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WILDLIFE IMPORTATION INTO THE
UNITED STATES, 1900-1972

United States Department of the Interior
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Special Scientific Report—Wildlife No. 200

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by Richard C. Banks



United States Department of the Interior

Fish and Wildlife Service

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WILDLIFE IMPORTATION INTO THE UNITED STATES, 1900-1972

by

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Abstract

Data from Bureau of Biological Survey and U.S. Fish and Wildlife Service reports show an overall increase in the number of birds and mammals imported from 1900 to 1972. The trend was interrupted by World War I, the economic depression of the 1930's, and World War II. Data are lacking for the years after World War II until 1968. Until 1942, domesticated canaries and a few species of game birds made up most of the avian imports; the shell parakeet or budgerigar was the most commonly imported parrot. Although the total number of birds imported 1968-72 was not greatly different from the pre-depression years, the proportion of canaries, game species, and parakeets declined greatly and the variety and number of cage birds including other parrot species greatly increased.

Until 1930 most mammals imported were for laboratory use or fur farming. After 1930 the number of imported mammals increased with the growing importance of primates, especially rhesus macaques, in research. Since 1968 the number of mammals imported annually has been at least 5 times greater than the previous peak of 1938, and primates have made up 87% of mammalian imports.

Information on reptiles and amphibians imported into the United States is available only for 1970 and 1971. Turtles were the most commonly imported reptiles, frogs and toads the most commonly imported amphibians.

Introduction

The black rat (*Rattus rattus*) probably came to North America on the earliest vessels from Europe (Laycock 1966). Since that time, man has accidentally or deliberately imported a great number and variety of exotic wildlife into this continent. The reasons for deliberate importation have been diverse—to establish new game species, to provide biological control of pest species (many of which, themselves, were exotic), to contribute to scientific and educational endeavor, to provide pets, or merely to enhance the environment. Little information is available on earlier importations. Oldys (1907) reports that there was a brisk trade in exotic cage birds by 1865, but details of early wildlife importations into the United States are sketchy and relate only to established species that have proven to be of either positive or negative economic value.

In 1900, the Congress of the United States passed the Lacey Act, one of the first Federal laws relating to wildlife and wildlife protection. Among its provisions was a section modeled after a law that had recently been adopted in Australia to prohibit the importation

of injurious wildlife. At that time, Australia was suffering as a result of the introduction of the European rabbit (*Oryctolagus cuniculus*) and was concerned about the introduction of other foreign species into its unique ecosystem. In the United States, officials of the Bureau of Biological Survey were well aware of the introduction of the mongoose (*Herpestes auropunctatus*) to islands in the Caribbean and Hawaii, and recognized the resulting damage to native wildlife of these areas. The English sparrow (*Passer domesticus*) and the European starling (*Sturnus vulgaris*) had been introduced into the United States, and their expanding populations were already causing economic damage.

The intent of the Lacey Act was to prevent the establishment of foreign species by prohibiting the importation of stock that might colonize. The first version of the Act made it unlawful to import any foreign wild animal or bird (except domesticated canaries and parrots) except under permit. Moreover, the new law placed an absolute ban on the importation of a certain few injurious species, and authorized the Secretary of Agriculture to declare other species injurious to the interests of agriculture or hor-

ticulture. The implementation of this Act by regulations set forth by the Bureau of Biological Survey provided, for the first time, a means of regulating the importation of wildlife into this country. At first, nearly all wild birds, mammals, and reptiles were denied entry unless a permit had been issued by the Bureau. After a few months, the regulations were eased so that 30 of the largest and best-known mammals, 3 well-known groups of birds, and all reptiles were exempt from the need for a permit (Palmer 1906). In addition, persons entering the country could bring in as many as five animals as personal belongings without a permit. All animals entering without a permit, however, were supposed to be declared at the Customs port of entry.

Thus, regulating the importation of wildlife provided a means of monitoring the flow of exotic species into the United States. By combining the information on species for which permits were issued and the Customs declarations of other importations, a fairly complete tally of incoming exotic wildlife was possible. The Bureau of Biological Survey maintained a card catalog of the species imported for many years. Unfortunately, this catalog cannot now be located. Information from the files, however, was summarized and discussed in the annual reports of the Bureau for most years through 1948, although the details provided varied considerably. The last year for which useful data were reported was 1942. No information was given for 1945, and for 1946-48 only the number of birds and mammals authorized entry by permit was given. For the most part, only birds and mammals were mentioned in these annual reports, and birds were considered in greater detail. Figures relating to importation into the Hawaiian Islands, under a separate permit system, included reptiles but were irregularly mentioned in the Bureau's reports and are not further considered here. In 1948 the Lacey Act was amended to transfer permit responsibilities for wildlife importation to the Department of the Treasury. Customs records may exist for subsequent years, but presumably none were kept by the Fish and Wildlife Service, of which the Bureau of Biological Survey had become a part.

In the first decade or so of reporting, information on the importation of wildlife occasionally appeared also in publications other than the Bureau's annual reports, particularly in articles by Bureau employees in the Department of Agriculture's Yearbooks (e.g., Palmer 1906, 1909). Usually these were summary articles, tabulating data for several years. Occasionally the annual reports also repeated data from several prior years, to summarize, make comparisons, or show trends. Thus, data for a single year may appear in two or more publications, but frequently the figures are not in agreement. For this report I have assumed that the later figures are more correct.

Beginning 1 January 1966, regulations became effective that again required the declaration of all live fish and wildlife imported into the United States. Current regulations require the filing of U.S. Fish and Wildlife Service Form 3-177, "Declaration for the Importation of Wildlife," with the District Director of Customs at the port of entry where actual customs clearance occurs. Copies of the forms are forwarded to the U.S. Fish and Wildlife Service. Annual summaries of the total numbers of birds, mammals, reptiles, amphibians, fish, mollusks, and crustaceans imported were published as *Wildlife Leaflets* from 1967-1972.

For the years 1968 through 1972, complete lists of the species of birds (Banks 1970; Banks and Clapp 1972; Clapp and Banks 1973a, 1973b; Clapp 1975) and mammals (Jones 1970; Jones and Paradiso 1972; Paradiso and Fisher 1972; Clapp and Paradiso 1973; Clapp 1974) declared for importation have been prepared, as has a list of the reptiles and amphibians imported in 1970 and 1971 (Busack 1974). For a variety of reasons, many having to do with problems of proper identification of animals listed on the declaration forms, the total numbers derived from these detailed analyses do not agree with the totals given in the *Wildlife Leaflets* mentioned above, but are accepted here as more nearly accurate.

The present report reviews and summarizes available information on the importation of living birds and mammals in 1901-42 and 1968-72, and compares the nature of the trade in those periods. A summary of data relating to imported reptiles and amphibians in 1970-71 is presented, but information on these groups is lacking for the earlier period. Data for 1901-42 are from the annual reports and related publications of the Bureau of Biological Survey. Information from the reports is usually readily identifiable by fiscal year; individual reports are not cited. The reports are contained in the annual reports of the U.S. Department of Agriculture or, after 1940, the U.S. Department of the Interior. Data for 1968-72 are from the compilations mentioned in the previous paragraph.

Birds

1901-42

Birds were imported into the United States long before the Bureau of Biological Survey had authority to regulate importation and thus the ability to monitor the entries. Oldys (1907) reports that there was a brisk trade in cage birds by 1865. The first relatively precise information available on the extent of avian importations is for 1901, when the number of game birds and miscellaneous nongame birds was given and the number of canaries was estimated (Table 1). The preciseness of this information

Table 1. *Number of birds imported into the United States, 1901-42.*

Year	Total birds	Canaries	Game birds	Miscellaneous birds
1901	190,000 ^a	180,000 ^a	6,584	3,416
1902	235,433	182,361	5,281	47,791
1903	254,633	201,527	9,126	43,980
1904	247,030	205,400	6,307	35,323
1905	258,639	230,682	3,539	24,418
1906	336,033	277,610	3,660	58,423
1907	437,532	352,564	11,422	47,816
1908	393,552	325,285	22,453	47,487
1909	437,777	338,256	35,768	41,414
1910	451,741	361,054	30,545	48,778
1911	455,264	354,858	59,473	64,338
1912	457,077	362,604	50,086	44,387
1913	477,364	392,422	25,465	59,477
1914	475,392 ^b	368,676	43,848	62,868
1915	316,145	216,037	28,266	51,440
1916	232,944	127,706	8,000 ^b	86,453
1917	105,000	16,471	35,507	53,022
1918	67,534	10,000	6,232	51,702
1919 ^c				
1920	27,417 ^b		27,417 ^b	
1921	186,656	68,533	22,209 ^b	96,014
1922	337,677	159,174	37,953 ^b	140,550
1923	388,388	182,000	9,923 ^b	196,465
1924	409,810	310,379	32,684 ^b	66,747
1925	451,908	310,297	42,307 ^b	99,304
1926	471,667	330,000	48,973 ^b	92,694
1927	572,927	374,895	90,659 ^b	107,373
1928	682,308	458,449	97,535	126,324
1929	825,486	589,251	123,709	136,501
1930	825,736	562,980	95,124 ^b	155,441
1931	658,892	525,429	59,712	90,987
1932	518,330	417,604	45,764	50,867
1933	311,036	261,633	28,131	21,272
1934	263,735	207,701	24,811	31,223
1935	197,100	138,756	31,772	26,562
1936	230,140	173,422	28,850	27,868
1937	300,817	162,700	106,298	31,819
1938	270,000	136,704	96,307	36,989
1939	252,628	121,024	102,363	29,241
1940	252,153	135,287	89,973	26,893
1941	89,028	50,128	13,948	24,951
1942	56,211	6,389	37,490 ^b	12,000 ^b
Total	14,409,140 ^b	10,186,248	1,685,474 ^b	2,500,618

^a Estimate.

^b Figure given is minimum.

^c No data available.

becomes somewhat doubtful when one discovers that the game birds and miscellaneous birds total exactly 10,000.

From 1901 through 1913 there was a gradual increase in the total number of birds imported each year (Table 1). Because the compilations apparently were not made the same way each year, some of the variation from the smooth trend (e.g., 1905-10) may be artificial. Both the number of canaries and the total number of birds peaked in 1913 and 1914. After those years, war conditions in Europe had a severe effect on bird importations. Most of the European partridges (*Perdix perdix*) and pheasants (mainly *Phasianus colchicus*) imported before the war were from Europe, although some were from Canada. Most of the canaries (*Serinus canaria*) also entered from Europe, particularly from Germany and Great Britain. By 1917 there was a total suspension of importations from central Europe and a prohibition on the exportation of birds from Great Britain. Further restrictions were in effect before the end of the war. During these years, the number of shipments of birds from South America and particularly from Asia increased and the port of San Francisco grew to rival New York as an entry place for exotic wildlife.

It was some time after World War I before the flow of birds from Europe to the United States resumed prewar proportions. Perhaps it was because importations were so limited that compilations of data were not presented for 1919 and 1920; only a few figures relating to the latter year are to be found in the 1921 report. By 1923 bird importation was back in full swing and the trade continued to flourish and grow, surpassing prewar levels in a few years and reaching new peaks by 1929 and 1930. The tariff act of 1922 had a dampening effect on the importation of cage birds beginning in 1924. An import duty of \$0.50 on all cage birds valued at not more than \$5.00 and 20% of value for those of higher value resulted in marked reductions in the importation level of several popular species (see miscellaneous birds, Table 1).

In addition to being a peak year for the entry of birds, 1930 was noteworthy because of several other events that played an important role in importation. It was the year that the first consignment of wildlife to cross the Atlantic by air arrived, on the dirigible *Graf Zeppelin*; the shipment included 539 canaries, a gorilla (*Gorilla gorilla*), and a chimpanzee (*Chimpansee troglodytes*). Oldys (1907) had commented that the development of the cage bird trade in both Europe and the United States was dependent in part on the replacement of sailing vessels by steamships; the "advantages of quick transportation" resulted in less mortality. Certainly the change to air transportation would have a similar stimulating effect.

However, other factors detrimental to the import trade in 1930 delayed the potentially boosting effect of air transportation. New regulations under the

Lacey Act prohibited the importation of any species that had special protection in its country of origin unless the animals had been taken in accordance with legal requirements. This restriction prevented the importation of certain rare species, but probably had no great effect on total numbers. More importantly, parrot fever (psittacosis) was discovered in the United States, and the U.S. Public Health Service prohibited the importation of most parrots beginning in January 1930. Another factor affecting importation after 1930 was the economic depression.

During the decade of the 1930's, the number of birds imported gradually declined (Table 1), mainly because fewer parrots and canaries were imported. The importation of game birds continued at a fairly constant level, increasing toward the end of the period, and the trade in cage birds other than parrots was relatively steady.

The onset of World War II affected the trade in birds even more greatly than had World War I. The importation of partridges from Europe fell by nearly 80% in 1940 and apparently ceased by 1942. The number of miscellaneous birds decreased by 50% from 1941 to 1942. In 1941 the principal sources of imported canaries were Japan and China; in 1942 the number of canaries imported was about 4% of the 1940 figure. Overall, the importation of birds in 1942 stood at about 20% of the 1939 level (Table 1).

Annual reporting of information on the importation of wildlife effectively ended with the 1942 report, although figures for the total numbers of birds and mammals were published sporadically after that. Reports for 42 years, 1901-42, recorded the entry into the United States (excluding Hawaii) of a minimum of 14,409,140 birds, of which more than 10,000,000 were canaries.

Game Birds

From 1901 to 1942, more than 1,600,000 game birds were imported into the United States (Table 1). Of these, more than 1,500,000 were of only two species, the European (or Hungarian) partridge and the so-called Mexican quail (mainly *Colinus virginianus*), discussed separately in following paragraphs. Thus, only 140,000 other birds considered to be of game species (galliform birds, ducks and geese, and pigeons and doves) were imported, and most of these (93,800) were pheasants of various species. For several years the data were not completely recorded, and the totals given here are low.

Although most game birds were imported in an attempt to establish populations for hunting in this country, the reports are rather general as to what was included as "game." Apparently many decorative pheasants were imported for exhibition or breeding in zoos and private aviaries, but were nonetheless

Table 2. Number of certain game and miscellaneous birds imported into the United States, 1901-42, considering only years for which specific information is available.

Year	Game birds			Miscellaneous birds	
	European partridge	Mexican quail	Pheasants	Parrots	Other
1901			626		
1903			1,565		
1904		40 ^a	661	17,325	17,998
1905	450	300 ^b	1,147		
1906	736	2,548 ^b	1,528	5,387 ^c	53,045 ^c
1907	3,075		5,248	12,543	35,273
1908	7,781		4,415	6,072 ^d	41,415
1909	29,832	640	1,200	13,073 ^d	28,341
1910	18,931	1,246	7,199		
1911	36,507	3,110	12,326		
1912	23,181	7,570	15,412		
1913	10,283	2,936	9,417		
1914	36,760	0	4,148		
1915	7,080	3,341	15,841		
1916	few	8,000	few		
1917		32,814			
1918		5,205	150		
1919					
1920		24,473			
1921		22,209		875	95,139
1922	10,000 ^d	37,953		9,075 ^d	131,475
1923	few	9,123		37,721	158,744
1924	4,196	28,388	100	45,817	20,930
1925	3,044	39,170		53,964	45,340
1926	11,839	37,134		53,770	38,924
1927	5,518	85,141		60,886	46,487
1928	12,620	84,915		56,307	70,017
1929	28,517	87,131	8,061	57,098	79,403
1930	5,453	90,124		69,673	85,768
1931	20,000	39,712		38,595	52,392
1932	6,615	39,131		20,167	30,700
1933	6,021	22,110		1,217	20,055
1934	2,300	13,611	900	1,911	29,312
1935	2,211	23,358		1,783	24,779
1936	500	27,783	567	2,214	25,654
1937	3,482	101,396	1,420	3,765	28,054
1938	14,905	79,465	1,937	3,086	33,903
1939	14,510	87,457		2,799	26,442
1940	3,081	85,995		125	26,768
1941	764	13,000	185	176	24,775
1942		37,490		100	12,000
Total	330,192 ^d	1,184,019 ^c	94,053 ^d	575,524 ^d	1,283,133

^a Identified as *Lophortyx elegans*.

^b Species not mentioned, or species mixed.

^c Figure for parrots is for shell parakeets only.

^d Figure given is minimum.

classified as "game" because of their taxonomic relationships. Ring-necked pheasants (*Phasianus colchicus*), for which several appellations were used, were brought in for both purposes; most of the unspecified pheasants enumerated (Table 2) were ringnecks, and most were apparently for stocking or game farm purposes.

It seems rather strange that the game bird imported most frequently in the early part of this century was a species already native to the United States—in fact, the most abundant of the native galliform species, the bobwhite, called at that time "Mexican quail." The first mention of Mexican quail in the Biological Survey's reports was in 1904, and the 40 birds imported that year were identified as *Lophortyx elegans*, a species now known as the elegant quail (*Lophortyx douglassii*). Three hundred quail imported during the following year are not specifically identified. In 1906, 148 bobwhite and 2,400 "Mexican quail" were imported; exactly what species were involved is not stated. Regular importation of "Mexican quail," apparently in the sense of Mexican races of the bobwhite (*Colinus virginianus*, mainly the race *texensis*), began in 1909 with 640 birds, and increased to a peak of over 32,000 just before this country's entry into World War I (Table 2). Importations increased quickly after the war until a peak of 90,000 quail was reached in 1930, then eased slightly during the Depression, and peaked again at 101,000 in 1937. In 1909-42, at least 1,181,000 of these quail were imported; this is 70% of all game birds and 8% of all birds imported in the first 42 years of the century.

Bobwhites were imported free of duty until 1922, when a tariff of \$0.50 a bird was placed on them. In 1925, the tariff was reduced to \$0.25, and in 1931 it was removed. The figures suggest that the imposition of the tariff had little effect on the rate of importation, but the reduction of the duty may have been partly responsible for the great increase from 1926 to 1927 and later years. From 1907 until the mid-1920's, the presence of quail disease (*Colibacillosis tetraonidarum*) and the necessity of a quarantine period held down the level of importation (Table 2).

Birds now known in this country as the Hungarian partridge (*Perdix perdix*) were imported in large numbers for propagation and stocking. An early effort peaked in the years 1909 to 1914 (Table 2). Interest in this bird as a game species and efforts to establish it fluctuated widely in that period. World War I stopped the importation of partridges from Europe, although small numbers came from Canada in some of those years. It was some time after the war before large shipments were again received. After the mid-1920's the interest apparently waxed and waned, and the pattern of importation was extremely erratic. From 1905 to 1942, at least 330,000 of these partridges

were imported, and eventually the species became established in several States.

Miscellaneous Birds

Here, as in the Bureau of Biological Survey's reports, "miscellaneous birds" includes parrots (discussed below) and all species other than canaries and those considered to be game birds. Data for 1901-42 indicate that at least 2,500,000 individuals were imported; of these, at least 1,280,000 were of species other than parrots (Tables 1, 2). During 1921-40, for which the best data are available, two-thirds of the miscellaneous birds were of species other than psittacids. The number of these cage birds imported was fairly constant during the first decade of record keeping, but increased slightly during the second. The number may have been held down in the late- and post-World War I years, as it was for canaries, but there was not as severe a decline for cage birds in general because the source of supply was more nearly worldwide. In fact, the number of cage birds imported reached the highest levels in the early 1920's only to be hit severely by the tariff that became effective in 1924. A climb toward a new peak was apparently halted when new provisions were added to the Lacey Act regulations in 1930; the rate of importation leveled off for the remainder of the reported period.

Very little information is available on the species of cage birds or the number of each species imported during this 42-year period. In the early years, spectacular or very rare species were mentioned—Cuban flamingos (*Phoenicopterus ruber*) in 1901, ostriches (*Struthio camelus*) for propagation in 1902, 20,000 pigeons and doves for breeding in 1904. In the 1920's, more species were mentioned but they were still the more noteworthy forms, often rare species brought in for exhibition in zoological parks. Over the years, representatives of virtually every avian family are mentioned. Several of the species noted are now considered endangered or threatened (Vincent 1966).

The report notes that in 1906 slightly more than 336,000 individuals of 344 species of birds were imported. Specific mention is made of 46 individuals of 7 species of pheasants for zoos and private aviaries, 3,521 individuals of 8 species of game birds for propagation, and 115 birds of 13 species of more than casual interest. Another 277,610 individuals were canaries and 1,528 were ring-necked pheasants. Oldys (1907) noted that 5,387 shell parakeets (*Melopsittacus undulatus*) were imported in 1906. Thus, 31 bird species contributed more than 288,000 (about 85%) of the total individuals so that 313 species were represented by 47,835 individuals, an average of only about 150 birds per species.

Parrots

Parrots have long been an important part of the cage bird trade. Oldys (1907) summarizes part of the earliest history of parrot importation. Early reports of the Biological Survey generally do not provide separate figures for the number of parrots imported, but include most of them with the other "miscellaneous" cage birds. In 1904, approximately half the miscellaneous birds were identified as parrots (in the broad sense as any member of the family Psittacidae); in 1907 this proportion was about a quarter, and in 1909 about a third (Table 2). It is reasonable to assume that from 1901 to 1920, when data were scanty, parrots constituted approximately 30% of the birds listed as miscellaneous. Apparently the shell parakeet or budgerigar was the most important species imported in these early years; Oldys (1907) noted that 5,387 were imported in fiscal year 1906, when they retailed at \$4 or \$5 a pair.

Separate figures for parrots were regularly recorded beginning in 1921 (Table 2). After 1923, numbers imported were generally high, ranging from about 20% to nearly 70% of the miscellaneous birds. During 1921-42 the number of parrots imported was more than 521,000. If one assumes that the average rate of importation in the years before World War I is adequately represented by the years for which data are available (1904, 1907-08), then 147,039 parrots were entered from 1904 to 1918, making a total of at least 717,000 from 1904 to 1942.

According to the report for 1930, "a mysterious disease, commonly known as 'parrot fever', was reported at Annapolis, Maryland, and was said to have been contracted from parrots recently imported from Colombia through dealers in Baltimore and New York." Nearly 200 cases in humans, a number of them fatal, were reported in a short period of time from widely separated cities, and additional cases were reported in following years. The importation of most parrots was stopped in January 1930, although several thousand were entered in the next few years.

As late as 1928, the shell parakeet was still the most frequently imported parrot, although the report for that year notes that about one-third of all known species of parrot had been brought in at one time or another in the past. Importation of shell parakeets slowed considerably in the early 1930's, not only because of the parrot fever and resulting restrictions but also because large numbers were being raised in this country. Lovebirds of the African genus *Agapornis* became more popular at this time, and Amazon parrots from Cuba and Central and South America continued to be highly popular. Several of the species listed by name in the Survey's reports, but without indication of number, are now listed in a threatened category by the International Union for the Conservation of Nature and Natural Resources (Vincent 1966).

1968-72

In 1968-72, at least 3,706,500 birds were imported into the United States. This figure is almost certainly several hundred thousand low, because in 1968 and 1969 canaries and parrots were exempt from declaration requirements (although some were declared). Thus, the apparent large increase in the number of birds imported from 1969 to 1970 (Table 3) is partly artificial, and the actual increase in importation is unknown. The sharp decrease from 1971 to 1972 in the number of birds entered reflects a nearly total ban on bird importation imposed by the U.S. Department of Agriculture (USDA) in August 1972 to prevent the infection of poultry flocks with viscerotropic velogenic Newcastle disease. If importation had continued until the end of 1972 at the same rate as in the first 8 months, more than a million individuals would have been imported in that year.

Canaries

A reporting requirement imposed for canaries probably accounts for the increased imports of that species in 1970 (Table 3). Probably the number actually imported in 1968 and 1969 was near the

Table 3. *Number of birds imported into the United States, 1968-72.*

Year	Total birds	Canaries	Game birds	Miscellaneous birds	Parrots
1968	513,694 ^a	3,064 ^a	5,554	505,076	80,592 ^a
1969	647,318 ^a	7,504 ^a	2,744	637,070	89,653 ^a
1970	937,938	229,931	1,038	706,969	126,814
1971	966,561	196,126	1,543	768,892	235,935
1972 ^b	640,995	60,775	1,213	579,007	54,593
Total	3,706,506 ^a	497,400 ^a	12,092	3,197,014	587,587 ^a

^a The figures given are minimal, because canaries and parrots did not have to be declared on Form 3-177 in 1968 and 1969, although some were.

^b Eight months only, January-August.

200,000 level of 1970 and 1971. There seems to have been a significant decrease in the rate of importation of canaries in 1972, beyond the effect of the ban on bird importation.

Game Birds

For the years under discussion in this section, I have considered all birds in the families Anatidae and Columbidae, and the order Galliformes, to constitute game birds. This was done to make figures as comparable as possible to those given for game birds in the Biological Survey reports for 1901-42. Relatively few game birds were imported from 1968-72, the total being only slightly more than 12,000. Only two species were important, and together contributed approximately half the game birds. More than 4,700 ring-necked pheasants and 2,400 bobwhites were imported in the 5 years. About half of the bobwhites were from Canada and the other half were masked bobwhites (*Colinus v. ridgwayi*) from Mexico, brought in for propagation of this endangered form.

Miscellaneous Birds

Birds of this category (all birds other than canaries and game species as previously defined) were imported at a gradually increasing rate from 1968 to 1972 (Table 3). However, the rate of importation

seems to have been substantially greater in early 1972, and there probably would have been a significant increase in the total in that year had the ban not been imposed by USDA. Over the entire period more than 3,197,000 individuals were imported into this country.

Parrots

A part of the increased volume of parrot importation from 1969 to 1970 may have been a result of newly imposed reporting requirements, but a part probably also reflects an actual increase in numbers. Numbers increased greatly from 1970 to 1971 (Table 3). The extreme drop in 1972, proportionally much greater than the decrease in all birds of the miscellaneous category, reflects the USDA ban on the importation of parrots (and mynah birds) that went into effect several months before the more general ban on all species.

Groups of Birds Imported

Members of all but 2 of the 27 orders of birds (Wetmore 1960) were imported in 1968-72; only the orders containing loons and grebes were unrepresented. All but about 50 of the approximately 170 families of birds (Van Tyne and Berger 1959) have been represented by imports into this country. The families not represented in these years can be

Table 4. *Species of birds most frequently imported, 1968-72.*

Species	Family	5-year total
Domestic canary, <i>Serinus canaria</i>	Fringillidae	498,561
Red-eared waxbill, <i>Estrilda troglodytes</i>	Estrildidae	333,050
Strawberry finch, <i>Amandava amandava</i>	Estrildidae	296,437
Canary-winged parakeet, <i>Brotogeris versicolurus</i>	Psittacidae	262,755
Black-headed nun, <i>Lonchura malacca</i>	Estrildidae	235,225
Orange-cheeked waxbill, <i>Estrilda melpoda</i>	Estrildidae	226,413
Spice bird, <i>Lonchura punctulata</i>	Estrildidae	219,487
Red-cheeked cordon bleu, <i>Uraeginthus bengalus</i>	Estrildidae	212,326
Green singing finch, <i>Serinus mozambicus</i>	Fringillidae	142,014
Silverbill, <i>Lonchura malabarica</i>	Estrildidae	139,636
Hill mynah, <i>Gracula religiosa</i>	Sturnidae	108,726
Halfmoon conure, <i>Aratinga canicularis</i>	Psittacidae	75,587
Quaker conure, <i>Myiopsitta monachus</i>	Psittacidae	64,225
Society finch, <i>Lonchura striata</i>	Estrildidae	60,039
Pin-tail nonpariel, <i>Erythrura prasina</i>	Estrildidae	52,686
Zebra finch, <i>Poephila guttata</i>	Estrildidae	52,618
Orange-chinned parakeet, <i>Brotogeris jugularis</i>	Psittacidae	48,455
Orange bishop, <i>Euplectes orix</i>	Ploceidae	40,587
Golden-breasted waxbill, <i>Amandava subflava</i>	Estrildidae	35,123
Cutthroat, <i>Amadina fasciata</i>	Estrildidae	31,864
Pintail whydah, <i>Vidua macroura</i>	Ploceidae	27,513
Red-billed fire finch, <i>Lagonosticta senegala</i>	Estrildidae	25,229
White-headed nun, <i>Lonchura maja</i>	Estrildidae	25,090
Napolean weaver, <i>Euplectes afer</i>	Ploceidae	23,740
Combassou, <i>Vidua chalybeata</i>	Ploceidae	23,466

categorized as those that include only species that: (1) are strictly pelagic; (2) gather all their food in flight or have other peculiarities that make them ill-adapted to cage life; or (3) are of very limited distribution and abundance, often endangered. During 1968-72, approximately 1,540 species of birds were imported (Clapp 1975), about 18% of the species in the world's avifauna. The number of species imported each year ranged from 625 to 815.

Despite the variety of species and higher taxa of birds imported, more than 96% of the individuals entering the country in 1968-72 belonged to only five avian families (Clapp 1975). The family Estrildidae, containing the waxbills and their allies, was the most important family in each of the 5 years, and contributed more than half (55%) of all imported birds. In 1972, 7 species in this family were among the 8 most frequently imported species (the canary, in the family Fringillidae, was the other); those same 7 species were among the 10 most commonly imported forms in 1968-72, each with more than 139,000 individuals brought to this country (Table 4). Of the 25 species leading the list of importations in the period, 14 are in the family Estrildidae.

The family Fringillidae, which includes a wide variety of finches, was the second most important imported group and contributed nearly 19% of the birds entered in the 5-year period. The domestic canary alone is responsible for 70% of the fringillids, but, even if the canary were omitted from consideration, this family would rank third in the number of individuals imported. Many species of finches are imported, but only 1 in addition to the canary is included in the top 25 for 1968-72 (Table 4).

The parrot family, Psittacidae, was the third most important avian group imported in 1968-72, accounting for nearly 16% of the individual birds. In 3 of those 5 years this family was second only to the Estrildidae. Many species of parrots are imported in moderate numbers. Only 4 species are among the 25 most frequently imported birds, but the list of the next 25 would (or would have, before the 1972 ban) include probably a dozen more (see Clapp and Banks, 1973a, 1973b).

The Ploceidae, the family of weaver finches, accounted for nearly 4% of the birds imported in 1968-72. No single species is of unusual importance; 4 forms appear among the top 25 for the period. The family Sturnidae, starlings and mynahs, is unusual in that the importance of its importation results almost entirely from a single species, the Indian hill mynah (*Gracula religiosa*). Nearly 98% of the sturnids imported have been of this species, which was the 11th most important species during the period.

Sources of Imported Birds

Birds were imported from 55 countries in 1970, from 63 in 1971, and from 53 in 1972. In the 3 years a total of

72 countries shipped birds to the United States, although most birds are imported from just a few countries. In 1970 more than 95% of all imported birds originated in 20 countries.

The country from which the United States imported the most birds in 1970-72 was India (Table 5); Senegal was a close second. Presumably most of the birds from these countries are of wild origin. Of those imported from Japan and Taiwan, on the other hand, most are raised in captivity—canaries and estrildid finches of Australian ancestry. Many of the birds originating in Holland were raised in captivity there, although some may have merely been transshipped through Holland, actually originating elsewhere. Clapp (1975) has shown that birds are sometimes shipped from countries other than the country of origin. The 11 countries listed in Table 5 were the sources for more than 95% of the birds imported into the United States in 1970-72. Information on the kinds of birds (by families) imported from each country, and further information on countries from which smaller numbers of birds came, is available elsewhere (Clapp and Banks 1973a, 1973b; Clapp 1975).

Table 5. Major sources of birds imported into the United States, 1970-72.

Country	Number	Percentage ^a of total
India	631,672	24.81
Senegal	528,839	20.77
Japan	278,865	10.95
Taiwan	267,193	10.49
Peru	195,393	7.67
Thailand	123,008	4.83
Mali	95,100	3.73
Paraguay	84,934	3.33
Colombia	79,020	3.10
Holland	77,412	3.04
Mexico	62,704	2.46
Total		95.18

^a Percentage of all birds imported, not just from those countries listed.

Table 6 shows the approximate percentages of birds that originated in each major geographic area from which birds were imported. Approximately half the birds imported came from Asia. If birds from Taiwan and Japan are omitted, because most are captive-reared, the Asiatic countries still can be considered the source of most of the wild birds imported. African countries contribute approximately one-fourth of the birds imported.

Table 6. *Continent of origin of birds imported into the United States, 1970-72, by percentage of total imported.*^a

Continent	1970	1971	1972
Asia ^b	53.86 (28.04)	48.06 (25.67)	55.24 (41.60)
Africa	26.89	22.24	28.56
South America	11.10	22.23	8.84
Europe	4.01	4.11	4.28
Central America	3.59	2.61	2.05

^a Based on the 19 to 23 countries from which 99% of imported birds originate.

^b Figure in parentheses excludes Japan and Taiwan, which export mainly domestically raised cage birds.

Comparison of 1901-42 and 1968-72

It is somewhat surprising that the total number of birds annually imported into the United States in recent years is only slightly greater than in the peak years before the economic depression of the 1930's. One might suspect that relatively inexpensive air freight, resulting in quicker transportation and reduced mortality en route, would have greatly increased the importation of exotic birds. Furthermore, the increased human population in the country should have increased the market. These and undoubtedly other factors certainly have had an effect, but the result was not as much an increase in overall bird importation as a change in the proportions of the kinds of birds imported.

Assuming that the figures for canary importation in 1970 and 1971 are reasonably accurate, and that they are representative of the earlier years when declarations were less stringently required (see p. 7), canaries have been imported recently in considerably smaller numbers than in the early part of the century. The number of canaries imported reached peaks in the pre-World War I and pre-depression years (Table 1) that were more than double the number imported in recent years (Table 3). If the reduction is real and not the result of inaccurate reporting, it may reflect a greater effort in breeding canaries in this country or competition from other, often more colorful, imported species that were less available earlier.

In 1901-42, a few species of game birds were imported in large numbers, about half as many as of all other species (excluding canaries). During 1968-72, on the other hand, the number of game birds imported was extremely small, constituting an insignificant proportion of all birds imported.

In contrast, the importation of parrots and other "miscellaneous" cage birds has been much greater in recent years than in the early part of the century. Assuming that 1970 and 1971 represent an accurate

base, the number of parrots imported annually in recent years is from 50% to 150% greater than the number imported in the peak prepsittacosis years of 1927-30. More parrots were imported in the 5 years 1968-72 than in the 27 years for which data are available in 1901-42.

Another important aspect of the change between the two periods involves the species of parrots imported. In the early years for which records are available, the major species of parrot brought in was the shell parakeet or budgerigar; no other species is mentioned in the Biological Survey reports as constituting a significant proportion of the number of birds imported. In the 1920's, large numbers of parrots of the genus *Amazona* were imported from Mexico and the Caribbean islands. In 1968-72 fewer than 300 budgerigars were imported, and no species of *Amazona* were among the 25 most frequently imported birds, although they were still fairly popular. In this 5-year period, four species of parrots (Table 4) contributed more than 76% of all parrots imported, and the number imported during these 5 years almost equals the number of all parrots entered from 1921 to 1942 (Table 2).

Numbers of miscellaneous cage birds (birds other than canaries and game species) imported in 1968-72 are 5 to 10 times higher than in 1901-40. If parrots are omitted from these figures, approximately the same degree of difference holds. More than twice as many of these "miscellaneous" birds were imported in the recent 5-year period than in years 1921-41 (Tables 2, 3).

The difference in bird importation in the two periods can be summarized as a recent decrease in canaries, game birds, and budgerigars, more than compensated for by an increase in miscellaneous cage birds, including a few particular parrot species. About twice as many species have been imported in recent years (average about 700) than in 1906 (344 species).

Mammals

1901-42

Mammals have never been imported into the United States on as large a scale as birds, and perhaps for this reason the reporting of statistics (Table 7) of mammal importation has been less complete. In many years, the annual reports of the

Bureau of Biological Survey give only the number of the most important mammalian imports, although other species are mentioned incidentally. For the first several years in which records were maintained only a few hundred mammals were imported annually. One giraffe (*Giraffa camelopardalis*), several chimpanzees, and one muskox (*Ovibos moschatus*) are the only mammals mentioned specifically in reports covering the first 3 years of record keeping.

Table 7. Number of mammals imported into the United States, 1901-42.

Year	Total mammals	Fox ^b	Black bear	Rhesus macaque
1901	350			
1902	214			
1903	629			
1904	1,470			(1,043 Guinea pigs)
1905	500			
1906	2,290			
1907	791			
1908	1,958			
1909	2,203			
1910	6,660			
1911	5,427			
1912	5,457			(1,471 Guinea pigs; 1,300 white mice)
1913	17,272			(12,112 Guinea pigs; large numbers of mice and monkeys)
1914	10,602 ^a			
1915	3,567			
1916	3,461			
1917	4,474			
1918	1,933	391		
1919		335		
1920	805 ^a	805		
1921	5,496	1,574		
1922	2,064 ^a	2,064		
1923	2,768 ^a	2,756		
1924	4,871 ^a	4,871		
1925	8,424 ^a	8,424		
1926	7,906 ^a	7,809	97	
1927	4,242 ^a	4,242		
1928	3,044 ^a	3,044		
1929	1,091 ^a	1,091		
1930				
1931	4,958 ^a	559	170	4,214
1932	6,361 ^a		190	3,000 ^a (6,171 monkeys)
1933	2,862 ^a		174	2,686
1934	8,319 ^a		96	8,200
1935	5,213 ^a		128	5,073
1936	13,159 ^a		102	12,992
1937	12,659 ^a		113	12,421
1938	17,681		87	15,851
1939	12,689 ^a		137	12,536
1940	10,252 ^a		92	10,146
1941	8,746 ^a		91	8,655
1942	6,122 ^a		68	6,024
Total	218,990 ^a	37,965	1,545	101,798

^a Number given is minimal.

^b Mainly silver and cross fox from Canada, for breeding. Some were imported as early as 1912.

The large increase in the number of mammals imported in 1904 (Table 7) was caused by the entry of 1,043 Guinea pigs (*Cavia porcellus*), the number of other mammals being only 427. The large number imported in 1906 may have resulted from a similar influx of experimental animals; the number imported under permit that year was only 654, and 1,636 entered under circumstances in which no permit was necessary. Small numbers of various Australian marsupials were noted specifically in some reports of the first decade, but little else was mentioned.

Imports of mammals in 1910-14 increased sharply over those in earlier years (Table 7). The majority of the imports in 1912 were Guinea pigs (1,471), white mice (1,300), and monkeys for laboratory and pathological experiments. Evidently the large-scale importation of mammals for other than laboratory or zoological use had not yet begun. The report for 1912, incidentally, bore the first mention of the importation of monkeys and of foxes for breeding purposes.

The year 1913 was a peak year for the importation of mammals, as it was for birds. The total of 17,000 mammals imported that year was not again reached until 1938; the total included more than 12,000 Guinea pigs. During the years of heavy importation of experimental animals, the import duty was 20% of value; this was reduced to 10% in 1913.

War conditions in Europe curtailed the importation of mammals into the United States as it did that of birds. By the end of World War I the number of mammals imported had dropped about 90% from the 1913 peak to the levels of a decade earlier.

The war years saw the beginning of large-scale importation of silver and cross foxes (*Vulpes fulva*) from Canada, particularly the Maritime provinces, for the fur-breeding industry. Having been mentioned first in the 1912 report, foxes were singled out for attention in every year from 1916 until 1930 (Table 7), although exact numbers were not always reported. Fox importation reached a peak in the mid-1920's and decreased rapidly thereafter; this species was not important enough for mention in the annual reports after 1931. During the 1920's foxes so dominated the mammalian portion of the import business that figures were generally not given for other mammals,

or even for the total number of mammals imported. In 1918-29, 37,406 foxes were imported from Canada.

The lack of complete information on mammal imports continued through the 1930's, apparently reflecting the continuing low level of importation of most mammals. Monkeys, particularly rhesus macaques (*Macaca mulatta*), replaced foxes as the principal mammalian import after 1932. During 1931-40, at least 87,119 rhesus macaques were imported, compared with only 37,406 foxes in 1918-29. Although monkeys were mentioned in reports as early as 1912, probably few were brought in annually from 1912 to 1931. Palmer (1909) mentioned 420 monkeys (species not stated) among imports in 1908, and Palmer and Oldys (1911) noted that 3,161 monkeys of various species were among the imports in 1910.

The importation of black bears (*Euarctos americanus*) from Canada was of sufficient interest that the Biological Survey recorded data on that species in the 1930's (Table 7). In 1931-40, 1,289 bears were brought into the country, mainly for exhibit and menagerie purposes; apparently some were also used for stocking in an attempt to reestablish native populations in several States.

Although data are completely lacking for some years and are incomplete for many others, the information available indicates that the minimum number of mammals imported from 1901 through 1942 was over 218,000 (Table 7). The actual number was probably at least 10%, perhaps 25%, greater. Approximately 70% of the total number, 153,000 individuals, were of only four species—the rhesus macaque, fox, Guinea pig, and black bear. A minimum of 65,000 (probably more nearly 75,000) individuals of other species were imported.

Attempts nearly every year to import mongooses and flying foxes were thwarted by rigid enforcement of the Lacey Act which prohibited their import, and by very effective cooperation of Customs agents. Permits for entry were denied, and any animals that reached ports of entry were returned or killed. The few individuals that did manage to enter the country were sought out and killed when their presence became known.

Table 8. *Number of mammals imported into the United States, 1968-72.*

Year	Total mammals	Rhesus macaques	Squirrel monkeys	Nonprimates
1968	129,520	30,933	45,014	15,806
1969	122,991	27,462	47,096	14,017
1970	93,653	23,302	25,769	15,278
1971	89,854	22,097	29,877	9,967
1972	90,457	23,210	25,293	12,819
Total	526,475	127,004	173,049	67,887

1968-72

During 1968-72, a total of 526,475 mammals was imported into the United States. In this period there were slight decreases from year to year (Table 8) but the trend was interrupted in 1972 by the entry of a large number of laboratory mice. In each of the years, monkeys and relatives in the order Primates made up the bulk of the importations, constituting approximately 87% of the total. More than half (57%) of the individuals imported were of two species, the rhesus macaque and the squirrel monkey (*Saimiri sciureus*). Of the 20 mammalian species most frequently imported, 17 are in the order Primates (Table 9) and contributed 83% of the mammals imported.

Mammals in the order Carnivora constituted about 4% of the total imported in this 5-year period. Raccoon-like animals of the family Procyonidae accounted for more than half of these, and cats (family Felidae) another quarter. Only two carnivores appear on the list of mammals most frequently imported (Table 9), although a raccoon of the genus *Procyon* might have appeared if all individuals in that genus had been identified accurately on the declaration forms.

Rodents (order Rodentia) and rabbits (order Lagomorpha) each contributed between 2% and 3% of the imported mammals in these years. Laboratory strains of the house mouse (*Mus musculus*) were imported in large numbers in 1972, sufficient to give that species a place among the 20 most frequently imported species; otherwise the tropical red squirrel

(*Sciurus granatensis*) was the most frequently imported rodent. The single lagomorph imported in quantity (most of which were entered in 1968 and 1970) was the snowshoe hare (*Lepus americanus*), a species native to parts of the United States.

In 1968-72, approximately 70% of the families, 33% of the genera, and 14% of the species of mammals of the world have been represented among imports into the United States. The number of species imported during this period was approximately 573 (Clapp 1974).

Sources of Imported Mammals

Mammals were imported from 85 countries in 1970-72. Relatively few countries were important as sources of United States imports, and only 3 contributed nearly 75% of the total and 12, 90% (Table 10). During this 3-year period there was a gradual increase in the number of mammals imported from Colombia, Thailand, and Somalia, and a gradual decrease from Nicaragua, Malaysia, Kenya, and Brazil. The relatively high position of Canada on the list of sources of imported mammals is mainly a result of the large number of snowshoe hares entered in 1970; the number of other mammals entered was insignificant. Almost all the mammals coming from India were rhesus macaques and most of those from Peru were squirrel monkeys.

As suggested by Table 10, countries of South America provide approximately 57% of the mammals imported into this country. Asian countries account

Table 9. Mammals most frequently imported into the United States, 1968-72.

Species	Order	Number
Squirrel monkey, <i>Saimiri sciureus</i>	Primates	173,049
Rhesus macaque, <i>Macaca mulatta</i>	Primates	127,004
Douroucoul, <i>Aotus trivirgatus</i>	Primates	20,869
White-fronted capuchin, <i>Cebus albifrons</i>	Primates	17,823
Cotton-top marmoset, <i>Saguinus oedipus</i>	Primates	13,711
Woolly monkey, <i>Lagothrix lagothricha</i>	Primates	12,808
Grivet monkey, <i>Cercopithecus aethiops</i>	Primates	12,721
Snowshoe hare, <i>Lepus americanus</i>	Lagomorpha	12,179
White-lipped tamarin, <i>Saguinus nigricollis</i>	Primates	9,135
Crab-eating macaque, <i>Macaca fascicularis</i>	Primates	8,058
Black-handed spider monkey, <i>Ateles geoffroyi</i>	Primates	7,981
White-throated capuchin, <i>Cebus capucinus</i>	Primates	7,448
Stump-tailed macaque, <i>Macaca arctoides</i>	Primates	6,717
Black-capped capuchin, <i>Cebus apella</i>	Primates	6,666
Vervet monkey, <i>Cercopithecus pygerythrus</i>	Primates	5,792
Coati, <i>Nasua nasua</i>	Carnivora	5,285
Moustached tamarin, <i>Saguinus mystax</i>	Primates	3,706
Olive baboon, <i>Papio anubis</i>	Primates	3,039
House mouse, <i>Mus musculus</i>	Rodentia	2,937 ^a
Pig-tailed macaque, <i>Macaca nemestrina</i>	Primates	2,730
Kinkajou, <i>Potos flavus</i>	Carnivora	2,608

^a More than 2,500 of these were imported in 1972 as laboratory animals.

Table 10. Sources of mammals imported into the United States, 1970-72.

Country	Number	Percent of total
Peru	79,844	29.14
India	66,178	24.15
Colombia	59,390	21.67
Thailand	11,307	4.12
Canada	6,789	2.47
Nicaragua	4,220	1.54
Ethiopia	4,161	1.51
Malaysia	3,900	1.42
Brazil	3,404	1.24
Kenya	3,380	1.23
Somalia	2,886	1.05
Tanzania	2,777	1.01
Total		90.55

for about 31% and the nations of Africa for 5%. These approximations are based on the countries of origin of 97% of the imports in the years 1971 and 1972 (Clapp and Paridiso 1973; Clapp 1974).

Comparison of 1901-42 and 1968-72

During each of the years 1968-72, the annual importation of mammals was greater by at least a factor of 5 than in the earlier peak year of 1938 (Tables 7, 8). In the recent 5-year period more than twice as many mammals were imported as in the entire 42-year period 1901-42. More individuals of a single species may be imported in a recent year than of all species together in an earlier year.

Data regarding the level of importation of particular species in the early part of this century are not available. One assumes, because the Biological Survey reports did not record large numbers of individuals of any species, that no species was imported in significant quantity. The Guinea pig and white (laboratory) mouse, singled out for comment in 1904, 1912, and 1913, provide conspicuous exceptions. It was not until the World War I years that any species was imported regularly in large enough numbers to be worthy of report. In the entire period, only certain experimental animals, silver and cross foxes for breeding in fox farms, and rhesus macaques seem to have played significant roles in the importation of mammals. In contrast, very few Guinea pigs and almost no foxes have been imported in recent years.

It is obvious that the major factor in the increased importation of mammals in recent years has been the large number of primates. Twice as many rhesus macaques came in annually in 1968-72 as in the peak years of the late 1930's. Squirrel monkeys, not

mentioned in the early reports, are now the leading mammalian import. Regrettably, figures for the importation of nonprimates cannot be calculated with accuracy for most of the early 42 years, but the fact that they are not given suggests that they were small. Thus, it is reasonable to assume that recent figures, 9,000 to 15,000 annually, represent a major increase over the early part of the century.

Reptiles

Detailed information on reptiles imported into the United States is available only for 1970 and 1971, when 1,724,282 and 1,337,179 individuals, respectively, were imported (Busack 1974). Because of the lack of details for other years, I assume that 1970-71 are typical of the pattern in recent years.

Turtles (using the term in the broad vernacular sense to include both aquatic and terrestrial forms) of the order Chelonia were the most commonly imported reptiles, and accounted for 80% of the total number imported in 1970 and 60% in 1971 (Table 11). By far the most frequently imported species was the red-eared slider (*Chrysemys scripta*), often called the green turtle, but not to be confused with the marine green turtle (*Chelonia mydas*). In both years, this species, mainly very young individuals from Colombia, made up 60% of all reptiles and 83% of all turtles brought in (Table 12). Only a few other species of turtles are imported in large numbers (Table 12). At least 80 species of turtles were represented in these 2 years; perhaps several additional species were represented by specimens not fully identified on the declaration forms.

Lizards form the second major group of imported reptiles, contributing 12% and 26% of the total reptile imports in 1970 and 1971, respectively. As with turtles a single species in the group contributes most of the individuals. The common iguana (*Iguana iguana*) contributed 11% of all reptiles imported in the 2 years. Lizards of at least 179 species in 15 families were entered in these years (Table 11).

Crocodylians (including alligators and caimans) made up 6 to 10% of the reptilian imports in 1970 and 1971. Although representatives of 11 species in two families were entered, most species were in small numbers. Nearly all imported crocodylians were declared as the caiman (*Caiman crocodylus*), the third most important reptilian species imported (Table 12).

Snakes formed the least important group in regard to importation, contributing only 1 to 3% of the reptiles entered in 1970-71. Although the number of individual snakes imported was rather low, and most were boa constrictors (*Boa constrictor*), the diversity of snakes entered was great. As many species of snakes were entered in these years as of all other

Table 11. *Groups of reptiles and amphibians imported into the United States, 1970-71.*

Group	Year	Number of individuals	Percent of total	No. of families ^c	No. of species ^c
Reptiles					
Crocodilians	1970	112,402	6.51	2	9
	1971	137,199	10.26	2 (2)	10 (11)
Turtles	1970	1,382,927	80.20	10	66
	1971	811,820	60.71	11 (12)	66 (80)
Lizards ^a	1970	208,920	12.11	13	131
	1971	350,801	26.23	13 (15)	135 (179)
Snakes	1970	20,033	1.16	10	192
	1971	37,359	2.77	9 (10)	219 (270)
Total	1970	1,724,282		35	398
	1971	1,337,179		35 (39)	430 (540)
2-year total		3,061,461			
Amphibians					
Caecilians ^b	1970	15	—	1	1
	1971	5	—	1 (1)	— (1)
Frogs and toads	1970	1,033,968	93.62	12	63
	1971	884,007	96.73	14 (14)	64 (90)
Salamanders	1970	70,389	6.37	4	15
	1971	29,857	3.26	4 (5)	15 (18)
Total	1970	1,104,372		17	79
	1971	913,869		19 (20)	79 (109)
2-year total		2,018,241			

^a Includes 59 individuals in 2 species of the Amphisbaenidae in 1970.

^b Only three individuals in this group were identified to species.

^c Figure in parenthesis is total for the 2 years.

reptiles combined (Table 12). Of the snakes declared, more than 8,800 were of venomous species (Busack 1974).

Sources of imported reptiles

Table 13 lists 11 countries that together exported more than 99% of the reptiles received in the United States during 1970-71. Colombia sent more than 92% of the reptiles and was the source of most of the crocodilians, turtles, lizards, and snakes in the list of most frequently imported reptilian species (Table 12). Although a variety of reptiles was imported from most countries, each nation listed in Table 13 served as the major source of one or more of the species in Table 12—Thailand for *Malayemys*, Mexico for *Gopherus*, Japan for *Chinemys*, Tunisia for *Emys*, Colombia and Nicaragua for *Chrysemys*, Kenya for *Chamaeleo*, Taiwan for *Trionyx*, and Dahomey for *Agama* (Busack 1974).

Comparison with Earlier Years

There is very little historical information available on the importation of reptiles. In fiscal year 1901, before reptiles were exempt from permit requirements, permits had been issued for the entry of 38 individuals. In 1905 there was a notation that 200 reptiles were imported, chiefly turtles and snakes. In a number of later years there were comments that permits had been issued for the importation of reptiles into Hawaii, but species and numbers were seldom given.

Amphibians

Details on the number and variety of amphibians imported into the United States are available only for 1970 and 1971 (Busack 1974). The patterns of importation in those 2 years are similar (Table 11),

Table 12. *Reptiles most frequently imported into the United States, 1970-71.*

Species	Family	Number	Percent of total
Crocodilians			
<i>Caiman crocodylus</i>	Alligatoridae	249,208	8.14
Turtles			
<i>Chrysemys scripta</i>	Emydidae	1,837,439	60.01
<i>Podocnemis</i> sp.	Pelomedusidae	126,459	4.13
<i>Geochelone denticulata</i>	Testudinidae	115,776	3.78
<i>Malayemys subtrijuga</i>	Emydidae	37,565	1.22
<i>Trionyx sinensis</i>	Trionychidae	12,184	.39
<i>Chinemys reevesii</i>	Emydidae	11,204	.36
<i>Gopherus berlandieri</i>	Testudinidae	10,700	.34
<i>Emys orbicularis</i>	Emydidae	9,611	.31
Subtotal, Turtles			70.54
Lizards			
<i>Iguana iguana</i>	Iguanidae	352,971	11.52
<i>Anolis</i> sp.	Iguanidae	48,380	1.58
<i>Cnemidophorus lemniscatus</i>	Teiidae	46,963	1.53
<i>Basiliscus</i> sp.	Iguanidae	21,544	.70
<i>Chamaeleo jacksoni</i>	Chamaeleonidae	7,757	.25
<i>Gekko gekko</i>	Gekkonidae	6,268	.20
<i>Ameiva</i> sp.	Teiidae	6,234	.20
<i>Agama agama</i>	Agamidae	6,165	.20
Subtotal, Lizards			16.18
Snakes			
<i>Boa constrictor</i>	Boidae	39,361	1.28
<i>Epicrates cenchria</i>	Boidae	6,216	.20
Subtotal, Snakes			1.48
Total			96.34

and for the purposes of this report I assume that these years are typical of the recent period.

Members of the families of anuran amphibians, known collectively as frogs and toads, made up 95% of the imports (Tables 11, 14). By far the most important were those frogs declared as grass or leopard frogs (*Rana pipiens*), a single "species" that contributed 80% of all imported amphibians. Many shipments of these frogs were declared by weight rather than by the number of individuals, and the figures presented are based on an estimate of 12 frogs per kg (5.6 per lb). These animals were imported, mainly from Mexico, for laboratory and educational use. Recent taxonomic studies on the *Rana pipiens* complex of frogs (Pace 1974) indicate that members of the group that originate in Mexico belong to species other than *R. pipiens* in the strict sense, that is, to morphologically similar populations to which other

Table 13. *Sources of reptiles imported into the United States, 1970-71.*

Country	Number	Percent of total
Colombia	2,834,541	92.58
Thailand	67,055	2.19
Mexico	20,461	.66
Japan	17,099	.55
Tunisia	16,358	.53
Nicaragua	16,096	.52
Kenya	15,745	.51
Union of S. Africa	15,515	.50
Taiwan	14,035	.45
Dahomey	12,261	.40
Indonesia	10,866	.35
Total		99.24

Table 14. *Amphibians most frequently imported into the United States, 1970-71.*^a

Species	Family	Number	Percent of total
Frogs and toads			
<i>Rana "pipiens"</i>	Ranidae	1,625,200	80.52
<i>Xenopus laevis</i>	Pipidae	215,742	10.68
<i>Bufo marinus</i>	Bufoinidae	40,419	2.00
<i>Ceratophrys calcarata</i>	Leptodactylidae	9,242	0.45
<i>Leptodactylus pentadactylus</i>	Leptodactylidae	4,142	0.20
<i>Rana catesbeiana</i>	Ranidae	3,984	0.19
<i>Dendrobates auratus</i>	Dendrobatidae	1,600	.07
<i>Pipa pipa</i>	Pipidae	1,286	.06
<i>Dendrobates tinctorius</i>	Dendrobatidae	1,056	.05
Subtotal			94.22
Salamanders			
<i>Cynops pyrogaster</i>	Salamandridae	61,876	3.06
<i>Triton cristatus</i>	Salamandridae	21,230	1.05
<i>Paramesotriton hongkongensis</i>	Salamandridae	16,729	0.82
Subtotal			4.93
Total			99.15

^a Includes all individuals identified to species in species of which 1,000 or more individuals were imported.

scientific names should now be applied. African clawed frogs (*Xenopus laevis*) and giant toads (*Bufo marinus*) are the only other anuran species that made up a significant proportion of the amphibians imported, although large numbers of a few other species were also entered (Table 14). Ninety species of anurans were declared for entry in these years.

Of the imported tailed amphibians, or salamanders, only three species contributed significant numbers to the total (Table 14). These three, all members of the family Salamandridae, made up 99% of the imported salamanders and approximately 5% of the imported amphibians. Only 18 species of salamanders were imported.

Sources of Imported Amphibians

Mexico supplied most of the *Rana "pipiens"* imported into this country, and thus accounted for about 80% of all our imported amphibians (Table 15). Most of the clawed frogs came from the Union of South Africa, the second most important amphibian supplier. As was the situation with reptiles, the nations that exported the greatest numbers of amphibians generally provided large numbers of a single species. In addition to the *Rana "pipiens,"*

Mexico supplies most of the bullfrogs (*Rana catesbeiana*). Japan is the source of *Cynops*, Colombia and Santo Domingo of the giant toad (*Bufo marinus*), and Colombia alone of *Dendrobates tinctorius*. Italy provides the *Triton*, and Hong Kong the *Paramesotriton*. Of countries not listed in Table 15, Costa Rica is the source of most of the *Dendrobates auratus*.

Table 15. *Sources of amphibians imported into the United States, 1970-71.*

Country	Number	Percent of total
Mexico	1,626,350	80.58
Union of S. Africa	204,955	10.15
Japan	62,037	3.07
Colombia	43,240	2.14
Italy	19,875	0.98
Hong Kong	16,757	0.83
Santo Domingo	15,675	0.77
Total		98.52

Discussion

The number of exotic animals imported in the first 42 years of this century represented neither an extreme threat of establishment by potentially injurious species in the United States nor an especially severe drain on native populations from which the imports were drawn. About two-thirds of the imported birds were domestically raised canaries, and a high proportion of the remainder consisted of a few species of game birds, one of which became well established. Most of the mammals were for experimental or breeding purposes. The importation of some rare and unusual species for exhibition in zoos and for aviary propagation may have contributed to the decline of some species in the wild, but the actual effect of this factor cannot be assessed from the information at hand. Except for the canaries and game birds, and perhaps some kinds of parrots, most species were apparently imported in such small numbers in any year that the probability of the establishment of feral populations was relatively slight.

The trade in wildlife in recent years has been quite different than in 1901-42. The proportion of canaries and game birds has decreased as a greater number of parrots and other nongame species has been imported. Many species are imported in large numbers. Mammals imported in the earlier years were mainly for experimental work or for breeding on fur farms; more recently, few experimental mammals other than primates have been imported but the number of imports has increased greatly. The importation of large numbers of individuals of certain species of exotic wildlife for several years poses a significant threat of the establishment of the species in the United States and the depletion of the native populations from which the imports are drawn.

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