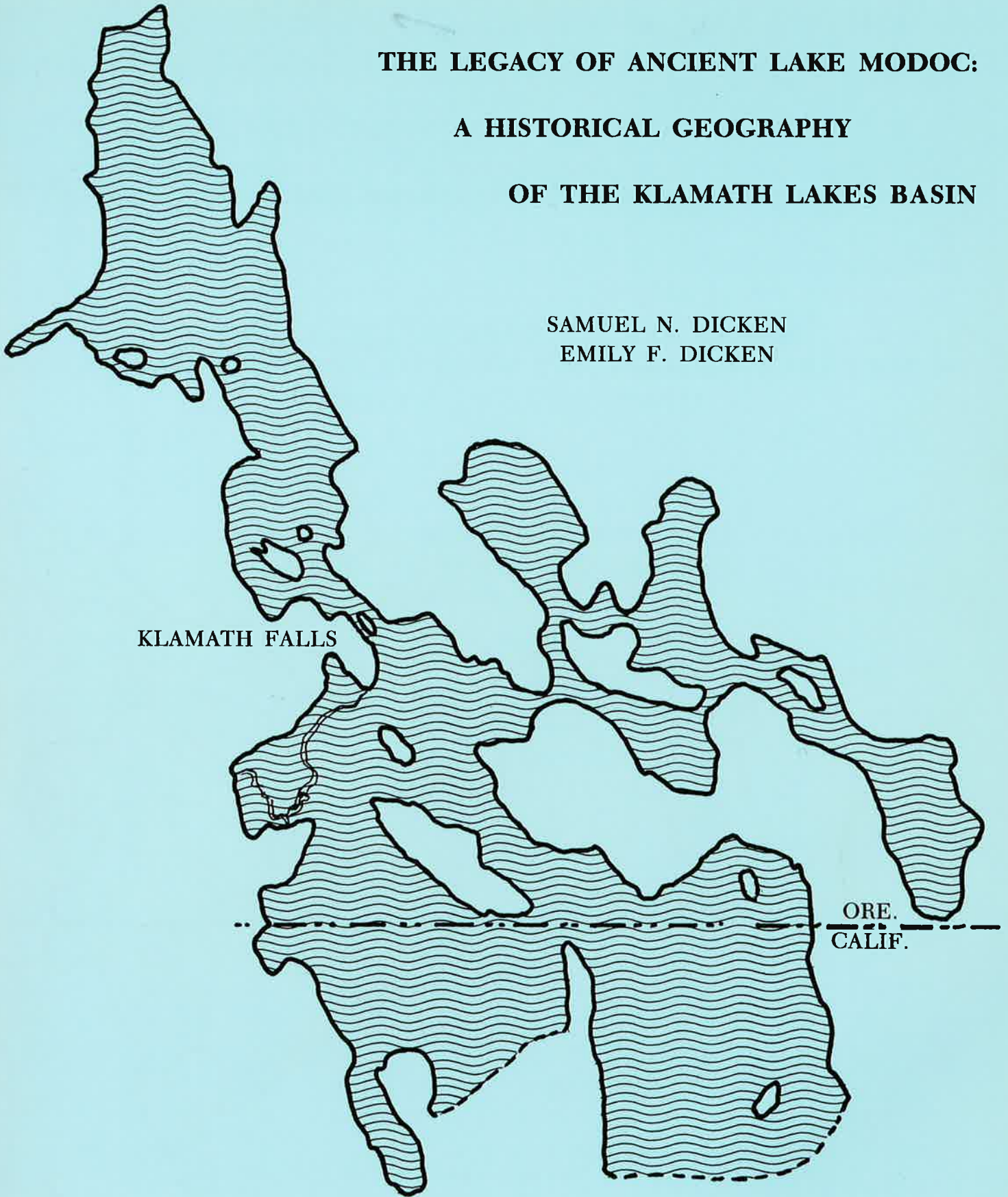


**THE LEGACY OF ANCIENT LAKE MODOC:  
A HISTORICAL GEOGRAPHY  
OF THE KLAMATH LAKES BASIN**

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Jack Remington

**THE LEGACY OF ANCIENT LAKE MODOC:  
A HISTORICAL GEOGRAPHY OF THE KLAMATH LAKES BASIN  
OREGON AND CALIFORNIA**

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With a Foreword by  
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## FOREWORD

If one examines a present-day contour map of the Klamath Lakes Region, he can easily see that an increment in the lake levels would cause the lot to coalesce into one large amoeba-shaped sheet. Others have observed the ancient geological shorelines along the dry hills but it remained for Sam Dicken to point out, limit, define, and name this pluvial sea, Lake Modoc. His trained eyes have seen the correct topography as it existed eons ago, together with the summation of changes to the present.

Lake Modoc never had the pristine loveliness of a Lucerne or a Louise, although its waters did wash the sylvan south toe of Mount Mazama and the Cascade salient. Much of its shoreline was rocky, bare, and semi-sterile, not unlike the present beaches of Abert Lake or Clear Lake. As the recession of waters began, those flatter or near dead-level shores emerged first as marshlands, the customary littorals of Klamath's non-mountain lakes.

But marshland can be beautiful. It all depends how one looks at things, not at all unlike viewing a scrawny three-day old pelican. Creation's chain-of-life in the wetlands is manifest from the most minute spore to the great "swanny white wing." The ooze is full of wiggles; so is the water; creepy crawlies inhabit every stalk. Birds nest whenever they can find a rough snag on a tule staff from which to hang a haven. Ducks, geese, cranes, storks, herons, loons, mud hens, mergansers, all the lesser shag, and native tweety birds of all shades and shapes begin their lives here.

Originally native Indians recognized the vast larder Mother Nature so conveniently provided and gathered a vitamin-rich, protein-rich harvest of fish, birds, snakes, frogs, lizards, wiggles, and tubers enriched with a seasonable supplement of eggs. The last--mainly duck eggs--regardless of age were a prize delicacy.

Nelson Reed's infinitely valuable Klamath River Interstate Compact generously affords the entire remaining flow of the Klamath to South California, but with the minor proviso that possession be taken at the mouth. With the river (which drains the lake) Klamath will prevail forever, but only as a home for the hardy, well accustomed to an attitude of apathy and a diet of crumbs returned and intended as full and equal measure for the treasure yielded as taxes. Oddly, Klamath was populated and pioneered from the west, not the east. A goodly measure of immigrants to the lowland dales were not sure they had found the Garden and they, with the more hardy landmen, brought with them the genesis of their herds, their plow, and their muscle. It was no easy task to combat the elements but those who so elected--and won--became the herd sires of the highlands. Giles French said it, "Eastern Oregon is he-man country. We raise wheat and beef, and alfalfa hay. Our cousins left in the valley persist to exist on a sub-culture of lettuce, prunes, and long-tailed sheep."

And the locale has always demonstrated an atmosphere of fierce independence. During the early days of Altamont many, many people existed--not lived--in the most basic of shelters. Cardboard, box slats, and canvas. And they suffered, but still managed to smile and, more important, to hope: Mud, bib overalls, bare feet, chickens, pigs, cow manure, gardens, more mud, loos with views and last year's Sears, bare light bulbs, and no curtains. The look of absolute despair on my mother's face when she dug up the keepsake coin which Uncle Bulgy had brought her from the Carson City mint years before and sent me to the little store. The need was now. It wasn't for seeds nor flour. It was for a loaf of bread and it was her last money--a dime. All that was left were string beans and eggs.

And still the archetype south-eastern Oregonian remains subservient to

no one, nor will he be. He is willing to give his last measure of effort if the deal is above the table, is friendly, compassionate, and as proud of his sweat as he is of his net. He breathes clean air, yet his country is now almost without immigration, as sadly, most Americans have become accustomed to fear breathing air which they cannot see. He knows not floods, hurricanes, tornadoes, typhoons, sandstorms, earthquakes, nor AIDS. He gets hot in summer. We are a friendly,

provincial, somewhat backward colony and, in many ways, a cultural desert. We're happy, we enjoy life, we have as much freedom as any, and much more than most. We have learned to cope with the adversities of both nature and politics, are accustomed to hard work and disappointment. We're anticipating a future of unknowns, containing who knows what roadblocks, firmly convinced that we or our offspring will continue to prevail...and with a smile, thank you!

FRANCIS S. LANDRUM

## ACKNOWLEDGEMENTS

One of the greatest rewards in writing a geography book of this sort is meeting with and learning from local people who, collectively, know more about the area than any one person will ever know. We have known the Klamath Basin, superficially, for more than thirty-five years. In 1950 we wrote a short description of it for the first edition of OREGON GEOGRAPHY. The present book is the result of four years of leisurely study in field and library.

Many agencies and individuals have contributed to this book. Klamath County agencies include the Planning Department, the County Museum, the County Surveyor, and the County Engineer. The Comprehensive Plan for the City of Klamath Falls and the Comprehensive Master Plan for Klamath County were very useful. Jonathan Chudnoff was especially helpful. James A. Allen read part of an early draft of the manuscript and reviewed the short paper, "Pluvial Lake Modoc," in the Herald and News. State Departments involved were the Oregon Institute of Technology and the University of Oregon. The Oregon Collections of the University Library were especially useful. The report of the Oregon Water Board was consulted frequently. Several Federal agencies were helpful: the Bureau of Reclamation, the Soil Conservation Service, the U.S. Geological Survey, the National Weather Service, and the U.S. Forest Service.

Many individuals have helped. Francis S. Landrum read all the manuscript, critically, some of it more than once. He also provided additional information. KLAMATH ECHOES, by Devere and Helen Helfrich, was frequently consulted. The sixteen volumes of the work provide a wealth of detail on the history and geography of the area. James Kerns guided us on field trips on the

ground and in the air, explaining the complications of the irrigation system in the Basin. Jessie Puckett read all the manuscript and guided us into some of the remote parts of the area, including the site of old Pokegama. Priscilla Knuth of the Oregon Historical Society read the manuscript critically and suggested some additional sources. The files of the Oregon Historical Quarterly which she edits were consulted and cited. Karen M. Seidel furnished useful material from the files of the Bureau of Governmental Research and Service.

My colleagues in the Geography Department, University of Oregon, offered encouragement and suggestions. Professor William Loy read the manuscript and offered suggestions for the maps. The staff of the Map Library, Susan Clark and Peter Stark, were most helpful with maps and airphotos. Georgette Bozovich and Teresa Benedict typed parts of the manuscript with great care.

We have studied in the field and in libraries in various areas, Kentucky, Minnesota, Mexico, and, most of all, in Oregon. The people of Klamath County have been most helpful, cooperative, and encouraging. And none asked the question: "What is the good of this study?"

These and many others, too numerous to mention, have contributed useful facts and ideas.

In spite of all the assistance and criticism there are undoubtedly some errors of fact and interpretation in the book. We would appreciate having them called to our attention, preferably with documentation.

Samuel N. Dicken  
Emily F. Dicken

## PROLOGUE

The earth shaking events which combined to form the Klamath Lakes Basin and the surrounding ridges began a few million years ago when the Cascade Range was uplifted, faulted, intruded, and covered with lavas. Displacement of huge blocks produced a basin-range surface which extends over a vast area from southeastern Oregon through California, Nevada, Arizona, and as far south as Mexico, D. F. In the Klamath Area the ridges have various names--hills, rims, ridges, and mountains. Some are broad, some long and narrow. Examples: Modoc Ridge, Hogback Mountain, Klamath Hills, and High Rim. The basins (or valleys) represent down-dropped parts of the earth's crust, partially filled with sediment, some of them containing lakes. Examples: Upper Klamath Lake Basin, Lower Klamath Lake Basin (now partially drained), and Tule Lake Basin (also partially drained). Basins formerly filled with lake water include Langell Valley, Poe Valley, Yonna Valley, and Swan Lake Valley.

This complex of basins and ranges has been subject to many changing forces. Lavas intruded the ranges, adding to the uplift, and poured out on the surface, forming peaks, cinder cones, and broad mesas. The materials include flow lavas, volcanic ash, pumice, and cinders. As the climate was humid during the last Ice Age, the basins filled with water to overflowing and the lighter materials were redistributed by waves and currents.

The most spectacular event was the eruption of Mount Mazama (to form Crater Lake) 7,000 years ago. The crater spewed out large quantities of ash and pumice which, carried by strong winds, covered a wide area. Much of the material which fell on the ranges was washed into the Basin by torrential rains, eroding deep canyons on the slopes.

Even before Mt. Mazama erupted,

perhaps 13,000 years ago, the climate slowly became warmer and drier, but not as dry as it is today. At this time all the basins in the Klamath Lake Area were occupied by a single large lake, which I have named Pluvial Lake Modoc.\* This lake covered an area of over 1,000 square miles. Its long, irregular shoreline can be seen in various parts of the Klamath Lakes Area at an elevation of approximately 4,200 feet. After the eruption of Mount Mazama, the drying and warming trend continued and the level of Lake Modoc (and various other pluvial lakes in eastern Oregon) continued to shrink. The level declined and some of the arms of the lake, such as Langell Valley and Poe Valley, became dry. As the level declined further, Upper Klamath Lake, Lower Klamath and Tule lakes were separated. All of which created an environment favorable for human occupation. Evidence shows that people have been living in the Basin for at least 3,000 years, probably longer. The level floor of the Basin has deep soils and an abundant water system of lakes and streams, a variety of vegetation and wildlife.

Ancient Lake Modoc left a legacy for the people of the Basin; for the Indians who lived for many centuries along the river banks and lake shores; and for the thousands of white people who have occupied the site for a little more than a century. In the following chapters the main features of the region are presented in historical perspective, too briefly perhaps, and with too much generalization. No one person and no single book can tell the whole story of this complicated and fascinating region.

\*Reference: Samuel N. Dicken, Pluvial Lake Modoc, Klamath County, Oregon, and Modoc and Siskiyou Counties, California. In Oregon Geology, v. 42, No. 11. November 1980. pp. 179-187.



Frontispiece. A view of Klamath Falls looking to the southwest. The Business District is in the center; to the left is Lake Ewauna and a part of the Industrial Area. On the right, middle distance, is the Ewauna Heights Residence District, beyond which is Link River. The Main Irrigation Canal meanders from right to left through the city. (Author's photo)

## 1. AN OVERVIEW

From the air (or from a satellite) on a clear day, or from air-photos, the essential features of this unique and interesting region can be clearly seen. The focus is the city of Klamath Falls (fig. 1.1), near the lower end of Upper Klamath Lake, the largest in Oregon. To the west is the forested Cascade Range, presenting a steep front to the Basin. To the north is Crater Lake; some of the water seeping through its porous rim flows into Upper Klamath Lake. To the east are numerous wooded ranges and intervening basins, a part of the vast Basin Range Region. To the south, in California, sparsely vegetated recent lava flows mark the southern end of the Basin. Dome Mountain stands up like a sentinel over the lava beds and, far to the south, Mt. Shasta shows its snow-covered profile. This small basin, only 75 miles long, is home to most of Klamath County's 58,000 people and a few thousand more in the California part of the Basin. It is quite distinct from other settlements in the area, but it is not isolated; it is served by railroads, airways, and a network of roads.

In this book on historical geography the main purpose is to describe and explain the geography of the Basin, period by period, from the time of the first explorations to the present. It involves the study of natural features such as basins, ranges, lakes, rivers, soils, forests and human features such as population, production, housing, and transportation. In explaining the geography of the Basin, attention is given to the perception of the region by the explorers and settlers.

In this first chapter a general overview is presented, including both natural and human features. Chapter Two, exploration, describes the land as it was before white settlement, up to 1860. Chapter Three portrays early

settlement, from 1860 to 1900. Chapter Four is concerned with expanding settlement and the introduction of large-scale irrigation, 1900 to 1930. Chapter Five, depression and recovery, covers the period 1930 to 1950. Chapter Six follows the continuing slow growth from 1950 to 1980. Chapter Seven is mainly concerned with the urban areas, Klamath Falls and Altamont.

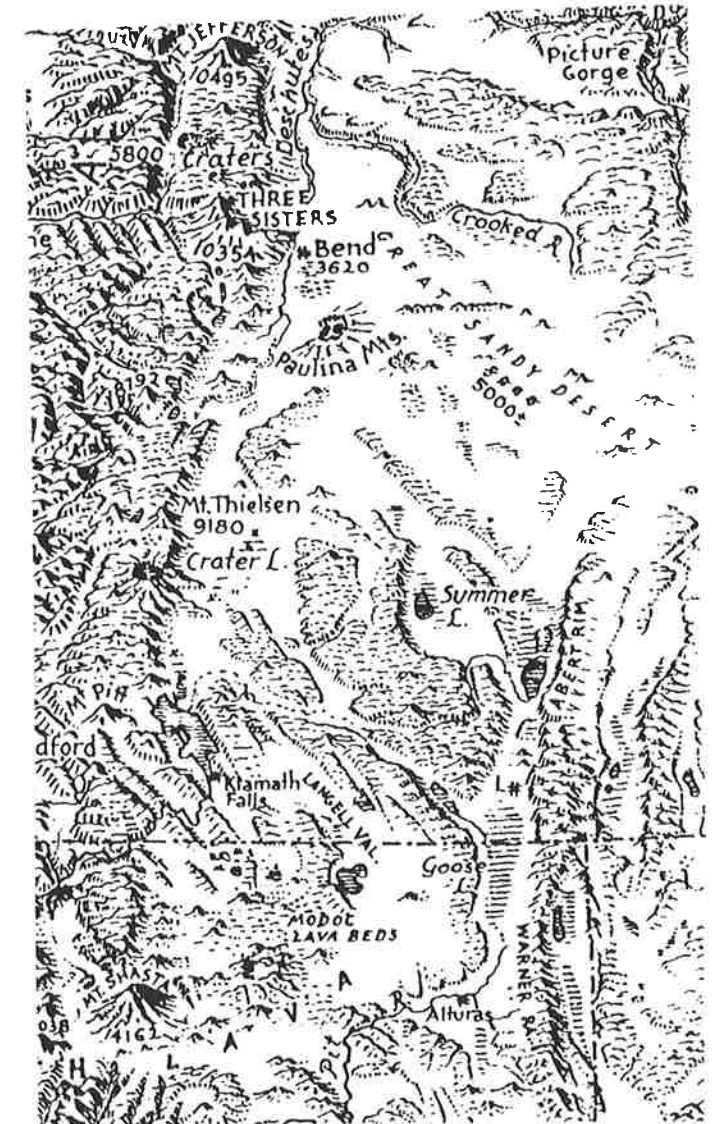


Fig. 1.1. The Klamath Lakes Area in Oregon and California is part of the rugged Basin and Range Region. (Map from Erwin Raisz)

NATURAL FEATURES

The floor of the Basin is the bed of an old Pleistocene lake, Pluvial Lake Modoc.<sup>1</sup> The meandering shoreline of the old lake is shown by a black line in figure 1.2. All that is left of Lower Klamath Lake (B) and Tule Lake (C) today are small remnants in the form of sumps, usually well-populated with wildfowl. In Oregon the trend of the ranges is northwest-south-

east; in California the ranges are more widely spaced and trend north-south. Lava flows from the south covered parts of this area in very recent geologic time, completely obliterating parts of the old shoreline. Letters indicate the various basins and the principal places. Williamson River, the largest, enters the map area on the north and empties into Upper Klamath Lake. Sprague River flows westward and joins

Figure 1.2. Map of the shoreline of old Lake Modoc (opposite page) and the location of many of the places mentioned in the text. In the south lava flows encroached onto the beds of Lower Klamath lake and Tule Lake (dashed lines), covering the old shoreline.

LEGEND

- |                       |                                |
|-----------------------|--------------------------------|
| A. Upper Klamath Lake | 7. Lost River                  |
| B. Lower Klamath Lake | 8. Spring Lake Valley          |
| C. Tule Lake          | 9. Klamath River               |
| D. Swan Lake Basin    | 10. Keno                       |
| E. Yonna Basin        | 11. Miller Hill                |
| F. Poe Valley         | 12. Turkey Hill                |
| G. Langell Valley     | 13. Malin                      |
| (K) Klamath Falls     | 14. Stukel Mountain            |
| (Al) Altamont         | 15. Klamath Hills              |
| 1. Modoc Point        | 16. Bryant Mountain            |
| 2. Williamson River   | 17. Big Tableland              |
| 3. Plum Hills         | 18. Modoc Lava Beds            |
| 4. Link River         | 19. Clear Lake Reservoir       |
| 5. Lake Ewauna        | 20. Hovey Point                |
| 6. Olene              | 21. Gerber Reservoir           |
|                       | 22. Oregon California Boundary |

THE SHORELINE OF OLD LAKE MODOC

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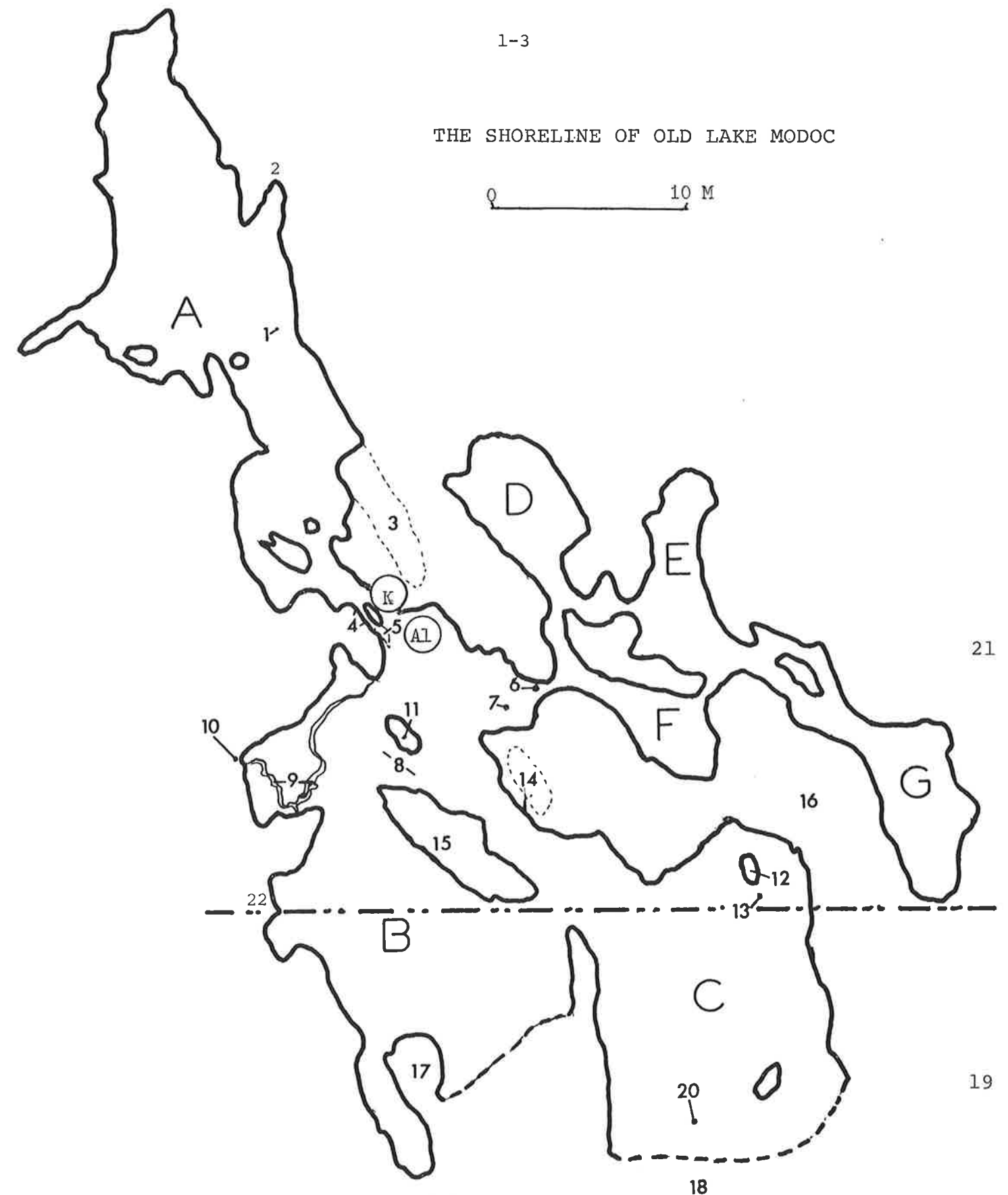


Figure 1.2

Williamson River. Lost River rises in Clear Lake in California, flows in a roundabout course into Oregon, through Langell Valley (G) and Poe Valley (F), than back again into California before emptying into Tule Lake Basin. A part of the Lost River drainage has been diverted to Klamath River. The old pluvial lake at its highest stage had an overall length of 75 miles, an area of more than 1,000 square miles, and a shoreline of over 400 miles. The old shoreline, at 4,240 feet above sealevel, shows almost no warping. It is, perhaps, slightly higher in the north. The various basins were formed by block faulting and igneous activity, both intrusive and extrusive. Large quantities of ash, cinders, and pumice were deposited in the basins and peat and diatoms were added. Numerous wells show that the depth of sediment reaches hundreds of feet in some areas. Only Upper Klamath Lake has a large body of water at present, with an area of about 90 square miles at low water, about 140 square miles at highwater stage. It is the largest lake in Oregon but is slowly filling with sediment and vegetation; irrigation engineers are worried about the diminishing storage capacity.

On the margins of the Basin numerous fault blocks in the form of hogback ridges, hills, and mountains rise above the lake plain (fig 1.3); some of the smaller ones were islands in the old lake.<sup>2</sup> The larger and higher elevations are called rims, scarps, hills, or mountains, according to their size, shape, profile, and the whim of the person who named them. The highest ones rise more than 2,000 feet above the lake plain. The peaks of the eastern scarp of the Cascade Range rise over 9,000 feet. In Modoc and Siskiyou counties in California, some of the elevations have the form of conical hills, including cinder cones and dome mountains. A few elevated lava-capped mesas occur, such as Big Tableland, southwest of Lower Klamath Lake Basin. On the south side of

the Basin the Modoc Lava Beds extend into the lake area, completely covering the old shoreline. It is probable that the lava flows blocked former surface outlets of Lower Klamath and Tule lakes, south to Pitt River.

After the close of the Pleistocene, perhaps 10,000 years ago, the climate gradually settled into its present semiarid, fluctuating, and unpredictable state and Lake Modoc began to shrink. The decline of Upper Klamath Lake was accelerated by the entrenchment of Link River and that of Lower Klamath Lake by the dncutting of Klamath River. By 1905, when the first accurate survey was made of lake levels, Upper Klamath Lake was down 98 feet from the old shoreline; Lower Klamath Lake was down 156 feet; and Tule Lake was down 184 feet. All the lakes are now shallow. In 1905 Upper Klamath Lake was 47 feet deep; Lower Klamath Lake, 15 feet deep; and Tule Lake, 25 feet deep. Tule Lake no longer had a surface outlet, although it was partially drained by seepage, and became, by definition, a part of the Great Basin. It had become separated from Lower Klamath Lake except at a high water stage. By the time settlement began, about 1867, the other basins were dry, except for a few small lakes and marshy areas. It was obvious that the general situation was favorable for large-scale irrigation once Upper Klamath Lake was stabilized by a dam on the upper end of Link River.

Such are the major natural features of the Klamath Lakes Basin. Only gradually did the early explorers, traders, and settlers become aware of the essential character of the region. At first only a few routes were traveled and observations were limited; some features were unknown for many years. Early explorers, like Ogden and Frémont, passed very near Lower Klamath Lake without noticing it. Early perceptions of the Basin were

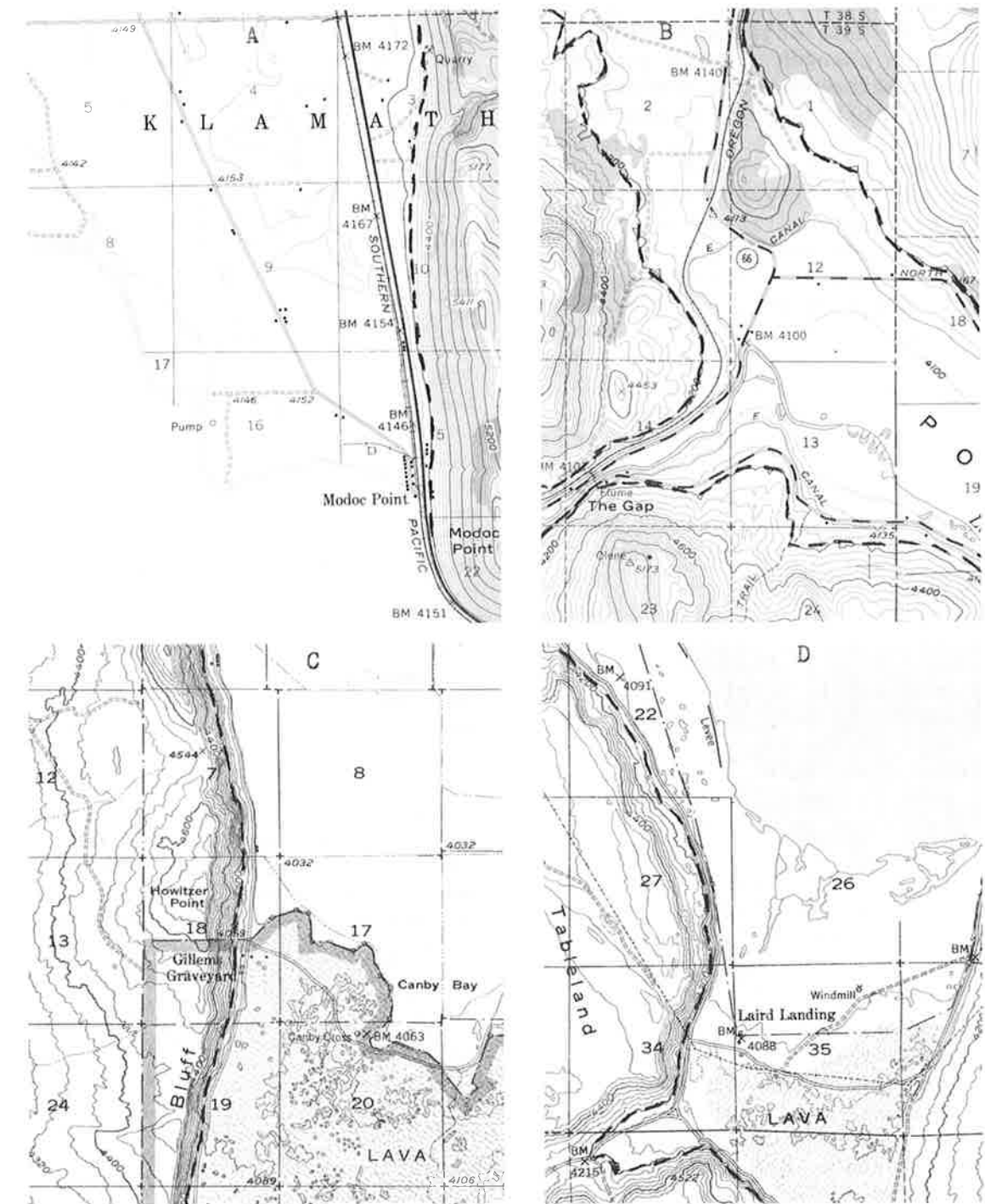


Fig. 1.3. Parts of Topographic Maps showing the shoreline of old Lake Modoc (dashed lines). A. Modoc Scarp on Upper Klamath Lake. B. Poe Valley, southeast of Klamath Falls. C. The shoreline south of Tule Lake marks the north edge of a lava flow, a part of Modoc National Monument. D. Laird's Landing on the south side of Lower Klamath Lake. (From the Modoc Point, Merrill, and Mount Dome Quadrangles of the U. S. Geological Survey).

colored by the background of the observers. But, as knowledge increased, the perception changed. Today a huge mass of information reveals the opportunities and limitations. Thousands of books, reports, maps, ground and airphotos reveal the features and their meaning, not only as they are today but as they were in years gone by. A good way to see some of these features in relation to each other is to observe them from the air.

#### FROM THE AIR

From a low-flying plane and from stereoscopic airphotos, the detailed features of the Klamath Lakes Region stand out with the three dimensional quality of a model and with a perspective not available to an observer on the ground. It is a landscape with great variety in shape and color, in both physical and cultural qualities; nevertheless, it has a definite unity; it is a mini-region. Flights over the area are necessarily brief, but hundreds of airphotos make it feasible to see all parts of the region, leisurely, and in three dimensions. Maps, old and new, make it possible to identify various places and to note significant changes. This is not to belittle field and library studies; one approach is just as essential as another. After all, many excellent studies in history and geography had been published before man learned to fly.

From the air the unity of the Klamath Lakes Region is clearly apparent and the unifying feature is the lake plain, the bed of old Lake Modoc. Included are the basins of Upper Klamath Lake, Lower Klamath Lake, Tule Lake, also the basins of Swan Lake, Yonna, Poe, and Langell valleys. In wetter times, a few thousand years ago, the huge lake, with a meandering shoreline 400 miles long, covered them all. Today in this extensive basin are most of the cultivated fields, irrigation canals, roads, railroads, factories,

and other works of man. Outside of the lake plain the population of Klamath County is very sparse.

The flight plan is generally from south to north, following a part of the route of Indians, fur traders, and explorers from the Modoc Lava Beds in California to the Columbia River. Before the coming of the whites, Modoc and Klamath Indians traveled this route on their way to trade with Columbia River Indians who had earlier access to trade goods. Peter Skene Ogden, with a party of fur traders, traveled the route from north to south in 1826, searching, with little success, for beaver and a navigable river to the ocean. John C. Frémont traveled the route from The Dalles to Klamath Marsh in 1843 and in 1846 approached from the south and reached the upper end of Upper Klamath Lake. Lieutenants R.S. Williamson and H.L. Abbot in 1855 surveyed the entire route from south to north, seeking a possible route for a railroad. Their report was unfavorable. In 1846 Levi Scott, Jesse Applegate, and a party from the Willamette Valley marked out an east-west wagon road for immigrants, near the 42nd parallel. These two routes, one north-south, one east-west, made the Klamath Lakes Region an important crossroad for early travel.

The flight begins near Dome Mountain in Siskiyou County, California, and as the plane circles for altitude, a general view of the Klamath Lakes Basin is obtained. Looking northward from an altitude of 10,000 feet above ground, the main features of the region can be seen. A dozen miles to the north are the remnants (sumps) of Lower Klamath Lake and Tule Lake. To the east is Clear Lake Reservoir, the source of Lost River, which flows into Oregon in a wide arc and back into California. In the middle distance is the broad pattern of irrigated and cultivated fields and the concentration of houses and people on the

southern margin of Klamath Falls. Upper Klamath Lake stands out as the largest body of water; its outlet, Link River, flows into Lake Ewauna, then into Klamath River which meanders to the southwest and disappears among the ridges of the Cascade Range. The most conspicuous feature of all in our view is the Cascade Range with its conical peaks, such as Mt. McLoughlin (Mt. Pit) and Pelican Butte. The dark coniferous forest contrasts with the lighter shades of the basin-ranges to the east. It is evident that the combination of the Cascade Range with its water supply and the plain of old Lake Modoc with its large area of flat land makes the Klamath Lakes Region unique in eastern Oregon.

Eastward of Mt. Dome are a variety of lava surfaces, some are black, rough, and hummocky; other areas are lighter in color, smoother with a thin scattering of sagebrush and junipers. On the older lava beds a few intermittent stream channels appear. Early travelers on horseback found north-south travel fairly easy (Williamson and Abbot made 25 miles in a single day), but east-west routes have to cross faulted lava ridges, with steep scarps, called bluffs. At the foot of the bluffs are a few intermittent lakes or ponds; some have names on the map: Sheepy Creek Lake, Panhandle Lake, Gillem's Lake, and Boozey Lake; some of them are little more than water holes. Sheepy Creek is fed by a spring but the others are usually dry. There are few signs of human occupation, only a few abandoned sheep camps. Red Rock Road crosses the lavas east-west, looping over one of the scarps in Gold Diggers Pass, suggesting that this was one of the routes branching from the Applegate Road to the California goldfields. The recent lava flow in the northern part of the Lava Beds National Monument shows almost no signs of human occupation. In detail the surface is rough and hummocky, with many pits and sharp ridges. Here Captain

Jack and his Modoc Indians defended themselves in the Modoc War of 1872-73. The lava flowed into the southern part of old Lake Modoc and covered the original shoreline. An old outlet to Pitt River, located near California Highway 139, was dammed by the lavas. In the early days, before and after the settlement of Klamath Falls, travelers found it relatively easy to cross the lava. Before the railroad reached Klamath Falls people, goods, and cattle moved across the lava beds to railheads in California, at Yreka, Bieber, McCloud, and Alturas. Today U.S. Highway 97, State Highway 139 (39 in Oregon), two lines of the Southern Pacific Railroad, and the Burlington Northern Railroad find easy routes across the lava beds.

Beyond the steep, shattered edge of the lava beds is the southern sump of Tule Lake, a wildlife refuge, and a little farther to the north irrigated fields in an area called the "Frog Pond," suggesting that this also was sump in recent times. To the west is the steep scarp of High Rim (Sheepy Ridge) (fig 1.5). This 10-mile long ridge is a barrier to travel and no roads cross it. A tunnel under it allows water to be pumped from Tule Lake sumps up to Lower Klamath Lake sumps, from which it drains into Klamath River. But for this pumping, water would accumulate in the Tule Lake Basin and flood the irrigated fields. Tule Lake's only natural outlet is by seepage. In the southeastern part of the basin a high ridge called "The Peninsula" rises 500 feet above the highest historic lake level. This ridge was an island when the lake was high. On the mainland to the east the old shoreline of Lake Modoc is clearly visible.

Farther north a small ravine on the eastern margin of Tule Lake marks the point where the Applegate Road descended to the shore and joined the Oregon-California Trail. The Applegate

A



B



C



D



Fig. 1.4. Four aspects of the Basin margin. A. The dam on upper Link River. B. Fractured lava marks the shoreline of Tule Lake. C. The waters of Old Lake Modoc washed against the cliffs of the "Peninsula" near Newell. D. The old shoreline runs along the edge of the wooded area in Poe Valley. (Author's photos).

Road branched from the Oregon Trail near Fort Hall in Idaho. In the Klamath Lakes Basin it passed to the north of Clear Lake, around the north end of Tule Lake and then skirted the south end of Lower Klamath Lake. The old road has been mapped in detail by Devere and Helen Helfrich in "Klamath Echoes."<sup>4</sup>

The flight is now over the 42nd parallel, the boundary between Oregon and California (fig 1.2)<sup>5</sup> This boundary of Oregon was defined on paper in the Treaty with Spain in 1819, but the line was not surveyed until some 60 years later. Whether by human or instrumental error, the boundary and the 42nd parallel do not coincide in the Klamath Lakes Basin. The boundary, followed approximately by the State Line Road, is a significant line. On the Oregon side are many irrigated fields; on the California side fewer fields, many small marshes, and areas of sagebrush. A few large fields are used for dry farming. Most of the marshland is reserved for wildlife.

Near the north shore of old Tule Lake is the site of the stone bridge on Lost River, near the town of Merrill. This "bridge" was described in various ways in the early days. Ogden thought it was a rock dam constructed by the Indians to trap fish. Abbot thought that it was a natural bridge with water flowing under it. One of the immigrants described it as a "singular bridge." Actually it was a rock ledge, usually covered with one or two feet of water, sometimes more. Today a modern steel bridge and irrigation dam cover the old rock ledge. Since many people crossed the bridge and noted the depth of water over the rock ledge, the variations in lake level were recorded. The river level here was nearly the same as the lake level. At the stone bridge the road divided, the Oregon-California Trail continued north on the east side of Upper Klamath Lake to the Columbia River, the Applegate Road

turned west and then south around the south end of Lower Klamath Lake. In effect, the stone bridge was at a crossroads of the two main routes and it might have been expected that a town and later a city would be located here. The town of Merrill is located near the bridge but it was not laid out until 1894. The site lacked water transport and furthermore, as noted later, Klamath Falls has a much better site for a city.

Once across Lost River, the flight is above the Applegate Road over a low divide and along the west side of High Rim (Sheepy Ridge) and (fig 1.3) reaches the south shore of Lower Klamath Lake. The lake was generally low in the early days of immigration, now all that remains are a few shallow sumps and marshes. Lieutenant Robert Williamson with a part of the Railroad Survey party and a detachment of dragoons followed this route in August, 1855.<sup>6</sup> He found the lake very low and the shoreline so soft and "miry" that it was difficult to water the horses. Nevertheless, he mapped the lake as if it were full, thinking, perhaps, that the low water was merely seasonal. Fortunately other sources of water were available to the immigrants near the route. A half century later Lower Klamath Lake was full and shallow-draft steamboats connected the south shore with Klamath Falls. Several landings were established on the shore of the lake with access roads to Yreka and other California points. As the plane flies over Laird's Landing at the southern end of the lake, a few collapsed roofs of the old buildings and a stone corral are visible; also a dredged channel, enabling the boats to approach the landing at low water stage.

From Laird's Landing the main route of the Applegate Road crossed the gap between Little and Big Tableland, crossed Willow Creek and continued along the margin of Mahogany



Fig. 1.5. Landforms of the Klamath Lakes Area in Oregon and California, showing the ranges, scarps, and basins. For locations see Figure 1.2. (Author's photos of models by the U.S. Army Map Service).



Fig. 1.6. A general view of Klamath Falls showing the relation to Upper Klamath Lake and Lake Ewauna (lower left). The valley of Link River (left center) shows up as a wooded area. The Central Business District and the Industrial area (lower right). (Author's photo).

Mountain to the Klamath River at the site of Keno (fig. 1.3). Here the river flows over a rocky reef which formerly controlled the level of Lower Klamath Lake. In wet periods Klamath River began at Keno; in dry periods it began at Klamath Falls, 20 miles upstream. Later the channel was dredged from U.S. Highway 97 to Keno and a control dam constructed at Keno to regulate the Klamath River level.

East of Keno the flight route is over the Main Valley, also called Klamath Valley (fig. 1.2) and Lost River Valley. The plain is mostly under cultivation with rectangular fields and an overlay of irrigation ditches. A part of the flow of Lost River is diverted to Klamath River, to lessen the flow to Tule Lake. Most of the irrigation water for this plain comes from Upper Klamath Lake. The western part of the plain was covered with water at high water stages.

Farther east is Poe Valley and Langell Valley (fig. 1.2). These two basins are quite similar in appearance. Both are quite flat, most of the surface is between 4,120 feet and 4,200 feet in elevation, and Lost River flows through both. In Langell Valley pumping stations lift water from Lost River to the adjacent fields, since the gradient is too low to permit gravity diversion ditches. In the early days part of the course of Lost River in Langell Valley was underground.<sup>7</sup>

To the north are Yonna Valley and Swan Lake Valley; both were arms of old Lake Modoc. Swan Lake Valley is the most isolated and is not irrigated from Upper Klamath Lake. A part of it is irrigated by small tributaries and part from wells, using center-pivot irrigation; a large part is not cultivated. The large, circular, dark green patches stand out in contrast to the dry land.

To the west is Upper Klamath Lake, the largest in Oregon (fig. 1.1). A general view shows that except for the

southeast end the shores of the lake are generally sparsely populated and that cultivation is less intensive than in the southern and eastern basins. Three reasons are indicated; less level land, available level land is above the present lake level and irrigable only by pumping, and, third, much of the eastern shore of the lake was included in the Klamath Indian Reservation for almost a century, thus limiting white settlement. At any rate, aside from the expansion of the city of Klamath Falls toward the southeast corner of the lake, few towns and farms are to be seen on the shores of Upper Klamath Lake (fig. 1.6).

The importance of the upper lake is as a reservoir, to collect and store the water used to irrigate the southern and eastern basins. The numerous steep valleys on the slopes of the Cascades, the creeks and rivers entering the lake from the north and east are visible. The chief rivers show up as meandering ribbons, Wood River and Williamson River from the north and Sprague River from the east. The growing marshes and the deltas, building at the mouths of streams, indicate that all lakes are temporary. Upper Klamath Lake is slowly filling with sediment and vegetation. Only the resistant rock ledge at the lower end at the outlet where Link River begins preserved the lake into historic time. Today, a low dam controls the level.

To the north, the plane flies over the route followed by Ogden, Frémont, Williamson, and Abbot, all on horseback (see Chapter 2). The hills come down in steep slopes to the water's edge, making it difficult for men and horses to follow the lake shore, impossible for wagons. The first obstacle, Cove Point, is easily bypassed to the east, but Rattlesnake and Modoc points were real barriers (fig. 1.3). Apprised of the difficulty, early travelers detoured to the nearby ridges, some of which are nearly flat on top, and

returned to the lake plain farther north. The old wagon road is still visible from the air. Today, notches are carved in these points for a highway and railroad.

West of Modoc Point is the beginning of an extensive lake plain, only a few feet above lake level. Williamson River flows across the plain and enters the lake in a small delta. The course is lined with low levees to protect the adjacent fields from flooding. Fields are large and many show signs of recent cultivation. Some of them probably produce only a crop of wild hay. The main body of the lake now lies to the west of the flight; the shore is low and swampy; a large part of it is in the Wildlife Refuge.

The flight follows up Williamson River to the confluence with Sprague River and the town of Chiloquin (fig 1.2). This was the focal point of the Klamath Indian Reservation on a main line of travel in the early days. After the Southern Pacific Railroad arrived in 1911 the town grew rapidly. To the north of Chiloquin the valley of Williamson River is one mile wide, formerly a part of old Lake Modoc. To the east of Chiloquin are several north-south basin ranges, through which Sprague River meanders. A few miles upstream, Sprague Valley opens up onto an old lake plain, more than a mile wide, with several scattered ranches. Today a paved road from Chiloquin leads up Sprague River and joins Highway 140 near the town of Sprague River. This was the route followed by the Oregon Central Military Road, from the Willamette Valley to the eastern border of the state.

Northwest of Chiloquin is old Fort Klamath on the east edge of Lake Modoc Plain. The fort was established in 1863, ostensibly to protect the immigrants on the Applegate Road from the Indians, but for some curious reason it was located 50 miles to the north of the road. Some said it was really intended

to protect Indians from Indians, the Klamaths from the Modocs. In the vicinity of the fort, settlers began to move in and establish ranches, the first permanent settlements in the region. From the fort an alternate road was laid out across the Cascades to the Rogue River Valley. Today a part of this route is followed by State Highway 140; the road climbing the east slope of the Cascades to Lake of the Woods and heading for Medford is visible from the air.

Turning south and following the west shore of Upper Klamath Lake, the steep slopes of the Cascades come into view. Only a few flat marshy places occur on the Basin floor, some of which have been drained and placed under cultivation. When John C. Frémont described this area in 1846, he found traveling difficult because of the thick timber and deadfalls. Later Pelican Bay had a landing for lake steamers when logs were transported to the mills at the lower end of the lake. A number of other landings were used but very few settlements were established. At the lower end of Upper Klamath Lake is the upper end of Link River, the outlet. When the lake is at a low stage, the basalt ledge is clearly visible, also the low dam which reinforces the ledge and diverts water into the irrigation canals. The main ditch enters a tunnel, flows through a hill, then through the city of Klamath Falls.

Flying in a descending spiral over the city of Klamath Falls and environs (fig 1.6), the essential features are clearly visible. When George Nurse established his trading post here in 1867 he could not have chosen a more favorable site for a city. The city began on a low terrace well above flood level, on the shore where Link River flows into the wide part of Klamath River, called Lake Ewauna. To the north is a low hill which limited the early growth of the business

district in that direction, but there was plenty of nearly level land to the east and south, the direction of major growth. In effect, Klamath Falls was the head of navigation of the lower lake system when water transportation was important.

The site has good access to north-south and east-west roads. To the southwest is the connection with the Applegate Road, now route 66, at Keno. A ferry, later a bridge across the lower end of Link River made this route accessible. To the east, an easy route led through Olene Gap to Poe Valley, Langell Valley, and on to Sprague River Valley, connecting with the Oregon Central Military Road. The north-south route, in spite of some difficult points such as Modoc Point (the Modoc Point handicap was first overcome by a ferry) was soon improved and became U.S. Highway 97. A highway map of 1930 showed this road, ambitiously, as the California-Banff Bee-Line Highway. At this time U.S. Highway 97 did not continue south of Klamath Falls, as it does today. Instead, it crossed the Cascades with State Highway 66 and joined U.S. Highway 99 near Ashland. Klamath Falls does indeed qualify as a crossroad location, but another fact overrides this. The waters of Upper Klamath Lake are the lifeblood of the region and the controlling point is on the upper end of Link River. Here the major ditches take out to irrigate thousands of acres on the lake plain to the south. Once through or around the intervening hills, the water divides and subdivides and reaches even into California. To be sure, water comes from other sources, from Clear Lake Reservoir by way of Lost River, from a few other streams, and from wells, but Upper Klamath Lake is the major source.

From the air the essential features of the site of Klamath Falls and the functional parts of the urban landscape are easily identified (fig. 1.6). The restrictions to growth of the various

parts - business, residence, and industrial - are both natural and man-made. To the north of the original settlement on the east bank of lower Link River is a steep hill, limiting commercial growth but not residential. To the south is the shore of Lake Ewauna, so the central business district grew to the northeast in a narrow belt. As the CBD grew beyond the hill slope, it spread out both to the north and south. This situation gave the core of the city a rectangular street pattern, oriented northeast-southwest and northwest-southeast. The coming of the railroad in 1909 restricted the growth of the city on the southeast. The original street pattern persisted for the older parts of the city long after the Land Office maps had established the township, range, and section system. Some streets were laid out parallel to the railroad and some followed the meandering course of the main irrigation canal. In the newer parts of the city, including the large suburb of Altamont (fig. 1.3), the orientation is north-south, east-west. The chief industrial area, mostly woodworking establishments, begins on the shore of Lake Ewauna and extends to the southeast along Highway 39, where a variety of light manufacturing establishments are located. Large sawmills and plywood mills are located along Klamath River south of the city. For these establishments Lake Ewauna and Klamath River serve as log ponds for storing rafts of logs.

Flights over the Klamath Lakes Basin and study of airphotos reveal the chief features of the region. Field and library studies have suggested their geographic and historic meaning. Of great significance is the plain of Lake Modoc with its thick, nearly level alluvial deposits. Of equal importance is the nearness to the Cascade Range with its supply of water, partly from melting snows, all the more important because of the low

annual precipitation in the Basin. The lakes - Tule, Lower Klamath, and Upper Klamath - have played a changing role. In the early days when roads were few, the lakes were widely used for transport, first by canoes and rowboats, later by small steamers. Still later large areas of Lower Klamath Lake and Tule Lake were drained, put under cultivation, or converted to wildlife refuges. Upper Klamath Lake continues as the chief reservoir for a large part of the Basin. Clear Lake and Gerber reservoirs also supply water for irrigation via Lost River.

Rivers were, from the beginning of settlement, the chief source of water and travel by boat or by land followed their banks. Most rivers, Wood, Williamson, Link, and Klamath, flow generally southward. Sprague River flows westward and was an alternate route to the Willamette Valley. Of special significance in the drainage system are the hard rock reefs at the lower end of Upper Klamath Lake and in the Klamath River below Keno. These rocky ledges or reefs helped to maintain the levels of the lakes. The reefs were removed by dredging and a dam controls the river level.

The various basins (there are seven main ones) are filled with hundreds of feet of porous sediment, pumice, ash, cinders, and diatomite and constitute a huge aquifer for storing groundwater, a resource which is just beginning to be utilized. Igneous bedrock, underlying the sediment or exposed in the adjacent hills, furnishes, in some places, hot (geothermal) water sufficient to heat many buildings, including those at Oregon Institute of Technology.