

The Story of Las Trampas

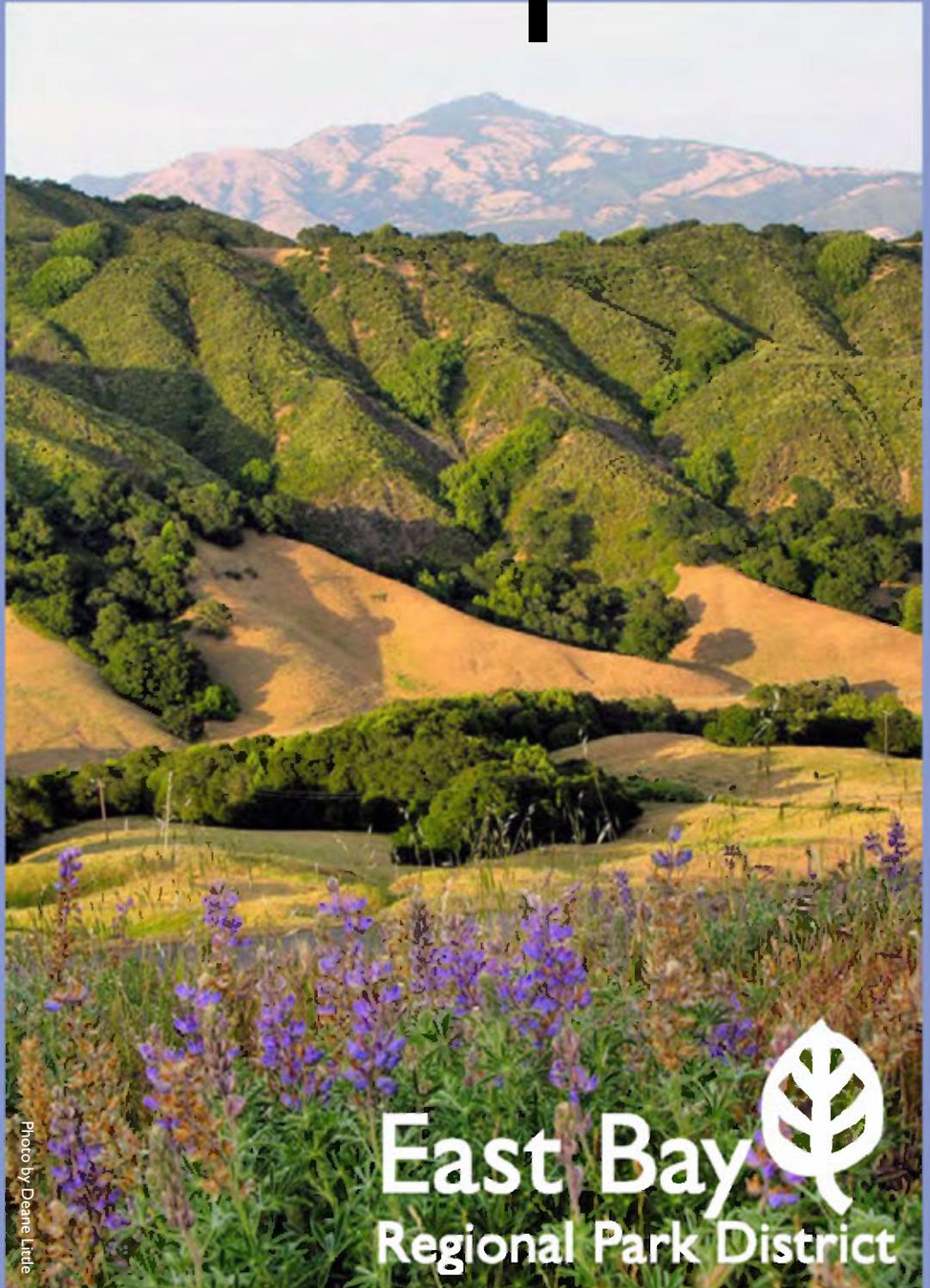
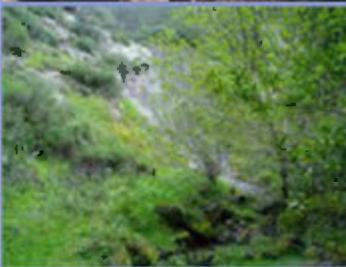


Photo by Deanne Little

East Bay 
Regional Park District

THE STORY OF LAS TRAMPAS

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A BRIEF HISTORY OF LAS TRAMPAS

By Molly Reeves

The earliest documented history of a land grant application to the area surrounding Las Trampas Ridge and Park, occurs in 1844 to the Romero brothers, Inocencio, Jose and Mariano. The application was accepted and signed by the Governor Manuel Micheltoarena, under the Mexican colonization and land laws of 1824. The grant covered five leagues, more or less, or approximately 17,600 acres, (one league equalled 4,400 acres), bordered by the Rancho of Joaquin Moraga on the W., S.W., the William Welch properties, "Las Juntas" to the N., N.W. and Salvio Pacheco and Lorena (wife?) to the N., N.E. In light of today's land values and size, the Spanish ranchos were vast land holdings of indefinite borders. In all of California, 50 ranchos of 11 leagues each and 350 of 4 leagues were granted under Spanish administration.

The fortunes of the Romero brothers' Rancho San Ramon, El Sobrante (El Sobrante meant 'surplus lands'), were ill fated for during an illness Inocencio entrusted his valuable documents to a distraught lawyer to use in a court land claim, only to have the lawyer leave the area soon after, for Georgia where he died! The loss of the original evidence permanently hampered the Romeros' land claim, despite lengthy hearings before the then American Commission in 1851 and following the expert testimony of their fellow neighbors Elam Brown of Lafayette, Jose Amador, James Tice and Ramon Briones. The testimonies were repeatedly rejected and declared invalid. Finally, Inocencio sold all rights and title to his lands to Andrew Jackson Tice in 1858 but not before having built fifteen years previously and lived in (the only brother to have lived on their property) an adobe near the Indian Village and springs in Tice Valley.

Such was a common fate for the Spanish rancheros, who having peacefully settled relatively undisputed lands (the Indians having dispersed to the hills) were now faced with the American authority from 1850 to 1870 to automatic review by the Lands Commission and appeals for their titles to the U.S. District Courts. Many a rancho lost all of his land and was forced to sell and quit-claim his properties.

When a land claim was recognized under the Mexican government, duly sworn and officially surveyed, (using a 137 foot 6 inch cord per each square league 4,400 acres) according to old histories "the new rancho symbolized his ownership by pulling up grass, breaking branches of

trees and shrubs and by throwing stones in four cardinal directions".

Names which today appear as County landmarks and place names were listed in an 1868 sales transaction as follows: Ramage (Peak), Wm. S. Cull (Canyon), Joshua Bollinger (Canyon), J. M. Tice (Valley), A. Stone (Valley) and Ned Hunsaker (Canyon), who was sheriff and tax collector! By 1874 Wittenmeyer, the County Clerk, had recorded land ownerships which divided the 8,000 acres plus, of the Rancho San Ramon, into the same quilt-like pattern of today's property lines, only the names have changed!

Indian evidence is fragmentary at best. One of the more complete records has been uncovered in Tice Valley area relating to the Saklan Tribe, approximately 1,000 inhabitants, from 1500 to 1772. These were primitive, food-gathering people, who subsisted meagerly at best on native berries, nuts and seeds, while living in simple mud-grass frames. They hunted and trapped in the nearby hills, which were called by the Spanish 'Las Trampas'. This meant 'the traps' and honored the Indian's method of driving elk and deer into the steep box-canyons. Thus when the animals were trapped, they made easy prey for a meal. With the increase of Spanish settlers and missionaries, plus pestilence and war, only remnant bands of the early Costanoans remained. By 1806 only very few triblets remained in the open valley.

Gone forever, too, are the Grizzly bear, herds of antelope and flocks of pelican which used to inhabit the valley and delta region.

No history would be complete without due consideration for the student movement S.A.N.E. (Save America's Natural Environment). Almost single handedly they succeeded in causing the transfer of \$26,000 earmarked for 'recreational-development' towards acquisition. You might say the kids adopted Las Trampas Park, and helped make it what it is today. Under the leadership of Mrs. Jane Helrich, science coordinator for the Mt. Diablo School District, they have further managed to preserve the wilderness aspect of the park by reducing the number of picnic facilities provided, as well as raised \$2500 for their own purchase of lands in Las Trampas. They have set an example for all of us to follow, their actions reflecting a genuine public spirit and concern for the welfare and future of Las Trampas Regional Wilderness Park.

Currently Las Trampas consists of 1533 acres, comprising

three major purchases: The Nordstrom property 480 acres purchased in 1966, Richard Mueller's 672 acres in 1969 and that same year the Starview Ranch of 313 acres was also added. The Mueller family secured some of their land in the early 1930s from Robert Dollar, of steamship fame.

Las Trampas had its beginnings in the minds of the Contra Costa Parks Council in advising the County Park and Recreational Commission to give serious consideration to the acquisition of lands in the Bollinger Canyon region. A study was proposed through the Board of Supervisors as to the feasibility of this area for park and recreational use. Following the recommendations, the East Bay Regional Park District entered into a contract with the State Department of Parks and Recreation for the release of State bond monies for the initial purchases of land.

Subsequently shown on page #4 is a map drawn in 1844. Esteros designated in the lower right-hand corner of the map are marshy areas near the old ferry slip in Martinez. Modern Pacheco Creek, listed on the map as Arroyo de las Nueces, probably accepts tributary of Pine Creek going downward at left-hand margin and the fork immediately above would probably be modern-day San Ramon Creek on the upper left and Las Trampas Creek on the right. The latter is designated Arroyo de las Nueces on the map. No doubt the two long ranges of hills are Rocky Ridge and Las Trampas Ridge. Arroyo del Hambre still retains that name and meanders along Alhambra Valley Road. The word "nueces", meaning nuts, would indicate the many native walnuts which abounded in the area at that time.

Interestingly all modern maps have "Bollinger" Canyon spelt thusly except the U.S. topographical maps which show "Bolinger".

On the page #4 map, "que se seca" written after Arroyo de las Nueces means in Spanish "that is dried" indicating, no doubt, its condition except in the wintertime.

-- Walter Knight

A GENERAL INTRODUCTION TO THE GEOLOGY AND PALEONTOLOGY OF LAS TRAMPAS REGIONAL WILDERNESS PARK

By Richard W. Clinnick & Stephen W. Edwards

This report was designed especially for intelligent but uninformed readers who long for a nontechnical introduction to the land around them. These readers, we trust, will be able to see the deliberate generality of our story as an enticing invitation to further research.

Las Trampas Regional Wilderness Park and nearby hills consist of a series of parallel ridges and canyons in the Berkeley Hills, about midway between the city of Oakland and Mt. Diablo. These low but prominent hills and Las Trampas Park in particular are of extreme interest to geologists, since they display today the results and remains of repeated marine inundations, volcanic eruptions, ancient rivers and lakes and fault movements including both uplift and transverse slippage. All of these have combined to cause numerous types of sedimentation or deposition of rock, many of which contain characteristic types of plants and animals. These remains allow geologists and paleontologists to deduce the relative ages of different formations of sediment, as each formation yields its own distinct assemblage of fossil life.

This report consists of a discussion of the major events of San Francisco Bay Region geological history, to be used as a reference or key to assist in the understanding of Las Trampas Park geology. Special consideration is given to what may be learned through analysis of fossil forms that may be found there, as well as to methods of study and interpretation.

The reader should remember, while studying such an account of the geologic history of a particular area, that natural earth movements, road-cutting, explosions and digging of all kinds continually supply the scientific community with fresh evidence. Unexpected discoveries are so frequent among the earth sciences that absolute historical interpretations based on observation of rocks must often be considered as tentative. Our own historical description is doubtless already questionable to some, aware of new understandings unpublished, in press or not in circulation.

GEOLOGIC SEQUENCES

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Within the sciences, particularly the earth sciences, a student quickly finds himself involved with studies of natural phenomena covering time spans from millions to hundreds of millions of years. This is a consideration of prime importance to the paleontologist, for one of the advantages the study of fossils has over other branches of natural history is the possibility of projecting back through time into past ages of earth history.

The geologist's comparative study of clays, sands, gravels, volcanic debris and similar formations has revealed a fascinating history of the earth. Geological formations which have been deposited layer upon layer and spread over the lowlands of the earth under the influence of such agents as streams, winds and glacial ice, and sedimentary deposits which have been laid down on the sea floor by wave and tidal currents, represent a temporal sequence of activity. Because sedimentary formations are deposited in this manner--layer by layer--those at the bottom of any undisturbed sequence are naturally the oldest, while successively shallower layers are younger. The naturally occurring stratification of sedimentary formations has enabled geologists to delineate their chronological order over much of the crust of the earth. From the comparative study of these layers a series of subdivisions of earth history have been recognized and outlined. The precise determination in years of geologic units is not possible; established dates represent fine estimates based upon information obtained through analysis of the thickness of rocks formed during any particular period, and the present degree of decomposition of radioactive materials recovered in association with the rocks in question.

ABSOLUTE DATING

Many rocks found in nature are combinations of several isotopes (atoms of the same element, chemically identical, but with different atomic weights). Of these isotopes some are radioactive--they emit nuclear particles and gradually disintegrate into other elements. Radioactive isotope carbon-14, for instance, disintegrates into stable carbon-12 and nitrogen. Today radioactive

(radiometric) methods are the most widely employed of the "absolute dating" techniques. This process is made possible by the naturally occurring radioactive isotope's gradual decay with the course of time. Each radioactive isotope has its own fixed rate of decay, so that it is not difficult to calculate, for a given specimen, the duration of time it has been in its process of decay. In calculating the length of time a certain radioactive isotope has been disintegrating, and by relating this quantity to the layer of sediment in which the isotope was found, an absolute date can be determined for that layer.

Three widely used radiometric dating methods include:
1. carbon 14 dating, applied to wood, charcoal, bone and other organic materials; potential accurate dating ranges up to about 60,000 years; 2. uranium 234--used in dating coral specimens, with a potential range of up to approximately 1,000,000 years; 3. potassium 40/argon 40 dating, dependent on the presence of volcanic material, with its potential range of accuracy starting from a time no later than 20,000 years B.P. (before present), but extending back billions of years.

FORMAL CHART OF GEOLOGIC TIME

The major divisions of earth history are known as "eras". Eras are subdivided into "periods", which may be further subdivided into "epochs". Examining the outline in figure 1, we can see that these divisions by no means represent equal lengths of time. Rather their boundaries are determined by significant events in geologic history, as precisely as the dates of those remote events can be known.

It is helpful and appropriate to imagine geologic history as a tall and majestic tree. Its huge gnarled trunk represents Precambrian eras, while heavy growth-laden limbs recall Mesozoic times, and far above the shaded ground fresh leaves and blossoming flowers, tossed by the wind, express the newness of Cenozoic history. Cellular growth, along the periphery of leaf buds and opening flowers, is as yet the only mark of recorded human struggles and triumphs.

CHRONOLOGICAL CHART OF THE HISTORY OF THE EARTH

Figure 1

Relative Duration of Major Geologic Intervals	Era	Period	Important Geological & Biological Events	Approximately					
				Duration millions of yrs.	Millions of yrs. Before Present				
Cenozoic	*C E N O Z O I C	Quaternary	Emergence of Man. Ice Sheeting.	3	3				
Mesozoic		Tertiary	Climates fluctuate between warm & cool, continental areas relatively free of marine inundation. Mammals begin to dominate the earth.	67	70				
Paleozoic						Cretaceous	The Rocky Mountains & the Andes are born. Dinosaurs meet with extinction. Birds, mammals, rapidly developing. Modern trees emerge: birch, elm, oak, maple.	65	135
							Jurassic	Land areas remain near sea-level. The 1st birds-Archaelpteryx-appear; Dinosaurs reach their peak.	45
	M E S O Z O I C	Triassic	Widespread desert conditions. Lobsters & complex arthropods in sea. 1st dinosaurs & 1st known mammals.	45	225				

Chart continued on page 8a with Permian period.

P A L E O Z O I C	Permian	Mountain building. Modern insects appear. Amphibians decline. Reptiles diversify.	45	270
	Carboniferous	Warm seas cover large areas. Giant insects dominate the forests, fish flourish, first reptiles appear.	80	350
	Devorian	Considerable areas of land below water. Lge tree-like plants appear on land. Amphibians, land-living vertebrates emerge.	50	400
	Silurian	Much land submerged. Mt bldg toward end. Some animals-scorpions, millipedes & some plants begin to live on land.	40	440
	Ordovician	Massive submergence of land areas. Seaweed, clams, starfish, coral present. Primitive fish, the 1st vertebrates.	60	500
	Cambrian	Lowlands, mild climates prevail. 1st fossil animals found, invertebrates-trilobites, mollusks, sponges, worms.	100	600
	Precambrian	Precambrian	Igneous activity, sedimentation, erosion. Life begins 3,000 million B.P.; bacteria, algae.	4,000

*The geological and paleontological history of the Las Trampas Park area occurs within the bounds of this era (Cenozoic).

Era	Period	Epoch	Important Mammalian Developments	Millions of years before present	
C E N O Z O I C	T E R T I A R Y	Quaternary	Pleistocene	Emergence of Modern Mammals including <u>Homo habilis</u> , <u>Homo erectus</u> , and <u>Homo sapiens</u> .	3
			P L I O C E N E	Gnathobelodon, Stegodon - elephant types; Teleoceras - rhinocerine with single horn; Pliohippus - horse; smilodon - sabertooth cat, Ramapithecines - Early hominids.	12
			M I O C E N E	Miocene mammals included-Gomphotherium, Mammut-elephant types; Baluchitherium-rhinoceros form, largest of all land mammals; Merychippus-horse, Machairodus-sabertooth cat; Palaeocastor-rhodent, beaver type; Dryopithecine apes-forerunners of Modern Apes and Man.	25
			O L I G O C E N E	Most of the living mammal families were present in the Oligocene. Some of the mammals were: Paleomastodon-elephant form; Brontotherium-a gigantic relative of the horse (early extinction); Hyaenodon-carnivore; Meschippus-horse; Caenopus-an early rhinoceros; Cricetops-rodent, Branisella-New World Monkey; Apidium-Old World Monkey; Oligopithecus, Propithecus, Aegyptopithecus-earliest apes.	40
			E O C E N E	Most modern mammal orders already present. Ancient groups of mammals prominent in the Eocene include: Moeritherium-1st elephant type; Eohippus-earliest horse; Hyrachyus-a forebear of the rhinoceros; Uintatherium and Eobasilus were the giants of the time - forerunners of the hoofed animals; Oxyaena, Mesonyx, and Tritemnodon-early carnivores; Many Prosimian Primates.	60
			P A L E O C E N E	Numerous hoofed herbivores; many emerging predacious carnivores; early primates; first rodents	70

* Marine and terrestrial fossils are most abundant from these two geologic epochs in the Las Trampas Regional Wilderness Park area.

SAN FRANCISCO BAY REGION

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Miocene

For millions of years before the middle Miocene epoch, an ancient sea occupied much of the present area of the California coast ranges. Because sediment was carried down from adjacent hills as well as from a low ancestral Sierra Nevada, this marine basin provided occasion for rich accumulations of fine-grained transported rock, now detectable as tremendously thick clay and sandstone deposits. Within these deposits can be found the fossil remains of extinct marine plants and animals.

Between approximately late Jurassic and Miocene times, this inland basin suffered periods of advance, decline and crustal deformation, so that the area was at times subdivided into smaller basins.

One period of massive inundation, bringing the Pacific shore far into the area of the present central valley, commenced in the early Miocene. At about the same time considerable mountain-building took place, so that at least the ancestors of several of the present coastal ranges were above water, perhaps extending north to south as axial-ridge islands.

During the Miocene, deposits of sand and silt gradually filled this inland sea, as the highlands from which the sediments came eroded away, so that by late Miocene times much of the previous basin consisted of low relief. Volcanic debris including ash, lava flows and boulders are mixed with this Miocene silt. This material probably originated from the axial interbasin ranges as well as from isolated volcanic islands. (Analysis of some volcanic formations of this period indicate that not all such activity produced surface effects. Molten rock which thus hardens beneath the surface only to be exposed by erosion sometime later is called "intrusive".)

Pliocene

Shallow inland seas persisted into the upper Miocene. Land masses were low and supported a surprisingly modern flora, dense enough to leave behind rich coal deposits. However, sometime in the late Miocene or in the earliest Pliocene, one long north-south ridge arose at about the longitude of the present bay, barring Pacific entrance into the central valley. Only far south of the present bay were ocean waters

admitted into the interior. Geologists call this ridge the "Orinda-Merced axis". Dry land obtained on the ridge's east side, where sediments washed down onto a broad plain at least as far as the ancestral Diablo range, which at that time was a fairly prominent one. Today geologists refer to sediment contributed by the Orinda-Merced axis and the ancestral Diablo range to the valley between them as the "Orinda formation". It consists mostly of mudstone, silt, sandstone, conglomerate and some volcanic ash which when compressed forms "tuffaceous" rock. This last material indicates the presence of early Pliocene volcanic activity, probably most intense somewhere to the northeast of the Orinda-Merced axis.

Perhaps the most interesting aspect of the Orinda rocks is that they contain fossil remains of mammals. This is fortunate since the lowest Orinda sediments are as yet of debateable antiquity. In some places these rocks not only interfinger but actually underlie formations of the upper Miocene. According to accepted stratigraphic principles, the lowest member of an undisturbed series of layers of rock is the oldest. Therefore Bay Region Orinda sediments are usually considered Mio-Pliocene in age. However most geologists are still uncertain about Orinda rocks, and future fossil mammal discoveries could be helpful indeed in clarifying temporal relations.

In the late Pliocene a period of explosive mountain building terminated more placid axial-range erosion. Remnants of inland seas receded, and most of the areas of the present coast ranges uplifted. Faulting (faults are radical breaks between adjacent rocks or land masses which are moving or have moved relative to one another) intensified, and sedimentary strata were folded, overturned and broken up.

In the rugged newborn coast ranges erosion increased, sending debris into coastal basins, and final Pliocene stages were occupied by the lowering of hills and filling-in of valleys once again. A low rolling topography was produced, leaving only remnants of the main coast ranges. (The dense volcanic core of Mt. Diablo, for example, which had only just appeared in the late Pliocene, was nearly leveled).

Pleistocene

One could almost say the Bay Region landscape we know today arose from scratch in the last two or three million years. The advent of the Pleistocene epoch introduced an onslaught of faulting associated with massive orogeny (mountain building). The coast ranges rose as huge tilted blocks, while the San Francisco Bay basin sank between two faults, admitting the sea. (A valley which sinks between two faults is called a "rift valley" or "graben"; a block that rises between two faults is called a "horst".) It is from this early Pleistocene time of deformation that we have the heights of our modern coast ranges, while their gullied and variously weathered present forms have come to be since that time.

LAS TRAMPAS

One can readily discern many aspects of Las Trampas park anatomy which clearly confirm what we already know of Bay Region geological history.

The Las Trampas area underwent major periods of uplift in late Pliocene and early Pleistocene, as did the coast ranges in general. Today Rocky Ridge stands 2000 feet above the sea, while Las Trampas Ridge has attained an average altitude of about 1600 feet. One must therefore experience a truly satisfying emotion, walking along the crest of either ridge, to know that surrounding millions of fossil shells imbedded in rock represent the Pacific Ocean floor of twenty million years ago. (See figure 3).

The most fascinating component among these Miocene sea-floor rocks, and one of the undoubted attractions of the park, is the Cierbo formation graywacke sandstone. This rock outcrops as huge projecting boulder-cliff hogbacks (see figures 4 and 5) along the western side of Rocky Ridge, and as flat-faced tilted beds or bulging walls (which from a distance are indistinguishable from Sierran granite) along the west side of Las Trampas Ridge. Cierbo graywacke consists of sandstone mixed with volcanic ash, along with minor mineral components usually found in granite, which give the rocks an intriguing salt-and-pepper appearance. Geologists believe their presence indicates shallow irregular bays and straits where sediment accumulated quickly.

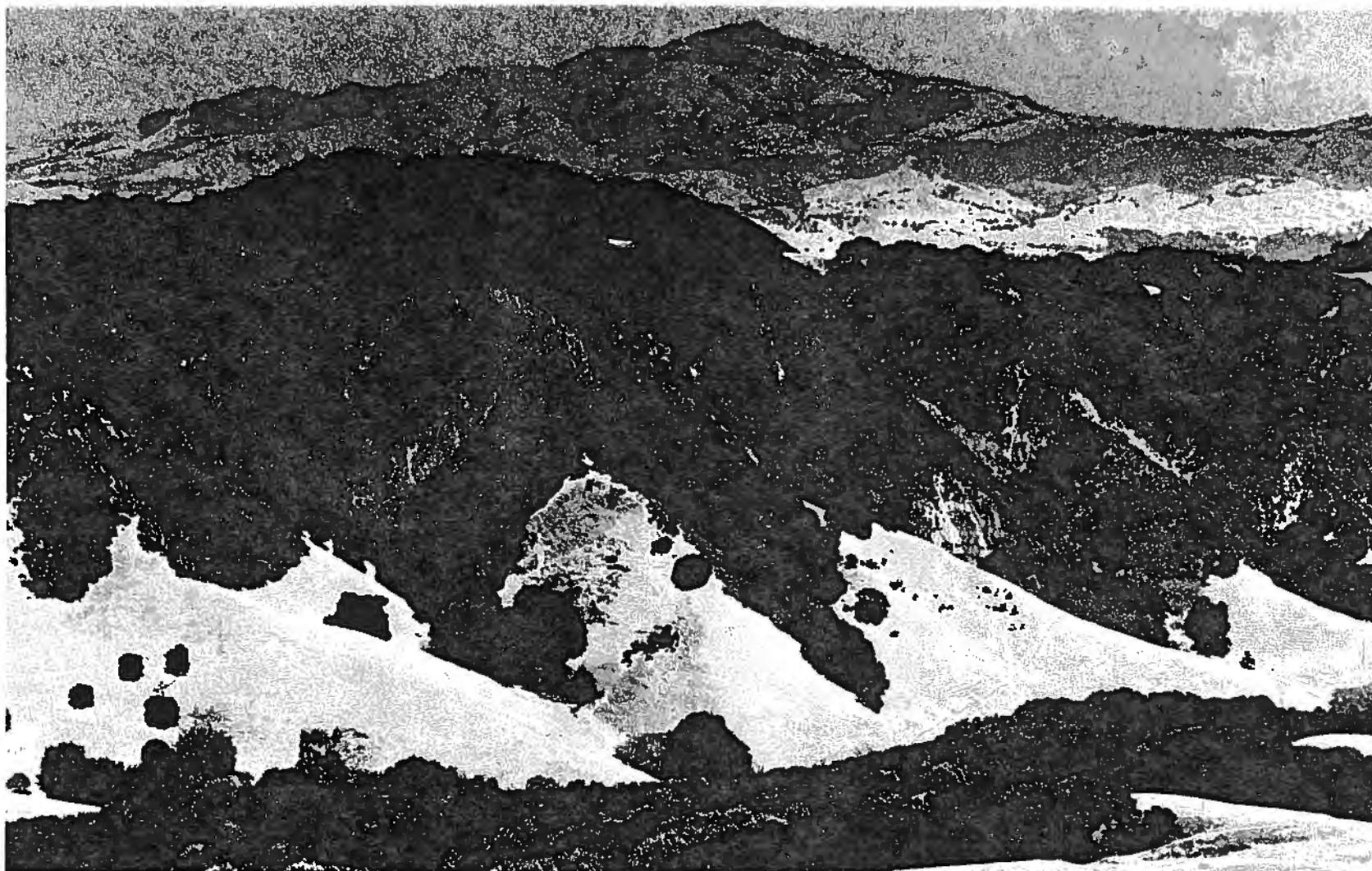


Fig. 3 - A middle view of Las Trampas Ridge from Rocky Ridge with Mt. Diablo in the distance.



Fig. 4 - View of a "hogback" formation seen from south to north. This ridge parallels Rocky Ridge to the west. It is adjacent to Las Trampas Regional Wilderness Park on land owned by the East Bay Municipal Utility Dist.

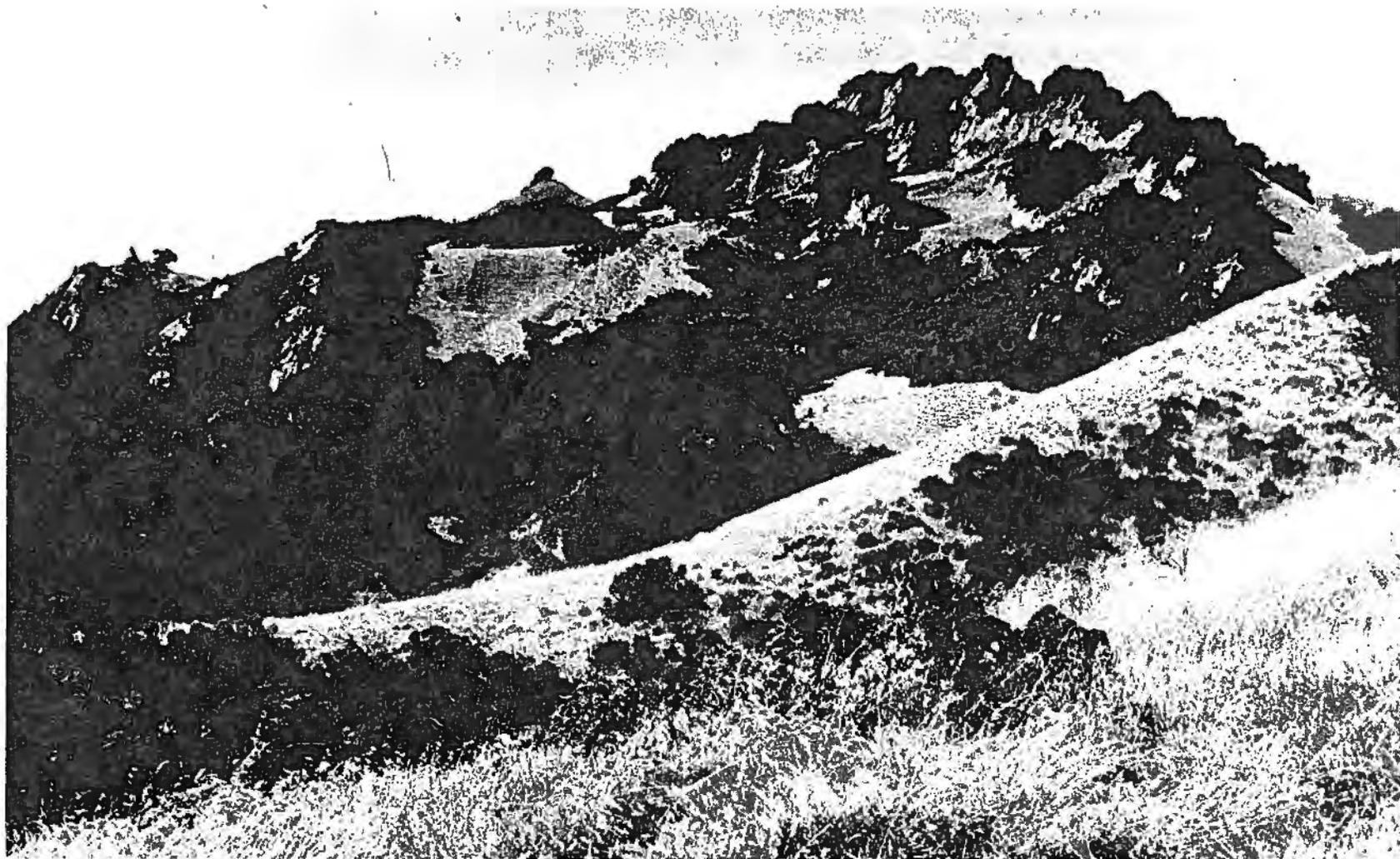


Fig. 5 - Another view of the "hogback" formation seen from south to north, viewing the western face.

Exposed along the two ridgetops are at least five different marine formations, all of which contain fossil shells, each indicating unique conditions and different times of sedimentation. All are Miocene in age--the period of time during which California experienced a vast western expanse of Pacific waters.

Mio-Pliocene marine recession facilitated deposition of the continental Orinda sediments. These wonderfully exciting rocks are exposed in the park along both flanks of Rocky Ridge and in Bolinger Canyon. Because they contain fossil land mammals to whom much of this report will be devoted, it is best to describe them in detail.

Orinda sediment is mostly mudstone, silt, sandstone and conglomerate. The conglomerate occurs in beds up to forty feet thick, containing subrounded pebble to boulder-size fragments of porphyritic volcanic rock, vein-quartz, sandstone, metamorphic rocks and chert. Thick beds of gray and red siltstone, mudstone and sandstone generally underlie the grassy eastern slopes of Rocky Ridge.

Orinda sediments become thicker to the east, suggesting that they flooded large basins as alluvial fans from the west. Likewise pebbles are so aligned as to suggest streams or rivers that flowed to the east. Another indicator of stream sedimentation is the fact that some easily-eroded Orinda rocks are well-preserved, suggesting short periods of transit or exposure to water.

Overlying, generally mixed with, and often confused with Orinda rocks are Mulholland formation sediments of the middle Pliocene. These consist basically of shale, siltstone, limestone and sandstone. Fossil ostracods (small crustaceans that secrete two shells, like miniature clam shells) and extremely well-preserved leaf imprints suggest that a time of quiet valley lakes followed earlier Orindan streams. (The best place to see Mulholland rocks is at St. Mary's College, where beautifully rippled sandstone beds are exposed in a roadcut northeast of campus.) Mulholland exposures occur in Gull and Bolinger Canyons.

The oldest rocks in the Las Trampas Park area are poorly represented. They are marine sandstone, conglomerate and shale of probable upper Cretaceous age, outside the south boundary of the park, and west of Rocky Ridge. They contain no fossils.

Paleocene rocks are unknown from the area, while marine Eocene sandstone and probable Oligocene tuffaceous sandstone and siliceous shale are present only as small exposures outside and northeast of the park.

PALEONTOLOGY: FOSSILS

Paleontology deals with both biology and geology. Study of fossil plants and animals is the primary object of paleontology, and fossils occur in sedimentary rocks, the study of which falls within the discipline of geology.

The necessity of paleontology being the interdiscipline of biology and geology is seen in the understanding of what a fossil is.

Fossils are remains of once living organisms, which can be biologically studied and classified. Most fossils represent species now extinct, displaying a definite temporal sequence of floras and faunas which have given rise to contemporary living forms. In elucidating the historical sequence of ancient organisms, paleontologists must refer to the historical relations of the different geological formations which contain them.

Generally only the hard parts of organisms are fossilized. In rare instances the softer parts may be preserved as well. Remains of mammoths, for example, solidly frozen for thousands of years, have been exposed by melting ice and ravenously devoured by wolves. (Often, when observers arrive, only bones, fur, and scattered bits of flesh remain for study.)

Fossilized plant material most commonly consists of imprints in stone, though complete stone replicas are abundant also.

Shells of marine invertebrates are usually preserved compressed, broken and sandwiched between layers of rock, their calcium carbonate substance often, but not always, replaced by other minerals.

The process of bone fossilization involves the replacement of protein by inorganic minerals from ground water percolating through the bone. Since this substitution of materials occurs at the molecular level, and because only soft parts which have rotted away are replaced, the form of the bone is exactly preserved as a combination of stone and the chemically complex original hard parts of the bone.

TAXONOMY

The paleontologist endeavors to classify the creatures he discovers, in terms which reveal their biological relations to all other living things.

The practice of taxonomic classification consists mainly of three operations: 1. observing and describing related but varying organisms; 2. recognizing them as forming an organized hierarchy according to population and phylogenetic principles; and 3. establishing appropriate nomenclature to reflect these different groups.

In the hierarchical system of classification a particular term is applied to each recognizable level or category. The smallest group regularly used is the species. A species is a group whose members display a high degree of mutual resemblance, to the extent that they are usually capable of freely interbreeding, with the production of fertile offspring. Genus (plural genera) is the term used to designate a grouping together of members of different species close enough to each other to reflect a recent common ancestry. Similar genera are grouped together into families, and similar families into orders. Examples of this category are primates, insectivores and rodents. A class is composed of similar orders, for example amphibians, reptiles, birds and mammals represent different classes. Phylum (plural phyla), the next higher category, consists of one or a number of classes--thus amphibians, reptiles, birds, and mammals, though different classes, all belong to the phylum chordata. The largest and most comprehensive level of taxonomic classification is the Kingdom, of which there are three: plants, animals and protistes; and it is to one of these kingdoms that all living things belong.

Oftentimes it becomes difficult to classify organisms simply between or within the above categories, and in an attempt to accurately represent the phylogenetic relationships between creatures, the terminology becomes modified. It is not unusual, therefore, to find an organism belonging to a particular super and subfamily as well as to a family. For example, man can be classified as follows:

Kingdom	Animalia
Phylum	Chordata
Subphylum	Vertebrata
Superclass	Tetrapoda
Class	Mammalia
Subclass	Theria
Infraclass	Eutheria
Cohort	Unguiculata
Order	Primates
Suborder	Anthropoidea
Infraorder	Catarrhini
Superfamily	Hominoidea
Subfamily	Homininae
Genus	<u>Homo</u>
Subgenus	<u>Homo</u>
Species	<u>sapiens</u>
Subspecies	<u>sapiens</u>

CLARENDONIAN MAMMALS

Fossiliferous deposits in and around Las Trampas were described in 1939 by R. A. Stirton of the University of California at Berkeley. Although the Clarendonian (early Pliocene) site at Black Hawk Ranch near Mt. Diablo has yielded abundant bones and teeth of reptiles, birds and mammals, Las Trampas sites have given up only scattered remains.

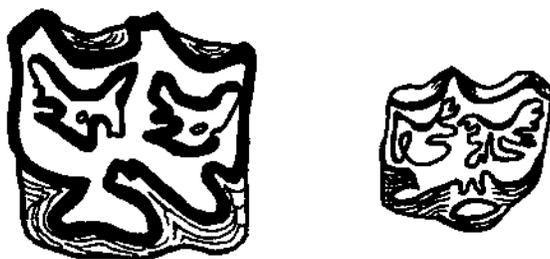
Geologists and paleontologists cannot yet say for certain how old the Trampas Orinda formation sites are. We do believe, however, that they are somewhat older than Black Hawk fossils from which may represent a fauna twelve or thirteen million years old. In any case, discoveries at Las Trampas suggest a fauna very similar to that of Black Hawk Ranch.

"Elephant teeth" from Las Trampas almost certainly represent remains of Gomphotherium, a mastodont with four tusks, two on each jaw. His head was flatter and his trunk perhaps shorter than those of living elephants. (See fig. 6, page 21.) Curiously, his lower jaw was decurved, or bent down toward the ground, just anterior to his cheek teeth. Elephants have only cheek teeth (in particular, molars) and incisors, the latter specially modified to form tusks. Gomphotherium molars have three or four rows of two low, rounded cusps, unlike those of living elephants which have many parallel ridges but no cusps.

Gomphotherium was not ancestral to living forms.

Two complete lower jaws were found just northwest of the present boundaries of the park, and are now housed at the University of California Museum of Vertebrate Paleontology in Berkeley.

The most common remains found in Las Trampas fossil beds are the teeth of an as yet unidentifiable horse. At least three genera of horses lived in the Clarendonian (Hipparion, Nannippus, Pliohippus) but this horse has a dental anatomy which does not correspond precisely with any of them. It will require much research and perhaps some revision of previously accepted ideas about how the teeth of one species of horse may vary, before the identity of our "new" horse is even tentatively settled.



Left upper molar of Equus (left) and right upper molar of Hipparion, to show differences in occlusal morphology. (Hipparion actual size, Equus slightly enlarged.) Note: Horse teeth we have found are very similar to the Hipparion molar pictured above, though they are probably not those of Hipparion.

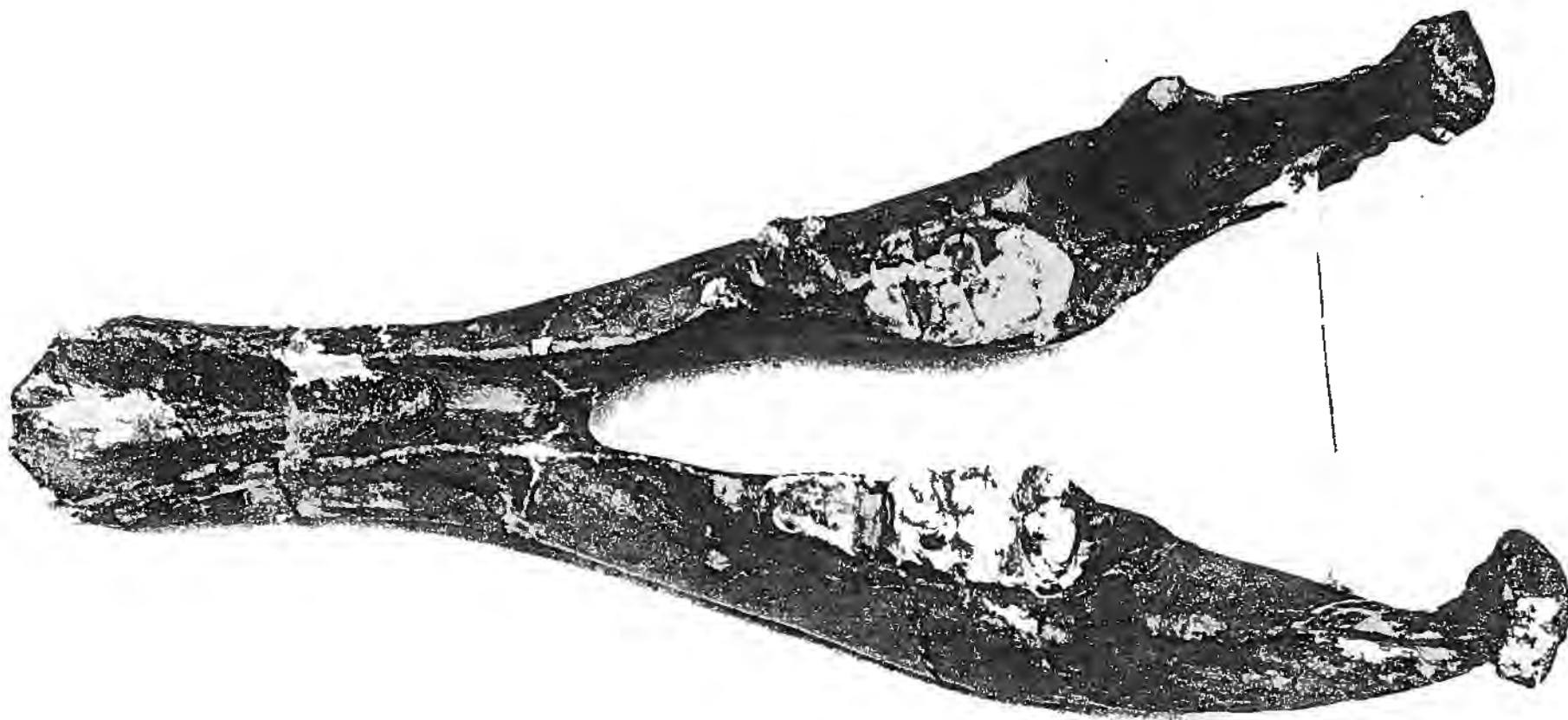


Fig. 6 - Mandible of a young Gomphotherium from the Las Trampas area. Occlusal view. (Photo by R. W. Clinnick. Specimen courtesy of the Department of Paleontology, University of California, Berkeley.)

Primitive camels and three other genera of horses have been found at sites near Las Trampas and at other sites possibly equivalent in age. The authors have discovered numerous teeth of small squirrels, the vertebrae of a toad and the specialized "carnassial" tooth of a carnivore, which remains to be identified, along with numerous bones crushed or stabbed before fossilization. The authors have also been blessed to recover a beautiful palate of Ustatochoerus, the last surviving genus of the oreodonts, an extinct family which is rather pig-like but closely related to camels.

At the Black Hawk site, where evidence is richer, finds include: primitive rabbits, ground squirrels similar to modern forms, archaic beavers, foxes, hyaenoid dogs, coati and wolverinelike carnivores, a large cat much like the modern mountain lion, possible saber-tooth cats, various archaic horses, peccaries, oreodonts, at least three genera of camels, a ruminant, and a gracile antilocaprid possibly ancestral to the prong-horn "antelope".

Other mammals, which might seem equally strange as Californians, appeared in middle (Hemphillian) and late (Blancan) Pliocene times, and in the Pleistocene. These included rhinoceroses, ground sloths and mammoths.

No one knows for sure why these animals went extinct. Most disappeared no later than ten thousand years ago.

There were myths in early America which told of strange and monstrous creatures which stalked the western forests, but none were found. Thomas Jefferson, who himself named the ground sloth Megalonyx, asked Lewis and Clark to look for them. They had no luck.

Countless theories have been offered to explain Pleistocene extinctions in many parts of the world. Some blame ice, some human overkill, some both. Either possibility may be true, for it must be remembered that in a complex and delicate ecosystem every species depends on every other--each alone and all together--so that the loss of one species may precipitate the extinction of an entire fauna. Reputable biologists, for example, suggest not only that dinosaurs may have gone extinct due to the extinction of laxative herbs on which herbivorous dinosaurs depended, but also that the herbs may well have disappeared due to an increase in cosmic radiation from a supernova (exploding star) in the Milky

Way. These are fanciful ideas--of course--but the fact that they are indeed quite possible demonstrates once more the awesome delicacy of life.

PLIOCENE PLANTS

In Kenya, when drouth comes, thirsty elephants seek out the baobab--a soft-stemmed tree of monstrous girth--to rip out and chew the moist interior. Cryptic succulents known as living rocks are safely hidden from view; more prominent succulent euphorbias, protected by long, stout spines, stand unmolested in the African sun.

This is the environment with which one normally associates hyaenas, rhinoceroses, zebras. But one of the most exciting things about California Pliocene mammals is that though many were closely related to modern African forms, they lived in a floral habitat almost identical to that which can be seen at Las Trampas today.

Over hot, west-facing hillsides spread mountain mahogany (*Cercocarpus*) and a sumac (*Rhus*) of the very same genus as poison oak. In ravines on those hillsides grew several species of oak (*Quercus*) very much like modern oaks. Climb up Las Trampas Ridge today and you will find the same type of flora.

Clarendonian plants are fairly well known, but Hemphillian (Mulholland formation) fossils are so far more plentiful, and from them we know there were many more similarities with the modern flora.

An extinct California bay laurel (*Umbellularia*) probably shaded east-facing hillside ravines and canyon bottoms, as bay laurels do today. Dogwood (*Cornus*) and maple (*Acer*) grew among them. A buckbrush-coffeeberry-manzanita (*Ceanothus-Rhamnus-Arctostaphylos*) chaparral joined sumac and mountain mahogany on the sunburnt hillsides, blending into an open forest of oak (*Quercus*), Fremontia (*Fremontodendron*), ash (*Fraxinus*) and madrone (*Arbutus*), on gentler slopes. Also present were barberry (*Mahonia*) and bushpoppy (*Dendromecon*), along with other forms closely related to modern types.

All these genera have modern representatives, and most are now present in Las Trampas Park. Without doubt appearances on hillsides and in rugged canyons were much like today.

The broad, flat plain with shallow lakes and meandering streams upon which both Orinda and Mulholland formations were set down, and which supported herds of Hipparion, camels and mastodonts, had another kind of flora. Willow (Salix) and aspen (Populus) lined the streams, overshadowed only by magnificent sycamore (Platanus) and elm (Ulmus).

* * * * *

Far away from smog, stench and pestilential noise, seek out the few remaining wilderness retreats of lowland and coastal California; discover again a peace, a confidence, an easy progression of life unspeakably old; find a barren rock and climb it, gaze out over the windy fields mastodonts once knew, ponder the deep and mysterious past from which you have come to be. And if your heart is lost twelve million years past, you may have finally found the long road home.

GLOSSARY

1. conglomerate: rock composed of cemented gravels.
2. geomorphology: study of the development, configuration, and distribution of the surface features of the earth.
3. igneous: rock material formed by the action of a fusing heat from within the earth; rocks consolidated from a molten state--from the Latin word ignis meaning fire.
4. metamorphic rock: rock that has endured changes in composition and texture caused by earth forces accompanied by heat, pressure and moisture.
5. mudstone and siltstone; very fine-grained rocks composed mainly of compacted and chthonicated mud and silt.
6. phylogeny: the history of the evolution of a species or group--from the Greek phylogenie which is a composite of phylon, race, and genia, birth, origin.
7. population: coherent complex of interacting members of a species, contained within a limited, or within a defined, geographical area. From the Latin word populus, meaning the people.
8. porphyry: an igneous rock with a groundmass enclosing crystals of feldspar or quartz.
9. shale: mudstone or siltstone type rocks which, when broken, most readily part along smooth planes parallel or nearly so to their bedding.
10. silica: extremely hard crystalline silicon dioxide, SiO_2 --the main constituent of quartz and sand.
11. siliceous: pertaining to, resembling or containing silica.
12. stratigraphy: a. the order and relative position of different layers of the earth's crust; b. the study or discription of such layering.

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MAMMALS OF LAS TRAMPAS

East and west-facing wind-swept ridges, dusty valleys, and moist spring-fed ravines establish a variety of accomodating animal habitats. This character of land ecology accounts for the different mammals and reptiles found within Las Trampas Regional Wilderness Park. Creatures from cougars to deer mice to western fence lizards and aquatic garter snakes have been reported and sighted.

The following is a compendium of animals known from the Las Trampas Park area:

Order: Carnivores

The flesh-eating mammals found in and about the Las Trampas Park area include: Cats, foxes, coyotes, skunks, badgers, weasels and raccoons.

COUGAR The Puma, (*Felis concolor*) also known as the Cougar or Mountain Lion, has been sighted and reported from within the park grounds and has been further identified by occasional ghastly screams emanating from Las Trampas Ridge, near the beginning of Chamise and Mahogany Trails and paw prints have been found leading up the Grassland Trail toward Las Trampas Peak. The big cat (80-200 pounds) is timid in the face of man. There are no known, properly documented, cases of an unprovoked attack upon an adult human. Deer are common prey of the Puma, though small mammals like rabbits and mice often balance the cat's diet and even such unlikely fare as grasshoppers and scorpions are eaten. Normally the Cougar's fur coloration is a melange of yellow and red hairs. However a very unusual and rare black Puma has been positively identified and observed in the Devil's Hole area of the park. The observer reports that the young cat playfully amused himself for approximately fifteen minutes in bantering and chasing the small animal.

The author and friends hope to track and photograph both the tawny and black Cougar documenting their life in the park.

BOBCAT The Bobcat or Wildcat (*Lynx rufus*) is a short tailed long legged cat measuring 25 to 35 inches in body length and weighing 15 to 30 pounds. Coloration varies but generally the coat is reddish to olive-brown and always streaked with black. The undersides of the body are light, often white, and commonly diffusely spotted with black. Bobcats prefer to live in wooded ravines. His only real enemies are men and roving

dog packs. Shortly after Las Trampas Park was opened for public use a number of irresponsible men carrying firearms and aided by hunting dogs scared a young Bobcat up into the large Bay-laurel tree adjacent to the parking lot. Fortunately the cat was promptly rescued and the men and dogs were ushered from the park. Being cautious animals, these cats are easily frightened by men. However this is no reason for regarding them as timid, relatively weak creatures. A single hunting dog is rarely able to detain a mature Bobcat and even when caught in a trap the Bobcat has been known to fight off a coyote. To fully appreciate the Bobcat's strength and ability it must be related that a 25 pound Bobcat can subdue and kill a 200 pound deer by sinking its canines deep into the deer's neck and maintain this attack by securing its hold with sharp curved claws.

Bobcats are seldom seen because, although they may be relatively abundant in certain areas, they are wary and retiring. Also they are primarily nocturnal animals. The Bobcat's usual diet is composed of rodents, rabbits, other small animals, and birds.

GRAY FOX

(*Urocyon cinereoargenteus*). In color the Gray Fox is grizzled gray on the head, back and flanks. The tail is bushy with black hairs, complimented with a line of stiff bristly hairs below. Cream-white dominates the underside of the animal and where ventral fur blends into the gray uppersides a varying amount of reddish-orange intervenes. With their salt-and-pepper coats and inconspicuous nature the Gray Foxes readily blend into their preferred chaparral-oak association habitat. Being relatively small animals (body length 21-29 inches, tail 11-16 inches and averaging between 7-13 pounds) Gray Foxes are sure-footed runners and able tree climbers. Endowed with a keen sense of smell and an acute sense of hearing, they are adept hunters of rodents and rabbits. Living near residential and/or farming areas, the Gray Fox is an extremely beneficial rodent controller. Frequent park visitors can look forward to an occasional view of Gray Foxes as they nose their way through grassland areas or run across and along open trails.

RED FOX

Traditionally wily, hunting mostly by night and an expert at concealment by day, the Red Fox (*Vulpes fulvus*) has been reported absent from the bay region. To the contrary, this golden-red animal has been conspicuously observed at Las Trampas Park. On a warm and clear summer afternoon, the author, his wife Lynn, and two friends (Walter and Irja Knight) had the delightful opportunity of being visited by a beautiful young Red Fox. We relaxed at a table in the Thistle Picnic Area and watched

in amazement as a light footed and sharp eyed Red Fox advanced unhesitatingly through the picnic area. The inquisitive animal spent no less than five full minutes investigating us, tables, trash barrels and barbecue stands.

Less than a half hour later a dark and sleek fox sporting a silver muzzle and silver-tipped tail caught our attention as he casually walked across the parking lot and headed up toward the beginning of the Creek Trail. In excitement I quickly arose and pursued the animal in hopes of glimpsing a more proximate view. Upon my closer approach, the wily fox bounded high above tall grass extending ten meters between us; at which point he suddenly bolted, sat straight up and peered directly at me. He did not pause long though before continuing on down and away under the cover of oaks.

Interestingly the "red fox" and "black and silver fox" sighted are both true Red Foxes. Four color forms are displayed by the Red Fox, sometimes all in the same litter. There is (1) the "usual" orange-reddish type with white undersides, dark feet, black ears and white-tipped tail; (2) and almost pure black form with silver-white muzzle and silver tipped tail; (3) the form commonly known as the "Silver Fox", with a semi-melanistic coat fashioned by a blend of white-tipped hairs spread throughout the back and flanks; and (4) the "cross" form which is predominantly reddish-orange with a dark band along the spine, crossed by another dark band running over the shoulders from the outer side of one foreleg to the other.

The Red Fox is a larger animal than the Gray Fox and in contrast to the Gray Fox is a creature of open meadowlands. Being cunning and swift, the Red Fox is known to capture such difficult prey as muskrats, skunks, opossums and ground squirrels. Year-round staples, however, are cottontails and field mice.

Man in hunting and killing the Red Fox not only commits the crime of unnecessarily murdering a beautiful creature but also serves to eliminate a most useful friend who is adept at preventing excesses in rodent-vermin populations.

COYOTE

Certainly one of the most senseless and heinous attacks that man has leveled against his natural environment has been and is his relentless campaign of Coyote (*Canis latrans*) extermination. As a fur bearer and sometime killer of livestock, the Coyote has been

ruthlessly trapped, snared, shot, poisoned and even stomped to death. As to the last method of killing it is not difficult to locate photographs of trappers proudly smiling as they stomp to death helpless Coyotes bound up in snares. Despite the evidence of studies, which have shown that approximately 80% of their diet consists of jack rabbits, ground squirrels, gophers, mice, and similar small mammals, about 90,000 Coyotes a year are still killed in federally supported programs alone.

We can therefore feel some comfort in knowing that Las Trampas Park offers a peaceful refuge for the hunted Coyote. Though he prefers grassy rolling hills and open rangeland, the Coyote has rarely been observed in the Las Trampas Park area. However this is understandable for he is usually active between dusk and dawn. The Coyote has been reputed to proclaim his presence in the Las Trampas Park area by occasionally greeting the first shades of night with a chorus of lonely cries, howls and yippings. It is difficult to determine just how many Coyotes inhabit or frequent the area because often an entire choral effect of calls is voiced by a single animal.

In general appearance the Coyote resembles a mistreated shepherd dog. Their shaggy fur is grizzled gray with a buffy undercoat mixed with a sprinkling of black hairs. Often the Coyote is distinguished with a tawny-orange colored muzzle complimented by cream-white cheeks and throat.

SKUNK

There are two skunk species indigenous to the Las Trampas area which represent two different genera: The Striped Skunk (*Mephitis mephitis*) and the Western Spotted Skunk (*Spilogale putorius*). The Striped Skunk is the more common and prefers open country or low growth to continuous forest areas, avoiding dense forests. Spotted Skunks inhabit dry uplands seeking rocky, brushy country. Both skunks possess musk glands which enable them to secrete pungent, noxious odors. When disturbed and frightened by an intruder, the Striped Skunk signals his uneasiness with a sudden flare of his tail and a stamping of his hind feet. Continued excitation will elicit a spray of nauseating oil. The Spotted Skunk has a more elaborate display, when threatened, as he rises on his forefeet and if goaded further will then drop to all fours, aim, and shoot his fine acrid mist at the enemy often and it is directed at the eyes. Spray accuracy extends up to a twelve foot range and if the eyes are struck, it causes extreme pain, often causing temporary blindness and sometimes permanent blindness.

These skunks are primarily nocturnal though the Striped Skunk is frequently seen in the late afternoon. Dietary habits are quite similar and the two Skunks both enjoy fruits, insects, small rodents and birds.

BADGER Preferring open country, sun-baked soil and rolling hills, the Badger (*Taxidea taxus*) has left a trail of identifiable potholes and piled dirt in the Las Trampas Park area. This mammal has seldom been seen in the park, however, it is extremely adept at concealment. In general appearance he is grizzled gray-grown with a black and white face. In bodily proportions the Badger is short-legged and very broad thus his entire body lies close to the ground. From its head to the base of its tail the animal measures 18 to 22 inches, tail 4 to 6 inches and its weight varies from 13 to 25 pounds. Long, slightly curved claws distinguish the Badgers forefeet which facilitate the creature in its life of prodigious digging. Badgers tunnel down through burrows after their favorite prey of gophers and ground squirrels and are known to dig large nests for themselves at depths of up to 30 feet below ground level.

WEASEL The Long-tailed Weasel (*Mustela frenata*) is a creature with a quick and sleek undulating movement and appears to be an amber streak as it scrambles through tall wild grass. Short-legged, long-bodied, agile and muscular, this little predacious hunter is small enough to follow rats and mice down into their burrows and rapaciously he seeks them out by day or night. More than a beautiful and interesting little creature, the Long-tailed Weasel is one of our best allies in rodent pest control. Unfortunately these carnivores are often destroyed for reputedly being notorious poultry killers, Though they are known to transgress, studies have shown that more than 90% of their diet consists of rodents. In Las Trampas Park, the Weasel is safe from traps, bullets, snares and poison.

To catch a glimpse of these reddish-golden-brown hunters in action park visitors should carry binoculars and be on the alert while traversing open grassy areas, especially during spring and summer.

RACCOON Of course, the common forager of the night at Las Trampas is the Raccoon (*Procyon lotor*). He is a very successful mammal with a widespread distribution inhabiting almost any type of country, avoiding only deserts and the highest mountain tops. Distinguished by its "masked" face and conspicuously ringed tail, the Raccoon is an expert climber and a good swimmer. He enjoys a well-rounded diet including crayfish, mussels, fish, fruit, insects, frogs, reptiles and small mammals.

RINGTAIL Nocturnal in habit, retiring and elusive in character, the Ring-tailed Cat is rarely seen. A cousin of the raccoon, this animal lives in wooded areas preferring stream-fed canyons. Being a carnivore and proficient at small rodent extermination, early California miners frequently domesticated these pretty little animals and kept them as pets. In the wilds they make permanent nests in rocky crevices or hollows in trees. The creature is identifiable by its long 15 inch ringed tail which is equal to its body length. Its glistening furry coat has a dense soft texture and is orange-brown in color darkening along the mid-back. It has been assigned a variety of names: Ringtail, Ring-tailed Cat, Cacomistle or cacomixtle--the latter being an Aztec Mexican name. Scientifically it is known as *Bassariscus astutus* which means the astute (astutus) fox (*bassariscus*) from the Thracian Greek word for fox.

Order: Marsupials

Marsupials are primitive mammals in which the young are generally nurtured by the mother in a special pouch or pocket. The young are born as larval animals after a very short period of gestation and promptly seek the teats which are located within the mother's pouch. The Marsupial mammals display different dental characters than Placentals. Also Marsupials have smaller brains and correspondingly lower mentalities than similar Placental mammals.

OPOSSUM The American Opossum (*Didelphis marsupialis*) which occurs in Las Trampas is truly a "living fossil" that has changed very little since the Cretaceous. Study of the Opossum can relate a general picture of the ancient mammalian condition. A small grayish-white animal about the size of a house cat,

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the Opossum living in Las Trampas Park today is basically a larger version of its ancestor of 80 million years ago. Its sole obvious specialization is a naked catlike prehensile tail which can be employed as an extra hand. With clawed, dextrous feet and a prehensile tail this creature is an efficient climber and spends considerable time in trees.

Like the Australian Kangaroo the female Opossum carries her young in a pouch. After a gestation period of only 12 days, blind and almost helpless Opossums, each about the size of a honey bee and weighing 7/100 of an ounce begin their crawl along a path of moistened belly hair (licked flat by the mother) in search of nipples located within the pouch. They remain there, receiving nourishment, for between two and three months after which time they are transferred outside to be carried along clinging to the mother's fur. Mature Opossums will consume almost anything edible and prefer nesting in hollow trees, logs or among rocks located in lowland foothill areas near stream waters.

Order: Artiodactyls

Artiodactyls are the even toed ungulates. Most of the hoofed mammals of the present day are Artiodactyls. The modern Artiodactyl order includes: Pigs, peccaries, hippopotamuses, camels, llamas, small tragulids, deer, giraffes, the pronghorns of North America, sheep, goats, muskoxen, antelopes, bison and cattle.

DEER The Black-tailed Deer (*Odocoileus hemionus columbianus*) is an Artiodactyl which has developed from Oligocene traguloid ancestors. Primitive progenitors of this living Deer were rather small creatures outfitted with a full complement of upper teeth including enlarged saberlike canine teeth and lacking antlers upon the skull.

As the Deer have evolved, in general, there has been a strong trend toward increase in size. Full grown Black-tailed bucks may reach an adult weight of 200 pounds. Deer have been browsers (ruminants) through the extent of their evolutionary history and hence grinding selenodont cheek teeth are predominate in modern individuals. The canines and incisors in the maxilla have been lost and replaced by a tough horny pad which is used in conjunction with the

lower front teeth to crop vegetation. Yet the most striking specialization to evolve among the advanced deer has been the development of antlers on the skull of males (also females in the Caribous). Unlike horns, which have a bony core over which the "horn" grows (the horns growing throughout the life of the animal), antlers of a Black-tailed Deer and all other deer are formed and shed each year. It is from the pedicels, two cylindrical bony stumps situated on the frontal bones of the skull, that the antlers grow. In life these pedicels are covered with furred skin and as the antlers develop during the year they, too, are covered with thin furred skin. It is during this period that the antlers are said to be in velvet. Each year they start to grow in the spring and by early summer the new antlers have nearly reached their full size. The skin that has covered them dries and is then scrapped and rubbed off against shrubs and they are polished against the trunks of saplings. With each successive year, until the buck has reached his prime, the pair of antlers grown are larger and more elaborate. By mating season the antlers have become hard, bony spikes or branched, multi-pointed weapons with which the bucks fight each other lunging and sparring and trying to push the opponent off balance. Usually the rival matches are short and one of the males retreats to seek another doe. After the rutting season is over, from mid-December to February, the antlers fall off; ordinarily one at a time. During spring and early summer the doe usually bears one to three young which are kept under cover during daylight hours. Throughout fall and winter Black-tailed bucks and does can be found together ranging through open woodland and chaparral. They feed on twigs and leaves and sometimes graze on grass and eat wild fruits.

Though deer seem to be common, they should certainly not be taken for granted. The Black-tailed Deer living in Las Trampas Park today share with other Deer the world over an ancestry of at least forty million years. Yet by and large man in his relentless, often senseless, expansion in and exploitation of the natural environment has arrogantly disregarded and abused the life of all creatures and especially those related to the Deer.

PRONGHORN

Up until the turn of the century the swiftest of all American mammals, the Pronghorn "antelope", (*Antilocapra americana*)--taxonomically this animal is classified as an Antilocaprid--roamed through

what is now the Las Trampas Park area. No longer! Endowed with an enormous windpipe, expansive lungs and large powerful heart, this animal is marvelously equipped for speed. Yet the most unusual distinction possessed by this creature is its elegant horns. Horns have a bony core over which the "horn" (a material similar to fingernails) grows. They are permanent features which continue to grow throughout the animal's life. The Pronghorn has true horns but they are unique in the animal world because they are deciduous and branched. In the Pronghorn the "horn" is a sheath covering a furred bony core. Thus unlike antlers which break off cleanly at the base, when these "horns" are shed a furry bone core remains. When the "horn" grows back again the hairy covering hardens and the horn is reformed. About four months after the old horns are lost the replacement growth is completed.

Despite the Pronghorn's amazing speed (60 plus m.p.h.) and rare horns, man has drastically reduced its numbers and has pushed it back from its native territory.

During the eighteen hundreds the Pronghorn population was depleted from its original estimated number of fifty to one hundred million to a mere 19,000 by 1908. Since then hunting regulations and conservation programs have enabled the Pronghorns to make a phenomenal recovery and today there is a population of some 350,000. But any possibility for a proper restoration of these animals has been forever destroyed.

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In primitive America, the elk was a widely distributed member of the deer family. When European man arrived, there were six different forms of elk in North America. Their range extended from the Pacific Ocean nearly to the Atlantic and from within Canada to the Mexican border. No longer! The Eastern elk was slaughtered so quickly and contemptuously that only a few museum pieces remain to attest that it ever lived: A couple of skulls and a single skin. Once indigenous to the mountains of Arizona and New Mexico, the Merriam elk is now also extinct. In California the Tule elk (or "dwarf" elk) is maintaining a very tenuous existence in the Owens Valley. The animal is on the Department of Interior's list of threatened American mammals and it is now considered to be one of the World's most rare species by the International Union for the Conservation of Nature. The once numerous Manitoba elk of Canada and the Roosevelt elk restricted to the Olympic Mountains of Washington and a few more southerly spots are now both at dangerously low population levels. The only elk which has been able to

maintain relatively substantial population numbers is the Rocky Mountain elk. Almost the entire North American population of approximately 350,000 animals live in the United States Rockies, although small groups also survive in Canada and Alaska.

As many as sixty plus million bison once roamed North America establishing perhaps the greatest population of a single large mammal in the earth's history. No longer! In response to the "white" man's pillage of the bison, Peter Farb, an eminent author and naturalist, has written that "the greatest slaughter of any form of wildlife in the world was well under way by the middle of the nineteenth century..... The rapidity of the extermination is difficult to envision". These 2,000 pound herd animals were almost hunted to extinction by 1900. Millions upon millions of bison were killed simply to clear land. When carriage robes of bison fur came into fashion, hundreds of thousands of bison perished. Also tens of thousands fell prey merely to supply a meal of bison tongue and the remainder of the animal was discarded. By 1865 an estimated fifteen million bison still survived. In this year alone a million bison were slain and by 1872 another seven million had been killed. In 1883 the largest herd remaining in the northwest numbered 10,000 animals. However all of these were methodically destroyed by a handful of marksmen who were stationed at every water hole that the bison were known to frequent. Twenty to thirty bison once composed the "last park herd" of Colorado. In the late 1890s this herd constituted approximately one-fourth of all the wild bison remaining in the world. Yet, despite attempts to save them, poachers systematically hunted down the members of the herd until in 1897 the last four bison were slain.

A forceful effort to save the bison from extinction almost came too late. However, President Theodore Roosevelt in 1905 established the Wichita Game Preserve in Oklahoma and the New York Zoological Society contributed fifteen bison. The environmentalists organized and founded the American Bison Society and they raised \$50,000 to create a National Bison Range in Montana. Today there are 20,000 plus bison that find sanctuary on small wild land areas which have been allocated for them. But Americans have so monopolized and destroyed the native wild lands that there is no longer any room for more than about 30,000 head of bison. There used to be ample space for over sixty million!

Order: Lagomorpha. (Hares, Rabbits, and Pikas.)

Lagomorpha are herbivorous gnawing mammals. Once these animals were classified as Rodents. However it has been determined that rabbits and their relatives are quite divergent from rodents. For instance lagomorpha have four enlarged upper incisor teeth and rodents only two; the cheek teeth in lagomorpha and rodents display no real similarities; and the masticatory musculature of the rodents shows certain specializations not found in lagomorpha.

COTTONTAIL Preferring semi-open grassland associated with scattered brush, the Western Cottontail (*Sylvilagus auduboni*) is often observed near the axis of the Valley Trail. This gray-brown rabbit conspicuously ornamented with a pure white, cotton-ball tail is most likely to be sighted on the western face of Las Trampas Ridge. Scampering in and out of the Black Sage and Chamise that border the wild grass the rabbit pursues his daily activities. The average Western Cottontail measures about thirteen inches in length, has relatively small 3-4 inch ears and weighs only 2-4 pounds.

BRUSH RABBIT A small dark pelaged species of cottontail, the Brush Rabbit (*Sylvilagus bachmani*) also inhabits the park. The Brush Rabbit prefers thicker vegetation than the Cottontail and usually it never strays far from cover. This furry little creature has been seen scrambling through bushes and berry thickets on the eastern side of Las Trampas Ridge. Unlike hares which are jumpers and deliver their young well furred with eyes open, rabbits are runners and when born their young are naked and blind.

JACK RABBIT The hare native to the Las Trampas Park area is a very long legged, enormous eared leaping animal. The Black-tailed Jack Rabbit (*Lepus californicus*) having evolved as a swift runner that bounds over the ground in long hops is most often found on the eastern and western faces of Rocky Ridge. Being a grizzled gray-brown in general appearance, this Jack Rabbit is distinguished by a black streak on the tail and is marked by black-tipped ears. If their natural enemies such as coyotes, bobcats, foxes and large birds of prey are destroyed the Jack Rabbit population can quickly abound and their unchecked roaming numbers can become definite pests.

Order: Rodents

Rodents comprise more than one-half the number of living species and approximate one-third of the known genera of mammals. Throughout their evolutionary history to the present the rodents have been and are gnawing animals. They are endowed with two pairs of sharp-edged chisellike incisor teeth: One pair in the skull and an opposing pair in the mandible. These teeth continue to grow during the entire life of the animal. Through persistent use the incisors are worn down thus compensating for their continual growth. As these wear, the hard enamel along the front edge of each incisor tooth forms a sharp chisel edge. Between the incisors and the cheek teeth there is a distinct gap because the lateral incisors, the canines and the anterior premolars are suppressed. Rodents are generally small and most are less than a foot long, and well under a pound in weight.

GOPHER

Botta Pocket Gophers (*Thomomys bottae*) are subterranean creatures and seldom venture outside their holes except to snatch vegetation immediately around their entrances. The gopher's method of tunneling is remarkable as they use their large incisor teeth as digging tools. In hard soils they literally gnaw their way through the ground. To prevent dirt from piling into their mouths, gophers can close their lips while the incisors remain outside. As soil is loosened, it is scooped back with the chin and with the forepaws. When enough dirt has been accumulated, the gopher turns around, places his forepaws together facing forwards, then pushes the load back down along the tunnel like a tiny bulldozer. In navigating through their tunnels, Gophers can run backwards as fast as they can run forwards and their naked tails serve as tactile organs to "feel out" their route.

They eat all manner of roots, bulbs, tubers, green stalks and grain. Food is cut and shaped into small pieces, stuffed into fur-lined cheek pouches and carried off to large underground storage rooms. Usually the rodents store more food stuffs than they will ever eat. Down in the deep tunnels the Gopher builds his nest, constructed with fibers and grasses.

The Botta Pocket Gopher has a brown furry coat with white feet and measures about 7 inches in length when fully grown.

SQUIRREL

Probably the only Squirrel native to the Las Trampas Park area is the California Ground Squirrel (*Citellus beecheyi*). They are rather plump, short-legged and bushy tailed. Their dull gray to brownish color often makes them hard to see. Large claws and powerful little legs enable them to dig their own holes and they rarely climb trees. Seeds, acorns, roots, fruit and greens are their preferred foods though occasionally insects and meat are eaten. In Las Trampas these squirrels are most often seen in semi-wooded ravines.

RAT

There are four different rats living in Las Trampas Park. Of these, only two are native to the area. Both the Norway Rat (*Rattus norvegicus*) and the Black Rat (*Rattus rattus*) are European rodents and have been imported from the Old World since Columbian times. In general these rats have upset the rodent ecology of California. Albino forms of the Norway Rats have become useful as experimental scientific "guinea pigs" hence they are often referred to as laboratory rats and are commonly sold as pets. (Indeed they do make good, intelligent and friendly pets.) Wild Norway Rats are grayish-brown with naked light-gray tails and measure bodily 7-10 inches and the tail length is 5-8 inches. The Black Rat is an adept climber, is dark brown or entirely black in color and its body dimensions are slightly smaller than the Norway Rat's although its tail is longer.

The Dusky-footed Wood Rat or Pack Rat (*Neotoma fuscipes*) and the Heermann Kangaroo Rat (*Dipodomys heermanni*) are indigenous to California. Wood Rats live in a variety of habitats but prefer wooded areas or thick vegetation. In Las Trampas Park we have found Dusky-footed Wood Rat nests constructed in thick bushes in the Sulphur Spring area and large domed nests have also been found in a number of the "wind caves" set in the large sandstone outcrops west of Rocky Ridge. Wood Rat "houses" are quite complex with many hallways and rooms inside of them. Often mice, lizards and salamanders occupy abandoned tunnels. Usually these elaborate "houses" are built with great piles of sticks and often fair sized branches are included. Wood Rats are often referred to as "Pack Rats" because of their habit of collecting all manner of odd objects, particularly shiny items like gum wrappers, jar lids, buttons, watches, etc. which are then carried away to their nests. Sometimes these curious animals will leave small natural objects, such as pebbles, in place of their pilfered treasures. The Dusky-footed Wood Rat has a predominately

gray-brown coat with white undersides and dusky hind legs near the feet. They enjoy a diet of wild fruits, berries and seeds, and eat the leaves and stalks of many plants.

In the Las Trampas Park area Heermann Kangaroo Rats are primarily found in open grassland or under sparse chaparral. They are unusual rodents with long highly developed hind limbs and shorter, less pronounced forelimbs. They can move rapidly along, hopping like miniature kangaroos with long tufted tails trailing behind to maintain balance and tiny forepaws held high and tucked under the chin.

An amazing adaptation displayed by these creatures is their ability to abstain from drinking water. The chemical decomposition and digestion of food within them, even if it is grain, provides all the liquid they need to survive.

These little creatures possess an olive-brown coat with cream-white undersides and white tail.

MOUSE

The three mice native to the Las Trampas Park area are: The Western Harvest Mouse (*Reithrodontomys megalotis*), the California Mouse (*Peromyscus californicus*) and the Deer Mouse (*Peromyscus maniculatus*). The Western Harvest Mouse is a small 2-3 inch animal that lives in dense grass and weeds. They are distinguishable from other species, notably the introduced House Mouse (*Mus musculus*) whom they closely resemble by their incisors which are medially grooved. Their scientific name, *Reithro-donto-mys*, means groove-toothed-mouse. Harvest Mice are nocturnal and are active both terrestrially and arboreally. In coloration they are yellowish-brown with grayish-brown undersides.

The California Mouse is similar in appearance to the Harvest Mouse except that he is a bit bigger with a black tail and dark brown coat. California Mice also prefer a habitat of heavy chaparral and oak.

Deer Mice are very widespread and are found in almost all parts of the United States. In Las Trampas Park they prefer chaparral and grassland. They have slender bodies, long pointed muzzles, large delicate ears and very long and slightly tufted tails. In motion they are agile, sure-footed runners and climbers. Their fur is reddish-brown on the back and sides, the under parts including feet, throat, cheeks and lower part of the muzzle are pure white.

VOLE The California Vole (*Microtus californicus*) is commonly called a California Meadow Mouse. However a Vole is not a mouse nor a mouse a Vole. Both belong to the same family, Cricetidae, but each belongs to a different subfamily. A Vole belongs to the Microdinae and a mouse belongs to the Cricetinae.

Voles are the most common and most prolific of all the rodents. They are communal animals but each individual constructs and maintains his own honeycomb of tunnels and runways under and through grasses and bushes.

If it were not for predators such as hawks, owls, weasels, skunks, badgers, foxes, coyotes, bobcats and snakes, most open fields would soon be completely overrun and ruined by Voles.

The California Vole is a thick, short (4-5 inches) and rounded creature which has a short tail (2-3 inches). He has a grizzled grey-brown coat with ears almost hidden by the thick fur.

Order: Insectivores

Insectivores are small insect eating mammals. None of the insectivores have evolved into large or even medium sized animals. The common shrews are the smallest of all mammals and in general morphology they have changed little since the Cretaceous. In many respects such as brain size and design, dental construction and skeletal anatomy the modern insectivores recall the structure of early placentals.

SHREW With pinpoint eyes and tapering snout the Trowbridge Shrew (*Sorex trowbridgei*) weighing only a few ounces is a very active predator within the park. Tracking insects of any size, the Shrew sniffs out his meals along hidden trails laced below grass and leaves. Due to its excessively high body metabolism, the Shrew persistently seeks food. If deprived of nutrition, a Shrew can die within a few hours. Their average life span extends to only 1½ years at the most.

MOLE Spending its life in underground darkness, sniffing out its food and endowed with fur that covers its eyes and ears, the Broad-footed Mole (*Scapanus latimanus*) is one of the strangest mammals that inhabits the Las Trampas Park area. His front feet,

working like blades, this creature is a virtual digging machine. With hair that has become especially adapted for living in subterranean tunnels, it will lie in either direction so that the Mole can run backward as well as forward unhindered. Many times their runways appear raised and broken at ground surface, especially in gardens. Seeking rich, moist ground, Moles enjoy diets composed of grubs, insects and worms. The Broad-footed Mole averages about 5 inches in length and carries a shiny blackish-brown coat.

* * * * *

Remember when next you visit Las Trampas Regional Wilderness Park that fellow creatures surround you all about. Know that they are your friends and only hope that you deserve to be theirs.

--Richard W. Clinnick

CATTLE GRAZING AT LAS TRAMPAS REGIONAL WILDERNESS PARK

The East Bay Regional Park District acts as lessor for offering most of the grassland areas accessible to cattle in the Bollinger Canyon watershed for grazing purposes. About three dozen head of mature cattle, plus their calves, enjoy keeping this grassy surface browsed sufficiently short that fire hazard is minimized. If grazing was not permitted, it would be very dangerous to keep the park open to the public during the dry summer and autumn seasons.

--Walter Knight

REPTILES OF LAS TRAMPAS

The following is a preliminary index of reptiles present in the Las Trampas Park area.

LIZARDS

- 1- Western Fence Lizard (*Sceloporus occidentalis*)
- 2- Coast Horned Lizard (*Phrynosoma coronatum*)
- 3- Western Skink (*Eumeces skiltonianus*)
- 4- Southern Alligator Lizard (*Gerrhonotus multicarinatus*)
- 5- Northern Alligator Lizard (*Gerrhonotus coeruleus*)

SNAKES

- 1- Rubber Boa (*Charina bottae*)
- 2- Western Ringneck Snake (*Diadophis amabilis*)
- 3- Sharp-tailed Snake (*Contia tenuis*) Rare!
- 4- Racer (*Coluber constrictor*)
- 5- Striped Racer (*Masticophis lateralis*) Very Rare;
eats rattlesnakes.
- 6- Gopher Snake (*Pituophis catenifer*)
- 7- Common Kingsnake (*Lampropeltis getulus*) Efficient
Rattlesnake killer, immune to venom.
- 8- Western Garter Snake (*Thamnophis elegans*)
- 9- Common Garter Snake (*Thamnophis sirtalis*)
- 10- Night Snake (*Hypsiglena torquata*) Toxic bite; no fangs,
not dangerous to man.
- 11- Western Rattlesnake (*Crotalus viridis*) Venomous; not
aggressive, usually not fatal.

--Richard W. Clinnick

BIRD LIST

LAS TRAMPAS REGIONAL WILDERNESS PARK

Brewer's Blackbird	Say's Phoebe
Western Bluebird	Band-tailed Pigeon
Common Bushtit	California Quail
Chestnut-backed Chickadee	Robin
Common Crow	Yellow-bellied Sapsucker
Mourning Dove	Loggerhead Shrike
Golden Eagle	Chipping Sparrow
House Finch	Fox Sparrow
Purple Finch	Golden-crowned Sparrow
Red-shafted Flicker	Lark Sparrow
Ash-throated Flycatcher	Savannah Sparrow
American Goldfinch	White-crowned Sparrow
Lawrence's Goldfinch	Starling
Lesser Goldfinch	White-throated Swift
Red-tailed Hawk	California Thrasher
Sharp-shinned Hawk	Hermit Thrush
Sparrow Hawk	Varied Thrush
Allen's Hummingbird	Brown Towhee
Anna's Hummingbird	Rufous-sided Towhee
Scrub Jay	Violet-green Swallow
Steller's Jay	Plain Titmouse
Oregon Junco	Turkey Vulture
Ruby-crowned Kinglet	Audubon's Warbler
Horned Lark	Wilson's Warbler
Yellow-billed Magpie	Cedar Waxwing
Western Meadowlark	Acorn Woodpecker
Mockingbird	Downy Woodpecker
White-breasted Nuthatch	Nuttall's Woodpecker
Western Wood Peewee	House Wren
Black Phoebe	Wrentit

The Prairie Falcon has not been observed for the past four years.

List furnished by Arthur L. Edwards

THE PLANTS OF LAS TRAMPAS

As can be evidenced from the parking lot, there are three plant communities in the park. Grassland dominates. On the slopes of Las Trampas Ridge facing Bollinger Creek and on the slopes of Rocky Ridge facing Kaiser, Cull and Bolinas drainage areas can be seen chaparral composed mostly of three plant species: Chamise, Buck Brush and Black Sage. An arboreal vegetation covers spots on the other sides of these ridges and along Bollinger Creek and its tributaries. Some of the prominent trees are Coast Live Oak, Bay-laurel, Buckeye, Big-leaf Maple, Black Oak, Canyon Live Oak and a couple of other oaks on the east side of Las Trampas Ridge.

Wildflowers are prevalent everywhere in the spring along all of the trails. One of the most amazing displays is in rocky, steep-walled Sedum Ravine on Sycamore Trail. In mid April the Red Delphinium is spectacular there and a couple of weeks later the yellow-flowered Stonecrop (a hen-and-chickens-like plant) forms bright floral mats in the upper part of the ravine.

In late summer on some of the outcrops along Rocky Ridge can be seen red ground covers of California Fuchsia. At the same time the leaves are turning brown on the Buckeyes and during September they have mostly fallen to the ground. A couple of months later the Big-leaf Maple and Black Oak also turn brown. Just outside of the park and down Bollinger Creek the Box Elders, too, lose their leaves in the fall. And the bushes with the red leaves at autumntime are Poison Oak which is the best fall color shrub in the park.

For about a week in the spring the Buck Brush, which is so prevalent in the chaparral, produces a myriad of white blossoms creating a snowlike mantle over the vegetation on the Bollinger Canyon side of Las Trampas Ridge. In the same area during December, large Toyon bushes are laden with red fruit.

Several times during the year hikes are conducted through the park by the Sierra Club, Audubon Society and the California Native Plant Society. Qualified leaders explain much about the plant and bird life which can be studied along the trails.

Asterisk(*) designates species introduced from other parts of the world. Where "sp." (species) is designated, we were unable to determine the species because at the time of observation insufficient morphological characters were in evidence.

A PARTIAL LIST OF THE VASCULAR PLANTS
LAS TRAMPAS REGIONAL WILDERNESS PARK

<i>Acer macrophyllum</i>	Big-leaf Maple
<i>Achillea borealis</i> ssp. <i>californica</i>	Yarrow
<i>Adenostoma fasciculatum</i>	Chamise
<i>Adiantum jordanii</i>	Maidenhair Fern
<i>Aesculus californica</i>	Buckeye
* <i>Aira caryophylla</i>	Shiver Grass
<i>Alchemilla occidentalis</i>	Western Lady's Mantle
<i>Allocarya bracteata</i>	Bracted Borage
<i>Alnus rhombifolia</i>	White Alder
<i>Amelanchier pallida</i>	Service Berry
* <i>Anagallis arvensis</i>	Pimpernel
<i>Apocynum pumilum</i>	Dogbane
<i>Arbutus menziesii</i>	Madrone
<i>Arctostaphylos crustacea</i>	Brittle-leaved Manzanita
<i>Arctostaphylos cushingiana</i>	Cushing's Manzanita
<i>Arctostaphylos manzanita</i> x <i>aureiculata</i>	Hybrid Manzanita
<i>Aristolochia californica</i>	Dutchman's Pipe (blooms Feb. Mar.)
<i>Artemisia californica</i>	California Sagebrush
<i>Artemisia douglasiana</i>	Mugwort or Wormwood
<i>Asclepias californica</i>	California Milkweed
<i>Asclepias fascicularis</i>	Mexican Milkweed
<i>Baccharis pilularis</i> var. <i>consanguinea</i>	Coyote Brush
<i>Berberis pinnata</i>	Barberry (Patches atop Rocky Ridge)
<i>Bowlesia incana</i>	Bowlesia
<i>Brassica geniculata</i>	Late Mustard
<i>Calandrinia ciliata</i> var. <i>menziesii</i>	Red Maids
<i>Calochortus luteus</i>	Yellow Mariposa
<i>Calochortus pulchellus</i>	Mt. Diablo Fairy Lantern
<i>Calochortus splendens</i>	Splendid Mariposa
<i>Calochortus umbellatus</i>	Oakland Star Tulip
* <i>Capsella bursa-pastoris</i>	Shepherd's Purse
<i>Camissonia ovata</i>	Suncups
<i>Cardamine oligosperma</i>	Bitter Cress
<i>Castilleja foliolosa</i>	Hairy Paintbrush
<i>Ceanothus cuneatus</i>	Buck Brush
<i>Ceanothus sorediatus</i>	Jim Brush

LAS TRAMPAS PLANTS

* <i>Centaurea calcitripa</i>	Purple Star-thistle
* <i>Centaurea solstitialis</i>	Barnaby's Thistle
<i>Cercocarpus betuloides</i>	Mountain Mahogany
<i>Chloragalum pomeridianum</i>	Amole or Soap Plant
* <i>Cirsium vulgare</i>	Bull Thistle
<i>Clarkia purpurea</i>	Purple Godetia
<i>Clarkia rubicunda</i>	Red-based Godetia (The Dyke)
<i>Clarkia unguiculata</i>	Elegant Clarkia (Gooseberry Trail)
<i>Clematis lasiantha</i>	Virgins-bower
<i>Collinsia bartsiaefolia</i>	White Chinese Houses
<i>Collinsia heterophylla</i>	Purple-and-White Chinese Houses
<i>Collinsia sparsiflora</i>	Few-flowered Blue-eyed Mary
* <i>Conium maculatum</i>	Spotted Hemlock
* <i>Convolvulus arvensis</i>	Field Bindweed
<i>Convolvulus occidentalis</i>	Western Morning Glory
<i>Cornus occidentalis</i>	Creek Dogwood
<i>Corylus cornuta</i> var. <i>californica</i>	Hazelnut
<i>Crassula erecta</i>	Sand Pygmy-weed (Trapline Trail)
<i>Cryptantha</i> sp.	
* <i>Cynara cardunculus</i>	Wild Artichoke
<i>Cynoglossum grande</i>	Hound's Tongue (Mahogany Trail)
<i>Datisca glomerata</i>	Durango Root
<i>Diplacus aurantiacus</i>	Sticky Monkey Flower
<i>Delphinium nudicaule</i>	Red Larkspur
<i>Delphinium variegatum</i>	Blue Larkspur (Sycamore Trail)
<i>Dodecatheon hendersonii</i>	Shooting Star (Mahogany Trail)
<i>Dryopteris arguta</i>	Wood Fern
<i>Emmenanthe penduliflora</i>	Whispering Bells (Devil's Ravine)
<i>Equisetum arvense</i>	Horsetail
** <i>Eragrostis curvula</i>	Weeping Love Grass
<i>Eremocarpus setigerus</i>	Dove Weed or Turkey Mullein
<i>Erigeron petrophyllum</i>	Inornate Fleabane
<i>Eriodictyon californicum</i>	Yerba Santa (Trail toward L. Trampas Pk.)
<i>Eriogonum caninum</i>	Dog Buckwheat
<i>Eriogonum nudum</i>	Nude Buckwheat
* <i>Erodium cicutarium</i>	Red-stemmed Filaree
* <i>Erodium obtusifolium</i>	Simple-leaved Filaree
* <i>Eucalyptus globulus</i>	Blue Gum
* <i>Galium aparine</i>	Cleavers
* <i>Galium murale</i>	Matted Galium (Above loading pen)

LAS TRAMPAS PLANTS

<i>Galium nuttallii</i>	Perennial Bed Straw
<i>Garrya elliptica</i>	Coast Silktassel (Blooms Jan.)
* <i>Geranium molle</i>	Dove's-foot Geranium
* <i>Geranium retrorsum</i>	New Zealand Geranium
<i>Gnaphalium chilense</i>	Cotton-batting Plant
<i>Gnaphalium californicum</i>	Green Everlasting
<i>Helenium puberulum</i>	Rosilla
<i>Helianthella castanea</i>	Diablo Helianthella
<i>Helianthemum scoparium</i>	Common Rush-rose
<i>Hemizonia congesta</i>	Hayfield Tarweed (White fls.)
<i>Hemizonia lutescens</i>	Sonoma Tarweed (Yellow fls.)
<i>Holodiscus discolor</i>	Cream Bush or Ocean Spray
<i>Heuchera micrantha</i>	Alum-root
<i>Juncus sp.</i>	Rush
<i>Juncus patens</i>	Spreading Rush (Sulphur Spring)
* <i>Lactuca saligna</i>	Willow Lettuce
<i>Lagophylla ramosissima</i>	Common Hareleaf
<i>Lasthenia chrysostoma</i>	Goldfields
<i>Lathyrus vestitus</i>	Wild Pea
<i>Lepidium nitidum</i>	Peppergrass
<i>Lithophragma affine</i>	Woodland Star
<i>Lithophragma heterophyllum</i>	Hill Star
<i>Lonicera hispidula</i>	
var. <i>vacillans</i>	Hairy Honeysuckle
<i>Lotus scoparius</i>	Deer Weed
<i>Lupinus albifrons</i>	Silver Lupine
<i>Lupinus formosus</i>	Summer Lupine
<i>Lupinus micranthus</i>	Small-flowered Annual Lupine
<i>Luzula comosa</i>	Wood-rush
<i>Madia exigua</i>	Small tarweed
<i>Marah fabaceus</i>	Man-root
* <i>Marrubium vulgare</i>	Horehound
* <i>Matricaria matricarioides</i>	Pineapple Weed
<i>Mimulus guttatus</i>	Yellow Monkey Flower
<i>Monardella villosa</i>	Coyote Mint
<i>Montia perfoliata</i>	Miner's-lettuce
<i>Navarretia mellita</i>	Honey-scented Navarretia
<i>Navarretia squarrosa</i>	Skunkweed
<i>Nemophilla heterophylla</i>	Baby White Eyes
<i>Nemophilla menziesii</i>	Baby Blue Eyes
<i>Orthocarpus pusillus</i>	Dwarf Orthocarpus (At Parking Lot)

LAS TRAMPAS PLANTS

<i>Osmaronia cerasiformis</i>	Oso Berry
<i>Osmorhiza chilensis</i>	Sweet-cicely
<i>Pedicularis densiflora</i>	Indian Warrior (Eagle Peak Tr.)
<i>Pellaea andromaedifolia</i>	Coffee Fern
<i>Perideridia kelloggii</i>	Yampah (Near Hugo Rock)
<i>Phacelia distans</i>	Common Phacelia
<i>Phlox gracilis</i>	Dwarf Phlox
<i>Phoradendron villosum</i>	Mistletoe (Chamise Tr. Summit)
<i>Photinia arbutifolia</i>	Toyon
* <i>Picris eschiioides</i>	Ox-tongue
<i>Pityrogramma triangularis</i>	Goldback Fern
<i>Plectritis</i> sp.	(Near Hugo Rock)
<i>Pogogyne serpylloides</i>	Thyme-like Pogogyne
<i>Polypodium glycyrrhiza</i>	Licorice Fern
<i>Polystichum munitum</i>	Sword Fern
<i>Potentilla glandulosa</i>	Sticky Cinquefoil
<i>Psilocarpus tenellus</i>	Slender Woolly-heads
<i>Psoralea physodes</i>	California Tea
<i>Pteridium aqualinum</i>	
var. <i>pubescens</i>	Bracken Fern
<i>Pterostegia drymarioides</i>	Rusty Creeper
<i>Quercus agrifolia</i>	Coast Live Oak
<i>Quercus chasei</i>	Chase Oak (acc. Fred Nora)
<i>Quercus chrysolepis</i>	Canyon Live Oak
<i>Quercus douglasii</i>	Blue Oak
<i>Quercus garryana</i>	Oregon Oak
<i>Quercus kelloggii</i>	Black or Kellogg Oak
<i>Quercus lobata</i>	Valley Oak (Del Amigo Tr.)
<i>Ranunculus californicus</i>	Buttercup
<i>Rhamnus californica</i>	Coffeeberry
<i>Rhamnus crocea</i> var. <i>ilicifolia</i>	Red Berry
<i>Rhus diversiloba</i>	Poison Oak
<i>Ribes malvaceum</i>	Chaparral Currant
<i>Ribes menziesii</i>	Canyon Gooseberry
* <i>Rorippa nasturtium-aquaticum</i>	Watercress
<i>Rosa californica</i>	California Rose
<i>Rosa gymnocarpa</i>	Wood Rose
<i>Rosa sonomensis</i>	Sonoma Rose
<i>Rubus parvifolius</i>	Thimbleberry
* <i>Rubus procerus</i>	Himalaya Berry
<i>Rubus vitifolius</i>	Pacific Blackberry

LAS TRAMPAS PLANTS

*Rumex acetosella	Sheep Sorrel
Rumex crispus	Curly Dock
Rumex pulcher	Fiddle Dock
Salvia mellifera	Black Sage
Sambucus coerules	Blue Elderberry
Sanicula crassicaulis	Snakeroot
Satureja douglasii	Yerba Buena
Saxifraga californica	California Saxifrage
Scutellaria tuberosa	Dannie's Skullcap
Sedum spathulifolium	Stonecrop
Senecio aronicoides	Butterweed
*Sherardia arvensis	Blue Field Madder
Sidalcea malvaeflora	Checkerbloom
*Silybum marianum	Milk Thistle
*Solanum nigrum	Nightshade
Solanum umbelliferum	Blue Witch
Solidago californica	Goldenrod
*Sonchus oleraceus	Sow Thistle
Stachys rigida	Hedge Nettle
var. quercetorum	Chickweed
*Stellaria media	
Stylomecon heterophylla	Wind Poppy (Mahogany Tr.)
Symphoricarpos mollis	Trailing Snowberry
Symphoricarpos rivularis	Common Snowberry
Tauschia hartwegii	Hartweg's Tauschia (Hugo Rock)
Thalictrum polycarpum	Meadow Rue
Trichostema lanceolatum	Vinegar Weed (Pasture at Valley Tr.)
Trillium chloropetalum	Wake Robin (Devil's Ravine)
Umbellularia californica	Bay-laurel
Urtica holosericea	Tall Nettle
*Urtica urens	Small or Dwarf Nettle
Verbena robusta	Robust Vervain
*Veronica persica	Persian Speedwell (Parking Lot)
Wyethia angustifolia	Narrow-leaved Mule-ears
Xanthium spinosum	Spiny Clotbur
Zauschneria californica	California Fuchsia
Zigadenus fremontii	Zygodene

**This grass was introduced from Africa and has naturalized along Bollinger Canyon Road in abundance below Little Hills Ranch. It is possible that some of it grows within the boundaries of the park.

--Walter Knight

THE TRAILS OF LAS TRAMPAS

The trail systems all radiate from the parking lot at the end of Bollinger Canyon Road. During the winter there are many times the trails are inaccessible due to rainfall. After a heavy rain, about a week is required for the trails to dry out for hiking. Most of the trail surfaces are clayey and the hilly segments are not traversible, even with lug soles, when wet. The winter of 1971-1972 was a very dry one and only once in a while the trails were too wet for hiking. During this present rainy season of 1972-1973 we are having a record precipitation and for weeks at a time it has been very difficult to reach the summit of either Rocky Ridge or Las Trampas Ridge.

The round trip hike to Devil's Hole is about six miles and there is no drinking water available so bring along a canteen. This applies to all areas in the park as the two horse watering points do not have potable water for humans. There is a one thousand foot ascent to both ridge tops. On Rocky Ridge the trail crosses a rocky spine just west of the summit. The rock formations feature some interesting little caves and bright lichens.

The round trip hike to Sulphur Spring over Las Trampas Ridge is also about six miles. It is a much gentler hike and can be made easily and leisurely in about four hours via Valley, Grassland, Hikers, Gooseberry, Sulphur Spring, Vista, Trapline, Mahogany and Chamise trails.

The combination hiking and horse trails are distinctly designated on the map on page 52.

The terraced trails running horizontally and close together in most of the steep areas of the grassland are called "cow trails" and are actually made by the cattle which have grazed the area for many decades.

During extremely wet weather the only place to hike is up Rocky Ridge pavement. An easy mile and a half hike, especially for small children, is along Creek Trail and the return is made via Valley Trail on the other side of Bollinger Creek.

Motor vehicles are excluded from everywhere in the park except the parking lot. Smoking is not allowed beyond the parking lot during the dry season. No overnight camping is permitted.

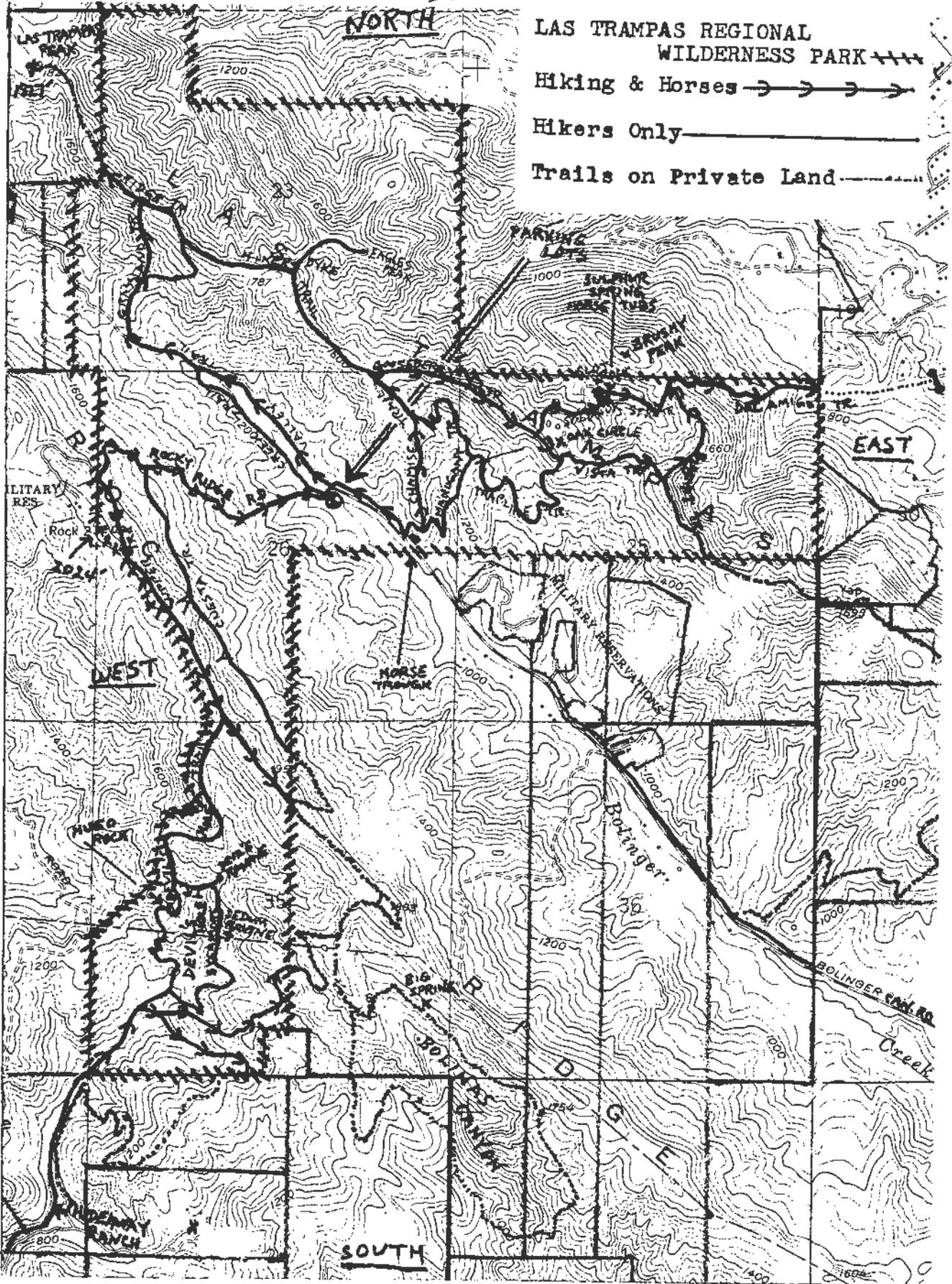
NORTH

**LAS TRAMPAS REGIONAL
WILDERNESS PARK**

Hiking & Horses → → → →

Hikers Only _____

Trails on Private Land - - - - -



WEST

EAST

SOUTH

MILITARY RES.

Rock 2

HUGE ROCK

HORSE TROUGH

Bolinger

BOLINGER ROAD

Creek

CHERRY RANCH

BIG SPRING R.

300

1200

1000

1400

1000

1000

1000

1000

1000

1000

1000

1200

660

1000

1000

600

1200

800

800

800

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800

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1600

1400

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