

the Mystery of a Map and a Man

by TIM BRADY

Ecologists, foresters, and other resource managers have come to depend on this famously meticulous map of historical Minnesota. Yet precious little is known about its origin or its creator.

It's known simply as the Marschner map to those interested in Minnesota as it once was. It paints the southern and western portions of the state a bright prairie yellow. Oak openings and aspen-oak lands, done in various shades of brown, sweep like a pageant sash from the northwest to the southeast. The northern forest is a rag rug of greens, blues, violet-pinks, and grays.

Through every township and every county, *Interpretation of Francis J. Marschner's Map of the Original Vegetation of Minnesota*, the card catalog name, details the look of the land before it was settled by Euro-Americans. Based on the notes of the Public Land Survey, 1847–1907, the Marschner map outlines just how much of the state was once wet prairie, oak openings, Big Woods, mixed hardwood, or any of a dozen other vegetative types that have been utterly changed by 19th- and 20th-century human habitation. The notes themselves provide the description of these earlier landscapes; but the only way we can apply them to the present, without ourselves reading all 200 handwritten volumes, has come by way of Francis Joseph Marschner.

For ecologists, natural resources managers and planners, historians, landscape architects, foresters, and others, the map is an invaluable tool. “It’s been the base reference for years,” says Daniel Wovcha, plant community ecologist with the Department of Natural Resources Minnesota County Biological Survey.

The Marschner map has been adapted for use by the DNR Natural Heritage Program and used extensively by MCBS. Digitized versions of the map have recently been created and used by the U.S. Department of Justice, Minnesota Department of Transportation, and U.S. Department of Agriculture Forest Service. It’s a favorite selection of students and visitors to the map library at the University of Minnesota. It has, in short, withstood the test of time.

John Almendinger, a forest ecologist

for the DNR, remembers road trips just outside the Twin Cities in the early 1980s with his fellow University of Minnesota grad student Eric Grimm, who was doing a paleoecological study of the Big Woods. They kept the Marschner map in the front seat between them. “It was remarkably accurate,” Almendinger says. “If it said you should be looking at basswoods, you would be looking at basswoods.”

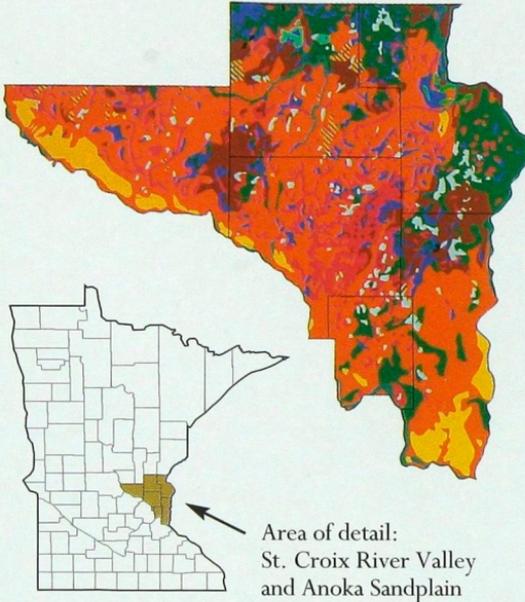
Like many of his colleagues, Almendinger points out limitations to the map. “When you get up into some of the parts, like the pink aspen-birch areas, things get a little fuzzy,” he says. But all who rely on it for their work are unstinting in their praise of the map and its value to the study of vegetation in the state of Minnesota. “When you think of all the variables that go into making a map like this—reading and reconstructing the words of so many different surveyors—it’s pretty amazing how [Marschner’s] interpretations still hold up,” says Wovcha. “If Marschner hadn’t made the map, someone would need to do it today.”

Still Visible. Ed Cushing, professor in the university’s Department of Ecology, Evolution and Behavior and advisor to Almendinger and Grimm, used to do the same kind of road trips with Marschner’s map. “It’s always surprising how the vegetation pattern and boundaries that he outlined are still visible on the landscape.”

Diane Hellekson, a landscape ecologist at Barr Engineering Company, has used the map often in preparing natural resources management plans for clients,

Marschner's Map: A Useful Base for DNR Research

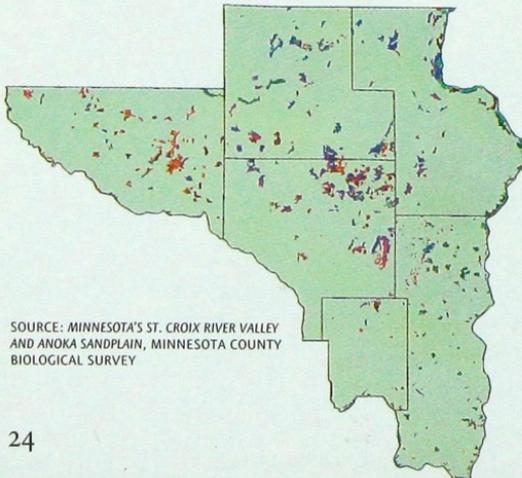
Presettlement vegetation as compiled by F.J. Marschner



-  Prairie
-  Wet prairie, marshes, and sloughs
-  Brush prairie
-  Aspen-oak land
-  Oak openings and barrens
-  Big Woods
-  River-bottom forest
-  Mixed hardwood and pine
-  White pine
-  Aspen-birch (conifer)
-  Conifer bogs and swamps
-  Water features

Area of detail:
St. Croix River Valley
and Anoka Sandplain

Present day native vegetation as compiled by the Minnesota County Biological Survey 1987–1990



SOURCE: MINNESOTA'S ST. CROIX RIVER VALLEY AND ANOKA SANDPLAIN, MINNESOTA COUNTY BIOLOGICAL SURVEY

The DNR, among others, uses the Marschner map as one of the most accurate records of Minnesota's presettlement landscape. For example, ecologists and botanists of the Minnesota County Biological Survey used Marschner's work (top left) to guide searches for remaining vegetation of the St. Croix River Valley and Anoka Sandplain of east-central Minnesota. The map at left, recorded a decade ago by MCBS, shows that only small fragments of the native landscape that Marschner mapped remain.

such as the city of Mendota Heights. “You can find resources that will help you determine an area’s geologic or soil history, but Marschner brings things above the ground. You get a really nice picture of what was, which informs what could be.”

The map was created in 1929 and 1930, a time in history when Americans were just beginning to understand the awesome changes that had taken place on landscapes in the 19th and early 20th centuries. The map was undoubtedly ahead of its time.

Yet for all the renown that has come to the map, for all its uses, and for all the admiration that has been heaped upon it, little is known about its origins and author. In fact, it spent the first 40 years of its existence either lost or in obscurity. Adding to its mystery is the fact that its creator may have never spent a day in the landscapes of Minnesota; and no one has been able to say with any certainty just why he made the map in the first place. To most of the people who use and admire his work, Marschner is himself unmapped.

Out of the Drawer. Miron “Bud” Heinselmann should be credited with rescuing the Marschner map from the recesses of a map file. Heinselmann, who spent years studying the fire and paleoecology of northern Minnesota, was a scientist working for USDA North Central Forest Experiment Station in St. Paul

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when he discovered the map in the station’s offices. “It was in pretty rough shape,” says his widow, Fran Heinselmann. “Just sitting at the bottom of a drawer.” She says her husband “fell in love with it” and decided it should be published.

With the assistance of two university cartographers, Heinselmann reconstructed the map and, in 1974, convinced the station that it should be printed. It is this published version that has, over the years, attracted so much interest.

Published in the same scale as the original—1:500,000—the 1974 map has a few minor changes in the color scheme, but the vegetation types were faithfully redrafted. To the map’s flip side, Heinselmann attached a lengthy note outlining what was known about Marschner’s method and the map’s early history.

According to Heinselmann, Marschner was a research assistant in the USDA Bureau of Agricultural Economics, Washington, D.C. Sometime in 1929, he began using early surveyors’ written descriptions of the landscape to create a map of the original vegetation of Minnesota. In July 1930, the completed map was sent to the director of the Lake States (now North Central) Forest Experiment Station in St. Paul.

At about the same time, Marschner, or someone under his supervision in the Bureau of Agricultural Economics, made a copy of the map—a fortunate event, as it turned out, because sometime between

1940 and 1950, the original disappeared.

In 1963 the second version of the map was sent to St. Paul to replace the original, and it was this map that Heinselman and the experiment station redrafted and published.

As for Marschner's methods for creating the map, Heinselman writes, "Unfortunately, [he] never gave the USDA Forest Service a detailed description of how he used these notes to construct the map, nothing was ever published by him on this subject, and no fur-

ther records of this work became available upon his death."

Heinselman was able to find one memo describing the process, written in 1956 by Marschner himself. It reads in part:

"The Natural Vegetation Map of Minnesota is in the main based on the field notes written, and the plats prepared by the surveyors of the General Land Office. . . . The distribution pattern of the vegetation types was constructed by checking out the tree associations accord-

W of the 4 th P.M., Minn.		W of the 4 th P.M., Minn.	
CHAINS.		CHAINS.	
	East random betw Sec 15 + 22 Var 9° 30'		7 inch between Sec 15 + 16 Var 9° 30'
40.00	Set temporary 1/4 Sec bar	38.00	Center tan + spruce swamp E + W.
79.84	Intersect to 1/2 line 30' W of line to Sec 14, 15, 22 + 22 from which - 89° 47' W ^{True line} betw Sec 15 + 22 Var 9° 30'	40.00	Set post 2 1/2 x 3.5 ft long 18 in in ground for 1/4 Sec bar from which I am 10' to N 75 E 10 W Spruce bar 85 W 18 W
39.92	Set post 2 1/2 x 3.5 ft long 18 in in ground for 1/4 Sec bar from which - Sec 9 in N 50 E 20 W - Sec 7 in S 20 W 20 W	47.50	Creek 20 W wide run S W.
79.84	Set center Sec 15, 16, 21 + 22, rolling surface, soil 3 ^d rate, thickly timbered with 1/2 Sec 16 white Pine Sec 9 Spruce + Fir Feb 16 1881	65.00	Leave swamp E + S W. Center Birch + Pine
		80.00	Set post 4 x 4.5 ft long, 18 in in ground for center Sec 9, 10, 15 + 16 from which Birch 14 in S 25 E 17 W Birch 9 in S 49 W 30 W Birch 8 in N 34 E 22 W Birch 9 in N 45 W 28 W rolling surface, 3 ^d rate soil, thick 1. . . . 1. . . . 2. . . . 3. . . .

Though Marschner left little record of how he constructed his map, he apparently relied on field notes and other records from early surveyors working in the state. Source: U.S. Surveyor General.

ing to significant distinctions which reflected causal relationship with climate, soil, and slope conditions. The distribution patterns were developed on the township plats, which usually contained already such distinctions as swamp, tree groves in the prairies, and, if I remember correctly, the boundary between woodland and prairie where it was sufficiently distinct. From the plats these distribution patterns were transferred by hand, township by township, to the 1:500,000 scale base map of Minnesota. The procedure required reading of more than 200 volumes of field notes, nearly all written in longhand, only the latest ones are typed.”

Prodigious Feat. The painstaking labor suggested in this description was typical Marschner—or so it seemed to those who knew him or his reputation. “This was truly a prodigious feat,” says John Fraser Hart, long a professor in the University of Minnesota Department of Geography. “Imagine the number of hours it would take to put this work together. And it was only one of several

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Tim Brady is a St. Paul writer currently working on a four-part television documentary, *Uncommon Ground: Minnesota’s Once and Future Landscapes*, for the University of Minnesota’s College of Natural Resources and Twin Cities Public Television.

great maps that Marschner produced.”

“Absolutely dedicated to his work,” says Marlow Vesterby, who holds a position first created and held by Marschner at the USDA Economic Research Service in Washington, D.C. “The legend here was

that he took just three days of sick leave in his entire working life.”

“He was a very special person,” says Dwight Gadsby, who began his own career as an agricultural economist at the USDA Economic Research Service in the 1960s as Marschner was ending his. “I remember this little old man walking around the building. Everyone treated him with such reverence, I thought he was someone’s grandfather.”

Born in Austria in 1882, Marschner studied at the Cartographic Institute in Berlin before immigrating to this country in 1915. He soon began working for the USDA in Washington, D.C., where his cartographic forte was land-use mapping. The first major project that Marschner worked on, according to a 1967 article in *Annals of the Association of American Geographers*, was the *Atlas of American Agriculture*, published in portions between 1922 and 1936, just when he would have been working on his map of the natural vegetation of Minnesota. One of his collaborators on the atlas was Raphael Zon, director of the Lake States Forest Experiment Station and the man to whom Marschner sent his Minnesota map in 1930.

In 1945 Marschner and a colleague began work on a map that used aerial photographs taken in the 1930s and '40s as its principal source. Five years later *Major Land Uses in the United States* was completed, the beginning of a data series published every five years. (Vesterby now oversees its creation.) In recognition for his work, Marschner was awarded an Association of American Geographers citation for meritorious work, the hallmark of his career.

Marschner retired from the USDA in June 1952, but an office was reserved for him, and he continued to go to work there each day for years, without pay, according to Gadsby. "And he walked to work every day, from an apartment on the very edge of the district to the south agriculture building on the mall"—a distance of close to seven miles. The encomium to Marschner's life and career in *Annals of the Association of American Geographers* says he never married and had no relatives in the United States, but that he had "the devotion of his 'family' of friends in the Department of Agriculture." Aside from his work on the *Atlas of American Agriculture* and on *Major Land Uses*, it mentions two reports that he wrote, published after his retirement: *Land Use Patterns in the United States* and *Boundaries and Records in the Territory of Early Settlement from Canada to Florida*. But according to Gadsby, "I doubt that even he kept a record of all that he did."

Nowhere do the annals mention the

A bigger mystery: Why make a map of such painstaking detail in the first place?

year he spent working on *The Original Vegetation of Minnesota*.

"I know he was proud of that map," says H. Thomas Frey, a retired geographer who used to lunch with Marschner in the 1960s. "He men-

tioned it to me several times and was disappointed that the original had been lost."

Detailed Surveys. Zig Zasada thinks he knows how that first map disappeared. "World War II," says Zasada, a forester and researcher at the Lake States Forest Experiment Station from 1933 to his retirement in the late 1980s. "I'd guess in the paper drives. Everyone was getting rid of files back then."

But a bigger mystery remains: Why make a map of such painstaking detail in the first place?

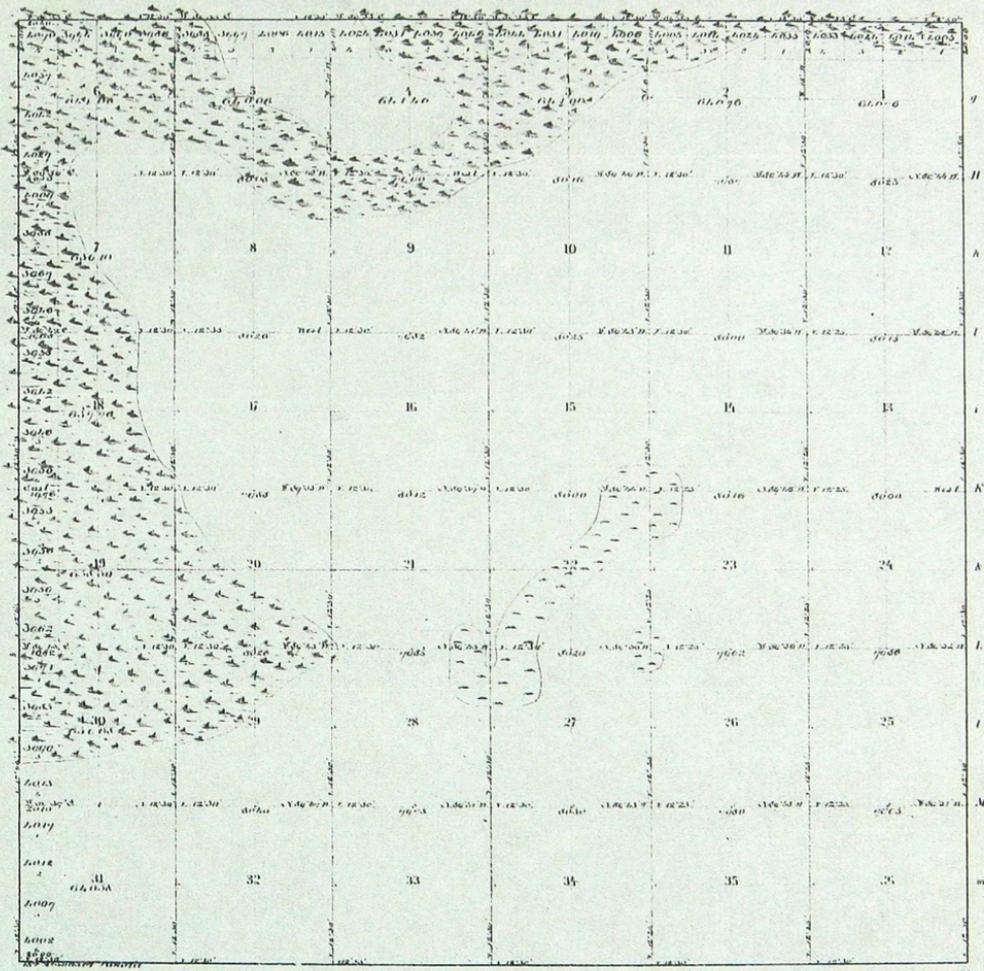
"We were starting to do detailed forest surveys about then and would have needed some base to go by," Zasada says.

Zasada knew and worked under Zon for more than 20 years. Right-hand man of U.S. Forest Service director Gifford Pinchot, Zon came to Minnesota in 1923, charged with creating experiments in the national forests of the north-central states, including Chippewa and Superior forests.

A progressive and scholarly thinker with strong connections in Washington, and a cartographer himself, Zon might have been just the person to request a map of the native vegetation of Minnesota from Marschner.

Unfortunately, Zon's papers at the

Township No. 161 N. Range No. 14 E. W. 5th Mer. Minnesota.



Survey designated	By whom surveyed	Date of tract	Total number of acres 25,045.000	
			Amount of Survey	When surveyed
Township	HARRIS	March 10, 1877	25,045.000	1877

The above map of Township No. 161 N. of Range No. 14 E. of Meridian 5th W. in Minnesota is correctly conformable with the original survey of the land which has been made.

Also available to Marschner were township plat maps drawn by public land surveyors, who recorded the major kinds of vegetation they encountered—such as forest, prairie, and marsh—as they walked section lines. This map from 1877 shows the wetland areas recorded by land surveyors in Polonia Township in Roseau County. Source: U.S. Surveyor General.

Since it was published more than a quarter-century ago, Marschner's map has provided guidance for the conservation and restoration of native habitats across Minnesota. Photograph of native prairie at The Nature Conservancy's Seven Sisters Prairie Preserve in Otter Tail County by Gary Alan Nelson.





Minnesota Historical Society hold no correspondence between him and Marschner.

Yet Marschner may have needed no request from Zon at all. Frey thinks Marschner was probably compelled by his own interests to turn the survey notes into maps. “My guess is that he came upon those survey notes [at the Bureau of Land Management in Washington] and just thought, ‘I can make a map out of these,’” Frey says. “I know that Marschner was never in Minnesota. Researchers in the Department of Agriculture in those days had a lot of latitude. I know that he never visited the western states that he mapped using those aerials [in *Land Use Patterns in the United States*].”

Maybe that’s enough. Maybe the value of the thing needs no enhancing by a provenance that includes a particular passion for the landscapes of Minnesota. Maybe the map has done its greatest service simply by helping induce those feelings in others.

As for Marschner, he remained utterly true to his legendary diligence at the USDA. In 1966, at age 83, he was trudging through a heavy snowstorm in Washington, on his way to another day of work, when he collapsed and died of a heart attack on the Capitol Mall.

To the best of Gadsby’s knowledge, Marschner died without a will, and with no known relatives. What estate he had would have been subsumed by the district government. Marschner was buried in a pauper’s grave. Gadsby, his son, and another Marschner admirer from the Economic Research Service went looking for a marker in the cemetery a few years back. They couldn’t find one. ●