

THE GEOGRAPHIC DISTRIBUTION OF THE BLUE-EYED
SHAGS, *PHALACROCORAX ALBIVENTER*
AND *PHALACROCORAX ATRICEPS*

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THE blue-eyed (or more correctly the "blue-eyedlidded") shags comprise a group of cormorants widely distributed through the Pan-Antarctic Zone. After discussing the various forms in the light of the evidence then available, Murphy stated (Oceanic Birds of South America, p. 881, 1936): "In closing these general remarks upon a poorly understood group, I must hark back to a suspicion hinted at above, namely, that perhaps no more than two species of blue-eyed shags, divided along latitudinal convergences, and each with subspecies at numerous islands, may ultimately prove to encircle the southern oceans and to include all the New Zealand as well as the American forms."

It is the purpose of this article to present new evidence directly relevant to this problem and which, in our view, strikingly confirms Murphy's "suspicion" that all the various forms of blue-eyed shags of the Pan-Antarctic Zone pertain in reality to only two species, *Phalacrocorax albiventer* and *P. atriceps*.

Differences and Identification.—Although very similar in external appearance, the two species present in the adult, and more especially during the breeding season, constant differences which permit positive and accurate identification.

In *P. albiventer*, the line separating the black of the head from the white of the throat starts at the point of junction of the mandibles and extends horizontally backward across the cheek and auricular region. In *P. atriceps*, this line also starts from the junction of the mandibles, but instead of running horizontally across the cheeks, it extends upward almost vertically to a point just below the edge of the eyelid and from there backward. The black of the nape and hind neck is almost always narrower than in *P. albiventer*. As a result of these differences, the cheek and auricular region are white in *P. atriceps* and partially or wholly black in *P. albiventer*.

During the courtship period and until the prolonged breeding season is over, adults of *P. atriceps* show a squarish area of white feathers in the center of the lower back. This white area is never found in *P. albiventer*. In addition to this area, *P. atriceps* generally, but not always, develops a white alar bar.

The nasal caruncles are almost always much larger in *P. albiventer* than in *P. atriceps*, and this is especially true when specimens of *P.*

albiventer are compared with the Magellanic subspecies, *P. atriceps atriceps*, in which the caruncles are noticeably smaller than those of other races of the same species.

Although the two species are virtually identical in size and weight, the differences in the distribution of the black and white on the head and neck make *P. atriceps* appear longer and slenderer, especially when in flight. *P. albiventer* looks bulkier and less graceful, and although the difference is nothing but an optical illusion, we have found it surprisingly reliable for rapid identification.

Distribution of P. albiventer.—It is well established that the center of dispersal of this cormorant is in the Falkland Islands, where it is known as the King Shag and where large breeding colonies have been described by Cobb, Vallentin, and Beck. It is noteworthy that in these islands, no birds with the characters of *P. atriceps* (white cheeks and white dorsal patch) have ever been recorded.

From the Falkland Islands, the King Shag has spread east and west, but apparently not south, as all shags so far reported from the Antarctic islands of the American quadrant are races of *P. atriceps*. To the west, it is found at Staten Island, the Atlantic coast of Tierra del Fuego, the Straits of Magellan and adjacent land areas, the coast of Argentine Patagonia up to Puerto San Julian, and, during winter migrations, as far north as the province of Buenos Aires and the coast of Uruguay. To the southwest, it has also been reported from a number of islands south of the Beagle Channel, especially islands of the Cape Horn group, and from Bertrand, Carolina, and London islands (the last at long. 72° W.). In most of this area, *P. atriceps* is also found.

To the east of the Falklands, no doubt owing to a lack of islands suitable for breeding purposes, the penetration of *P. albiventer* is much less noticeable. Nevertheless, it has now been established that the shag colonies found on Crozet and Kerguelen islands in subantarctic latitudes of the Indian Ocean are races of *P. albiventer* (*P. a. vanhoeffeni* Reichenow and *P. a. verrucosus* Cabanis, respectively) and not separate species as had previously been supposed. *P. atriceps* is not present at either of these islands. It remains to be seen what cormorant of this group, if any, inhabits Gough Island. It is to be expected that it would also be a race of *P. albiventer*.

In any case, the typical race from the Falklands and southern South America should now be referred to as *P. albiventer albiventer*.

Distribution of Phalacrocorax atriceps.—Even as *P. albiventer* would appear to have originated in the Falkland Islands, all the evidence points to *P. atriceps* having had its origin in the Fuegian region

of southern Chile, from whence it has extended northward along the Pacific coast to lat. 37° S., south and southeast to the fringes of Antarctica and west along the Sub-Antarctic Convergence to the New Zealand quadrant.

The nominate race, comprising the main population, inhabits the entire Fuegian region, including the maze of islands and channels

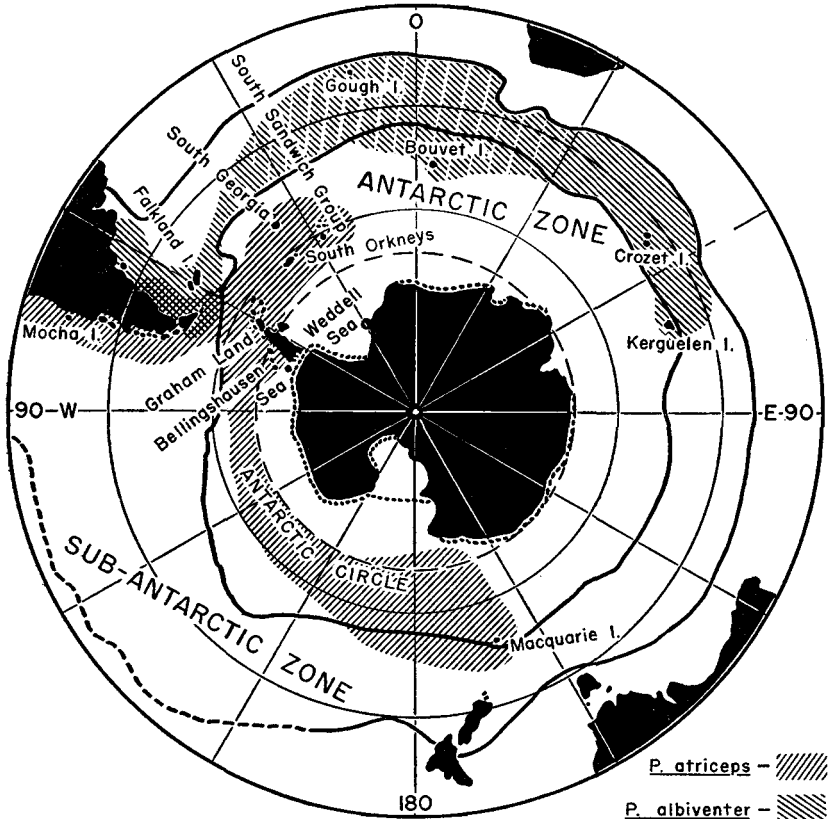


FIGURE 1. The world distribution of *Phalacrocorax atriceps* and *P. albiventer*.

extending to the southernmost extremities of the continent, the Pacific coast as far north as Santa Maria Island in the Bay of Arauco, the Straits of Magellan, and the Atlantic coast of Patagonia from Cape Dungeness to the Santa Cruz River at lat. 50° S. As will be seen later, in the eastern section of this extensive area, it shares common breeding grounds with *P. albiventer albiventer*.

In the different islands of the Antarctic Zone of the American quadrant, the blue-eyed shags are represented by subspecies of *P.*

atriceps, *P. albiventer* being absent altogether. Thus at South Georgia, we have *P. atriceps georgianus* Lönnerberg, which differs from the typical race in having a shorter bill, much larger nasal caruncles (approximating those of *P. albiventer*), and the line of demarcation between the black and white on the head lower down, with the black area covering the opening to the ear.

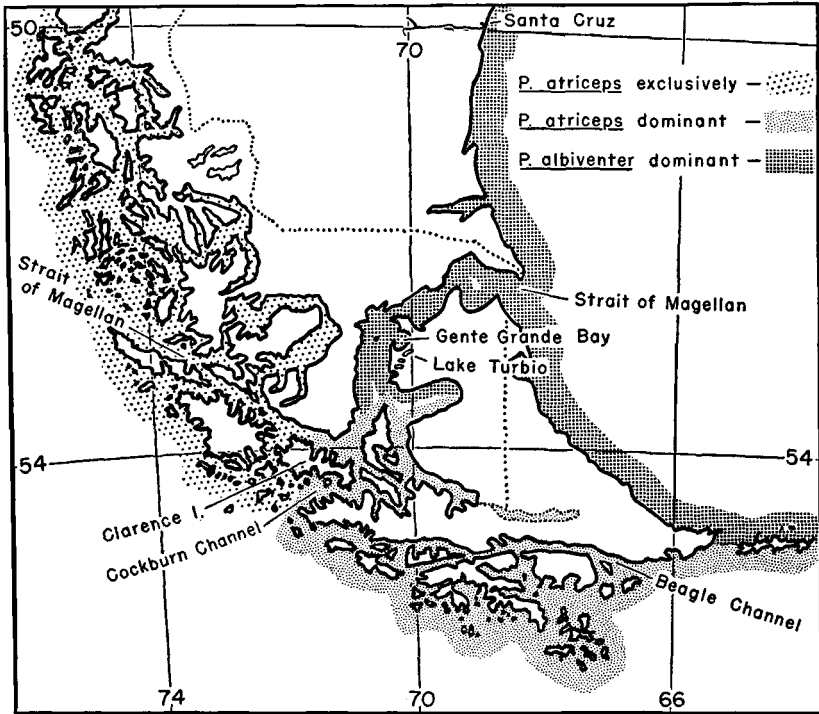


FIGURE 2. The distribution of *Phalacrocorax atriceps* and *P. albiventer* in southern South America.

In the South Shetlands and ranging south in Graham Land to lat. 67° S. the local race is known as *P. atriceps bransfieldensis* Murphy and is characterized by a longer bill than in *P. a. georgianus* and consistently larger size as can readily be seen from the following measurements of 8 specimens secured by us in Graham Land and Greenwich Island (between lat. 62° and 65° S.) from January to March, 1952.

Weight, 2994 gm. (2750–3250)	Wing, 325 mm. (320–330)
Bill, 59 mm. (57–62.5)	Tail, 146 mm. (136–158)

The caruncles are also larger than in *P. a. atriceps*, and the tail is obviously longer than in *P. a. atriceps* or *P. a. georgianus*.

In the South Sandwich Islands and South Orkneys, *P. atriceps* is also abundant, but, as far as we are aware, it has not yet been satisfactorily determined whether this form is part of the *georgianus* or *bransfieldensis* populations or whether it constitutes a separate endemic race peculiar to these islands.

Finally, far to the west, at Macquarie Island in sub-antarctic latitudes of the New Zealand quadrant, we find another blue-eyed shag which, though originally classified as a separate species, is now recognized as a race of *P. atriceps*, namely *P. atriceps traversi* Rothschild.

Distribution of P. albigenter and P. atriceps atriceps in the overlapping zone.—On the island of Tierra del Fuego and adjacent waters, the relative distribution of these two cormorants acquires characters of special interest as here and here alone they occupy the same territory as breeding species.

This matter has long been open to discussion, for while Reynolds, a competent observer and resident on the island for many years prior to his untimely death, considered that the two were merely subspecies of *P. atriceps*, Murphy came to the opposite conclusion and insisted that they were separate species even though superficially extremely similar.

We offer as proof positive that Murphy was right the following observations which we made on the northwest corner of the island of Tierra del Fuego between November 8 and 28, 1952.

Between the port of Porvenir and the sheep ranch known as Gente Grande (big men) are three long lakes lying between low, rolling hills and so close one to the other that a relatively slight rise in water-level would be sufficient to connect the Bay of Porvenir on the west coast of the island with Gente Grande Bay on the Straits of Magellan. Near the middle of the last of these lakes, that is to say the one nearest to the Straits, known as Lake Turbio, is a low, oval island some 1500 square meters in extent. With the exception of a small area of higher stony ground near the western end, the entire surface of this island is covered with cormorants' nests, extending in rows of mathematical precision from water's edge to water's edge and with almost exactly a foot of space between one and the next steep sided, truncated cone. These cones are built of seaweed and other vegetable matter, and by use and weathering become caked into a hard and solid mass of dried vegetation, earth, and guano. It is obvious that the same cones are used year after year with nothing more than the addition of a little fresh material around the periphery and lining for the actual nest.

So regular is the master plan of construction of the colony that

it was an easy matter to calculate the total number of nests—in round figures 8,000. Of these, approximately two-thirds were occupied at the time of our visit and, most remarkable, starting from the northeast end of the island, every nest had an owner until the top third of the colony was reached. From there onwards, the truncated cones continued, row upon row, and yet in all this top third not one nest had an occupant!

In the lower two-thirds, where the birds were in residence, every stage of the reproductive process might be observed, from the arranging of freshly gathered material around the saucer-shaped depression on the tops of the cones to the presence of more than half-grown young. The majority of the nests contained either three eggs or three young birds. However about one nest in every five had two eggs or two young only. On the other hand five nests were found with four eggs or four young birds and two with five eggs each.

As may be seen from the photographs, the occupants of the colony paid so little attention to us that it was almost possible to touch them with the hand; and as we picked our way among the rows of truncated cones, only the birds nearest to us left their nests, flying off to windward and returning to resume their brooding the moment we had moved further on. Thanks to this extreme tameness, we were able to establish beyond all possibility of doubt the presence of both *P. albiventer* and *P. atriceps* in the colony and determine the approximate proportion of each.

The colony comprised a majority of *P. albiventer*, with not more than two percent of the nests occupied by *P. atriceps*, these being interspersed here and there apparently at random and without any trace of separation into groups or segregation of any kind. Thus each of these white-checked, white-rumped birds might be observed surrounded on all sides by examples of *P. albiventer*. There was no visible difference in size, and of the four specimens collected on the nests for purposes of positive identification, one of each species weighed 5 lbs. 14 oz. and the other two, also one of each species, 5 lbs. 10 oz. All four specimens, shot at 9 A.M., proved to be males, which would tend to indicate that the females incubate during the night and are relieved by the males in the early morning.

The birds obtained their food and also the nesting material from the salt water of the Straits of Magellan and the Bay of Porvenir, at a distance of one mile and twelve miles, respectively. No birds were observed at any time fishing in the lake.

From a stretch of higher ground situated on the direct route between the lake and the sea, it was interesting to watch the continual coming

and going of the cormorants, sometimes singly or in twos and threes and at other times in flocks of 20, 30, or even more, and note how on the homeward journey they invariably sought to gain altitude before making the land crossing. The reason for this soon became obvious; two pairs of Chilean Skuas (*Catharacta skua chilensis*) were lying in wait and would rise in the air and dive on the hapless cormorants to make them disgorge their loads of fish. We later found the nest of one pair of these skuas on the shores of the lake directly beneath the cormorants' flyway.

The discovery and investigation of this colony, which local residents assured us has been in existence for at least 50 years, shows that *P. albiventer* is present as an abundant breeding species at least as far west as long. 70°. Also, we feel certain that when an investigation can be made of the large cormorant colony known to exist on Magdalena Island, situated in the Straits of Magellan directly opposite the colony visited by us, it will be found that *P. albiventer* is the predominant breeding species and not *P. atriceps* as hitherto supposed. This island was visited and the cormorant colony commented upon by Cunningham as far back as 1871, but from his notes it is not possible to identify the species.

In any case, the information already available renders necessary a revision of previously accepted views as to the relative abundance of one or the other of these two species in the regions where their areas of distribution overlap.

It is our opinion that *P. albiventer* should be regarded as the dominant species in the comparatively dry zones which characterize eastern and northern Tierra del Fuego, the Straits of Magellan as far west as parallel 71, and the Patagonian coast from the eastern entrance to the Straits north to the Santa Cruz River. *P. atriceps*, on the other hand, is unquestionably the dominant species in the areas of much heavier precipitation comprising southern Tierra del Fuego, the Beagle Channel, the Cape Horn region, and the labyrinth of islands and channels leading westward to the Pacific Ocean. In this zone, the most westerly known penetration of *P. albiventer* is at London Island, near the Pacific entrance to the Cockburn Channel at long. 72°. As a breeding species, it is not known west of the colony described in this article.

The accompanying map of the pan-antarctic regions is intended to give a general idea of the respective areas of distribution of the two species of blue-eyed shags, while the larger scale inset shows in more detail the relative distribution of each in the "critical" area where the two are found together.



BLUE-EYED SHAGS AT COLONY IN NORTHWESTERN TIERRA DEL FUEGO. (*Top*) In the foreground, an adult *Phalacrocorax albiventer* in a defensive display. Above and to the right, an incubating *P. atriceps*, showing more white on the side of the head. (*Bottom*) Close-up of *P. atriceps*, showing the white patch on the back and the white alar bar.



BLUE-EYED SHAGS AT COLONY IN NORTHWESTERN TIERRA DEL FUEGO. (Top) General view of the colony. (Center) Nest and eggs of *Phalacrocorax albiventer*. (Bottom) Nest of *P. albiventer* with newly hatched young, November, 1952.

Summary.—The blue-eyed shags of pan-antarctic latitudes were originally considered to belong to 4 or 5 species or, with subspecies, as many as a dozen different forms. Subsequent investigations, and especially that of Murphy, have shown that in all probability there are only two good species, *P. atriceps* and *P. albiventer*, each with a number of insular subspecies.

Although extremely similar birds, close examination and acquaintance show that there are certain constant differences which permit positive identification, even in the field.

P. albiventer, centering on the Falkland Islands, is found westward to parts of Tierra del Fuego, islands south of the Beagle Channel and the Straits of Magellan, and eastward to Crozet and Kerguelen islands in the Indian Ocean. *P. atriceps* has its center of dispersal in the Fuegian region of southern Chile and has spread southward to the approaches to the Antarctic Continent, northward to the coast of south-central Chile, and westward to Macquarie Island in the New Zealand quadrant.

An overlapping zone common to both species is found in Tierra del Fuego, the Straits of Magellan, and along the coast of Patagonia as far north as the Santa Cruz River at lat. 50° S. This zone is discussed in detail, and a large nesting colony discovered on the northwest corner of the island of Tierra del Fuego is described. This colony consisted mostly of *P. albiventer* with less than two per cent of *P. atriceps*, thus upsetting previous concepts that *P. albiventer* was merely an occasional visitor to the Magellanic area.

The writers reach the conclusion that the range of *P. albiventer* as the dominant species must be extended to include the comparatively dry zones of eastern and northern Tierra del Fuego and the Straits of Magellan as far west as parallel 71, while *P. atriceps* should be regarded as predominant in the areas of much heavier precipitation to the west of this line and from the Beagle Channel southward.—*Santiago, Chile, August, 1953.*