiology. Connected to the linguistic emphasis was the ultimate goal of determining "how the mind of man has been influenced by his environment..."

Later chapters will point out certain differences between Gilmore's and Harrington's ethnobiology.

THESIS STATEMENT

This thesis will be a study in microcosm of Melvin R. Gilmore's Nebraska research. The intention is to

9 Springer 1910.
10 Robbins et al 1916; Henderson and Harrington 1914.
11 Hewett et al 1913.
12 Harrington 1916.
14 Ibid.: 624.
analyze his ethnobiological field work and writings in terms of biographic factors. Gilmore's ethnobiological research manifests both bioecological and cultural ecological rationales. The bioecological problems he sought to solve were obviously a product of his ongoing botanical instruction. But his cultural ecological objectives are not so easily accounted for. It will be hypothesized that there was a direct connection between Gilmore's bioecological ideas and his cultural ecological premises. It will be shown that Gilmore's pioneering work in ethnobiology, together with studies by Harrington and others, laid the groundwork for modern cultural ecology as practiced by Julian Steward and others.

The interplay between bioecology and cultural ecology is best seen in Gilmore's ethnobotany. Ethnobotanical data were collected for the purpose of solving certain botanical ecological problems, as well as for the purpose of providing facts necessary for the proper interpretation of ideological culture. There are two means by which bioecological ideas intergrade with the cultural ecological premises.

The chief connecting link is what might be termed "bioecological determinism"—the fact that Gilmore,
like ecologists in general, viewed organisms in terms of the environmental factors of a given region. 

Primitive man, being largely dependent on the resources of a circumscribed area, was particularly subject to ecological speculation.

Another link between both types of ecology is in the fact that the Indian modified his environment by augmenting or exterminating certain wild plant species. This alteration of the floral balance is mainly a phytogeographic problem, though it has cultural ecological aspects. Such floral changes were a byproduct of man's utilization of the environment.

Ethnogeography and ethnozoology were wholly inspired by cultural ecological premises. Relative to Gilmore's research strategy, both methods can be regarded as extensions of ethnobotany. Both ethnogeography and ethnozoology continued to investigate the aborigine's utilization and conceptualization of respective areas of the environment. However, Gilmore's ethnogeography offers significant variations from the type of data considered by ethnobotany and ethnozoology. The ramifications of this will be discussed.
Chapter II

GILMORE'S ECOLOGICAL AND ETHNOGRAPHIC BACKGROUND:
THE INFLUENCE OF THE CONCEPT OF ECOLOGY ON THE
DIRECTION OF HIS ETHNOGRAPHIC RESEARCH
INTRODUCTION

Gilmore spent the initial portion of his anthropological career in Nebraska (1904-16). During this period his ethnographic interests changed from the gathering of general data on Indian history and society to a more specialized collection of ethnobiological information. His post-Nebraska career was largely an elaboration on the ethnobiological theme original to his Nebraska tenure.

This chapter presents Gilmore's parallel background in botany and ethnography with the intention of showing that he acquired the ecology concept before beginning ethnobiology. Later chapters will show how ecology inspired the undertaking of ethnobiology.

THE EARLY YEARS

Melvin R. Gilmore was born in Valley, Nebraska on March 11, 1868. His parents were John Randolph Gilmore (1838-1901) and Mary Concannon Gilmore (d. 1893). J. R. Gilmore was born in Pennsylvania and moved to Illinois in 1860. After serving in the Civil War, he migrated to Douglas County, Nebraska, married (1867), and settled down as a farmer. Melvin was
one of eight children.¹

It is only possible at this point to determine a few specifics of Melvin's early life. He grew up on his parents' Valley farm and obtained his earliest education from the country schools in Douglas County.² He served as a schoolteacher in nearby Elk City.³ In 1890 Melvin Gilmore is listed as a farmer along with his father.⁴ He also matriculated at the Fremont (Neb.) Normal School, completing the highest course there.⁵ His dates of attendance at this private college are unknown.

One significant personal trait seems to have had its genesis while in rural eastern Nebraska: Gilmore developed an interest in and love of nature. George Will states

He [Gilmore] grew up on a Nebraska farm where his deep interest in the things of nature was stimulated and his powers of observation were built up.⁶

²Will 1941: 179; Gilmore ms. 1909: 43.
³Valley Enterprise, Aug. 1, 1940.
⁴Anonymous 1890: 1015.
⁵Moomaw 1916: 234.
⁶Will 1941: 179.
This boyhood interest was strongly reflected in his later career as a botanist and an ethnographer.  

EXPOSITION EXPERIENCE

In contrast to his parochial life in eastern Nebraska, Gilmore was a participant/visitor at three of the international expositions occurring at the turn of the century. In all probability he at least visited the Trans-Mississippi and International Exposition in nearby Omaha (1898). His exact role in this affair remains in doubt. George Will flatly states that Gilmore was "in charge of state exhibits" at this and two subsequent expositions. This allegation is not wholly true.

Gilmore's role at the expositions of 1901 and 1904 is somewhat more distinct. At the Pan-American Exposition in Buffalo, N.Y. (1901) he was in charge of the composite beet sugar exhibit sponsored by the Nebraska industry. In 1904 Gilmore was a two months' visitor to the Louisiana Purchase Exposition in St.

7Gilmore 1921a: 1144.
8Will 1941: 179.
9Nebraska Farmer, April 25, 1901, p. 466; Waterloo Gazette, Nov. 25, 1901; Cotner Collegian, May, 1905.
Louis. He did not appear to have any official connection here, however.

It was evidently in this exposition context that Gilmore first came into contact with primitive man, resulting in some initial ethnographic work. At the Buffalo and St. Louis events he gathered data on the Ainu people of Japan. At the latter exposition he was also in contact with a number of American Indian groups, including the Pawnee.

There was also a botanical aspect to Gilmore's participation in the expositions of 1901 and 1904. A potentially strong connection with farming interests is indicated by his representation of the Nebraska sugar beet industry in 1901. No doubt certain of his family were involved in the growing of sugar beets; Valley, Nebraska was the center for the growing of the crop in the state. Also demonstrating a botanical interest was his published report on the outdoor exhibit of the Bureau of Plant Industry at the St. Louis Exposition.

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12 Valley Enterprise, May 21, 1897.
13 Gilmore 1904.
Gilmore was an observer and recorder of both the ethnographic and botanical facets of the 1901 and 1904 expositions.

COTNER UNIVERSITY

Melvin Gilmore was associated with Cotner University in Bethany, Nebraska (four miles from downtown Lincoln) from 1903 to 1911. Cotner was affiliated with the Christian Church. Gilmore entered Cotner as a part-time senior in the academic year 1903-04, simultaneously finishing his B.A. degree and serving as a teaching assistant in the Department of Ancient Languages. After graduation in 1904 he taught in the Department of Science; for the first two years under another faculty member, from 1906 on as the head of the department. From 1904 he was associated with the museum at Cotner, retaining the dual status of instructor and curator until 1911 when he severed his ties with this institution.14

As an instructor of biology Gilmore taught a range of general courses: botany, zoology, geology, anthropology, hygiene, nature study, cellular biology. The

14Moomaw 1916: 111-12; Bulletins of Cotner College.
Anthropology course dealt mainly with the biological aspects of man. The above subjects are probably indicative of his own course work at Fremont Normal and Cotner, as well as his ongoing training at the University of Nebraska. Reflecting his academic position, Gilmore was accorded the nickname "Nature's Advocate" in one of the Cotner yearbooks.15

Gilmore also served as Cotner's resident anthropologist. The ethnographic research accomplished while at Cotner was disseminated to students. He wrote a few anthropological articles for the student publication, The Cotner Collegian.16 As a lecturer he presented talks on at least two occasions: on the Ainu people of Japan and on Omaha Indian folk music.17 As Cotner's curator he contributed or loaned some of the ethnographic items which he collected.18

Gilmore's religious beliefs may also be mentioned in this academic context.19 Of the two articles pub-

16Gilmore 1906a, 1906b, 1906c.
17Cotner Collegian, Feb. 1905; ibid., May, 1907.
18Ibid., Oct., 1906; Bulletins of Cotner College.
19Just before coming to Cotner Gilmore was "making active preparation" to become a missionary to Japan (Dr. Royal Dye to Gilmore, Nov. 20, 1902, letter quoted to me by Mrs. Hubert Gilmore, 1971). For some reason these plans never materialized.
lished of a specific religious nature, one entitled "Burden Bearing" deserves summary. St. Paul's precept that one should "bear another man's burden" was verified by biological analogy. The interdependence and interactivity of plant cells indicated to Gilmore that "the law of burden bearing is the universal law of life..." This sociological application of biological knowledge reveals the strength of Gilmore's botanical training at this point in time.

INITIAL FIELD WORK (1905-06)

Ethnobiology was not a topic of Gilmore's first two seasons in the field. In focusing on the history, society, and music of the Omaha tribe he was apparently influenced by the presence of A. E. Sheldon and Francis LaFlesche.

Addison Erwin Sheldon (1861-1943), better known as a political scientist and historian, was the earliest ethnographic field worker for the Nebraska State Historical Society. His research considered the Teton Dakota, Omaha, Winnebago, and Pawnee. 1905 was apparently his last active year in the field. 21

20Gilmore 1905.
21Sheldon collection.
Sheldon and Gilmore made considerable use of the camera and Edison recorder as ethnographic tools. The latter device apparently belonged to the Nebraska State Historical Society, the institution which Sheldon represented. LaFlesche assisted Gilmore in lining up the correct ceremonies and individuals to photograph and songs to record. Gilmore also collected data on Omaha history and social organization.

Some of the photographs and data gathered in 1905 by Gilmore appeared in the first two volumes of the Illustrated History of Nebraska. In three extended footnotes in volume two Gilmore dealt with the LaFlesche family, the early aboriginal police force of Chief Joseph LaFlesche, and Omaha Indian societies. The second topic was reiterated along different lines in two later articles praising the early Omaha prohibition law.

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22 Gilmore to Paine, July 20, 1905.
23 Sheldon diary, 1905.
24 Gilmore to Paine, July 20, 1905.
25 Gilmore to Paine, Aug. 10, 1905.
28 Gilmore 1906c, 1910.
In 1906 Gilmore spent the better part of August on the Omaha reservation. He conducted research into the same general areas as the previous summer:

My purpose was to get the original words and a history and translation into English of some of the Omaha songs, and to gain any other knowledge I could of the history, customs and folk-lore of this tribe... 29

BESSEY AND CLEMENTS

Gilmore spent ten years (1904-14) as a part-time graduate student in botany and geography at the University of Nebraska. He received both his M.A. (1909) and Ph.D. (1914) degrees in botany. 30 As a botany major he was trained in the ecological method of Charles Edwin Bessey (1845-1915) and Frederic Edward Clements (1874-1945).

Bessey’s influence upon students, as well as upon other professionals, helped shape the development of 20th century botany. During Bessey’s tenure at Nebraska the Department of Botany became a mecca for advanced study. Though Bessey was a prolific writer, his significance lies more in the realm of the influence he exerted on students than upon any theoretical discoveries made. 31

30Gilmore transcript.
31Manley 1969: 89.
From 1884 to 1915 Bessey served the University in a number of capacities: as a professor of botany, dean, state botanist, and twice as interim chancellor. With the help of students he was able to accomplish the first comprehensive botanical survey of the state before 1900. He became the botanical editor for *Science* from 1897 to 1915 and also had the honor of being elected President of the American Association for the Advancement of Science (1910-11).32

Bessey's effect on the profession of botany went well beyond the estimated one-fifth of his graduate students who reached national or international prominence.33 Such famous contemporaries as Coville, Coulter, and Trelease followed his lead.34 Due to his editorship and knowledge of foreign languages Bessey was very receptive to European botanical concepts.35 This accounted for his early acceptance of the "biological" method in the study of floras and plant distribution--the science of ecology, as it became later known--a study of extrinsic and intrinsic factors in plant growth and development from the standpoint of circumscribed areas....

32Peattie 1929; *Who Was Who* 1942.
33Holck n.d. 9.
34Rodgers 1944: 244.
35Ibid.
Bessey inspired his students to go forward with the new method of ecological investigation.36

At the turn of the century Nebraska and Chicago were the only two American universities promoting ecological investigation.37

F. E. Clements, one of Bessey's greatest students and one of Gilmore's early professors, was a major contributor to the ecological school.38 Clements received his doctorate under Bessey in 1898 and taught at his alma mater from 1894 to 1907.39 Roscoe Pound and Clements' The Phytogeography of Nebraska (1898) was one of the earliest applications of the ecological method in this nation.40 Clements also wrote an early textbook on ecology.41

NEBRASKA STATE HISTORICAL SOCIETY MUSEUM

In conjunction with his pioneering archaeological studies Elmer Elsworth Blackman (1862-1942) became the first full-time curator at the Nebraska State Historical Society in 1902.42 Blackman's tenure was marked

36Ibid.
37Sears 1956: 24.
41Clements 1905.
42Gunnerson 1950.
by a rapid growth of museum collections. \textsuperscript{43} Blackman stepped down as curator in 1910. \textsuperscript{44}

There was a hiatus of one year before Gilmore was appointed curator. \textsuperscript{45} His museological background and familiarity with the Historical Society museum and personnel made him one of the most qualified candidates for the job. In 1905 Gilmore became a member of the Historical Society, \textsuperscript{46} and came into close contact with Secretary C. S. Paine, A. E. Sheldon, and E. E. Blackman. From 1907 Gilmore had been a member of the Historical Society Museum Committee. \textsuperscript{47}

In January, 1911, at the request of C. S. Paine, James Mooney of the Bureau of American Ethnology submitted a list of prospective candidates for the job of curator. However, Gilmore soon became the primary prospect. Gilmore's M.A. thesis, \textit{A Study in the Ethnobotany of the Omaha Indians}, was submitted to Mooney as a basis for recommendation. Mooney reacted favorably to this work--based on ethnobotanist F. V. Coville's judgment--and added his personal support for Gilmore, whom he had met briefly while in

\textsuperscript{43} Records of the Secretary's Office, Nebraska State Historical Society 1909: 18, 66; hearafter footnoted RSO-NSHS.
\textsuperscript{44} RSO-NSHS 1910: 182.
\textsuperscript{45} RSO-NSHS 1911: 394-95.
\textsuperscript{46} N.S.H.S. 1907: 239-40.
\textsuperscript{47} Ibid.: 262; Blackman et al 1907.
Hired secondarily as a field worker, Gilmore's main duty was the renovation and classification of existing museum collections. However, his most noted museological contribution was the construction of ethnobotanical displays, a product of his field work. These exhibits received a great deal of publicity for the Historical Society. Under Society auspices, Gilmore also participated in numerous expositions around Nebraska.

In 1916 Gilmore left the Nebraska State Historical Society to become curator at the North Dakota State Historical Society. Financial considerations were probably partially behind this move. He also expressed the belief that his research efforts were stifled in Nebraska and that he was offered "a much greater scope" in North Dakota.

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50 RSO-NSHS 1911: 360; Blackman ms. 1917.
51 Gilmore to Whelphley, Feb. 20, 1912; Gilmore to Buckley, Jan. 8, 1912.
52 RSO-NSHS 1911: 395.
53 RSO-NSHS 1915: 255.
54 RSO-NSHS 1915: 238.
From 1905 to 1910 Gilmore limited his research to the Omaha-Winnebago reservation in northeastern Nebraska. Most or all of the finances for field work previous to his tenure at the Nebraska State Historical Society appears to have come from his own resources.

After joining the Historical Society in 1911 Gilmore had to wait two years before Society funds were available for field work. He nonetheless continued research in 1911 and 1912. The Omaha were visited in 1911. In 1912 research was extended to the Pine Ridge reservation in South Dakota. Funds for this expedition were provided by the University of Nebraska. The Omaha were also investigated.

In 1913 Gilmore was granted a fund for traveling expenses by the State Legislature. This enabled

55 M.A. thesis photo credits indicate field work in 1907 and 1908; the Walthill (Neb.) Times (Aug. 20, 1909) field work in 1909; it is a likely assumption that research was continued in 1910.

56 Mooney to Paine, March 29, 1911 (RSO-NSHS 1911: 338-39).

57 RSO-NSHS 1911: 366, 397.

58 RSO-NSHS 1912: 111, 122.

59 N.S.H.S. 1917: 297.
him to conduct field research among the Pawnee in Oklahoma, Teton Dakota in South Dakota, Ponca, Santee Dakota, and Omaha-Winnebago in northeastern Nebraska. This was by far his most productive year in the field. In 1914 he again visited the Omaha. Also in the summer of 1914 Gilmore and an old Pawnee chief took a tour of aboriginal sites in Nebraska. The 1915 field work was restricted to the Omaha reservation.

In five seasons of field work with the Historical Society Gilmore spent about equal time on ethnogeography and ethnobotany. The years 1911 to 1914 were devoted to the geographic and botanic knowledge of the aborigine; in 1915 ethnozoology became an area of inquiry among the Omaha.

GILMORE'S ETHNOGRAPHIC CONFIGURATION

Correlating the influences on Gilmore is made easier by looking at his research interests in sequential terms. Gilmore commenced Plains ethnog-
raphy with the investigation of Omaha ethnomusicology and the social aspects of their culture (1905-06). Somewhat later (c. 1907), he began surveying Omaha ethnobotany. Still later (c. 1911), as his attention was directed to other Plains groups as well (Teton Dakota, Pawnee, Ponca), there was a concomitant expansion of interest in the extra-botanical facets of the culture-environment relationship, viz., ethno-geography and ethnozoology. In essence, there appears to have been a marked shift away from the gathering of general data on Indian society to the more specialized study of aboriginal utilization of the environment. This sequence seems to imply a growing awareness of the importance of the environment (as a tripartite entity of botanical, zoological, and inorganic aspects) in assessing culture.

A statement by Gilmore substantiates the ethno-botanical origins of his ethnobiology:

I began as a botanist, becoming interested in Indian ethnobotany, but I have gone on to make inquiry into not only their plant lore, but their animal lore, and their knowledge and uses of the minerals, their geography, and their whole relation to their physical environment.65

The next two chapters will provide further evidence confirming this configuration.

How does one explain this configuration? The concept of ecology may help to clarify Gilmore's changing ethnographic interests. As his instruction in botany advanced beyond the introductory courses taken in 1904-05, Bessey's ecological methodology perhaps suggested certain botanical problems to Gilmore—problems which were being partially solved by the contemporary ethnobotanical survey method. Evidence seems to indicate that bioecological problems instigated the initial step to ethnobotany. The subsequent, more holistic, gathering of ethnobiological data is more definitely attributable to the idea that environment was the ultimate explanation behind cultural phenomena.

POST-NEBRASKA CAREER

In 1916 Gilmore vacated the museum position in Nebraska to assume a similar one at the North Dakota Historical Society in Bismarck. Gilmore remained there until 1923 whereupon he was appointed to the

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66Gilmore transcript; Bulletins of the University of Nebraska.
staff of the Museum of the American Indian, Heye Foundation, in New York City. Because of this institution's financial difficulties, he was forced to leave the Museum in 1928. After spending nearly a year in Battle Creek, Michigan, working as a landscape designer for the Kellogg Nature Preserve, he became associated with the Museum of Anthropology at the University of Michigan in Ann Arbor (1929-37). He died in Lincoln, Nebraska on July 25, 1940, after suffering from Parkinson's disease since 1934.67

Gilmore's post-Nebraska research continued to center on ethnobiology. Field work was expanded to other Plains tribes: Arikara, Hidatsa, Mandan, Osage; and two non-Plains groups: Chippewa, Onondaga.68 Certain cultural ecological ideas first developed in Nebraska found new emphasis or application during his later career.

A number of significant museological innovations marked his post-Nebraska tenure. In North Dakota he drew up plans for "a living outdoor museum" for the

67Will 1941; Jones 1941a, 1969.
68Indian Notes 1925: 289; ibid. 1927: 166-69; Gilmore 1926b, 1933; Jones 1971.
While at the Museum of the American Indian in New York he established an outdoor "ethnobotanical garden" where various crop plants were grown using seeds obtained from Indian provenience. The culmination of Gilmore's career came with the founding of the Ethnobotanical Laboratory in 1930, as a semi-official unit within the Museum of Anthropology at the University of Michigan. The Laboratory became a nationally-known center for the identification of vegetal remains from archaeological sites.

Less well known was Gilmore's extra-museum application of his ethnographic discoveries. Part of his post-Nebraska tenure was spent proselytizing for the idea that European culture resident in this nation should be "Americanised," i.e., modified along indigenous lines. For example, schoolchildren should be taught appropriate aboriginal myths and games, and native plants should especially be adopted for their economic and aesthetic values. What particularly

69Gilmore 1921a.
70Gilmore 1926a.
71Gilmore 1932a.
irked Gilmore was the incongruity of planting flora which did not fit the natural setting. His role as instructor in summer conservation schools provided a vehicle for the dissemination of his doctrines. He was particularly proud of his position on the teaching staff of the American School for Wild Life Protection (1922-33).  

Characterizing Gilmore's post-Nebraska writings was a more humanistic rendering of ethnobiological data. The effect of plant and animal life as expressed in the folklore and ritual of the Plains Indian became a newly-emphasized facet of his studies. *Prairie Smoke*, a popular collection of folk beliefs, was the principal manifestation of this orientation.  

Outside the domain of ethnobiology, Gilmore's general investigation of the Arikara tribe represents a significant addition to Plains ethnography. Unlike the Omaha, which he also studied extensively, the Arikara were a relatively neglected Plains group. Of his diverse articles dealing with the Arikara those detailing their ceremonial life perhaps best reflected his abilities as a field worker. Recording

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73Gilmore 1921b, 1922, 1929.
the rituals of this tribe he acknowledged as one of his most important contributions. Gilmore deserves to be credited as the principal authority on the Arikara.

During his Nebraska tenure Gilmore became aware of the superior conceptual and economic adjustment of the Plains Indian to the local environment. His continued devotion to ethnobiology, and particularly to the humanistic rendering of it, was rooted in a personal identification with this intimate adaptation. There were emotional overtones to his research:

For me, since I have acquired from the old Indians of many tribes of this region of the whole course of the Missouri River and its tributaries, the lore of places, plants and animals, the country is alive with interest and spirit. It lives with me and talks to me. On any trip, by rail, automobile, horseback or on foot, the plants along the way, the birds that fly, and the mammals (native) which I may chance to see, all have their story and song.

His museological innovations can be viewed as another means by which he presented these ecological values to the public.

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74 Who Was Who 1942: 458.
75A check of Murdock's (1960) bibliography reveals Gilmore's dominant position in Arikara studies.
76 Gilmore to Clark, March 3, 1920.
CONCLUSION

Gilmore's ethnobiology was the product of an interdisciplinary background. Ethnographic field work began apart from his training as a botanist. Later, his botanical and ethnographic interests coalesced with ethnobotanical investigation. Still later, ethnogeography and ethnozoology were pursued. What is the theoretical underpinning to this sequence?

The ecology concept is seen as the chief integrating mechanism uniting botany and anthropology. Its principal manifestation was ethnobotany, its logical extension ethnogeography and ethnozoology.
Chapter III

GILMORE'S ETHNOBOTANY:
BOTANICAL ECOLOGY AND CULTURAL ECOLOGY
INTRODUCTION

Gilmore was basically a salvage ethnographer whose primary aim was the preservation of data which would otherwise be lost. As such his works were largely a record of information gathered in the field. Despite the non-theoretical character of his writings, his main line of research had a basis in ecological theory.

There were two specific motivations behind his undertaking of ethnobotany. The botanical knowledge possessed by the aborigine was useful in clarifying certain botanical problems. Secondly, in seeing environmental conditions as the most important factor in cultural growth, data on man's interrelation to plant life was necessary to any assessment of culture.

It will be hypothesized that both of the above rationales had their basis in ecological theory transmitted to Gilmore via botanical training. Gilmore was instructed in the ecological method of approaching botanical problems. The basic botanical problems which he hoped ethnobotany would solve were in those areas of the discipline influenced primarily by the ecological method, viz., experimental plant breeding and phytogeography. There were similar applications of data by a number of other contemporary botanists.
It is in the second rationale that Gilmore comes closest to being a cultural ecologist. The ecological premise of the interdependence of organisms within an environment seems to have imparted determinist notions regarding man. Ethnobotanical data in this regard played a primary role in assessing culture. The ethnographic survey was used by Gilmore as the means of collecting the necessary range of information by which to gauge man's relationship to flora.

ETHNOBOTANY

Ethnobotany is the study of the relationship of primitive man to his ambient floral environment.\(^1\) Within this context many aspects may be considered. Most commonly the problem is phrased in terms of how one, many, or the entire range of plants are economically utilized by a specific society. However, the area is sometimes expanded to include how the flora is conceptualized by man and how these concepts are integrated into the non-economic sphere of culture.\(^2\) Ethnobotany investigates one aspect of the natural environment as it affects culture.

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\(^1\) Schultes 1967: 33; Jones 1941b: 220.
\(^2\) Harrington 1947: 244.
For the necessary scientific accuracy ethnobotanical investigation requires the collection of three basic things in the field: the plant itself; the aboriginal name associated with the plant; and the ethnographic data regarding the uses of or the concepts about the plant. The herbarium specimen is collected for later scientific identification or for evidence corroborating the specific identification in the field. A certain linguistic ability in recording aboriginal names is perhaps more important than a botanical background.  

Ethnobotany's aim is to gain a more total picture of the culture-environment relationship than is realized in the typical monograph considering many aspects of a whole culture. This goal requires an examination of the total range of plants utilized by a culture or, in some instances, the consideration of a dominant plant and its total effects. Corn and wild rice are two examples of flora which have been used in economic analyses of culture.  

The uses of ethnobotanical information have been chiefly for anthropological ends. The interdisciplinary

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Ibid.: 245.

For example, The Omaha Tribe (Fletcher and LaFlesche 1911) identified 13 species of plants, while Uses presents data on some 60 Omaha plants.

Parker 1968; Will and Hyde; Jenks 1900.
approach required in the collection and verification of data has rendered ethnobotany, and its allied sub-disciplines, a valuable position from which to judge culture. Robert Lowie has stressed the importance of the extra-anthropological sciences in explicating the diversity of culture:

Ethnologists are not always sufficiently conscious of the assistance rendered to them by techniques and concepts extraneous to their own discipline. Yet such dependence is no cause for abasement. There are no hard and fast lines between culture and the rest of reality. For specific tasks, zoological, botanical, psychological, historical, metallurgical facts may prove more important than other phases of culture... We cannot gauge a people's utilization of their natural resources without knowing the character of the fauna, flora, and topography, i.e., without the help of natural history and geography; and so theoretical a matter as Levy-Bruhl's thesis can be settled only in the light of such ecological insight. This is the justification for the development of ethno-zoology and ethno-botany.

Within the field of anthropology not only ethnology but archaeology has profited from the application of botanical knowledge.

The latest and most refined anthropological application of ethnobotanical data has been in the area of ethnosemantics or ethnoscienc. Ethnosemantics attempts to describe the categories of a specific culture

6Lowie 1937: 254.
relative to one aspect of its environment. The goal is to deduce the cognative structure, the logical processes, implicit in this categorization. In this area the study of folk botanical taxonomies has been widely utilized. 7

The potential botanical contribution of ethnobotany should not be overlooked. Even today ethnobotany serves the function of revealing a broader range of economically-useful plants. While presently the emphasis is upon the discovery of drug plants, 8 at the beginning of this century ethnobotany was playing a role in providing experimental botanists with the crop varieties adapted to diverse climatic conditions. 9 The aborigine as horticulturalist was a plant breeder, and as a gatherer he had an intimate knowledge of the uses of many wild plants. Ethnobotany also helps the phytogeographer in determining some of the factors behind the distribution of both wild and cultivated flora.

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7 Werner and Fenton 1970: 538; Berlin et al 1968.  
8 Schultes 1967.  
9 See later section on Plains ethnobotany; Jones 1941b: 220-21.  
10 Harshberger 1906: 137; Jones 1941b: 221.
INCIPIENT ETHNOBOTANY

1895 was the year in which ethnobotany received both its name and a methodology. Botanists John William Harshberger (1869-1929) and Frederick Vernon Coville (1867-1937) were ethnobotany's respective founding fathers. Previous to 1895 ethnobotanical data had been collected in a limited and unsystematic manner. It was not until the 1870's that the uses of flora received greater attention: Stephen Powers investigated the aboriginal botany of California tribes and Edward Palmer attempted a more systematic view of plants utilized in the U. S and Mexico. However, ethnobotanical research began in earnest only in the 1890's, led by Coville and Harshberger.

Coville, who became head of the National Herbarium in 1893, achieved his greatest fame as a student of ecological plant geography. It was in this context that his interest in ethnobotany began. As a leader of the Death Valley Expedition of 1891 (investigating plant ecology) he became interested in the means of subsistence of the desert Indians. The product of his observations is presented in an article in the

11 Castetter 1944: 158.
12 Kellogg 1946: 140.
American Anthropologist. "The Panamint Indians of California" examined the uses made of various plant species.\textsuperscript{13} Coville also took the opportunity while on another botanical survey to study the plants used by the Klamath Indians of Oregon.\textsuperscript{14} But, perhaps Coville's greatest contribution to incipient ethnobotany was embodied in a pamphlet formulating the scientific methods to be employed in the field: "Directions for Collecting Specimens and Information Illustrating the Aboriginal Uses of Plants," published by the U. S. National Museum.\textsuperscript{15} In this work the procedure for the gathering of ethnobotanical data is quite completely outlined.

Harshberger, who is remembered chiefly for his phytogeographic studies, coined the word "ethnobotany" in 1895.\textsuperscript{16} He is not known to have undertaken any ethnobotanical field work. His interest in aboriginal plants took shape when he analyzed the vegetal remains from the Wetherill archaeological collection, which had been assembled for the 1893 Chicago World's Fair.

\textsuperscript{13}Coville 1892.
\textsuperscript{14}Coville 1897, 1904.
\textsuperscript{15}Coville 1895.
\textsuperscript{16}Jones 1941b: 219.
In a resulting article, "The Purposes of Ethnobotany," he noted several potential applications of ethnobotanical data.\textsuperscript{17}

Concurrent with this botanical interest in aboriginal plant utilization was the parallel concern expressed by anthropologists, most notably those associated with the Bureau of American Ethnology and the U.S. National Museum. The ethnologists the decade before and after the turn of the century (apart from the academic anthropologists) emphasized the effect of environment upon culture.\textsuperscript{18} The material culture relative to the plant environment was examined by those government workers concerned with the Southwest: W. J. McGee on "The Beginnings of Agriculture" among the Papago;\textsuperscript{19} Jesse Fewkes and Walter Hough with the Hopi and their plant utilization.\textsuperscript{20} In 1897 David P. Barrows submitted a dissertation at the University of Chicago examining Coahuilla ethnobotany.\textsuperscript{21} The cultures of the Southwest seemed to be a major focus of early ethnobotany.

\begin{footnotesize}
\begin{itemize}
  \item \textsuperscript{17}Harshberger 1896.
  \item \textsuperscript{18}Cf. Mason 1907.
  \item \textsuperscript{19}McGee 1895.
  \item \textsuperscript{20}Fewkes 1896; Hough 1897.
  \item \textsuperscript{21}Barrows 1900.
\end{itemize}
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Another pioneering study should be mentioned as being influenced by government ethnologists. At the suggestion of W. J. McGee and Otis T. Mason, Albert Earnest Jenks undertook a dissertation on *The Wild-rice Gatherers of the Upper Lakes: a Study in American Primitive Economics*. It was later published by the Bureau of American Ethnology. 22

The development of Plains ethnobotany lagged behind that undertaken in the Southwest. Prior to the ethnobotanical research of Gilmore, which began around 1907, there are two evidences of field work. In 1900 plant usage among the marginal-Plains Fox Indians was investigated by William Jones, but never published. 23 As a by-product of broader investigations, George Bird Grinnell wrote a short article on medicinal plants used by the Cheyenne. 24 It was not until after 1910 that George Will, Gilbert Wilson, and M. L. Wilson joined Gilmore in studying Plains ethnobotany.

THE OMAHA TRIBE CIRCA 1905

The Omaha can be characterized as one of the more comprehensively investigated of Plains Indian tribes.

22 Jenks 1900.
23 Smith 1928: 181-82.
24 Grinnell 1905.
Though some of the credit for this claim can go to Gilmore's studies, the most renowned investigations of the Omaha antedated Gilmore's most notably J. Owen Dorsey's *Omaha Sociology* and Alice Fletcher and Francis LaFlesche's *The Omaha Tribe*. Both of these works, published by the Bureau of American Ethnology, focused on the social organization of the tribe, bypassing any systematic picture of material culture. This deficiency was noted by Gilmore and served as a principal justification for undertaking ethnobiology.

It was in the context of already drastic culture change that Gilmore entered into field work on the Omaha reservation in 1905. As is typically the case this change was more pronounced in the realm of material culture. Ethnographer Alice Fletcher had in her own way caused great economic changes among them. Arriving on the reservation in 1861 the conditions and pleas of the Omaha stirred her humanitarian sentiments and soon she was using her powers of persuasion in Washington to gain a far-reaching bill (1862) allotting to each Omaha 80 acres of land which was "to remain

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25Dorsey 1884; Fletcher and LaFlesche 1911.  
26Appendix A.
tax-free and held in trust by the government for a period of twenty-five years after which time adult, competent Indians would be granted...control."27

The effect of this was several years of unprecedented prosperity followed by economic turmoil, as the Indians were unable to sustain their new careers in agriculture.

In time the remaining wild plants and game, as well as money, all began to be exhausted, but systematic farming on a large scale had never really been developed.28

So, though there was a resultant switch back to wild plant foods after the farming venture failed, the supply was to some extent exhausted and altered.

There was also an influx of whites upon the tribal domain resulting in further acculturation. The construction of a railroad branch line through the reservation precipitated the founding of the town of Walthill in 1906.29 In the process of rapid culture change the Omaha also lost the seeds of a number of varieties of the plants they had formerly grown and still recalled.30

The Fletcher and LaFlesche monograph was not

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27Lurie 1966: 49.
26Ibid.: 51.
29Green 1969: xii, 151.
30See later section "Ethnobotanical Field Techniques."
completed when Gilmore began his research. Yet Gilmore was surely aware of their bias for the intellectual aspect of Omaha culture. As close Gilmore associates, Francis LaFlesche, and particularly the rest of the LaFlesche family, were ideal sources for the communication of this ethnographic proclivity.

Their homes also were the headquarters for scholars of many different fields who came to study the botany, music or the ethnology of the Omaha.

The reference to Gilmore in the above statement is unmistakable.

1907 is the tentative date at which Gilmore began ethnobotanical field work. There is no indication that his research of 1905 and 1906 involved any concern for aboriginal botany. Photos dated 1907 in his M.A. thesis indicate that he investigated the incipient use of the peyote plant. The help of Wajapa, who died in August, 1907, is acknowledged in both Uses and his M. A. thesis.

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31 The publication was delayed until 1911.
32 Appendix A; Gilmore to Paine, July 20, 1905.
34 Based on his letters to Paine (1905), the Sheldon diary of 1905, and the published description of his field work of 1906 (Gilmore 1906b).
35 Gilmore ms. 1909.
36 Gilmore 1907; 1919: 46; ms. 1909: 3.
It was in the context of disintegrating tribal culture that Gilmore assumed the role of salvage ethnographer. Ethnobotanical data was recognized as both unrecorded and evanescent, and as such warranted preservation.\textsuperscript{37} But there was an additional incentive to conserve this type of data because of its potential use in solving certain botanical problems.

**BOTANICAL ECOLOGY**

The ecological method studies the relationship between organisms and their environment. In botany, ecology sees the adjustment of flora to the habitat, the habitat being the sum of all physical and biotic forces within a given region.\textsuperscript{38} In its most basic sense plant ecology is nomothetic in seeking to determine the underlying causes behind the development of plant communities.\textsuperscript{39} Ecological generalizations are based on field work which measures climatic and geologic factors in terms of the distribution of groups of associated plants.\textsuperscript{40} Out of such research

\textsuperscript{37}Appendix A; Gilmore ms. 1909: 1-2; 1919a: 53.
\textsuperscript{38}Clements 1905: 16-19.
\textsuperscript{39}Pound and Clements 1900: 13.
\textsuperscript{40}Weaver and Clements 1938: 33.
botanists derived a number of concepts significant to understanding floral demography: formation, association, invasion, succession, zonation, alternation, community, etc.\textsuperscript{41} The knowledge gained from ecolog-ical studies stimulated the growth of such areas as experimental plant breeding and conservation.\textsuperscript{42}

Ecological botany in both its theoretical and applied sense received a boost from developments at the University of Nebraska.\textsuperscript{43} Bessey played a role in the establishment of Agricultural Experiment Stations,\textsuperscript{44} designed to breed existing crop species to fit differing environmental conditions. Clements was a major contributor to the theoretical phase of ecology, ecological phytogeography, which looked at the distribution of flora in terms of the habitat-plant relationship.\textsuperscript{45} The Bessey school has even been credited with bolstering the science of conservation.\textsuperscript{46}

Part of the motivations behind Gilmore's ethno-botany lay in the solution of certain botanical

\textsuperscript{41}Clements 1905.  
\textsuperscript{42}Rodgers 19\textsuperscript{44}: 244; Sears 1958.  
\textsuperscript{43}Sears 1956.  
\textsuperscript{44}Manley 1969: 105.  
\textsuperscript{45}Whittaker 1958; Pound and Clements 1900: 14.  
\textsuperscript{46}Sears 1958.
problems of an ecological nature. What set him apart from his fellow ecologists was his technique of gathering data about flora. While the ecologist conducted field work by direct observation of plants in their surroundings, Gilmore interviewed the aborigine to gain their knowledge of flora. The information from the Indian, in turn, sometimes provided leads for the plant ecologist to follow up.

GILMORE'S EARLIEST ETHNOBOTANY

Preliminary to Uses Gilmore had two works published collating ethnobotanical data on the Omaha and Teton Dakota.

A Study in the Ethnobotany of the Omaha Indians was done as a M.A. thesis in 1909 and later published by the Nebraska State Historical Society with minor revisions. This represents Gilmore's first ethnobotanical work. Plants and their uses discussed in the text are separately listed by taxonomic families and then according to the various basic uses (food, medicine, etc.). The former list is annotated by the botanical description of each species. The

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47 Hearafter cited as Omaha Ethnobotany.
48 Gilmore ms. 1909, 1913c.
purposes of this study merit attention. He is interested in the goal of preserving and recreating the economic environment of the Omaha Indians as it was before the white man. He also suggests that this study might have practical application in recommending plants useful to the citizens of the state: those plants used by the aborigine were already adjusted to Plains climate and soil. 49

"Some Native Nebraska Plants with their Uses by the Dakota" was also published by the Nebraska State Historical Society and continued the format typified in Omaha Ethnobotany of taxonomically listing the plants considered. A brief description of aboriginal uses annotates each botanical entry in the list. This article was the result of field work undertaken on the Pine Ridge reservation in South Dakota in August, 1912. 50

USES

Gilmore's Uses of Plants by the Indians of the Missouri River Region is a comparative survey of the

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49 Gilmore ms. 1909: 1.
50 Gilmore 1913d.
plants utilized by the tribes then or formerly inhabiting eastern Nebraska.\textsuperscript{51} There was a hiatus of five years between its completion as a dissertation in botany and its publication by the Bureau of American Ethnology.\textsuperscript{52} This study was the outgrowth of research undertaken for the M.A. thesis, which limited itself to the ethnobotany of the Omaha.\textsuperscript{53} Besides the Omaha Usage considered four additional tribes: Ponca, Winnebago, Dakota, Pawnee.

The major portion of this monograph is taken up by a "Taxonomic List of Plants" (75 of 111 pages). The list is arranged by botanical relationship rather than by tribe or use. The botanical family is the unit under which individual species are listed and described. The species term in each case is followed by its common English designation and then by the aboriginal name(s) phonetically rendered and etymologically defined. Subsequent to this identification the plant's use is briefly discussed for the one or more tribes to which it applies. This format

\textsuperscript{51}Gilmore 1919a.
\textsuperscript{52}Gilmore ms. 1914: "On the Uses of Plants by the Indians of the Nebraska Region," the title of this dissertation, consisted of two parts: "I. A Study in Economic Botany; II. On the Ethnogeography of the Nebraska Region." This second section was deleted when it was published.
\textsuperscript{53}Gilmore ms. 1909.
results in a concise compendium illustrating the variety of plants employed by the indigenous peoples inhabiting the region west of the Missouri River. The taxonomic list is both introduced and concluded with Gilmore's theoretical percepts regarding the subject at hand. A "Glossary of Plant Names" at the end of this monograph facilitates the use of the taxonomic list by providing a cross-listing of terms: scientific with common and aboriginal terms, common with scientific name, and each tribal designation with the scientific term.

USES AS A BOTANICAL DOCUMENT

Uses shows the signs of being the offspring of botanical requirements. The basic data are organized under botanical categories, unlike most contemporary studies. This taxonomic arrangement cross-cuts and does not group the various broad uses of plants; there is no efficacious manner of distinguishing which plants were used for food or which were used for medicinal purposes, for instance. As many as five tribal groups may likewise be subsumed under each individual plant considered. The concepts illustrated in Uses are further indication of its basic
debt to botanical instruction. The theoretical portion of this monograph, introducing and concluding the "taxonomic list," is an exposition of botanical concepts at the base of Gilmore's ethno-botany: ecology, phytogeography, experimental botany.

The section in Uses on the "Influence of Human Population on Flora" expresses the concerns of a plant ecologist and phytogeographer.

The plant ecologist should be interested in the influence of primitive man on his plant environment. Phytogeography...is concerned not only with the distribution of wild plants, but also with the laws governing the distribution of cultivated plants.

Gilmore here directed his attention toward the results of the introduction of new plant species by man in the Nebraska region. He lists not only a number of cultivated species deliberately introduced to the Plains in pre-Columbian times but also new types of non-cultivated flora accidently or purposely transported from other regions. The floral environment was modified by man in other ways. While

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56 Jones 1941a: 220.  
57 Harshberger 1906: 137.  
European culture changed the grasslands and woodlands floral balance by the plow, the Indian retarded the advance of the forest line by means of fire. He believed the latter tool probably altered the phytogeography of eastern Nebraska.59

In expressing the desirability of discovering improved varieties of agricultural plants and wild species favorable for domestication Gilmore voiced the goals of experimental botany. Reinforcing the necessity for finding such plants was his view of the white man's ecological maladjustment to the Plains environment. While the aboriginal culture pattern was an expression of the physical environment, the subsequent European culture disregarded the opportunities afforded by its new milieu. European-based culture in the Plains was in essence an artificial construct based on habits transported from another environment. North America was being made over by its interlopers into a carbon copy approximating conditions on a different continent. There was no effort to gain rapport with the new conditions.60

In another study Gilmore explained that the European culture, by means of its superior transportation and

59Ibid.: 61.
60Ibid.: 53-54.
communication facilities, equalized environmental dependence "throughout all North America." 61 Man was no longer dependent on local resources; it was easier for the contemporary Nebraska citizen to transport material culture items in from other regions than it was to change his habits.

The problem was that more profitable use could be made of the resources of the Plains region. Some crop plants introduced from the Old World were indeed beneficial in this new environment; however, the commonweal could be greatly improved by augmenting these plants with those already adapted to the Plains climatic and soil conditions. More economically effective use of the land could be made by closely patterning consumptive habits in line with indigenous flora. The value of many of the local plants remained hidden from the non-Indian culture because of lack of communication with the aborigine. 62

GILMORE AS ECOLOGICAL BOTANIST

Gilmore's training in the ecological method is best illustrated in a strictly botanical study.

61Gilmore 1913a: 317.
62Gilmore 1919a: 53-54.
While on his way to the Pine Ridge reservation in August, 1912 he made a botanical observation which he later reported to Charles Bessey. At Bessey's request he wrote up this insight in a two page manuscript dated October 10, 1912: "Observations on the Return of Native Flora on an Abandoned Tree Plantation on the High Plains of Nebraska." Bessey soon published this paper verbatim in his column in *Science*, giving full credit to Gilmore. Gilmore's insight reflects the interrelatedness of ecology and phytogeography. He listed 25 plant species which repossessed a tract of land in which man had intervened and then abandoned. The trees which were planted by man were losing out to the species characteristic of the phytogeographic region. This was a recognition of the ecological process: adjustment of plants to their habitat. Or, in this case, readjustment. The dominant flora of a region (the phytogeography) was the manifestation of the ecological process.

Gilmore appears to have been less concerned with the phytogeographic aspects of cultivated plants than he was with man's effect upon the natural distribu-

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63 Gilmore ms. 2.  
64 Bessey 1912.
tion of flora. Cultivated plants in the Plains were "exotics," introduced from another, tropical, environment. His discussion in *Uses* of the human agency in the migration of wild plants is more extensive and significant than his ideas presented on the means of distribution of cultivated plants. 65

He expanded this brief resume in two later papers: "Dispersal by Indians a Factor in the Extension of Discontinuous Distribution of Certain Species of Native Plants" and "Plant Vagrants in America." 66

The latter essay discusses the wild species of Old World flora introduced into North America by Europeans.

There are several instances in which Gilmore appears as an experimental botanist. In each case the Indian or Indian plants figure in as a factor.

Both Gilmore's and Bessey's interest in applied botany is strongly indicated in a letter from Gilmore to Paine, dated December 8, 1913. In this communication from the field in Oklahoma Gilmore indicates that he had promoted the domestication of previously wild plants by various tribes and that Bessey was keenly interested in this goal.

65 As indicated in the introduction, pp. 58-61.
66 Gilmore 1931, 1932b.
A most interesting point, in the communication from that young Shawnee 67 is that he is making a beginning of domestication of a wild plant which his people found useful. So this adds the Shawnee to the list of tribes among which I have this year discovered attempts making toward the domestication and cultivation of a plant or plants, found useful by them in the wild and heretofore uncultivated. I have advocated the cultivation and improvement of some wild plants whose use in the wild by the Indians suggests their possible usefulness to us under cultivation. But the Indians "beat us to it" since they have been allotted land in severalty and so have permanent abiding places. This is a point to the credit of the Indians for perspicacity. Dr. Bessey will be especially interested in this list. I have this year discovered individuals of the following tribes making a start at the cultivation of some plants known for their use to them in the wild but heretofore never planted by man: Omaha, Ponkas, Ogalalas, Pawnee, Wichitas, and now the Shawnees. No doubt investigation would discover other tribes also to add to this list.

One further indication of Bessey's contemporary interest in the domestication of wild plants is evinced in the title of an address given in January, 1912 at the University of Nebraska: "Wild Fruits which ought to be Cultivated." 68

Acclimatization of corn to Nebraska was a problem that received Gilmore's scrutiny. The semi-arid regions of the state needed a type of maize adapted

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67Gilmore met this Shawnee Indian at the Kansas City Land Show in Feb., 1912 (Gilmore to Paine, Dec. 8, 1913).
68Daily Nebraskan, Jan. 16, 1912.
to its deficient conditions. The request of a Nebraska farmer brought the recommendation by Gilmore to use the drought-resistant aboriginal varieties fitted to the environment of the Southwest. The U. S. Bureau of Plant Industry was helpful in providing Gilmore with this information on suitable Indian varieties. In the manuscript "Maize," Gilmore stated that by his own experiments he believed the Indian varieties of corn possessed qualities superior to those types commercially grown. The excellence of aboriginal varieties had yet to be made known to the white man.

The improved economic utilization of the state's plant resources was the subject of another manuscript: "Wild Rice: a most Excellent Native Grain." Though no domestication was implied, it was advocated that this overlooked plant resource could be profitably harvested. The wild rice crop of the Sand Hills was going untouched despite the exploitation of similar yields in Minnesota and Wisconsin. The

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69 Gilmore to Hopka, Feb. 16, 1914.
70 Gilmore to Collins, Feb. 24, 1914; G. N. Collins was carrying on experiments with various Southwestern maize varieties at this time (Collins 1914).
Nebraska crop was ignored because no Indians were present in the area to teach the white man how to harvest the plant, or to maintain an industry themselves. Nebraska could meet the demand for wild rice from within its own boundaries, instead of importing it from other states.

Further evidence of Gilmore's interest in the use of wild plants is indicated by his experimental growing of the sand cherry shrub. This bush, native to western Nebraska, whose product was used by the Indian, was found useful for decorative planting in parks and gardens. By his own transplanting he proved this plant adjustable to the soils of Lincoln.71

As a result of his ethnobotanical studies Gilmore found several wild plants he believed worth cultivating. These plants included the Plains turnip or tipsin, the buffalo-berry, the sand cherry, the Nelumbe water lily, and the ground bean. He was especially enthusiastic about the possibilities of the latter plant.72

71 Gilmore 1913b.
72 Sheldon 1919, 1923.
CONTEMPORARY PLAINS ETHNOBOTANY

Paralleling Gilmore's interest, experimental botany was a major stimulus behind contemporary Plains ethnobotany. The plant breeders searching for viable types of maize for the northern Plains turned to investigating the native varieties for possible leads.

In *Corn Among the Indians of the Upper Missouri*, Will and Hyde credit Gilmore with the discovery of numerous maize varieties among the Omaha, Ponca, Pawnee, and Winnebago. In *Uses* Gilmore's most apparent failure is in the delineation and discussion of the numerous maize varieties which he discovered. If one is after a total picture of the interaction of flora and Missouri River Indian culture, this lack of concern with maize is hard to rationalize. Gilmore also collected specimens of other crop plants.

In the introduction to their book Will and Hyde sketch the trials and errors of growing maize in the dry Dakotas. Most early settlers to this region attempted to emulate the farming success "back east" by using the same crop varieties. The native types

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74 More space, for example, is devoted to the discussion of the pasque flower than to *Zea mays*.
75 Will and Hyde 1917: 19-33.
of corn were assumed to be of little value. Though some recognition was gradually accorded indigenous varieties, the breeding of improved types remained at a standstill. Interest in discovering all of the pure varieties of native maize was revived after 1910 as a means of finding the kinds of corn which would produce adequate yields. Will and Hyde's book was inspired by experimental plant breeding. Its distinct contribution was lodged in a list of maize varieties. This list was based on experiments conducted and seed collected by its two authors, Gilmore, M. L. Wilson, Gilbert Wilson, and others. 76

George Francis Will (1884-1955) had a background in experimental botany which was perhaps even more substantial than that of Gilmore. Trained in botany and anthropology at Harvard University, he inherited additional incentive in plant breeding from his father's pioneering investigations. 77 Oscar H. Will, owner of the first seed business in North Dakota, was an early discoverer of the value of native varieties in selecting and breeding many plants for this region. 78 G. Will, after graduation from college

76 Ibid.: 15-18.
77 Wedel 1956: 74.
78 Will and Hyde 1917: 7.
in 1906, went into business with his father. The plant breeding was continued. According to Fenton, Arthur C. Parker's 1910 monograph on Iroquois maize "influenced the direction of their experiments with drought-resistant corn." George Will, like Gilmore, possessed the credentials of an anthropologist, with the emphasis on ethnobotanical research.

The original work of the Wills' was acclaimed by agronomists Alfred Atkinson and M. L. Wilson of the Montana Agricultural Experiment Station. Atkinson and Wilson collated data and seed from Will, Gilbert Wilson, and Gilmore. The results of their experiments, the monograph Corn in Montana (1915), was the earliest statement of its kind outlining the value of maize indigenous to the Plains.

Experimental botany also entered into the ethnobotany of Gilbert Livingston Wilson (1868-1930). Though the basic objective, that of presenting the subject of native horticulture as one participant herself sees it, was far removed from any botanical

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79Wedel 1956: 74.
80Fenton 1968: 30.
82Ibid.: 7-8; G. Wilson 1917: 4; Gilmore to M. L. Wilson, May 4, 1914.
83Will and Hyde 1917: 31.
84Wilson 1917: 3.
goals, Wilson's research ultimately contributed to the aim of providing additional acclimatized maize varieties for the northern Plains. Wilson's field work (1912-15) achieved financial support from two botanical sources who were seeking drought-resistant maize: A. F. Woods, Dean of the College of Agriculture, University of Minnesota; and M. L. Wilson.85 This support evidently paid off, for according to Jenks,

the study has unexpectedly revealed certain varieties of maize of apparently great value to agriculture in the semi-arid areas west of Minnesota...86

Rev. Wilson became a graduate student in 1910 after years of field work among the Hidatsa.87 **Agriculture of the Hidatsa Indians: an Indian Interpretation** was done as a dissertation at the University of Minnesota. Wilson's choice of a thesis topic was suggested by his advisor A. E. Jenks, whose own dissertation dealt with the Indian's utilization of wild rice.88

The collection of seed for experimental purposes was one of the principal aims of early Plains ethno-

85Ibid.: 3-4.
86Jenks 1917: iii.
87Wilson 1917: 2.
88Ibid.; Jenks 1900.
botany. Cooperation between botanists and anthropologists involved the exchange of different types of aboriginal seed. Gilmore supplied specimens to Will, Hyde, and M. L. Wilson. 89

BIOECOLOGICAL DETERMINISM

Juxtaposed to the strictly botanical rationales behind Gilmore's ethnobotany was an even more important premise: that to properly appraise culture one had to have an intimate knowledge of the physical conditions precedent to its development. This idea has its basis in deterministic theory which was apparently a by-product of ecological principles.

Ecology is a flexible scientific methodology which can be applied to various problems within both the natural and social sciences. The premise behind ecological analysis is that organisms are interrelated to each other and to the physical environment. Primitive man, being largely dependent on the resources of a circumscribed area, was also subject to ecological speculation. 90

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89 Will and Hyde 1917: 15, 17; Gilmore to Hyde, Nov. 10, 1913; Gilmore to M. L. Wilson, May 4, 1914. 90 Cf. Gilmore 1913a.
One of the by-products of ecological investigation was deterministic theory. Clements, in his textbook on ecology, saw vegetation as ultimately dependent on climate and physiography. Fauna, in turn, was only somewhat less conditioned by the floral distribution. Clements even viewed man in deterministic terms, sociology being the ecology of a particular species of animal.

...vegetation is coming more and more to be regarded as a fundamental factor in zoogeography and in sociology. Furthermore, with respect to the latter, it will be pointed out below that the principles of association which have been determined for plants, viz., invasion, succession, zonation, and alternation apply with almost equal force to man.

The above bioecological determinism was extended by Gilmore to include culture. The determinist model is apparent in Uses:

The dominant character of the vegetation of a region is always an important factor in shaping the culture of that region, not only directly by the raw materials which it supplies or withholds, but indirectly also through the floral influence on the fauna.

To Gilmore not merely the material culture but "the intellectual culture is a reflection and a result of

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91Clements 1905.
92Ibid.: 16.
93Ibid.: 11.
94Gilmore 1919a: 56.
the material and physical conditions." Consequently, culture can only be interpreted "in the light of knowledge of the physical environments..." The relationship of bioecological determinism to ethnobotany is more apparent when one considers the fact that Gilmore extended his investigations to ethno-geography and ethnozoology.

Gilmore was perhaps influenced by another botanist's correlation between culture and vegetation. Cited in Uses, J. W. Harshberger's paper "Phytogeographic Influences in the Arts and Industries of American Aborigines" expresses a phytogeographer's view of the effect of broad-scale plant regions on culture. In delimiting the various phytogeographic regions of North America he found a correlation with the distribution of aboriginal culture types. Harshberger seems to be independently developing the idea of the culture area.

MAN AS AN AGENT OF ECOLOGICAL CHANGE

There is another means by which bioecology intergrades with cultural ecology. Gilmore's concern with

95See Appendix A.
96Gilmore 1919a: 45.
97Ibid.: 54; Harshberger 1906.
man's modification of the floral environment is simultaneously a botanical and a cultural ecological problem.

Omer Stewart has asserted that primitive man's effect in altering the ecological balance should be considered a cultural ecological problem, though it has been almost totally ignored by anthropologists. Stewart claims that the aborigine had more than a minor influence on environment. He bases this contention on evidence of man's extensive use of fire. Gilmore recognized fire's importance and considered the additional factor of the human transportation of plant species into the Missouri River region from other areas.

The recognition that the aborigine was an agent of environmental change could have served to reinforce the Indian's place in any ecological scheme. If ecology is going to be viewed in its true, reciprocal sense, it must consider both sides of a relationship: man affects and is affected by the environment. Moreover, any significant alteration of nature ultimately results in a cultural readjustment to the new conditions.

98Stewart 1954.
NON-MATERIAL CULTURE AND ETHNOBOTANY

Linguist J. P. Harrington was responsible for the truly anthropological definition of ethnobotany. Ethnobotany of the Tewa Indians broadened the scope of the subdiscipline to where it was concerned with aboriginal systems of classification. One idea behind this study was to see how the Tewa linguistically structured one aspect of their environment. Before presenting the list of specific plants utilized Harrington arranged a series of Tewa conceptual categories applicable to flora in general (e.g., plant parts, growth of plants, color of plants). This work, because of the type of data considered and the manner in which it is organized, deserves to be regarded as a forerunner of present-day ethnosemantics.

Uses does not manifest this sophisticated concern for aboriginal taxonomy. The etymological rendering of each native term does indicate an incipient effort in Harrington's direction, however. So does Gilmore's contention that the Indian realized a faint sense of botanical relationship in their terminology. The interrelation of the mental life of primitive man to the floral environment was stressed by Gilmore but

100 Schultes 1967: 33.
101 Robbins et al 1916.
not summarized, verified, or arranged in taxonomic terms.

Gilmore used metaphorical terms in contending that Indian non-material culture is partially a reflection of the floral environment. In *Uses* the Dakota poems "Tradescantia" and "The Song of the Wild Rose" are employed in reference to two plants.¹⁰³ This means of expressing man's relationship to flora was actually more indicative of his post-Nebraska career.¹⁰⁴ *Prairie Smoke*,¹⁰⁵ his popular collection of folklore, epitomizes this approach. Some of Gilmore's studies of Indian ceremonial life can also be subsumed under the ethnobotanical category. A good example of this is provided by his study of the Omaha peyote cult.

Gilmore's research into the Omaha Indian peyote cult was interrelated to his ethnobotanical studies. Peyote was introduced to the Omaha tribe in the winter of 1906-07. The resultant "Omaha Mescal Society" quickly began supplanting both Christianity and native beliefs. Beginning in 1907 Gilmore became the only ethnographer to describe the Omaha Indian peyote cult.¹⁰⁶ His main contribution was a short descriptive paper published by the Nebraska

¹⁰³Ibid.: 70, 85-86.
¹⁰⁴See Appendix B.
¹⁰⁵Gilmore 1921b, 1922, 1929.
¹⁰⁶LaBarre 1938.
State Historical Society.107 Herein he sketched the origin of the cult and described its ceremony, which centered around the powers of the hallucinogenic peyote plant. Being based on a plant this new religion warranted mention in both *Uses* and *Omaha Ethnobotany*.108 The effect of the peyote plant upon Omaha religious beliefs may have served as a basis for Gilmore's later contention that plant life was an important factor in shaping ideological culture.

ETHNOBOTANICAL FIELD TECHNIQUES

The implicit aim of *Uses* is to present a systematic and complete picture of the Missouri River Indian's use of their floral environment. To this end Gilmore spent about seven seasons in the field. From all indications he was a consummate field worker, using the techniques of interview with much apparent success.

In *Uses* Gilmore outlines the basic method of gathering data:

The information was obtained by bringing actual specimens of each plant to the observation and identification of many informants, and the names, uses, and preparation in each case were noted on the spot at the dictation of the informant.109

Gilmore also emphasized the fact that he attempted to

107 Gilmore 1919b.
109 Gilmore 1919a: 45.
corroborate information by interviewing more than one informant. Correspondence was a supplementary means to gain, clarify, or verify data. By correspondence and in the field Gilmore obtained the active cooperation of such minor ethnographers as James R. Walker, James R. Murie, and Francis LaFlesche. In the off-season Walker, a physician at Pine Ridge, was persuaded to gather ethnobotanical specimens from the Indians for later identification. One of the LaFlesche sisters was asked to collect information on food preparation.

Gilmore possessed a high degree of ethnographic rapport. His ability to communicate was probably enhanced by his feeling of empathy for the Indian's sorry plight. By his own analysis when interviewing he attempted to operate on the aborigine's own level, free of ethnocentrism:

I find myself able to disarm their suspicion and overcome their reticence and enter into conversation with them on things they never discuss with a white man. Not encountering

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110 Ibid.
111 Gilmore to Murie, April 19, 1913; Gilmore to LaFlesche, April 25, 1913.
112 Gilmore to Walker, April 28, 1913.
113 Gilmore to Diddock, Feb. 19, 1914.
any supercilious curiosity in my attitude in conversation, and being induced by the knowledge of Indian matters they find me already possessed of, they come almost unconsciously to talk of other things with me as with another Indian, thus adding to my information. I make it a painless process for them, which is the only practicable process of extraction of information from them, for Indians are very sensitive.  

A specific technique used by Gilmore to gain rapport with and information or specimens from the Indian was based on a weakness they possessed for their old time plants. In the process of acculturation some tribes had lost the seed of a number of valued crop plants. Gilmore obtained similar seed from other tribes and passed it on to those tribes in need. For instance, the tobacco seed he obtained from the Hidatsa in 1908 (by mail) was supplied to the Omaha who had lost this desired plant.  

The Pawnee were particularly lacking in Nebraska plants since their removal to Oklahoma. Gilmore as a field worker drew on this weakness:

I have a good avenue of approach in the fact that there are so many plants in Nebraska, known and prized by the Pawnee, which they are unable to get down here, and so in exchange for them they are willing to give one information.  

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115 Gilmore to Paine, Nov. 28, 1913.
116 Gilmore 1913c: 330-31; Gilmore to Furnus, April 13, 1913.
117 Gilmore to Paine, Nov. 29, 1913.
GILMORE AND THE BUREAU OF AMERICAN ETHNOLOGY

Some publications of the Bureau of American Ethnology were the result of research undertaken for other institutions. Contributions of monographs by non-staff members provided a continuing source of material for both the Bulletins and the Annual Reports. \(^{116}\) Gilmore's *Uses* fell into this category. *Uses* was one of several ethnobotanical studies that the Bureau began publishing in 1900. Previous to Gilmore's there had been three monographs issued on the uses of plants. \(^{119}\)

Gilmore's ethnobotanical research came to the attention of the Bureau via his M.A. thesis. *Omaha Ethnobotany* was submitted to James Kooney in January, 1911 as a basis for assessing Gilmore's qualifications for the job of curator of the Nebraska State Historical Society. Before it was returned in March it also received ethno-botonist F. V. Coville's endorsement. \(^{120}\) In November, 1911 Gilmore sent the manuscript to Alice C. Fletcher and to F. W. Hodge, the head of the Bureau, presumably for the purpose of offering it for

\(^{116}\) Judd 1967: 37.  
\(^{119}\) Jenks 1900; Stevenson 1915; Robbins et al 1916.  
\(^{120}\) See Chapt. 2.
publication. Though evidently *Omaha Ethnobotany* was not accepted for publication, they did plan to publish his slated dissertation:

> I am very sorry that the publication of the Fletcher monograph seems to ban the way for Mr. Gilmore's *Ethnobotany* at present, as I consider his work very valuable. I hope he may go forward with it and await patiently the opportunity.

Though *Uses* was accepted for publication in 1915, it was not published until 1919. The bottleneck that Mooney was referring to was the 27th Annual Report, Fletcher and LaFlesche's *The Omaha Tribe*.

Gilmore attempted to become a more integral part of the Bureau program. There is evidence of two requests by Gilmore asking for Bureau support for projected research. The manuscript "A Proposition to Make a Survey of the Plant Lore and Geographic Lore of the Indian Tribes of Nebraska" was apparently submitted seeking their financial aid in undertaking further ethnobiological research.

> It is suggested that the Bureau give recognition to the work already done and financially promote the furtherance of the same...

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121 Gilmore to Fletcher, Nov. 24, 1911; Hodge to Fletcher, Nov. 29, 1911.
122 Mooney to Paine, Sept. 15, 1913.
124 Fletcher and LaFlesche 1911.
125 Reprinted herein as Appendix A.
126 See Appendix A
The idea of seeking Bureau assistance was suggested to Gilmore by Dr. Susan LaFlesche Picotte (1865-1915), half-sister of Francis LaFlesche. Considering the dearth of research funds provided by the Nebraska State Historical Society during Gilmore's first two years, a tentative date of 1912 for this proposal would be a logical guess. There is no proof, however, that this proposition reached the Bureau.

The second proposition has greater substantiation. Following Francis LaFlesche's presence in Lincoln to address the Annual Meeting of the Historical Society, Gilmore wrote Mooney proposing a cooperative effort with LaFlesche on the latter's studies of the Osage in Oklahoma:

Mr. Gilmore writes to Mr. Mooney proposing to undertake a study of the ethno-botany and ethnozoology of the Osage Indians while Mr. LaFlesche's studies are in progress among them, and presumably under the Bureau's auspices. Mr. Mooney informs me that Dr. F. V. Coville speaks very favorably of his botanical training, and of course in a work of this kind a broad botanical knowledge is essential. I imagine, however, that to be thoroughly scientific ethnobotanical research requires a more or less intimate knowledge of linguistics in order that the proper forms and the meaning of the Indian names can be recorded. It seems to me that we have here

127 Ibid.
128 Jan. 8-10, 1912 (N.S.H.S. 1917: 280).
a good chance to study the Osage ethno­biology if Mr. Gilmore and Mr. LaFlesche can cooperate, and provided, of course, the necessary physical means can be found. Will you kindly confer with Mr. LaFlesche on the subject and let me have your frank opinion on the matter? A great deal of attention is now being given to ethnobotany and ethnozoology, as you know, especially from the work of Harrington, Henderson, and Robbins, and it seems to me that the Osage might be treated in the same way.129

It is a pity that nothing came of this proposal. It was years later (1925) that Gilmore, while with the Museum of the American Indian, undertook a study of Osage ethnobotany.130

CONCLUSION

From its inception ethnobotany was the domain of both botanists and anthropologists. Ethnobotany, unlike either ethnozoology or ethnogeography, was directly related to bioecology. Some botanists found ethnobotany useful in providing leads helpful in solving particular bioecological problems. Phyto­geography and experimental plant breeding were aided by data and specimens derived from the aborigine. The context of Coville's pioneering studies indicates the closeness of the botanical and ethnobotanical

129Hodge to Fletcher, Feb. 29, 1912.
130Indian Notes 1925: 289.
survey methods.

Gilmore's ethnobotany was motivated by a combination of botanical and anthropological goals. Evidence seems to indicate that the botanical objectives behind his initial ethnobotany were more highly developed than anthropological ends. What is termed "cultural ecology" came somewhat later in his Nebraska tenure and developed out of his training as a botanist.

What is the connection between bioecology and cultural ecology? The case under study illustrates what linked both types of ecology. As a part of ecological training Gilmore inherited a determinism particular to biology but easily applicable to primitive man. The conception of culture qua environment ultimately represented a major premise justifying ethnobotanical field work.

His later ethnogeography and ethnozoology are understandable only in terms of this determinist model since neither technique demonstrated any applicability to geologic or zoological problems.
Chapter IV

GILMORE'S ETHNOGEOGRAPHY AND ETHNOZOOLOGY:
AN EXTENSION OF ETHNOBOTANY
INTRODUCTION

The term "cultural ecology" becomes an even more appropriate designation for Gilmore's research as it branched out to include ethnogeography and ethnozoology. Both of the above techniques had no notable application to geological or biological problems.

Ethnogeography and ethnozoology represent logical extensions of cultural ecological interests developed while pursuing ethnobotany. In this extension Gilmore was following the logic implicit in ecology: there are more than one set of causal factors within an environment. The same ecologically-based determinism apparent in Uses came to justify the gathering of data on the Indian's relationship to the other two components of the environment. However, ethnogeographic data differed in a number of respects from that characteristic of ethnobotany and ethnozoology.

So far "ethnogeography" has served as a convenient designation for the study of the utilization of the inorganic environment. However, only a part of Gilmore's ethnogeography dealt with the use of mineral resources. In considering aboriginal sites and associated geographic customs relative to environmental con-
ditions, he looked at a broader context than that characterizing ethnobotany and ethnozoology.

ETHNOGEOGRAPHY

In terms of Gilmore's research, ethnogeography will be broadly defined as the investigation of the aboriginal occupation of the landscape as a place of habitation and exploitation. It is an interrelated study of 1) the Indian's knowledge of his environment ("geographic lore" in Gilmore's terms), chiefly as it is manifested in the named geographic locus, but also including data on subsistence and land tenure customs, etc.; and 2) "the geographic conditions and controls" behind the aboriginal utilization of the environment. This involved more than a study of primitive man's interdependence with the inorganic environment, for native sites, geographic customs, etc. also had a reference point in botanical and/or zoological conditions. There are two subcategories of ethnogeography deserving separate consideration: ethnogeology, which examines the native use of mineral resources; and aboriginal toponymy, the collation of place names.

1Gilmore 1915: 179; Appendix A.
Tewa ethnogeography offers both similarities and differences to that conducted by Gilmore. Harrington's *Ethnogeography of the Tewa Indians*, though primarily a rendering of toponyms and geographic terms, placed each site named in topographic context. He also devoted a separate chapter to ethnogeology. A companion study by Henderson and Robbins presented a battery of general physiographic and climatic facts on the Rio Grande region intended for later correlation with archaeological and ethnographic data. Absent from Harrington's ethnogeography were the generalities on the environment-site relationship exhibited by Gilmore's works.

Gilmore's ethnogeography operated on a more generic level of abstraction than ethnobotany and ethnozoology. By considering general environmental factors relative to culture, his ethnogeography begins to resemble the speculation typical of early 20th century geography.

General theorizing on the means by which environment influences man dates to ancient times. But it was Frederick Ratzel's late 19th century anthropogeography which had a particular impact on the disci-

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2 Harrington 1916.
3 Ibid.: 579-84.
4 Hewett et al 1913.
pline of geography. After the turn of the century Ellen Semple's and Ellsworth Huntington's environmentalism vied with Vidal de la Blache's possibilism, both viewpoints claiming inspiration from Ratzel.5 In the United States the leading geographers through the first quarter of this century were environmentalists.6

GILMORE AS ETHNOGEOGRAPHER

During his tenure at the Nebraska State Historical Society, Gilmore's ethnogeographic research was approximately equal to that accomplished in ethnobotany. Gilmore did not commence the study of aboriginal geography before coming to the Historical Society.7 Starting in the summer of 1911 such field work was undertaken among the Omaha,8 continuing in August and September, 1912 among the Pine Ridge Dakota and the Omaha,9 and in 1913 among the Omaha and the Pawnee in Oklahoma.10 In 1914 Gilmore persuaded two Pawnee Indians from Oklahoma to come to Nebraska to visit

8RSO-NSHS 1911: 366.
9RSO-NSHS 1912: 111.
10RSO-NSHS 1913: 149.
and identify aboriginal sites. Using a borrowed auto Gilmore accompanied Chief White Eagle and an interpreter in revisiting much of the former Pawnee territory in the Loup and Platte valleys, locating a number of village sites, agricultural fields, and scenes of notable historic events.  

The above research was manifested in a significant (unpublished) portion of Gilmore's dissertation, three articles, and at least three lectures. He lectured on aboriginal geography before the Nebraska Academy of Sciences in 1912, the Mississippi Valley Historical Association in 1913, and the American Association of Geographers in 1914. Gilmore's expertise was broad enough to enable him to teach a course entitled "Indian Geography and Industry" for the Department of Geography at the University of Nebraska in 1915. As the leading expert on Nebraska Indian toponymy he served as the major source on aboriginal nomenclature for both Fitzpatrick's and

12Gilmore ms. 1914: 116-96.
13Gilmore 1913a, 1915, 1919c.
14Nebraska Ethnological Society mss. collection; Proceedings, Mississippi Valley Historical Association 1913: 23; Barrows, ed. 1915.
15Bulletin of the University of Nebraska 1915: 127.
Link's compendia of Nebraska place names. Gilmore was also able to use his ethnogeographic knowledge in testifying on behalf of the Omaha tribe in a Federal land claims case in 1912. His testimony attempted to verify the boundaries which the Omaha had claimed.

Gilmore's basic ethnogeographic method was to collect data about the named, geographic locus. The focus was upon village sites, significant topographic features, places of economic exploitation, tribal boundaries. He later constructed a number of maps locating various native sites.

GILMORE'S ETHNOGEOGRAPHY

Like ethnobotany, the aim of Gilmore's ethnogeography was to provide data necessary for the proper assessment of culture. The connection between this goal and bioecological determinism was made clear:

To attempt a study of the human culture and forms of government of any given region without first knowing the topography, meteorology and other general features of the physical conditions of the region

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16Fitzpatrick 1925: 3; Link 1933: 11, 118; cf. Link collection.
17Gilmore 1928; Gilmore to Keefe, Oct. 8, 1912.
would be altogether futile. The physical conditions of a region determine the flora and fauna and these in turn determine the nature of human activities and the kind and degree of culture.  

This model implies that the inorganic environment was basically an indirect influence on culture, though Gilmore's research noted some direct physical determinants.

Surveying the Indian's geographic knowledge entailed the location of a range of native sites. The village was the locus around which other sites, mainly places of exploitation, were situated. As such, villages were the product of botanical, zoological, and inorganic factors:

The Pawnee, Omaha, Oto, and Iowa lived in permanent villages of which the major controls determining their location were wood, unfailing water, and sufficient ground suitable for tillage...Then the abundance of game and wild fruits and other vegetal products had their place as contributory factors...  

Teton Dakota settlements were largely the product of zoological controls. Some other examples of environmental influences: routes of travel were largely determined by stream courses; the earth lodge was archi-

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20Gilmore ms. 1914: 119.  
21Gilmore 1913a: 323.  
22Gilmore ms. 3.
tecturally a response to climatic conditions.\textsuperscript{23}

Gilmore believed that the Plains environment was responsible for the convergent cultural development exhibited by the tribes which migrated in from widely-differing regions. He considered a culture's governmental and religious institutions to be "directly responsive to the physical environment of the region in which they reside..."\textsuperscript{24}

The physical environment also had its effect on ideological culture. Two Gilmore manuscripts demonstrate the conviction that certain physiographic features made a distinct impression on the Indian mind. "The Legend of Pahuk" was a myth interrelated to a geographic locus which was venerated by the Pawnee tribe. This legend was collected by Gilmore in 1914 in the context of locating Pahuk and other sites with Chief White Eagle. Gilmore's paper on the "University of Nebraska Campus Boulder" illustrated the fact that an impressive geological feature became a landmark for the traditional rivalry between the Omaha and Ponca shamans.

How does ethnogeographic data differ from that of ethnobotany? As manifested in \textit{Uses}, ethnobotany was

\textsuperscript{23}Ibid.; Gilmore ms. 1914: 137.
\textsuperscript{24}Ibid.: 195.
concerned with the utilization of a range of plant species, focusing on the resulting material culture items. Ethnogeography largely bypassed material culture, considering more general aspects of the culture-environment relationship. The environment-site correlation generalized about the landscape's effect on human distribution and development. It is this kind of data which has cross-cultural significance. Gilmore himself illustrates the type of cross-cultural comparison which can be made by looking at the general environment as it effected aboriginal settlement.25

Contemporary geography speculated on the culture-environment relationship in a manner similar to Gilmore's ethnogeography. Not considering environment's effect on man's physiology, Gilmore adhered to three of four classes of Ratzel-Semple determinants: psychological, relative abundance of natural resources determining economic and social development; environment's influence on man's movements and distribution.26 Like Semple,27 Gilmore largely bypassed material culture and focused on such cultural manifestations as settlement, tribal boundaries, migration, land tenure.

26Dickinson and Howarth 1933: 197.  
27Semple 1911.
ETNOCHELOGY

One often overlooked aspect of ethnogeography can be termed "ethnogeology." Ethnogeology investigates the aboriginal uses of mineral resources. In contrast to the other areas of ethnogeography, its data is most comparable to that of ethnobotany and ethnozoology.

Gilmore devoted only a brief section of his dissertation to ethnogeology. His later career reveals merely one article on the aboriginal uses of earth products. Harrington has a more impressive list of minerals used by the Tewa. It appears that data on the aboriginal employment of minerals was relatively sparse, particularly in the Plains region.

ABORIGINAL TOponomy

The compellation of place names was probably the most productive component of Gilmore's ethnogeography. His dissertation, for example, collated 22 pages of Omaha, Pawnee, and Teton Dakota geographic terms. Despite their collection in an ethnobiological con-

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28Gilmore ms. 1914: 141-46.
29Gilmore 1925.
30Harrington 1916: 579-84.
31Gilmore ms. 1914: 150-72.
text, aboriginal toponyms generally functioned outside of a cultural ecological frame of reference.

Gilmore justified the study of place names in a historical and ideological framework. Geographic names as records of the past might indicate a certain historical event, yield a myth, or be descriptive of some physical or biotic feature. Indigenous toponyms might also function as replacements for the many deficient English terms. Gilmore characterized the English language place names in Nebraska as impoverished; the terminology was often inappropriate, ludicrous, or trite. The substitution of certain appropriate or euphonious native terms (or their English equivalents) would add a distinctive element to a locality. Gilmore succeeded in having the State Department of Geography change the name of a waterfall in northeastern Nebraska to its Omaha language designation.

One manifestation of this stress on geographic terminology was an emphasis on linguistic accuracy. The phonetic recording of terms, with the exact meaning of each element, was utilized. Epitomizing

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32Gilmore 1919c: 130-33.
34RSO-NSHS 1915: 252.
this concern with detail was his interpretation of the word "Niobrara." When some individuals had misinterpreted its meaning as "swift-running water" Gilmore was quick to retort that it meant "spreading water." The genesis of this mistake he attributed to faulty sound detection by the English-speaking individuals recording the name. Gilmore's explanations to Link on aboriginal terminology were given in terms of the meaning of the particles comprising the words. For example:

The particle "ke" connotes the idea of "something stretched along." In the name of a stream it carries the idea of a stream flowing along over a level plain or through a level valley.

The study of place names had its cultural ecological aspects. To a certain extent Gilmore's toponymy dealt with place names whose meaning was descriptive of the geographic feature being designated—i.e., a conceptualization of a geographic locus. Harrington's massive study of geographic terminology was apparently undertaken solely with the purpose of documenting Tewa conceptualization of a respective component of the environment.

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35 Gilmore to Editor, Lincoln State Journal, May 23, 1913.
36 Gilmore to Link, Feb. 7, 1927.
37 See Chapt. 1.
Like many of the previous studies dating from the early 1800's, Gilmore's toponymy represented the motivations of a historian. There is some evidence to indicate that Gilmore emphasized place names as a result of James Mooney's influence.

MOONEY AND ETHNOGEOGRAPHY

James Mooney (1861-1921) introduced the topic of ethnogeography to the Nebraska State Historical Society in 1910 and 1911. Historical Society director C. S. Paine met Mooney, William Henry Holmes, and John R. Swanton at a St. Louis meeting of the Mississippi Valley Historical Association in June, 1909. This illustrious trio, representing the Bureau of American Ethnology, were addressing the Association on respective areas of the ethnology of the Mississippi River region and on aboriginal American history. Paine afterwards extended an invitation to Mooney to be the principal speaker at the forthcoming Annual Meeting of the Historical Society in January, 1910.

Of the three Bureau representatives who became

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38See Link 1933.
39Holmes to Paine, July 9, 1909.
40Proceedings, Mississippi Valley Historical Association 1909: 17.
41Holmes to Paine, Nov. 22, 1909.
acquainted with Secretary Paine, Mooney was the most desired orator because of his familiarity with the Plains tribes. Mooney's popularity as a member of the Bureau was seen as a certain way of drawing attention to the Nebraska State Historical Society. Archaeologist Robert F. Gilder, a close friend of Paine's, was also responsible for encouraging Mooney's participation. Gilder saw Mooney as promoting the largest gathering ever, and was eager to promote newspaper publicity for the event. Paine attempted to get representatives from the nearby State Historical Societies to attend the Annual Meeting.42

James Mooney began his 36 year association with the Bureau in 1885. As one of those characteristically self-trained ethnographers for the Bureau he was one of a few who focused research on the Plains tribes. Besides being an expert on the Cherokee of the Southeast, his Plains research was concentrated on the Kiowa and Cheyenne, though he studied many of the other Plains groups.43 His most noted study, The Ghost-dance Religion, was couched in terms of the many Plains tribes he visited.44

42Gilder to Paine, Nov. 27, 1909; Paine to Gilder, Nov. 29, 1909.
43Anonymous 1922.
44Mooney 1896.
Mooney had a close association with the institutions of Nebraska. In 1898 he was in charge of the Bureau's exhibit for the Trans-Mississippi Exposition held in Omaha, also being one of the originators of the Indian Congress at the Exposition. He became a member of the Nebraska State Historical Society and the Mississippi Valley Historical Association, then headquartered in Lincoln. Mooney accepted the role of principal speaker at the Annual Meeting of the Historical Society in 1910 and 1911, but subsequently declined such invitations because of ill-health, the exigencies of research, and a lack of government funds for travel.

"Systematic Nebraska Ethnologic Investigation," one of several addresses delivered here by Mooney (1911), is significant because it presents some parallels to Gilmore's later research. Speaking extemporaneously at the 1910 meeting Mooney gave the less formalized version of this "regular Roosevelt lecture to tell you what ought to be done." Implicit in both address was a suggested role for the local historical society as seen by the Bureau.

In 1910 Mooney stated that the American people

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45 Mooney 1899.
46 Anonymous 1922.
47 See N.S.H.S. Correspondence File.
48 Mooney 1913.
49 Mooney to Paine, Dec. 4, 1910.
were making daily inquiry to the Bureau about the Indian, most of which related to aboriginal names, thereby taxing the Bureau's facilities. He saw the role of the local historical society as that of helping the Bureau in a regional context:

These historical societies are the very foundation for the history structure itself. The feeling is growing that it should be the duty and aim of these societies to restore the aboriginal nomenclature; to find out what names were given by the Indians to the streams, the hills and other local features, and to perpetuate these names. Those who can best help us in this direction are the Indians themselves.

The preservation of indigenous geographic terminology was significant to the Historical Society program because Indian place names etymologically revealed much of the earliest state history: local Indian history.

The 1911 address stressed the systematic aspects of a statewide investigation of Indian ethnological and archaeological sites. Granted legislative authority, Mooney suggested a planned and cooperative effort in gaining such information for the entire state. A circular letter calling for the requisite ethnographic data should be mailed to individuals.

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50Mooney 1917: 204.
51Ibid.: 205-06.
52Ibid.: 207-08.
in every area of the state. Using the broad range of information received the institution should then send out its field workers to the aborigines for verification. To find out more about Nebraska the Historical Society should even

\[ \text{go down to the Pawnee and others in Oklahoma and find out all that they can tell of the central region, or...get one or two of them up into Nebraska.}^{53} \]

It would be important to ultimately locate all landmarks on a section map to the most exacting degree possible.

Mooney, in stressing the importance of the Indian as the final source on aboriginal nomenclature, emphasized the linguistic phase of field work:

\[ \text{You should make it a point to get the real Indian name of all rivers and hills and places. Get them correctly; get the name from the Indian himself (he is the best authority) and not the modern name manufactured as a translation by some white man. Get the real Indian name in scientific, phonetic spelling, and get the definite translation.}^{54} \]

Bureau representatives traditionally had emphasized this aspect of ethnographic accuracy as a part of their own research, Mooney being notably proficient in the Cherokee language.

\[ ^{53} \text{Mooney 1913: 106.} \]
\[ ^{54} \text{Ibid.} \]
Ethnogeography reoccurred as a topic at the Annual Meeting of 1912 when Francis LaFlesche, also representing the Bureau, talked on Indian geographic names. In this unpublished address he concentrated on examples of the use by the white man of aboriginal terms for various geographic entities. He also reiterated Mooney's claim that

Indian names are now in big demand. At the Bureau of Ethnology letters are frequently received from individuals and from corporations asking for Indian names...

Both Mooney and LaFlesche, in promoting the gathering of place names, were not advocating any investigation into the culture-environment relationship. Representing the non-theoretical phase of the field work tradition, their concern had personally been limited to the recording of primary data. Neither of these Bureau members made ethnogeography an important aspect of their own research. The exigencies facing the Bureau seemed to be the basis for their urging the study of place names.

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55N.S.H.S. 1917: 280.
56RSO-NSHS 1912: 71.
FACTORS BEHIND GILMORE'S ETHNOGEOGRAPHY

Gilmore's ethnogeography investigated primitive man's direct and indirect dependence on the inorganic environment. Gathering data on the aboriginal use of minerals and on the physical and biotic controls upon native culture was the second phase of his research strategy. The cultural ecological goals behind his ethnogeography had a reference point in bioecological determinism—the same ideology which bolstered his ethnobotany. This determinism was a manifestation of a basic association between ecological botany and physical geography.

Gilmore's ethnogeography was carried out partially for requirements of the Ph.D. minor, as manifested in his dissertation. Why did Gilmore choose geography as a minor to botany? Was it with the intention of preparing for ethnogeographic research? There is no evidence to answer the latter question. However, there does appear to be a more generic relationship of note. Ecological botany was closely related to the subdiscipline of physical geography. Ecologists such as Clements, in emphasizing the physical causes behind the distribution of vegetation, oriented botany toward geography. A necessary method of botanical
ecology was to measure the physiographic and climatic factors constituting the habitat. Physical geography, in this respect, was an area complementary to botanical science. Gilmore's minor course work focused on physical and economic geography.57

Bioecological determinism has been used to explain Gilmore's holistic collection of cultural ecological data. Though ethnogeography satisfied cultural ecological premises, its differences from ethnobotany and ethnozoology warrant further explanation.

There is some evidence to indicate that Gilmore acquired an environmentalism from geographic instruction (1911-14) which was complementary to that of bioecology. Determinism was popularized by such contemporary geographers as Semple, Huntington, and Brigham.58 Gilmore's use of the term "anthropogeography" indicates at least a knowledge of Ratzel's or Semple's work.59 Gilmore, having some knowledge of German,60 could have read Ratzel. One of Gilmore's earliest courses (1911) stressed "the geographic control of settlement and

57Gilmore transcript; Bulletins of the University of Nebraska.
60Gilmore transcript.
development of each region" of North America.61 Certain of Gilmore's generalizations seem typical of contemporary geography.

Was Mooney's suggestion for systematically collecting aboriginal place names instrumental, or merely coincidental, to Gilmore's toponymy? Could Mooney have been the inspiration that resulted in Gilmore's broader ethnogeographic investigations? Mooney's lectures before the Historical Society predated Gilmore's ethnogeographic research, the initial appearance antedating Gilmore's first geography course.62 But beyond this circumstantial evidence there is nothing to indicate a causal connection. There is a possibility that the Bureau's program for local research could have influenced Gilmore to concentrate on place names, if one considers the historical function of toponyms in relation to the fact that Gilmore was conducting research while a member of a historical society.

Bioecological determinism may explain why an area termed "ethnogeography" was undertaken but does not account for the divergent manner in which Gilmore

61Gilmore transcript; Bulletins of the University of Nebraska.
62Gilmore transcript.
approached the subject. Events in Gilmore's life (c. 1910-11) suggest various possible sources for his tripartite ethnogeography. None of these alleged influences were mutually exclusive. Ethnobotany was the immediate precursor of ethnogeography; ethnogeology was a logical but limited offshoot of ethnobotany. Surveying native sites and associated environmental conditions was interrelated to aboriginal toponymy. However, each area satisfied separate goals and are perhaps traceable to separate influences. The aims of ethnogeography are best explained in terms of contemporary geographic theory, which stressed the general determinants of environment upon man. Aboriginal toponymy satisfied largely historical motives. The above explanation is, of course, only tentative.

GILMORE'S ETHNOZOOLOGY

Ethnozoology was the third and final component in Gilmore's research strategy. Like ethnobotany and ethnogeography, his goal was to collect the data crucial to the proper assessment of culture.63 He began systematic investigation into aboriginal zoology among the Omaha in 1915.64 His preliminary research

63Appendix A.
64RSO-NSHS 1915: 251.
was manifested in a 20 page manuscript: "Some Notes on Native Animals Known to the Omaha Indians." He also addressed the Historical Society on the same topic in January, 1916. The idea of ethnozoology appears to have been present in Gilmore's mind by early 1912, antedating the publication of Harrington's pioneering Ethnozoology of the Tewa Indians.

Perhaps Gilmore's belated survey of ethnozoology was due in part to the relatively difficult field work method required by the subject. Gilmore obtained animal skins from Professor Swenk at the University of Nebraska, using these as the basis for interviewing the Indian. As wild animals are mobile this was the only reliable means of obtaining ethnozoological data. This cumbersome process of extracting accurate information has made aboriginal zoology a relatively rare form of ethnography.

Gilmore viewed the faunal environment in the same cultural determinist framework which exemplified his ethnobotany and ethnogeography. Bison, as the chief animal species effecting Omaha culture, is given the...
greatest attention by Gilmore. There were 28 lesser mammals listed. 69

Gilmore's post-Nebraska career evinces a prolonged interest in ethnozoology, particularly that of the Omaha and Teton Dakota. 70 Subsequent Omaha ethnozoology entailed the collection of ornithological terms, which were elicited chiefly by displaying bird pictures. 71 He served as a consultant on Sioux terminology for Earnest T. Seton's important volume on North American big game. His letter to Seton contained the detailed rendering of etymology characteristic of his correspondence with Link on geographic names. 72

CONCLUSION

Gilmore's ethnogeography was in many respects different from the type of data considered by ethnobotany and ethnozoology, though all three approaches made up the same research strategy. The ethnogeographic frame of reference examined Indian occupancy of the landscape as it was shaped by the general

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70. Indian Notes 1927: 169; Jones 1970.
72. Seton to Gilmore, April 9, 1926; Gilmore to Seton, April 10, 1926.
environment. This broadened approach is probably best understood in terms of premises specific to contemporary geography. Ethnogeography was not so much a logical extension of ethnobotany as it was an area of investigation complementary to ethnobotany and ethnozoology. Only the ethnogeologic aspect of ethnogeography considered data comparable to that of ethnobotany and ethnozoology. But the limited aboriginal utilization of minerals relegated this area of inquiry to a very minor part of Gilmore's total research.

Two new factors assume importance in assessing Gilmore's ethnogeography: the influence of cultural geography and James Mooney. However, neither influence explains Gilmore's undertaking of ethnozoology, the third component in his research strategy.
Chapter V

CONCLUSION
DESCRIPTIVE AND ANALYTICAL CULTURAL ECOLOGY

Gilmore's research is essentially descriptive cultural ecology. Ethnobiological data describes one aspect of the culture-environment relationship, but does not attempt to theorize about the underlying processes by which man adjusts to environment. However, descriptive studies, such as those by Gilmore, laid the groundwork for present-day analytical cultural ecology.

Modern cultural ecology is largely synonymous with the techniques instituted by Julian Steward in the late 1930's. Ethnobiology can be seen as one of a number of approaches contributing to the development of Steward's methodology. The culture area concept, cultural geography, and cultural evolution were other influences.¹

Ethnobiological field work involved a systematic study of man's utilization of environmental resources. As such, ethnobiology should be regarded as a major forerunner of Steward's intensive investigations into Great Basin subsistence. Ralph V. Chamberlin's studies of Gosiute and Ute ethnobiology are most significant in this regard.²

²Cf. Steward 1938.
Steward's system has its basis in ethnobiological data. Simply stated, his system focuses on what social transformations occur as a result of man's adjustment to the food resources of a given region. The primary relationship which must be examined is that between exploitative technology and environment. This is very similar to ethnobiology. But what distinguishes Steward from ethnobiologists such as Gilmore is that analytical cultural ecology used such facts, along with other ethnographic data, as a reference point from which to make broader generalizations about the culture-environment relationship.

In determining what social changes occur as a result of the adaptation of technology to food resources, there must be an assessment as to what plant and animal species are most important economically. Steward discovered that the exigencies involved in the exploitation of these basic species determines what type of settlement pattern/social structure are possible or probable in a given region.

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3 Steward 1968: 337.
4 Steward 1955: 40.
The differences between Steward and Gilmore should not be emphasized. Both individuals were working with the same type of basic facts and accepted the same fundamental cultural ecological premises. In fact, Steward's cross-cultural correlation between environmental resources and settlement pattern was anticipated by Gilmore, and no doubt other contemporaries.

CONCLUDING STATEMENT

While in Nebraska Gilmore developed an interest in ethnobiology. His initial ethnobotanical field work was related to his ongoing botanical training. He exhibits no discernible cultural ecological goals in his earliest ethnobotany, though bioecological aims are apparent. Later in his Nebraska career, after commencing ethnogeography, cultural ecological premises were invoked: ethnobiological data was regarded as sine qua non for the proper assessment of culture. Ethnozoology was the last phase in his research strategy.

In attempting to demonstrate that Gilmore's cultural ecological premises arose from bioecological ideas, two problems must be solved: to show how bioecology and cultural ecology are connected, and to show how

ethnobiology's three components are interrelated.

Gilmore collected ethnobotanical data with certain botanical objectives in mind. One aim was phytogeographic—i.e., concerned with determining the underlying causes behind the distribution of flora. Gilmore recognized that the Indian was one of many factors influencing floral demography. A second botanical goal was the discovery of either economically-useful wild plant species which might be domesticated or of cultivated varieties already adapted to particular environmental extremes. Both phytogeography and experimental plant breeding were botanical applications of the ecology concept.

There are two links connecting bioecological ideology and cultural ecological premises. "Bioecological determinism" refers to the general model of causal relationships existing between the inorganic, floral, and faunal aspects of the environment. Given the fact that Gilmore recognized that the Indian was basically dependent on the resources of a circumscribed area, it is only logical that he extended the bioecological model to include the aborigine.

Connected to the idea of bioecological determinism was a complementary concept: that the Indian altered
the natural environment. The recognition that the aborigine was an agent of environmental change could have served to reinforce the Indian's place in any ecological scheme.

Unlike ethnobotany, Gilmore's ethnogeography and ethnozoology are understandable only in terms of cultural ecological goals. As such they can be viewed as logical extensions of his ethnobotany; i.e., logical relative to ecology's concern with all three aspects of the environment. However, Gilmore's ethnogeography has certain anomalous characteristics which cast some doubt on this interpretation. Two aspects of his ethnogeography were apparently inspired by sources other than the ecology concept itself: cultural geography and James Mooney. Perhaps these outside influences can be viewed as complementary to the ecological viewpoints already accepted by Gilmore.

This study has attempted to prove that Gilmore's cultural ecological premises were the result of bioecological ideology. The explanation of Gilmore's ethnobiological research contained in this thesis is only partially successful, for there may be other factors influencing him which are not apparent in the
data at hand. Gilmore's ethnobiological research has a logical cohesiveness which is best viewed in terms of the ecology concept.
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8. The Legend of Pahuk. 7pp.

APPENDIX A

"A PROPOSITION TO MAKE A SURVEY OF THE PLANT LORE AND GEOGRAPHIC LORE OF THE INDIAN TRIBES OF NEBRASKA."

Melvin R. Gilmore collection, Nebraska State Historical Society.

1. The comparative neglect of research of the physical life conditions of the indigenous peoples of Nebraska.

Much has been done in gathering information of the Mythology, traditions, stories, songs, ceremonial rituals, social institutions and customs, and other features of the intellectual life, but scarcely anything, and that little fragmentary, of the material culture of the tribes inhabiting this region, whereas the intellectual culture is a reflection and a result of the material and physical conditions. The works of Miss Alice Fletcher, of James Owen Dorsey, of Riggs and others give us much of the intellectual culture of the tribes, but no sustained and systematic work has been published on the material culture.

2. Desire on the part of educated members of the tribes themselves to have this done.

This lack has been remarked and deplored by educated members of the tribes, and one, Susan LaFlesche Picotte, M.D., of the Omaha tribe, has made the suggestion and expressed the wish that such a line of research might be taken up and financially supported by the Bureau of American Ethnology.
3. Private work already done.

A beginning of such work has been made by a graduate student in the departments of botany and geography in the University of Nebraska, but his private means are insufficient to pursue the work most efficiently and expeditiously. The work needs to be expedited for very much information now available will be forever lost by the death of the fast passing generation of old people who alone possess it.

4. Scope of the work.

It is suggested that the Bureau give recognition to the work already done and financially promote the furtherance of the same in the interest of science before it is too late. The work would comprise an inquiry into the knowledge and uses of all native wild plants and animals for food, shelter, clothing, religious ceremonies, medicines, esthetic arts, technology, etc. Also the geographic conditions and controls, the boundaries, hunting grounds, trails and village sites, places of resort for salt, for paints, and other particular resources; health resorts, shrines, notable and historic spots, etc., also their several names in each tribe and their etymology and interpretation, in fact the Indian geography in general as the tribes themselves knew it previous to the coming of the white man.
APPENDIX B

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2. A proposition to make a survey of the plant lore and geographic lore of the Indian tribes of Nebraska. 2pp.

3. Indian agriculture in Nebraska. 5pp.


5. Wild rice: a most excellent native grain. 3pp.

6. Some food and methods of their preparation among the Omaha Indians previous to their Europeanization. 3pp.


11. The legend of Pahuk. 7pp.

12. University of Nebraska campus boulder. 4pp. 1915.


14. Some notes on native animals known to the Omaha Indians. 20pp.

15. Indian names of Melvin R. Gilmore. 2pp. 1918.