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PERSPECTIVES IN ORNITHOLOGY

NEOTROPICAL ORNITHOLOGY: THEN AND NOW

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NEOTROPICAL ORNITHOLOGY HAS blossomed over the last two decades, with the publication of major works (Buckley et al. 1985, Stotz et al. 1996, Remsen 1997) and the founding of the Neotropical Ornithological Society (NOS) in 1987. Since 1990, the NOS has published *Ornitología Neotropical*, the only international journal devoted to scientific ornithology in the Neotropical region. Two other publications of note are *El Pitirre*, published since 1987 by the Society for the Conservation and Study of Caribbean Birds (formerly the Society of Caribbean Ornithology), and *Cotinga*, published since 1994 by the Neotropical Bird Club (United Kingdom).

Those books and journals are proof of the tremendous growth of Neotropical ornithology in the last two decades (see Haffer 1983, Parkes 1985). Ever larger numbers of ornithologists, especially younger ones, carry out research on Neotropical birds, and more of them than ever before are native to and resident in Latin America. For example, 35 Latin American ornithologists from four countries authored or co-authored 15 of 24 articles (62.5%) in volume 13 (2002) of *Ornitología Neotropical*, whereas only 2 from one country authored 1 article of 5 (20%) in volume 3 (1992). In addition, older societies of ornithology have been rejuvenated, for instance the Asociación Ornitológica del Plata, which was founded in 1916 and has been publishing *El Hornero* since 1917 (López de Cazenave 2001).

Some of the new societies are national—for example, the Sociedade Brasileira de Ornitologia founded in 1984 and publishing *Ararajuba* since 1990; and the Unión de Ornitólogos de Chile, founded in 1987 and publishing *Boletín Chileno de Ornitología* since 1994. Others are regional, like the Sociedad Antioqueña de Ornitología in Colombia (publishing *Boletín de la Sociedad Antioqueña de Ornitología* since 1990).

It is timely to document this growth and to highlight factors that have permitted it. Toward that goal I review aspects of the history of ornithology in the Neotropics, analyze some of the reasons for its evolution, and evaluate Neotropical ornithology today. Although I range widely over time, persons, and topics, I emphasize the role of systematics and of one ornithologist—Carl Eduard Hellmayr—whose work I consider to have been a key element that eventually led to the present growth of ornithology in the Neotropics. (“Neotropical region” is taken here to encompass Latin America from México and Central America southward through all of South America, the Caribbean Islands, the Galápagos, and the Falkland [Malvinas] Islands, much as in Sclater’s [1858] original definition.)

NEOTROPICAL ORNITHOLOGY THROUGH THE AGES: A BIRD’S EYE VIEW

Pre-Columbian period: Ethno-ornithology.—The first Neotropical “ornithologists” were probably religious or secular leaders of the pre-

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Columbian period who used birds to predict certain events. Little direct evidence has remained of that knowledge because of the general absence of a written record, yet much can be learned through the people's art. To discover the significance of birds in the lives of ancient Americans, scholars have identified the bird species depicted in their pottery, carvings, and other art forms. Quetzalcoatl, the "plumed-serpent," is one of the major gods of the Toltecs and Aztecs. The name Aztec comes from the Nahuatl word *aztecatl*, meaning "one who comes from the place of the cranes." The Codex Mendoza (Armstrong 1975), a crucial manuscript for archeologists because of the information it contains in Spanish, shows an eagle holding a snake in its talons, illustrating the origin myth of the Aztecs. In his 1615 book on natural history in New Spain (México), Francisco Hernández listed 229 birds by their Aztec names (Boubier 1925). Some of those names, "like *pauxi*, *hoatzin*, or *motmot* have been taken over from... Hernández... into the permanent vocabulary of ornithology" (Stresemann 1975:32). In the Maya world, Navarijo (1999) has identified birds from 22 families in 13 orders, especially Galliformes, Psittaciformes, and Apodiformes.

Postconquest ornithology: Slow beginnings.—The study of birds did not begin in Latin America until after the conquest by Portuguese and Spanish explorers and adventurers, whose competing voyages led to the fundamental linguistic subdivision of Latin America. They also negatively affected the rate of discoveries in natural history: the "development of...the sciences (in Central and South America) was stopped dead for two centuries" (Boubier 1925: 92). Overviews of the history of ornithology in Brazil and Argentina, respectively, can be found in Sick (1993) and Steullet and Deautier (1935). Additional historical information can be gleaned in Boubier (1925), Stresemann (1951, 1975), Pinto (1979), Farber (1982), Oren (1990), Rounds (1990), Kaimowitz (1995), Mones (1996), Escalante (1998), Alves and Silva (2000), and others. However, a thorough account of the history of ornithology in the entire Neotropical region remains to be written.

In the sixteenth century, meager and often erroneous information about Neotropical birds trickled from Latin America to Europe through the narrations of a few observers, usually reli-

gious men. One of them, the French Huguenot minister Jean de Léry (1534–1611), traveled in Brazil and described birds in a book published in 1578 (Boubier 1925, Sick 1993). According to Boubier (1925:67), however, "The true pioneer of our knowledge on the natural history of America is the Spaniard Francisco Hernández" (see also Stresemann 1975). Unlike other early travelers, he was not a priest but a naturalist and medical doctor, sent to México by Philip II "with the mission of studying her scientific riches." His Latin manuscripts were translated and published in Spanish in México in 1615. Other manuscripts of that period exist, such as one by Frei Cristóvão de Lisboa (1623–1631), who traveled in Brazil (Oren 1990). The German Georg Marcgraf, or Marcgrave, (1610–1643, 1644) also explored Brazil. His unpublished paintings (Schneider 1938) were considered by Sick (1993) to be "of the greatest importance" for the early ornithology of Brazil.

A quantum leap: Linnaeus and his contemporaries.—A sharp turn took place in the mid-eighteenth century, when Linnaeus (1707–1778) formally described many bird species from the Neotropical region in the tenth and twelfth editions of his "Systema Naturae" (1758, 1766). The German ornithologists Philipp Ludwig Statius Müller (1725–1776) described such species as *Laterallus viridis* and *Pionus fuscus* (in 1776 in his German version ["Naturesystem"] of Linnaeus' *Systema*). Another German, Johann Friedrich Gmelin (1748–1804), described other species, including *Discosura longicauda* and *Platyrhynchus platyrhynchos* (in his 13th edition of Linnaeus' *Systema Naturae* 1788). In 1783, the Dutch naturalist Pieter Boddaert printed 50 copies of what is now "an exceedingly rare work" (Zimmer 1926) containing the description of species like *Daptrius americanus* and *Ara manilata*. According to Zimmer, "The importance of the work lies in the priority of many of Boddaert's generic and specific names over later accepted terms..." (see also Newton 1896).

Among the most important naturalist-explorers of the seventeenth century were the Spaniard Félix de Azara (1746–1823), who traveled in Paraguay and Argentina (Azara 1802–1805), and the German Alexander Baron von Humboldt (1769–1859), who traveled in Venezuela, Colombia, Ecuador, Perú, and México (von Hagen 1955). Neither was an ornithologist, yet both contributed significantly

to the development of Neotropical ornithology. Azara was sent to South America as a Spanish commissioner to delimit—together with his Portuguese homologues—the boundary between Spanish and Portuguese territories in South America. Frustrated by the procrastination of the Portuguese, Azara started to study natural history (Stresemann 1975, Rounds 1990). His three-volume book (Azara 1802–1805) was later translated into French by C. N. S. Sonnini (1809) and his bird descriptions were catalogued in 1837 by G. Hartlaub (1814–1900). Humboldt, primarily a geographer, documented the biology of the Andean Condor and discovered the guacharo (*Steatornis caripensis* Humboldt, 1817). Local naturalists like the Chilean-born Jesuit priest Giovanni (Juan) Ignazio Molina (1740–1829) also described birds like *Vanellus chilensis*, *Agelaius thilius*, *Phytotoma rara*, and *Mimus thenca*, in his 1782 volume *Saggio sulla Storia Naturale del Chile*.

The golden era of traveler-naturalists.—The advances made by eighteenth century pioneers were scattered geographically and taxonomically. It was only in the nineteenth century that Neotropical ornithology started to flourish. In Farber's (1982:33) words: "Traders, explorers, colonials, and *voyageurs-naturalistes* provided a steady flow of new species which broke into a deluge after 1815 when, following the cessation of the Napoleonic wars, nations undertook large scale explorations and surveys." Charles Darwin (1809–1882) and Alfred Russel Wallace (1823–1913) are certainly among the best known of those traveler-naturalists. Sick (1993) pointed out that nineteenth century travelers had an easier time than their predecessors because of the opening of new ports and new roads. Also, and importantly, those travelers were far better equipped technologically and intellectually. Johann Baptist von Spix (1781–1826), for example, was head of the Zoological Department at the Royal Museum of the Bavarian Academy of Sciences in Munich (now the Zoological Museum). He spent 1817–1820 in Brazil with the botanist Carl Friedrich Philip von Martius and published "a sumptuous work entitled '*Avium Speciae Novae, quas in itinere per Brasiliam annis 1817–1820... suscepto collegit et descripsit...*,' consisting of two volumes in imperial 4°" (Hellmayr 1928). Also in Brazil, the Austrian Johannes Natterer (1787–1843) collected over 12,000 specimens of birds, now in the Vienna

Museum. They were worked up by von Pelzel (1871). After returning from his travels in Brazil in 1816–1818, the Englishman William Swainson (1789–1855) published a book on classification and geographical distribution (Swainson 1835). Other explorers include the Germans Friedrich Sellow (1789–1831) and Hermann von Ihering (1850–1930) in Brazil, Karl Hermann Konrad Burmeister (1807–1892) in Brazil and Argentina, and Johannes Gundlach (1810–1896) in Cuba; the Poles Konstantin Jelski (1837–1896) and Jean Stanislaus Sztolcman (often spelled Stolzmann, 1854–1928), and the Swiss Johann Jakob Baron von Tschudi (1818–1889) in Perú; and the Englishman Frederick A. A. Simons (d. 1917) in Colombia. One of the most important traveler-naturalists of that time, however, was the Frenchman Alcide Dessalines d'Orbigny (1802–1857), who traveled in southern South America.

By the end of the nineteenth century, many species of Neotropical birds had been described, and a vast literature in German, French, English, Spanish, Italian, and Portuguese dealt with their systematics, distribution, and natural history. The complexity of the Neotropical avifauna, however, impeded the systematic synthesis that would be a necessary prelude to biological investigations. Some authors nevertheless bravely attempted that synthesis, especially Sclater and Salvin (1873), but their efforts were premature. As Boubier (1925:156) wrote, "There does not exist, nor can it exist at the present time, a complete general work on the ornithology of South America." The avifauna of the Neotropics was "still incompletely known" at that time.

Late nineteenth and early twentieth centuries: Nomenclatural chaos.—During the later part of the nineteenth and the early part of the twentieth centuries, the intensification of field activity resulted in large collections pouring into European and North American private collections and public museums. Two key persons who studied that material were the Polish ornithologist Ladislaus Taczanowski (1819–1890; see Taczanowski 1884–1886), who was curator at the Zoological Museum in Warsaw, and the German Hans von Berlepsch (1850–1915), who kept a large collection (~50,000 specimens including 300 types) in his castle at Witzhausen. The collectors who provided those ornithologists with the material they studied and published are too numerous to be cited

here. The era of the great twentieth-century collectors peaked between 1920–1940, although a renewal, to which I will return, took place later in the third part of the twentieth century.

Despite that tremendous field and museum activity, real progress in the understanding of many aspects of the Neotropical avifauna was not forthcoming at the rate one could have expected, given the rate of discoveries and publications. I think that advances in Neotropical ornithology in the early years of the twentieth century were slowed down, not by lack of exploration, lack of specimens, or lack of ability on the part of authors, but by the absence of a unified nomenclature for the numerous species and genera of the Neotropical avifauna. Many species had been described more than once by authors ignorant of the work of others, and the genera of some authors were not the same as those of others. One can truly speak of nomenclatural chaos, even though Linnaeus's binomial system was widely employed. Some perceptive ornithologists correctly viewed that as a big hurdle to progress and attempted to redress the situation. The American Museum of Natural History's (AMNH) Joseph Asaph Allen (1838–1921), for example, studied type specimens of species described by Prince Maximilian von Wied Neuwied during his three-year travels in Brazil (Allen 1889, 1891; Pinto 1979; Sick 1993). Later (Allen 1910) he attempted to match Mathurin-Jacques Brisson's genera with those of Linnaeus. Whereas Linnaeus' genera were broad, Brisson's were narrow. One of the earliest true museum curators, Brisson (1723–1806), had described ~1,500 species in 115 genera and 26 orders in his epoch-making six-volume treatise *Ornithologie* of 1760 (Stresemann 1951, 1975; Farber 1982).

The end of chaos: Carl Eduard Hellmayr.—At about the time that great naturalists like Allen started to untangle the systematic and nomenclatural thickets of previous eras, a truly amazing figure stepped onto the Neotropical scene and dominated it for four decades, the Austrian ornithologist Carl Eduard Hellmayr (1878–1944). Hellmayr is best known today for his authorship or coauthorship of 13 of the 15 volumes of the *Catalogue of Birds of the Americas* (hereafter “*Catalogue*”) published between 1918 and 1949 by Chicago's Field Museum of Natural History. To ornithologists today who take for granted excellent field guides and easy travel to and in

the Neotropics, the *Catalogue* must seem like old-fashioned literature good only for accumulating dust on library shelves, but I believe that the true significance of Hellmayr's work is often underrated. For example, he ranks only a few sentences in Stresemann (1975) and Lowther (1995). Haffer (1994, 1997, Haffer et al. 2000), however, placed Hellmayr in his Seebohm-Hartert “school” of influential ornithologists in an intellectual lineage from Henry Seebohm (1832–1895) to Hans von Berlepsch (1850–1915), Ernst Hartert (1859–1933), Carl Eduard Hellmayr (1878–1944), Erwin Stresemann (1889–1972), Bernard Rensch (1900–1990), and Ernst Mayr (b. 1904).

Hellmayr's pivotal role was first and foremost to bring order to nomenclatural chaos. Only after that was achieved could he complete the *Catalogue*. His systematic work thus paved the way for such later works as Eisenmann's (1955) list of Middle American birds and Meyer de Schauensee's (1966) list of South American birds. Those works are direct descendants of Hellmayr's own list. Another advance, the development of field guides to birds of the Neotropical region (Vuilleumier 1997), also has its roots in Hellmayr's work. (Because the volumes of the *Catalogue* were not published in a taxonomic sequence, I cite them as one single entry: Cory et al. 1918–1949, but indicate in brackets the authorship of each of the 15 volumes.)

HELLMAYR'S ROLE IN THE DEVELOPMENT OF NEOTROPICAL ORNITHOLOGY

Hellmayr and the Catalogue of Birds of the Americas.—I single out high points of the history of the *Catalogue* from its originator Charles Barney Cory (1857–1921) to its main author, Hellmayr, and on to Conover (1892–1950), who finished the task after Hellmayr's death. While Curator of Birds at the Field Museum, Cory had conceived the extraordinarily ambitious project of compiling a catalogue of all the bird species found in the Americas. Cory's two volumes appeared in 1918 and 1919. After Cory's death on 31 July 1921, the trustees of the Field Museum found a patron who would underwrite the costs of hiring an ornithologist who would complete Cory's work—Charles R. Crane.

Late in 1921, Hellmayr was offered the job of continuing Cory's magnum opus. At that time, Hellmayr was Curator of the Bird Department at the Munich Museum, a position he had

held since 1908. In view of the difficult economic situation in Germany after World War I, Hellmayr accepted the job, sailed to the United States, and started employment at the Field Museum in 1922. He was 44 years old and had been the world authority on Neotropical birds since the early 1900s, when he was in his mid-twenties. In 1905 and 1906, he was junior author with A. Ménégaux of the National Museum in Paris and H. Berlepsch of Schloss Berlepsch of four papers on types of South American birds (Ménégaux and Hellmayr 1905, 1906a, b; Berlepsch and Hellmayr 1905) and had published, as sole author, the first of two papers on types of poorly known Neotropical birds (Hellmayr 1906a, 1913). Also in 1906, he published a 165-page paper in which he revised the types of Spix's Brazilian birds deposited in the Munich Museum (Hellmayr 1906b). It took him two years to revise the Spix material, an undertaking that he confessed to finding "much more laborious than [he] had anticipated."

The fundamental importance of type specimens: Then and now.—A paper on the types of birds collected in Brazil by an early nineteenth century German naturalist might not seem to qualify as a turning point in the development of Neotropical ornithology. However, it was. Then, as now, type specimens constituted the fundamental entity upon which species are described according to the rules of zoological nomenclature (LeCroy and Vuilleumier 1992, International Trust for Zoological Nomenclature 1999). Far fewer species of birds are described today (e.g. Vuilleumier and LeCroy 1992, Gaban-Lima et al. 2002) than in the early 1900s. At that time many species were described, and often casually, or even carelessly. The question of what name(s) to apply to this or that binomial species was often left unresolved. Worse, mistakes in allocation of specimens to given species without checking the types resulted in further erroneous citations in the literature by later authors. That disorder meant that the significant field discoveries could not be viewed in an accurate, synthetic manner. The only way out of that morass was to undertake a systematic study of type specimens, establish solid synonymies, and prepare carefully documented and authoritative check-lists.

Hellmayr's genius was to recognize that only a study of as many types as possible could provide a solution to the tangled systematics

of Neotropical birds. That meticulous work requires intense concentration and remarkable visual memory to make comparisons between types and other specimens (many of which are scattered in different collections) before definitely establishing the identity of a given taxa. To evaluate Spix's types, Hellmayr needed to revise entire genera of birds and to make trips to museums in Paris, London, Vienna, Berlin, Frankfurt, and Leipzig. In his own words,

As a rule only the original description...was cited [in the paper], and not only cited, but also in each instance carefully worked through. When dealing with species that had been described by other authors earlier than Spix, I searched for material from the *terra typica* (type locality) for comparisons.

He added, "In this way we should hope to reach a stable nomenclature in a foreseeable future."

How Hellmayr acquired his work habits is difficult to state. His contacts with von Berlepsch and his study of the latter's collections at Schloss Berlepsch in Witzenhausen in 1904–1905 were clearly crucial, as was his 1905–1908 sojourn at Lord Walter Rothschild's museum at Tring, where he had been hired by Ernst Hartert. According to Stresemann (1944), it was von Berlepsch who taught Hellmayr "method, system, and thoroughness in ornithological work." Hellmayr (1901) himself described a new species of *Poliophtila* as *P. berlepschi*, "after my highly admired ['hochverehrten' in the original German] ornithological friend, Count H. von Berlepsch, to whom I owe most of what little I know about Neotropical birds." According to Miriam Rothschild (1983), the Tring influence (probably not only Rothschild and Hartert but also the entomologist Karl Jordan; see Hemming 1960, Rothschild 1983) was paramount: "It could almost be said that Tring moulded Hellmayr." After revising Spix's types, Hellmayr went on to study types as well as series of Neotropical birds in collection after collection of birds received from Trinidad, Guiana, Perú, Colombia, Venezuela, and Brazil. Between 1907 and 1922, the year he decided to go to the Field Museum, he published 44 papers on Neotropical birds (not counting the six on types from 1905–1906 mentioned above). Some of them were short (descriptions of new taxa), but others were substantial (~170 pages for his 1910 paper on the birds of the Río Madeira).

No other ornithologist in the world was as well prepared as Hellmayr to tackle Cory's huge, unfinished job. To help one understand Hellmayr's reputation in 1922, the unpublished correspondence (in the archives of the Department of Ornithology at AMNH) between Hellmayr and the seasoned Neotropical ornithologist Frank M. Chapman (1864–1945), who was 14 years his senior, shows that Chapman repeatedly asked Hellmayr's opinion about problems of nomenclature and systematics. Bangs (1930) similarly acknowledges his debt to Hellmayr in his list of types at the Museum of Comparative Zoology at Harvard.

Hellmayr's Catalogue of Birds of the Americas.—Only two years after being hired at the Field Museum, Hellmayr published the first post-Cory volume of the *Catalogue*. Cory was listed as the senior author of the 1924 volume, with the title page indicating that it had been "*Revised and continued by* CHARLES E. HELLMAYR, Associate Curator of Birds." In view of Hellmayr's tremendous knowledge of Neotropical birds, I think it is likely that it was he, not Cory, who had done the bulk—if not all—of the writing. Two more volumes, published in 1925 and 1927, were signed as having been "*Initiated by*" Cory and "*Continued by*" Hellmayr. The subsequent six volumes (1929, 1934, 1935, 1936, 1937, and 1938) were signed by Hellmayr alone.

It is worth noting that five of those six volumes, from 1934 to 1938, were written in Europe, not in Chicago. In 1931, restless in the United States, Hellmayr had returned to Austria after being granted an indefinite leave of absence from Field Museum. The 1934–1937 volumes were composed while Hellmayr was given office space at the Museum of Natural History in Vienna. In 1938, Hellmayr was arrested and imprisoned during the *Anschluss*, when the Nazis annexed Austria to the Third Reich. When he was released, he left his native Austria forever and settled in Geneva, Switzerland, where he died in 1944. Hellmayr was sole author of all volumes from 1934 to 1938, and senior author (and Conover as junior author) of the last four volumes (1942–1949). The last three volumes (two in 1948 and one in 1949) were published long after his death. About those three, Conover wrote,

Because of war conditions, [Hellmayr's manuscripts] did not reach [the United

States] until after his death. It was impossible, therefore, to submit to him any changes found necessary because of material in Field Museum and certain critical specimens examined in other American collections. Such emendations have been kept as few as possible.

My reading of the second sentence of that paragraph is that Hellmayr had written the draft manuscript of those three remaining volumes before his death in 1944 and that those manuscripts were so advanced that little was needed to bring them to publication. If that is so, then one can only marvel at Hellmayr's capacity for work under the difficult conditions prevailing then in Europe, even in neutral Switzerland. Even before the *Catalogue* was completed, it constituted the most authoritative record of all bird species and subspecies found in the Americas (with the exception of the first two volumes, authored by Cory alone, which are not as scholarly as the others). To this day no work supersedes or even comes close to Hellmayr's check-list, even though it is in many ways out of date. The authors of other check-lists, like Peters (see Bock 1990), directly or indirectly owe Hellmayr a huge debt.

NEOTROPICAL ORNITHOLOGY AFTER HELLMAYR

Is Hellmayr still cited?—Yes. However, a literature citation index to Hellmayr's work would be a misleading way of judging its significance. His systematic arrangements have been incorporated so thoroughly by later authors that his successors are the ones cited. Check-lists of birds of the Neotropics published since Hellmayr include Meyer de Schauensee (1948–1952, 1959) for Colombia and Pinto (1938, 1944) for Brazil. In addition to check-lists, another kind of book on Neotropical birds is now being produced—a hybrid of a check-list, a manual, and a pocket-sized field guide, such as Hilty and Brown (1986) for Colombia and Ridgely and Greenfield (2001a, b) for Ecuador.

The importance of fieldwork.—None of the modern check-lists and none of the modern field guides (whether pocket-sized or not) can be produced without extensive fieldwork. It is a truism to say that fieldwork is a prerequisite to any sort of research on Neotropical birds. Some giants of Neotropical ornithology of earlier times, like Chapman (1938), for example, and

some giants of more recent or contemporary Neotropical ornithology, like Skutch (1950), Koepcke (1972), Sick (1993), and the late Ted Parker (see papers in Remsen 1997), spent much time in the field and knew their birds. Chapman, for example, "Beginning December 1925... passed twelve Dry Seasons (December to April) on Barro Colorado" (Chapman 1938:vii). According to Remsen and Schulenberg (1997:9), "From 1974 to 1993 [Parker] spent a total of approximately 115 months (9.6 years) in the field in the Neotropics, or roughly six months per year...." In both Chapman's and Parker's cases they also had a phenomenal knowledge of birds in the museum.

In sharp contrast, Hellmayr never once set foot in the Neotropics. However, he must have been a competent field ornithologist, as I judge by some rare notes (Hellmayr 1924, 1942) and discussions with Paul G  roudet (pers. comm.), who met him when he was living in Geneva. In fact, Hellmayr was hoping that after completing the *Catalogue*, he would carry out fieldwork in Brazil before writing an ornithology of that country. He died at the relatively young age of 66 before the manuscripts for the last volumes were published and so never fulfilled his dream. In retrospect, what is truly remarkable about Hellmayr is that his sharp insights about Neotropical birds were obtained entirely from his study of many thousands of museum specimens and his meticulous revision of many hundreds of type specimens. Such a feat would be impossible today. No ornithologist can afford any sort of synthesis on Neotropical birds without extensive field experience.

The maturation of Neotropical ornithology: From the 1940s to the 1960s.—Part of that coming of age can be illustrated by examples from the literature. In the early to mid-1940s, many descriptive pieces such as Sutton and Pettingill's (1942) "Birds of the Gomez Farias region, south-western Tamaulipas" were published. Although similar titles were still common 20 years later when I first crossed the Tropic of Cancer in M  xico, another era had begun. It can be highlighted by Skutch's (1950) study of the factors determining breeding seasons in Central American birds, Marchant's (1959) analysis of breeding seasons of birds in arid southwestern Ecuador, Miller's (1959) study of nonannual breeding periodicity in *Zonotrichia capensis* in equatorial Colombia, Hamilton and

Rubinoff's (1963) analysis of speciation and species distribution patterns in the Darwin finches, or Moynihan's (1963) interpretation of social mimicry in some Andean passerines.

Those papers, selected from a large number of articles from that period, show a trend away from descriptive pieces and toward studies designed to solve biological questions. For example, although basic information on Gal  pagos finches was available (e.g. Swarth 1931), the statistical analytical tools used by Hamilton and Rubinoff (1963) did not exist then. Similarly, in the 1940s lack of quantitative data precluded causal studies of patterns of breeding periodicity such as those of Skutch (1950), Miller (1959), and Marchant (1959), although basic work on Central American birds (e.g. Carriker 1910 in Costa Rica) and on Colombian and Ecuadorean birds (e.g. Chapman 1917, 1926) had been available for a long time. And Moynihan's (1963) study of social behavior in *Diglossa* would not have been possible before elucidation of the systematic relationships of those birds (e.g. Zimmer 1929).

NEOTROPICAL ORNITHOLOGY NOW

Neotropical ornithological congresses.—How far we have come in the last four decades is attested by events such as the Sixth Neotropical Ornithological Congress, held in Monterrey, Mexico, 4–9 October 1999. It "had 419 registered participants from 26 countries, of which 18 were Latin American" (Enkerlin-Hoeflich and Vuilleumier 2000). A large proportion of the attendants were Latin American students, thus indicating that many young Neotropical ornithologists are now active in the field. Enkerlin-Hoeflich and Vuilleumier (2000) added that the scientific program of that manifestation "included 320 oral papers, 105 posters, 9 symposia, and 15 thematic tables." A congress gathering hundreds of ornithologists from across Latin America would have been unthinkable in the 1940s and even in the 1960s. One wonders whether pioneers like Chapman and Hellmayr would have predicted that sort of growth. I now regret not attending the First Neotropical Congress, organized by Juan Daciuk in Buenos Aires in 1979 (Daciuk 1983). Eugene Eisenmann was there, and after his return to New York told me, "You should have been there: I witnessed a tremendous historical event in the development of Neotropical ornithology."

Had a Neotropical congress been held in the 1940s, 1950s, or even 1960s, it would have been attended by just a score or two of persons, a majority from north of the Río Grande and only a few from Latin America. Although there were many native Neotropical ornithologists several decades ago—like F. Carlos Lehmann in Colombia, Rodolfo Philippi in Chile, and Olivério M. de Oliveira Pinto in Brazil—as late as the late 1950s Neotropical ornithology was an occupation pursued more by non-Neotropical ornithologists during expeditions to various parts of Latin America than by residents. Also, some of the best-known resident ornithologists in the Neotropics of the 1940s to 1980s—like Maria Koepcke (1924–1971), Claës Olrog (1912–1985), Helmut Sick (1910–1991), or William H. Phelps (1875–1965)—had emigrated to Latin America. Other well-known figures, like Eugene Eisenmann (1906–1981), were seasonal migrants to the Neotropics.

The fundamental role of systematics.—Neotropical ornithologists of the present generation, trained in fields such as reproductive biology, community ecology, population dynamics, or behavioral ecology, often are not formally trained in systematics. The wealth of papers on many topics published on Neotropical birds in regional, national, and international journals, and those presented at international congresses such as the Sixth Neotropical Congress, clearly show a diversification away from an earlier focus on systematics. Yet, systematics remains fundamental to all other endeavors. If the taxa studied in a research project on behavioral ecology, for instance, are improperly identified and incorrectly named, the value of the research is severely diminished. Furthermore, our appreciation of the relative placement of various taxa within a system of classification has changed markedly in the last two decades. Hence, deductions about the evolution of breeding systems and correlations between vocalizations and plumage differentiation, for example, depend on correct systematic interpretations of the position of particular birds under study.

Three advances are especially relevant here: cladistic (or phylogenetic) methodology (e.g. Cracraft 1981), DNA sequencing (e.g. Chesser 2000), and fast computers. Phylogenetic methodology, using various combinations of morphology, behavior, ecology, or DNA sequencing, has allowed us to revise our concepts of

systematic arrangements and to better integrate those with other sorts of evidence. In addition, advances in recording techniques (e.g. Parker 1991, Vielliard 1993, Budney and Grotke 1997) have made it possible to tape vocalizations of many Neotropical birds. That information has been integrated into several systematic schemes and has allowed the discovery of numerous cryptic species (examples in Remsen 1997). In recent issues of *The Auk*, for instance, several papers use those methods (e.g. Birdsley 2002 [cf. von Ihering 1904], Lovette and Bermingham 2002, Price and Lanyon 2002). Difficulties of identification, even in well-studied groups like the Pipridae (Hellmayr 1906c; Chapman 1935; Snow, 1963, 1975; Sick 1967; Prum 1990, 1992), still pose problems that can only be solved by taking multiple approaches (e.g. Anciães and Del Lama 2002, Haffer 2002, Marini and Hackett 2002). Therefore, those Neotropical ornithologists who are not systematists should pay attention to the work of their colleagues who are, and make efforts to assimilate systematic concepts and master taxonomy and classification of Neotropical birds.

That systematics is again regarded as essential seems reflected in a renewal of interest. Part of that is due to efforts of the late George H. Lowery, Jr. at the Museum of Natural Science of Louisiana State University. Under his impulsion many expeditions have been launched, especially to South America. His successors have pursued Lowery's lead. That work has led to significant advances in our knowledge of Neotropical birds (see many relevant papers in Buckley et al. 1985 and Remsen 1997; see also Stotz et al. 1996). New species have been and are being described, the ranges and ecological preferences of many little-known and poorly understood species have been clarified, and broader systematic analyses have been and are being carried out. Not to be ignored is the significance of gazetteers of Neotropical countries published by Paynter and his collaborators (e.g. Paynter et al. 1975, Paynter and Traylor 1981, Paynter 1995). Those documents have paved the way for detailed studies of geographical distribution of a precision hitherto impossible (e.g. Isler 1997). Combined with systematic analyses they have led to a much better understanding of a number of issues in Neotropical ornithology.

Modern field guides and Neotropical ornithology.—I have argued elsewhere (Vuilleumier 1997) that the phenomenal development of field

guides to Neotropical birds has been a major factor in the recent development of ornithology in that region. Field guides were rare in the early 1960s and 1970s and even though useful were not really "field" guides because their authors had museum, rather than field, experience (e.g. Meyer de Schauensee 1964, 1970). The availability of truly excellent fieldguides in the later years of the twentieth and early years of the twenty-first centuries has revolutionized Neotropical ornithology. Moreover, whereas early field guides were produced mostly by professional museum-based ornithologists (Bond 1947, Blake 1953, Olrog 1959, Koepcke 1964), they are now often prepared by ornithologists whose livelihood is not academic or museum ornithology but a relatively new profession derived from the hobby of bird watching, that of birding guide. Note that the great majority of modern field guides are authored by non-Neotropical ornithologists and illustrators and are written in English. That is surely good for amateur birders, the majority of whom are northern-based, but perhaps not so much for professional or would-be professional ornithologists in and from Latin America.

The role of amateurs in Neotropical ornithology.—Many amateurs who travel to the Neotropics from Europe or North America are interested in adding birds to their life lists. Others, however, are keen naturalists knowledgeable about many aspects of ornithology. They and the professional guides who lead tours as staff members of bird tour companies often publish their field observations, especially data on breeding, geographical distribution, or ecology. Birding as a hobby is still relatively undeveloped in much of Latin America but is growing in certain countries, for example, Argentina (e.g. see a journal like *Nuestras Aves*). I suggested previously (Vuilleumier 1997) that the very important role of amateurs "remains to be treated fully in the context of the evolution of Neotropical ornithology."

SUGGESTIONS FOR THE FUTURE

To ensure future progress in Neotropical ornithology and better communication among all ornithologists interested in the Neotropical avifauna, several steps should be considered.

(1) *Language fluency.*—Non-Neotropical ornithologists who spend much time in the Neotropics should make an effort to learn (or to

learn more) Spanish and Portuguese. They must also make a greater effort to publish some of the results of their work in Latin American journals, in either Spanish or Portuguese.

(2) *Availability of literature.*—The problem of diffusion of technical literature between and among countries and between English-speaking ornithologists on the one hand, and Portuguese- or Spanish-speaking ones on the other, must be addressed (Vuilleumier 2000). Literature lists such as those on Brazilian birds (Oniki and Willis 2002), Chilean birds (Lazo and Silva 1993), and those published in the gazetteers by Paynter and his coworkers, should be incorporated into a Neotropical-wide database.

(3) *Spanish and Portuguese common names.*—One of the factors of progress in Neotropical ornithology, especially in the English-speaking world, has been publication of a unified set of English names for all Neotropical birds (Eisenmann 1955, and Eisenmann in pages xiii-xiv of Meyer de Schauensee 1966). A unified vernacular Spanish and Portuguese nomenclature for all Neotropical bird species should be compiled to avoid some of the current problems posed by its absence and by the proliferation of vernacular names that differ from one country to another (Vuilleumier 1999).

(4) *Collections database.*—Collections of birds (mostly skins) in museums of Latin America are an invaluable and nonrenewable resource that must be properly cared for and should be easily accessible. No matter how well-maintained collections are, if they are inaccessible to *bona fide* students they are useless. A database giving a list of museum collections in Latin America is urgently needed. Such a database should include, in addition to the name and address of the collection and the name(s) of its curator(s), information about the number of specimens it holds, their geographic and taxonomic coverage, and whether that collection has any types or specimens of historical importance. A catalogue like Kiff and Hough (1985) for egg collections is invaluable. About 15 years ago, after the Third Neotropical Congress in Cali (1987), Patricia Escalante and I (Escalante and Vuilleumier 1989) prepared a preliminary "Directory of Ornithological Collections in Neotropical American Countries." That document is totally out-of-date and needs to be redone. Similarly, a Neotropics-wide database of tape recordings of vocalizations should be prepared.

(5) *Database of MS and PhD theses.*—Many Latin American students graduate from universities within the Neotropical Region with either a master's degree or a PhD (e. g. Borges 1995). The theses they write as partial fulfillment of their degree requirements are unfortunately not published but are often cited in ornithological literature, especially in Latin America. Again, a database of university theses should be prepared and kept up-to-date. Of course, copies of the theses should be deposited in known libraries or in a central Neotropical repository.

(6) *Database of societies.*—A database of Neotropical societies and journals should be initiated, maintained, and made available on the Internet. All too often, ornithologists in neighboring countries do not know of the existence of parallel societies across their borders.

(7) *Internet access to basic check-lists.*—The fundamental treatises on Neotropical birds, especially works that have long been out of print, should be captured and be made available on the Internet. A prime example is Cory et al. (1918–1949), including especially the volumes authored or coauthored by Hellmayr, which are unavailable in some Latin American countries. Other examples are Meyer de Schauensee's (1948–1952, 1959) check-list of Colombian birds, which is not widely available in Colombia, even though it was published in the well-known journal *Caldasia*, and Hellmayr's (1932) Chilean check-list, which is virtually unavailable in Chile.

(8) *Latin American authors.*—Textbooks of ornithology should be written by Latin American ornithologists for Latin American ornithologists, with examples from the Neotropics. All too often, texts are oriented toward the north temperate zone and give short shrift to the situation in tropical America. A welcome "northern-written" text that attempts to redress the "temperate bias" is Stutchbury and Morton (2002). A southern-based text that includes excellent chapters on birds is the one by Jaksic (1996) on the ecology of vertebrates in Chile.

(8) *A plea to authors.*—Authors publishing papers on Neotropical birds, whether resident or not, should include a section indicating directions for future research. Such guidelines are invaluable for students who may lack the resources to find out what sort of avenues of research remain open for future work. For instance, Rappole (1995) and Stutchbury and

Morton (2002) provide working hypotheses in migration and behavioral ecology that can be tested by future research, as does Jaksic (1996) in ecology.

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