

Changing Perspectives: The Attitude of the Scientific Community Toward Wildlife As Shown in the Recorded Population Patterns of Ravens and the Crows in the Bay Area

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ABSTRACT There exists a discrepancy in the portrayal of the common raven (*Corvus corax*) and the American crow (*Corvus brachyrhynchos*) in popular culture and published literature. Descriptions from the beginning to middle of 20th century depict the habitat of these two species as remote or rural, while contemporary studies give them a place in the urban landscape. To understand these patterns, original field notes stored in Museum of Vertebrate Zoology at University of California, Berkeley were analyzed using an environmental history approach. Journal entries of observations in the San Francisco Bay region were closely examined. It was found that while raven and crow populations likely have shifted over this period, the unique attitudes and perspectives of the biologists have also changed and appear to have a significant impact on the data set. Early observers (1911-1960) took notice of the Bay Area, acting as careful naturalists early on and casual collectors later. By the 1960's field biologists began spending less time in the Bay Area, causing the number of raven and crow sightings plummet, while a trend of creating focused studies begins to appear before the 1970's when almost no Bay Area data was available. By the 1980's a new attitude of stewardship had emerged, and more local focus reappeared. Data from the 1980's shows a small presence of ravens and crows in more urban settings, indicating that the change occurred during the gap from the late 1960's to 1980. Data indicates that the cultural patterns of the scientific community influenced observations of crows and ravens.

INTRODUCTION

In “Fish First: The Changing Ethics of Ecosystem Management,” Merchant (1997) showed that fundamental ethics toward wildlife has shifted over the 19th and 20th centuries indicating a cultural change. Not surprisingly, within the same time period a number of environmentally related events have occurred, beginning with the work of preservationist John Muir and the conservationists / preservationist debate (Stoll 1997) and turn-of the century efforts to rehabilitate the symbolic populations of the American Bison (Isenberg 2000), ranging to landscape changes as a result of the Green Revolution in the post World War II era, the appearance of influential works such as Rachel Carson’s *Silent Spring* (1962), the founding of the Environmental Protection Agency in 1970 , and the passing of powerful environmental legislation such as the Endangered Species Act in 1973. These major events underscore the fact that a great many social, political and cultural changes occurred over the course of the 20th century, and even the subculture of the scientific community was not immune from that change. Although objectivity and reductionism is a major focus in the modern practice of science, cultural attitudes and ethics can influence the way science is done over the passage of time.

I began to discover this change in scientific perception while doing background research on the common raven (*Corvus corax*) and American crow (*Corvus brachyrhynchos*). I found that what some of the earlier observers in the Bay Area were saying about these birds completely contradicted what I personally discovered doing my own field research. The writings from the early part of the century described the crow and raven as creatures found almost exclusively in remote or rural zones, yet I had done a term project on their use of habitat elements of the highly urbanized campus of University of California, Berkeley. Continuing my search, I soon discovered the paradigm shift -- in contrast to the earlier works, that contemporary literature appeared to take for granted the urban presence of these two species, just as I had.

Having learned from the late Professor Ned Johnson how to take proper field notes, I had also learned that the form was supposedly consistent and fairly universal in its application, a protocol that was put in place by the Museum of Vertebrate Zoology’s founder Joseph Grinnell in 1908. The Museum holds an impressive collection of such field notes, and I decided that these primary data sources may hold the clues necessary to unravel the mystery I had found in the published

literature, revealing the underlying pattern of what has been really on going between these two dominate impressions of the species.

The notes did reveal a possible explanation for the apparent discrepancy, but it was not through the revelation of the actual patterns in the birds' populations. Rather the notes revealed that the perceptions of the 20th century biologist community had changed. Based on what the naturalists wrote, it appears that for a time of 20-30 years from the late 1960's through the 1980's, they did not really notice the patterns in crows and ravens. The scant evidence during this time indicates that the shift from urban to rural occurred during this period. By the time the scientific community began to notice crows and ravens again, they had already comfortably assumed a new role, one where the observers were already used to these "rural birds" urban presence.

Time and Two Tales

Secondary sources as recent as 1994, drawing upon earlier primary sources for their data depict the raven as a remote creature, removed from humanity and threatened by man's presence.

Grinnell and Wythe (1927) describe them as having once been very common in the San Francisco and San Mateo areas but, by 1927, were rare. They were found on Point Reyes and "build[ing] their nests only in the most inaccessible places on the face of the cliffs" (Grinnell and Wythe 1927). Keeler (1907) also observed the rarity of the ravens and their preference for the Bay Area's rugged habitats. Joseph Mailliard, from the California Institute of the Sciences, San Francisco, stated that there were no ravens in his 1930 *Handbook of the Birds of Golden Gate Park*.

Beyond the Bay, the image is maintained in the secondary guides, Goodwin's *Crows of the World* (1986) and Madge and Burn's *Crows and Jays: A Guide to the Crows, Jays and Magpies of the World* (1994). They place the raven in coastal and mountainous regions with a preference for "'wild' country [such as] rugged coastlines" (Madge and Burn 1994).

A little less isolated from humanity, early references to rural, crop stealing crows are more common. Not necessarily the most beloved species, Keeler (1907) states bluntly that the crow had been "exterminated about Berkeley." Mailliard (1930) does not say why crows are rare in Golden Gate Park, but he does say that their avian cousins, the jays, are destructive to other birds

and are killed on sight. The rural crow is described by Grinnell and Wythe (1927) as part of Berkeley's past. They had "nested commonly in the oaks" of the Berkeley campus in 1872, but by Grinnell and Wythe's time, they were absent from "Alameda County shores."

Rural imagery predominates the description of the American crow in secondary sources. In a State of California Fish and Game document on the hunting of doves, pigeons and crows, the crow is described as "closely associated with agricultural areas" (Anonymous 1995). A little more descriptive, Goodwin (1986) states that the American crow is found in "open country, farmland, wood edges, open woodland and parks" (Goodwin 1986). The sentiment is mirrored by Madge and Burn (1994) who state that the crow "favours lush agricultural country with scattered trees." Madge and Burns looser wording allows for the possibility of the American crow being found beyond that habitat, but makes a clear assertion that the rural bird will usually be found there. Even popular culture reflects the notion, the crows in Disney's *Dumbo* (1941) are discovered out of town.

Yet in the spring of 2003 and 2004, I personally witnessed ravens gathering materials and building nests on the Berkeley inner-city campus, not far from passing students, and on most days, I can find American crows in or near the Eucalyptus Grove on campus. A recent study (Kelly et. al. 2002) confirms my observations. In a roadside survey, Kelly et. al. found that Bay Area raven and crow density was significantly greater in urban and suburban zones than in rural areas (although ravens still exhibited a preference for the shoreline). A quick search of any database will reveal that there have been a great many studies of both crows and ravens where not only is urban habitat usage accepted, but urban elements play a significant role in the behavior studied. (For examples, see Ward and Low 1997, Cristol and Switzer 1999, and Restani et. al. 2001.)

In popular culture, the presence of a raven or crow in an urban area is accepted without question, as much a part of the scene as pigeons. While describing an old windmill in Golden Gate Park, a San Francisco Chronicle journalist mentions the perched pigeons and raven's nest casually, smoothly in the same short paragraph -- simply as part of the setting (Sullivan 2001). In the background and devoid of any special attention, a suburban crow takes flight in the movie *Elephant* (2003). Also, in the inner-city core of the fictitious world of the *Matrix*, the character of the oracle is seen feeding ravens in a starkly urban landscape. (*The Matrix: Reloaded*, 2003)

METHODS

Having learned the basics of field note taking, I turned to the Museum of Vertebrate Zoology archive, in an attempt to discover what was really going on with the populations of the American crow and the Common raven. I had learned from the staff of the Museum of Vertebrate Zoology, that one of Joseph Grinnell's goals was to establish a large database on wildlife by collecting and compiling field notes, and by putting great emphasis on note taking. According to Grinnell (1908), "Our field-records will be perhaps the most valuable of all our results. ...any and all (as many as you have time to record) items are liable to be just what will provide the information wanted. You can't tell in advance which observations will prove valuable. Do record them all!" (MVZ website) As a result, the Museum currently has a sizable collection of notes dating as early as 1907. The notes have been collected with such care, that currently a team from the Museum is reproducing studies of the Yosemite Sierra by Grinnell and Dixon to evaluate how the area has changed (pers. comm. and press releases Chui 2003, Sanders 2003).

Familiar with the note taking format and the possible limitations, I devised my methodology, mostly from what I expected to find in the notes and from some preliminary reading. However, a study by Boarman and Coe (2002), which had done a similar study of the Common Raven near Joshua Tree National Park, was particularly relevant. They utilized both published and unpublished materials and museum records and found that Raven population size and habitat area had expanded over the last 50 years. However, their study took place in a remote, rather than urban area.

I selected the Bay Area as my study zone because the region has very urban zones as well as rural zones, and that these zones can be separated (for the most part) by county lines. A moderately small study area was necessary because the specific trends in rural and urban populations had been the focus of my study, not the overall trend in an area. A large area, such as California, would be harder to isolate the developed from the undeveloped regions. Most significantly, it was in this area that I first noted the discrepancy between what I was seeing, and what I found by reading some of the older guides to birds found in the library -- which tended to be locally focused.

I develop my methodology by reading the notes of Joseph Grinnell (19 volumes), Auden Miller (18 volumes), and Aldo Leopold (nine volumes, 46 volumes total). As crows and ravens were more frequently seen and not collected, data was gathered from the “journal” section of the field notes. Catalogue sections were ignored, and “species accounts” were quickly searched for accounts specifically about crows and ravens. I also assumed that the field biologists are able to properly identify the birds. Since the Common Raven and the American Crow are the only species of ravens or crows found in the Bay Area, it is assumed that a “raven” is a common raven, and that “crow”, “common crow” and “western crow” are all different names for the American crow. For consistency with the journals, the species will be referred to only as “crow” and “raven” from here on.

I restricted my study to a slight modification of the San Francisco Bay Region defined after Grinnell and Wythe (1927) as the counties that have border on the San Francisco Bay: Alameda, Contra Costa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma, Marin, and Napa counties. This definition is also consistent with the public perception, as shown by the San Francisco Chronicle when it divides up the region by county. I modified the definition to include Santa Cruz County. I made this modification because Santa Clara county extends much farther south than San Mateo county. Although Santa Cruz County does not border the Bay, its southern border is nearly parallel to that of Santa Clara County, and background literature indicated that coastal habitat is significant for the raven’s distribution.

To avoid biasing my data by selecting authors by names or years, without breaking the continuity of a single scientist’s series, I read alphabetically by author A-E, starting with Adams, Lowell 1944-46 and ending with Evenden, Fred G. Jr. *Species Index II Vol. 7*, covering 118 volumes by 54 different biologists (see figure 1) Only the field notes of Clark and Dixon were skipped, because these notes were frequently being used by the Museum. All the data discussed in this paper is drawn from this set.

These 118 volumes of compiled notes were carefully skimmed for all entries that took place in the modified Bay Area as defined above. If the entry referred in any part to an area that was within my study area, the year, date, author, and location were recorded. The entry was then carefully examined for any reference to either crows or ravens. If any information was revealed, these details were recorded. As a number of biologists studied mammals and reptiles without

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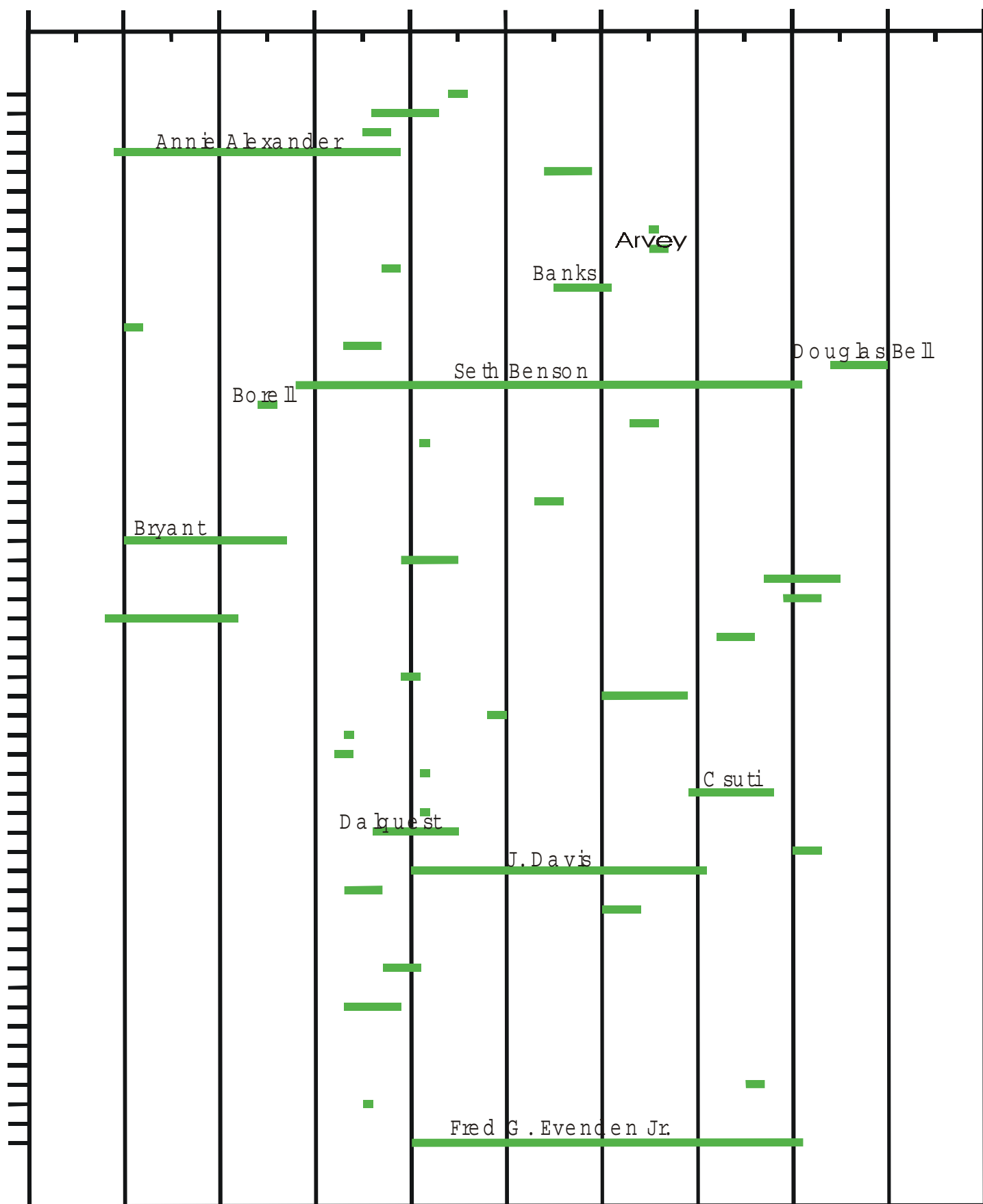


Figure 1: Time interval of the field biologists, Adams through Evenden, sorted alphabetically

noticing the birds that were present, if three or more birds were mentioned in a single paragraph, the entry was marked as one where birds were listed. This coding helped identify non-reports of crows or ravens where the observer was focused on something else and not likely to report a crow or raven whether either species was actually present or not. In addition, I took note of what the biologist was doing that may have distracted them from actually reporting a crow or raven sighting. For example, one biologist admitted he was too busy with his traps that he did not notice birds. Similarly, a close study of shorebirds or waterfowl would yield a good list of birds; however, other birds that were not a part of the focus might have gone unnoticed. There were only a few occasions when a crow or raven was reported without several birds being listed.

The focus of the methods I used to gather data was set on trying to understand what the population of ravens and crows looked like over the passage of time. However, as I was reading Grinnell, Miller, and Leopold's notes, I discovered that each scientist brought with him his own unique perspective and attitude that influenced the type of birds they noted and the way they recorded wildlife. While I had casually taken note of the attitudes before had, it was suggested that I share what I found. So, when I started the alphabetical series, I rigorized this process, recording key quotes that I felt captured that particular author's attitude toward their work so that I could qualify the meaning of each author's non-sightings. Post-hoc, I have attempted to use a historical and ethnographic approach (Andrade forthcoming) to interpret these quotes, when I discovered a distinct pattern in the ethics and attitudes that emerged among different cohorts and time periods. I focused on decades as my unit interval, clumped decades where a similar traits such as what the major purpose or type of study (such as indexing, bird watching, capturing herps, or trapping mammals, for example) which I called the "major focus" was and what the major attitude or ethic toward their work was as shown in how they acted as shown through how they collected, their response to the animals they collected as shown through their tone and diction, and the level of detail involved in the depiction of their study. In my analysis, I speculated on how their focus and attitude might have affected their reporting of the crow and raven species, and summarized the results in table 1.

Since I had chosen to focus on the San Francisco Bay Area, the attitudes I found only reflect those shown in the Bay Area, which may be presumed to be a starting place, rather than a exotic

destination, as many of these scientists worked with the Museum. Data outside the defined Bay Area was not rigorously collected, although a few examples have been incorporated.

For simplicity, the raven and crow data has been combined.

RESULTS AND DISCUSSION

The Empirical Findings

The compiled data shows that over the last century it appeared that ravens and crows generally matched the early descriptions as rural or remote species. Crows and ravens were most commonly seen in rural Marin, Solano and Sonoma Counties (fig. 2b), and frequently reported in entries on remote Santa Cruz and Napa Counties (fig. 2a). They were rare or absent in more urban Alameda, San Francisco and San Mateo Counties (fig. 2). Entries that correspond to the more urban counties typically occurred in either rural or set aside portions of the county or occurred in the most recent entries (1988-1990). Of the three Alameda sightings two occurred in a canyon (Arroyo Canyon) near Livermore. Similarly, of the four Contra Costa sightings two were on Mt. Diablo, which is currently a State Park, one entry was unclear but was near the San Joaquin county line (and was likely an undeveloped zone in 1948). The fourth Contra Costa sighting, in Moraga, was not until 1989. The single San Francisco sighting was a raven's nest on a cliff in 1990. Similarly, of the 54 entries that occurred in the Bay itself, ravens were spotted on three occasions. All three sightings took place on Alcatraz Island, in 1988 and 1989. In contrast, Marin, Santa Cruz, Solano and Sonoma sightings were fairly consistent across time, with usually at least one sighting per decade when the area was observed during that time period. (Exceptions were that no crows or ravens were seen during the two visits to 1920's Sonoma or the only 1980's visit to Solano, and possibly the two 1970's reports for Marin, however, one of the two entries was illegible.)

Over the passage of time, the ratio of the number of crow sightings to the number of bird lists (as defined above) appears to increase; however, in 1962 the number of sightings falls dramatically over the next two decades until the 1980's where the percent of sightings (this time, in urban areas) increases beyond pre-1960's levels (fig. 4a). Similarly the total number of entries are minimal in the 1960's and 1970's (fig. 3c), although the ratio of the entries where three or more birds were listed to the total number of entries still remained very high when compared to

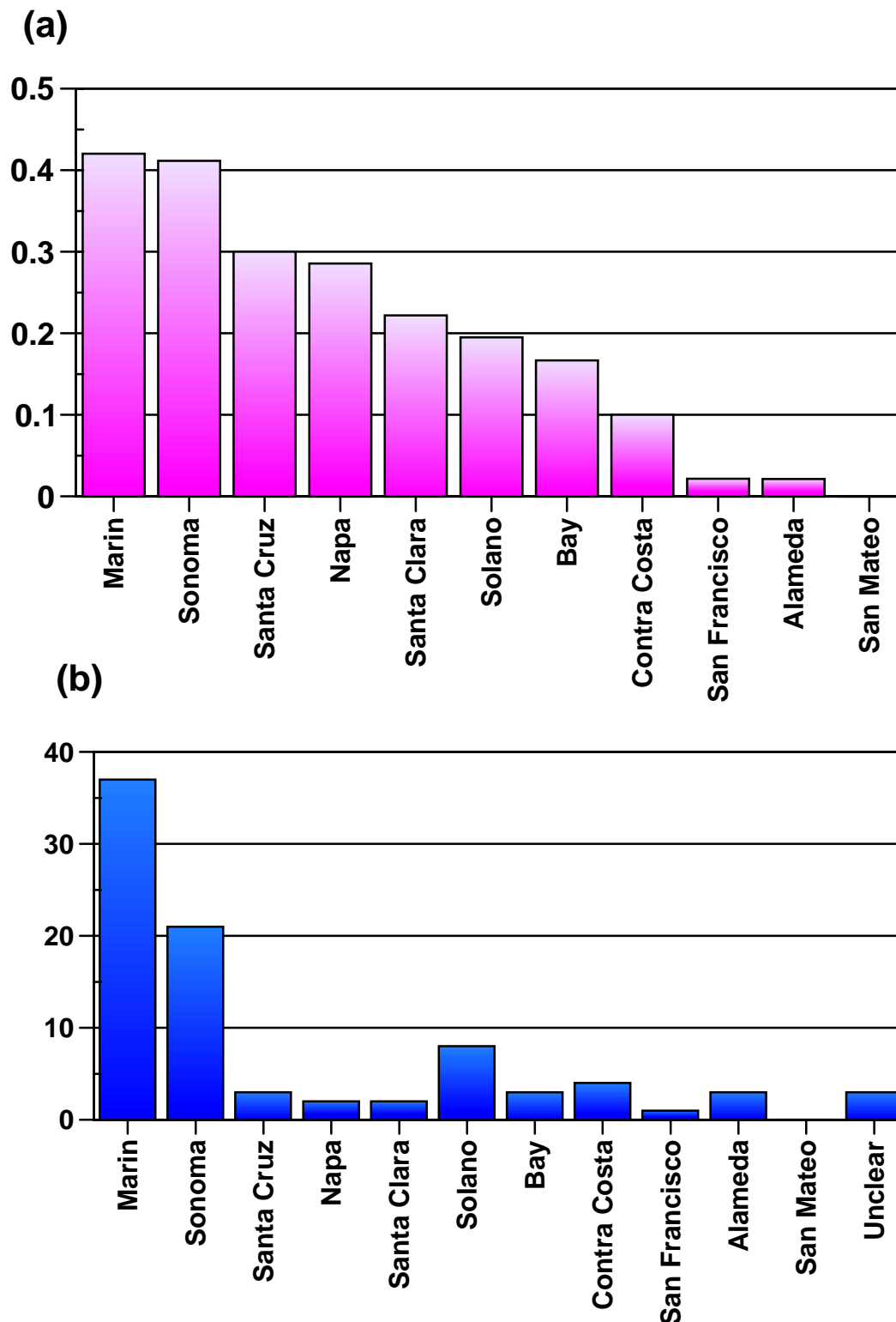
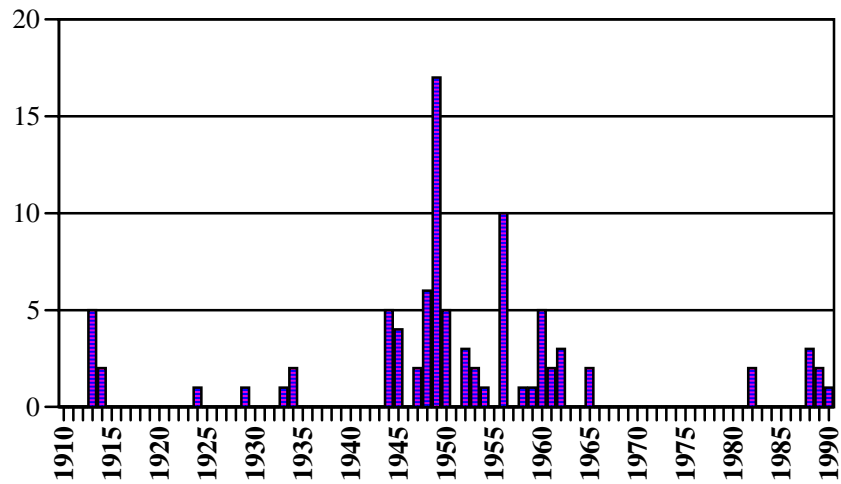


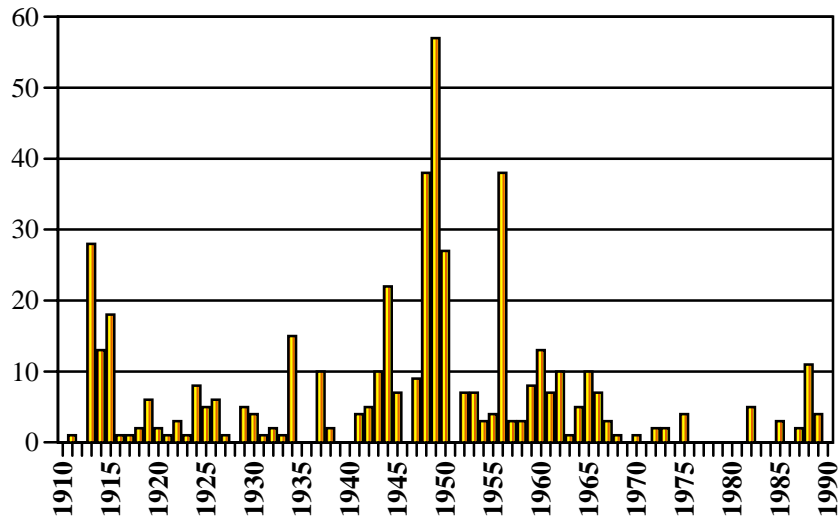
Figure 2(a, b): Compiled data on the Crow and Raven Sightings by County from 1911-1990 (a) ratio of crow and /or raven sightings to total number of entries when birds were listed, (b) total number of crow or raven sightings by county. Note that the one San Francisco sighting took place in 1990, two of the three Alameda sighting took place in rural areas near Livermore, and the Contra Costa sightings, with one exception, were in underdeveloped zone. The exception was near Moraga in 1989.

Number of Entries

(a)



(b)



(c)

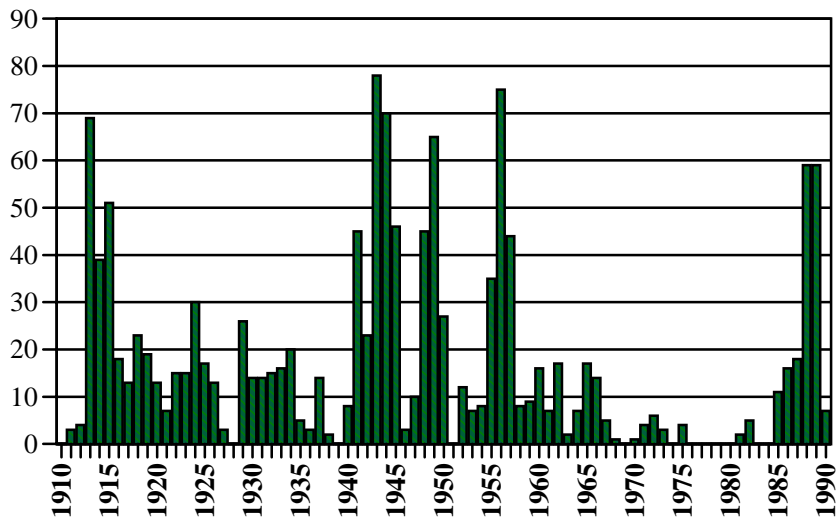
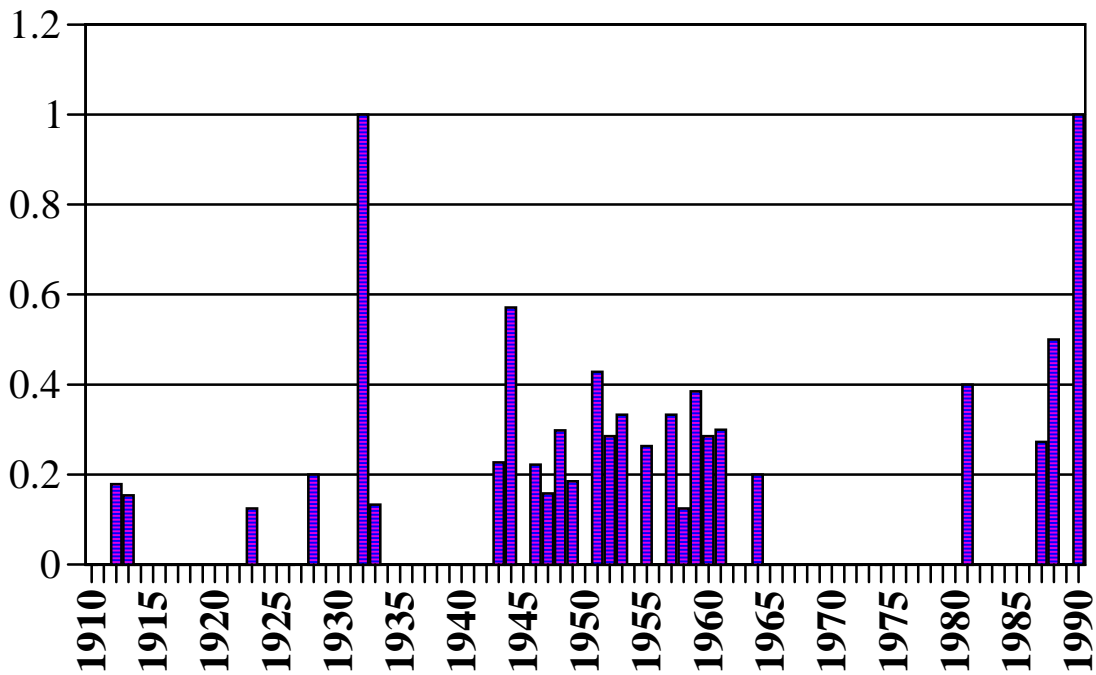


Figure 3 (a-c): Total Number of Entries where (a) crows or ravens were reported, (b) three or more birds were listed with a single paragraph of the entry, (c) all the entries that were recorded in the study counties in a given year.

Ratio of Entries

(a)



(b)

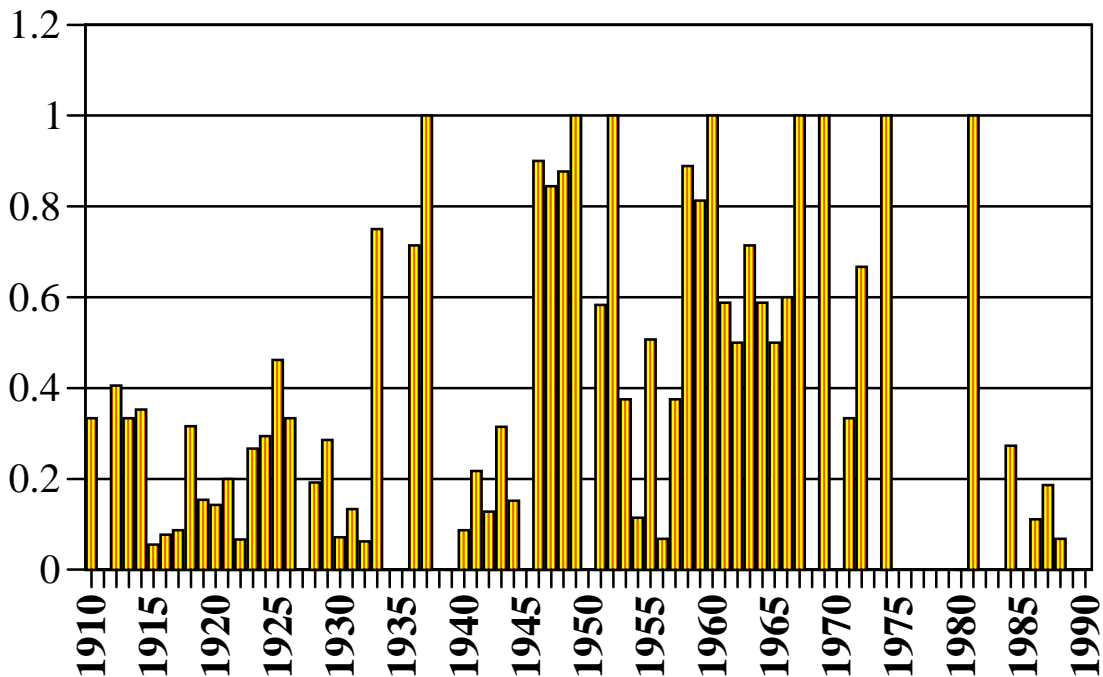


Figure 4 (a, b): (a) the total number of raven or crow sighting divided by the number of entries where 3 or more birds were mentioned in a single paragraph (indicating that birds were noticed), (b) the number of entries where birds were noticed divided by the total number of entries in a given year. Notice that while number of entries were low in the 1960's (figure 3c) the ratios are high.

other time periods (fig. 4b). Figure 3 (a-b) show this data by number of entries rather than proportions.

It is possible that the fall in the number of sightings is the result of an underlying decline in population size during the 1960's and 1970's may be due to environmental pollutants such as DDT and the increase in agriculture as discussed by Rachel Carson (1962). If such a fall occurred, the 1980's may represent a recovery following early 1970's regulation. It is also possible that the 1980's, mostly collected by Douglas Bell, does not accurately reflect the patterns in the underlying crow and raven population. If the 1980's data set is discounted, the data seems to indicate that the raven and crow populations will continue to diminish, and that the apparent shift to urban life cannot be shown by the data set. However, the present body of literature and personal observations indicates that crows and ravens are common urban residents. The 1980's data is consistent with this evidence.

The Transition

By accepting the 1980's data, the 1960's and 1970's data must be examined closely. If this data set is ignored, my empirical findings match those of Boarman and Coe's (2002), that the raven and crow populations have expanded over the last century. These non-sightings may reflect an underlying population pattern; however, what I have been looking at are reported sightings of crows and ravens. Just because no crows or ravens were sighted does not mean that they were not there. The data set cannot be understood without understanding the people who created it. So, I have turned to another form of analysis, the quotes and the question of perspective.

The overall number of entries from the Bay Area during the 1960's and 1970's is limited (figure 4). The number of data points was the lowest out of all the decades, with the sum of the 1960's and 1970's Bay Area entries (17 +71) being less than the number of entries in the next lowest category (1930's with 97 entries). That is not to say that there were few authors who wrote during this period. No less than 17 scientists¹ have journals in the Museum made during this time period. Of these seventeen, only nine made Bay Area entries. A great majority did

¹Steven J. Arnold, Bill Arvey, R.C. Bank, Seth Benson, A.C. Borell, P. Brylski, Stephen D. Busack & J.A. Visnaw, Susan M. Case, C. Cavalier, G.M. Christman, Blair Csuti, David M. Darda, J. Davis, Paul DeBenedictis, V.M. Dziadosz, P. Elias, Fred G. Evenden Jr.

research out of the area, some internationally. The Bay Area was not a major focus of study since the cold war era.

Based on the conclusions I can draw from my qualitative historical approach, the type of data the scientists of the period collected differed, with the passage of time, the attitude and the way science was done changed. This change has great impact on my empirical findings that cannot be discounted. While reading the notes, the attitudes of the field biologist's subculture changed, and by the 1960's and 1970's the raven and crows simply weren't "seen."

The Scientific Attitude

The Careful Naturalist

In the first half of the century, field biologists may have been influenced by the ideas of preservationists like John Muir and conservationists like Pinchot and Teddy Roosevelt. According to Mark Stoll (1997) John Muir took a religious approach to nature, respecting natural places as the work and examples of the glory of God. Similarly, Stoll described Gifford Pinchot as another "prophet" of the era, who came to represent the "moral regeneration" that resulted from conservation. While both stood on the opposite side of the debate on how natural resources should be used (see the debate on the damming of Hetch Hetchy in Stoll), both individuals and preservationist / conservationist movements showed a great reverence and sense of stewardship toward nature. In the examples selected by Stoll, both Muir and Pinchot describe the natural world with eloquent language similar to free verse poetry.

I found a pattern similarly reflected in the early journals I read. The biologists, showed this great reverence for nature. One must remember that the ethics of the day differ from the modern perspectives, as many of these early scientists frequently hunted or trapped without conveying any sense of a conflict of interest or reduction of their admiration for nature's glory appearing in their notes. Some of the early naturalists like Annie Alexander (1909-1939), were primarily trappers and did not notice the avifauna very closely. However, many (such as Grinnell, Bryant, and Camp 1909-1930) tended to be generalists, discussing the whole picture, taking full notice of the wildlife around them. Their notes often indicated an attempt to make a complete index.

In their journals, the element of hunting and collecting was portrayed simply as a part of the naturalist's work, and seldom was a major focus. It was part of cataloguing and indexing the

wildlife: “A strange bird was singing outside my window... Shot it and it proved to be a Western Yellowthroat, a new bird for the campus.” (Bryant 5/21/19) Bryant’s shooting of this bird was not meant destructively, but it was part of his work to identify the birds on campus, and such specimens could be used in the future to identify the “strange bird” in the field.

In her study of fisheries, Merchant (1997) described the attitude ambient in the time period as utilitarian and homocentric. By collecting and establishing a database for the future, the biologists were fulfilling their moral duty by reporting the natural world and preserving the knowledge for future generations. They went beyond the mere collection of specimens for the museum, and tried to capture that precious and fleeting experience of nature and preserve it in written text:

Mr. Floyed Johnson, caddy master at the Berkeley Country Club, phoned to the museum saying that the same or another heron was after the goldfish again, (see page 3), I went out Jan. 22 and arrived at the pond at 4 p.m. Shortly after I had settled in my hiding place the heron lit on a little hill about 100 yards from the lake. Several times it walked toward the lake but each time it was frightened by some golfer. Each time it would walk back over the hill out of sight. About dark two song sparrows came in and hopped about in the bushes a few feet from me. A mouse, which I could not see, came out and gnawed in the grass and would rustle back to it’s hole every time I made a move. Ten killdeers came in and ran about the pond, one of them took a bath.

A. Borell, Jan. 23 1924

Borell’s writing also reflects the world view the biologists brought to their work. Even though Borell is out to kill the heron, it is very important to remember that the culture was different. Borell has placed himself as part of the natural system, noticing the details of the natural world around him and saving them in his text, rather than just stalking his prey.

The efforts of the scientific community and their respect and true interest in wildlife can best be seen when the attitudes of the biologists are contrasted with that of the larger society at the time. Bryant (1911) on his trip through Napa, wrote in his journal folk remedies and excuses to kill the wildlife, such as feeding cyanide to robins to protect an olive crop and burning the hair of live rats and setting them free in order to disrupt the rat population. Bryant also noted that one could buy an assortment of live water fowl on sale in the 1910’s markets of San Francisco. In his lush description of a fox study (technically, hunt) in Colusa, A. Borell described how a \$5 coyote

bounty was still in effect and noted “that the clerk doesn’t know, or doesn’t want to know, the difference between a coyote and a fox pup” (Borell 12/2/24) and that a lot of people were turning in fox kits. The fox Borell was tracking got away.

Abundant Nature: The Collectors

In the 1940’s and 1950’s there is a movement away from the utilitarian ethic of the last time period. The desire to leave a lasting legacy for the future is not as strong as it had been. Interestingly, emerging ethics of the period include what Merchant called “ecocentric.” Characterized by attitudes such as Aldo Leopold (1887-1948)’s “land ethic” which emerged in 1950, and apparently places “an intrinsic value to all living and nonliving things, and all have a right to survive” (Merchant 1997). While this ethic may have emerged at this time, it does not appear in the notes I read. Interestingly the museum has the notes of an Aldo Leopold, but the Leopold I read did not share the same ethic. Aldo Starker Leopold (1913-1983) studied game animals, reporting quail, turkeys, and pheasants. He was closely involved with an annual hunt, recording the number pheasants that were killed each year. And the only crow I found in his notes, was the one he heard in a tree and promptly shot (Leopold 7/6/49).

The attitude I found in these notes match what I found during the 1940’s and 1950’s. In this time period the act of collection became more focused in the scientist’s journals, and a greater degree of carelessness can be detected. There may be a correlation between the more causal regard for nature’s productivity and the nation’s increased prosperity and the bounty following the end of the Great Depression. In a age of suburban expansion into once rural areas and the increase in farming and pesticide use during the Green Revolution as discussed by Carson (1962), it is possible that the naturalists of the time, while still very interested with the natural systems and wildlife populations, were unconcerned with the possible impact their collecting and hunting might have on the wild populations. Cold War era fears may have also played a role, as it may be possible that the fear of losing everything in a nuclear attack may have resulted in less concern for leaving a legacy and more living in the moment.

Hunting and destructive forms of collecting may have been seen as a practical approach to get an inventory of the wildlife, as they appeared to be in earlier times. The approach in the 1940’s and 1950’s, however, was a little more careless than in earlier times.

In Camp Taylor, Marin, Seth Benson was collecting mammals when “I had a momentary glimpse of dull green eye-shine. I then picked up a bright whitish yellow shine and shot the animal which turned out to be a big variegated house cat.” (sic, Benson, 5/31/44). While studying mammals, Dalquest (1941-1945) frequently took time to notice more than just what he trapped; however, his writing indicated that he frequently did not take the best care of his specimens. In fact, while focused on making his quota for collecting, very few were saved. For one that was preserved, he noted: “The possum was very fat and was left in gasoline. I will fix it tomorrow.” (Dalquest, 10/1/41) Some were eaten by predators or infested with flies. He was disgusted when he “only” trapped *Peromyscus*. And on two occasions he recorded the small mammals’ interesting fate -- “One of the ones I caught today was fed to my pet King snake. He ate it at once.” (Dalquest 5/3/42)

Although Fred G. Evenden Jr. (1940-1981) had a style different from all the other scientists whose notes I read, his attitude toward wildlife fits in to this period. Frequently writing more than one entry per day, Evenden wrote comprehensive lists that sometimes included counts but no other notes on behavior. (Due to his style, Evenden increased the percentage of bird lists in the decades he worked.) Although he was not a collector, his focus was on creating a solid list of avian life rather than capturing the moment for the future.

As this time period went on, the focus shifted, so that what was collected was the only data that appeared to matter. This attitude is best summarized by R. C. Banks (1958-1961) who went hunting in an area where he later found out hunting wasn’t allowed, and was relieved he didn’t know. “The morning was frustrating -- birds were scarce, not singing, and very wary. By 8 o’clock had only 2 birds.” (Banks, 5/1/59)

Leaving the Bay: An Increasing World View

As mentioned above, limited data is available in the 1960’s and the 1970’s. The data that is available is split between the now older scientists, like Seth Benson, Fred Evenden, and Aldo Stalker Leopold, and newcomers. As they aged Benson and Leopold either did less field work or took fewer notes. Evenden left the Bay Area, doing the same work across the country including making headlines by doing the first survey of the White House property since Theodore Roosevelt.

Many of the new biologists of the 1960's had either short or single volumes, and, as noted above, mostly worked out of the area. Those who recorded observations in the Bay Area engaged in focused studies: Paul DeBenedictis (1960-1964) took sea and shorebird censuses from the Oakland Bay Bridge toll plaza, Steve Arnold (1965-1966) studied only reptiles and amphibians, and Bill Arvey (1965-1967) studied the cormorants intently. (DeBenedictis did most of his work in Central America and the Galapagos.)

Based on Arvey's notes, some of the old notions about collecting during this period prevailed. Although Arvey was mostly focused on cormorants, he did report something else he tried to collect: "On the way back, we saw a family of crows. They were very large and had deep voices... Tried to get a shot at one but they sat in a huge old cedar which hung out over the river." (Arvey, 7/9/65)

As most of the work in the late 1970's took place outside the study area, no conclusions can be drawn about the attitude or ethic during this period. Blair Csuti (1969-1978), when he was in the area, tended to make good lists of birds with more notes than Evenden, but very few of the entries in his single volume were relevant, so I could not get a good feel for his style. Most of the information I have on the time consists of the very end of Benson's long run notes, and one of the entries involved a quick run past some of his old haunts (passing through several counties in a single entry) as he prepared for another Peru trip. Evenden also returned to his old favorite places to observe, although much of his data during the 1970's came from the San Francisco airport.

A New Respect for Nature

Leopold's "land ethic," where humans are part of the nature world where "plants and animals and waters are entitled to full citizenship as fellow members of the community" (Callicott 1999) does not seem to be relevant until 1980's, when a new ethic first appears in the data I collected. Of particular relevance is Merchant's vision for the future of a type of ethic which she calls "partnership ethics," a combination of this ecocentric ethic and elements of the homocentrism.

This ethic, a combination of utilitarian needs and ecocentric beliefs, appears in the attitude I found from the 1980's.

In this decade, Douglas Bell did a sizable amount of work in the San Francisco Bay area, and from his notes I was able to draw my insights into this new period. Following the tradition noted by Arvey, Bell (1984-1990) did species specific studies, writing many entries on sea gulls (particularly on Alcatraz), and Peregrine falcons. He was not as focused on generating overall impressions but rather focused on one thing at a time in his journals. But most significantly, collecting was no longer as central or as casual. On the Berkeley campus specifically, Bell noticed an albino robin, which he observed for many days, before losing track of it. Similarly, he watched a single Peregrine falcon which nested on Berkeley's bell tower for almost a year. He watched both until he could not find them any longer. These actions contrast with earlier field biologists who would have attempted to collect these birds when they were done studying them, if not immediately.

Bell does do some collecting, but his awkwardness and regret for the apparent "need" to collect is shown in his great emphasis on the hunting aspect of all his outings when specimens were collected. In describing birds gathered from the Farallon Islands, he mentions birds "picked up freshly expired at one of the 'botulism' springs," by a colleague and used terms such as "sacrificed" to describe the gulls that were killed, and only went after adult gulls. On one trip to Tomales Point, "only a few juveniles pass[ed] within 'spitting' range. Needless to say we did not shoot these." (Bell, 8/22/85) In the 1950's a juvenile would most certainly have been collected. Similarly, when he was out to collect gulls, he and those with him on the outing do not collect anything but the gulls, despite the presence of "+200" brown pelicans. This image contrasts starkly with Benson, who wasn't the only biologist to shoot a house cat.

Nor was Bell a good shot, something that might have been looked down upon 30 years earlier. Yet, his writings do not indicate any embarrassment by this lack of skill. His collecting (vs. just observational) entries are full of his effort, though they mostly report on how he missed.

My first shot at a sitting bird hit, but it ran into the surf. I tried shooting a second, but missed, then went for the wounded one. A mistake! I should have gone right for the wounded bird. I fired, but it didn't stop the gull - it kept swimming out and out. About 15 min. later I did manage to shoot 2 gulls on the beach (DAB 248-249). I was real worried about the wounded gull. As I was leaving I scanned the ocean - and saw it, floating dead at least 1/4 mile out. What a lesson!

Douglas Bell, March 8, 1988 Santa Barbara

Not only does Bell miss twice, he feels guilty for trying to take two birds rather than finish what he had started, and for fatally injuring a bird that he was unable to put to scientific use. For the sake of science, for the utilitarian sake of humanity, Douglas Bell sacrifices wildlife.

The culture of the 1980's as shown here, reflects sentiments similar to those present today. This change may have been influenced by Leopold's "land ethic," and the emergence of ecocentric ethics described by Merchant. As little data is available from the 70's, I cannot conclude if the attitude found in the '80's had begun to manifest itself in the scientific community sooner. We do know that the work of Rachel Carson and ecocentric ethics had an influence on larger society and politics, as the movement resulted in the creation of the Environmental Protection Agency in 1970, the passing of the strong Endangered Species Act in 1973, and powerful environmental legislation such as the Clean Air and Clean Water Acts in the same time frame.

Conclusions: The Significance of the Absence of Observations

Between Arvey and Bell, the apparent impression regarding hunting and collecting changed; however, the nature of data collecting did not. Both Arvey and Bell were focused on single species and restricted studies. During the three decades (late 1960's, 70's, and 80's) a majority of the research done took place outside of the Bay Area. That which did take place there was done minimally when the biologists were in the area. And it was at that time that the rural crow and remote raven may have moved into the urban sector.

The different attitudes and their impact on the number of crows and ravens (summerized in table 1) can now be used to offer a new possible explanation for the the mystery of the change in the crow and raven.

In the first half of the century, biologists were exploring the Bay Area. The naturalists felt a need to record and report the wildlife of the area. By the 1940's and 1950's that data was already collected and the utilitarian effort of capturing the moment for the future was beginning to fade. The region had been explored, its wildlife documented. Data from that period, may have been seen as only reinforcing what was known. Perhaps the scientific community was satisfied with what it had done. By the beginning of the 1960's, it appears the need to fill in the details came into effect. Just as modern research builds off the body of literature that came before, well

Table 1: Summary of changing focus and attitudes in major time periods

	1900-1940	1940-1960	1960-1980	1980-present
Major Focus	Indexing, local	Collecting, local	Out of area study	Specific group study, local and abroad.
Attitude	Take time to record all details	Discovering nature through collecting	???	Take only what you need. Be focused.
Effect on Observations	Data Available, high level of detail	Data Available, limited details	Absence of Data	Limited data

known species such as the raven and crow no longer needed to be studied on something as basic as population and distribution. By the 1970's the Bay Area, home base, was "so well known" that from then on distant lands or (by the 1980's) rare or threatened species (i.e. the peregrine falcon and other staples of the environmental movement) were more closely studied, while that which was "common" or "well known" was not closely watched. And by the late 1980's the first urban crow and raven sightings appeared in the journals, unremarked upon -- possibly indicating that these sighting were not the "true" first occurrences.

While the scientific community was not noticing them, the ravens and the crows moved in, adapting to urban life. Perhaps, similar to what Boarman and Coe (2002) discovered, the Bay Area population size and habitat area rose continuously. Perhaps, the population declined some, as the decreased number of sightings seemed to indicate, though not likely as dramatically as the data indicated. Perhaps it remained constant. Nevertheless, by the time the scientific community was ready to study ravens and crows again, their image had already changed, obtaining a place in popular culture revealed in contemporary movies and writings that the raven and crow are regular urban residents.

Even in a field as rigorous as science, all the work is still done by a community of people, subject to certain social notions of what is expected and the expectations and ethics of that culture changes over time. Perhaps, instead of trying to mask the unique personalities all people bring with them, they should be shared so that all may know how we inadvertently color our results.

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