EVOLUTION OF BEAKS .....

PURPOSE- *It is the purpose of this exhibit to give the viewer a feeling of what Charles Darwin thought was a theory that species originated by evolution from other species and that evolution is mainly driven by natural selection. Scientist believe that there are several factors that led to the evolution of one specie into several sub-species; however they often disagree with one another about the importance of each. The figure below shows that the difference are apparent in the food chosen by the finches and their feeding methods.*

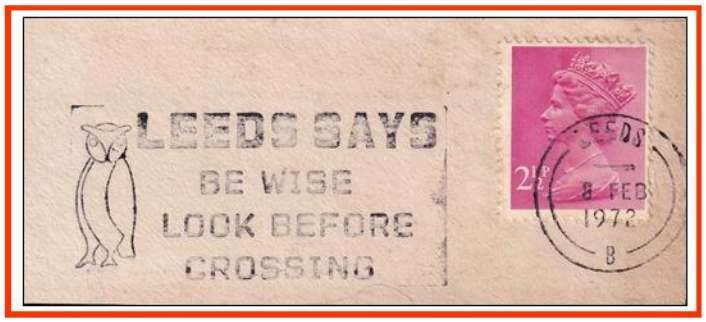
SCOPE- *It encompasses all aspects Darwin's Theory of evolution by natural selection, among Finches at Galapagos Island and factors that led to the changes include geographical and ecological isolation, change in the environment and competition for resources. For example, if a slender beak made it easier to eat food in a dry year, then birds with this type of beak would survive and reproduce, giving birth to finches with the same characteristics.*

METHODOLOGY- *The exhibit focus on the Darwin's Evolution Theory, and the distinctiveness of it as seen on stamps. It also deals with other scientific theories of Neo Darwinism or* ***Mendelian inheritance****: The mode of inheritance of all diploid species, and therefore of nearly all multi cellular organisms. Inheritance is controlled by genes, which are passed on to the offspring in the same form as they were inherited from the previous generation. At each locus an individual has two genes -- one inherited from its father and the other from its mother. The two genes are represented in equal proportions in its gametes.*

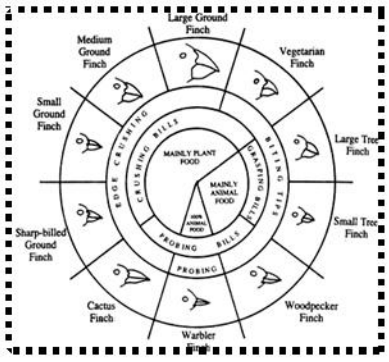
REASEARCH- *This exhibit contributes with new information from original research related to the development into modern theory of study performed independently by Clifford Tobin of Harvard Medical School in Boston and his colleagues shows that Bmp* ***(Bone morphogenic protein)*** *determines beak size and shape in the six ground-dwelling Darwin's finch species of the genus* ***Geospiza****. Illustrations serve an important tool to get a fair idea to understand the exhibit, and could not be avoided.*

THE EXHIBIT PLAN-

1. ***Introduction to Science watch-Beak variation in Darwin's Finches.***
2. ***Panorama of Beaks.***
3. ***Primitive Beaks.***
4. ***Charles Darwin-I Think; Evolutionary Tree & Origin of Species.***
5. ***Adaptive Radiation.***
5. ***Curious Beaks -The Fact Files.***
6. ***Avian Environmental issue and preservation.***



Owls , also known as raptors, as they swallow the prey as whole. Owls are unable to tear the flesh, due to very small sized beak compared to their body size.
A slogan postmark - Cut Square dated 08 Feb 1972



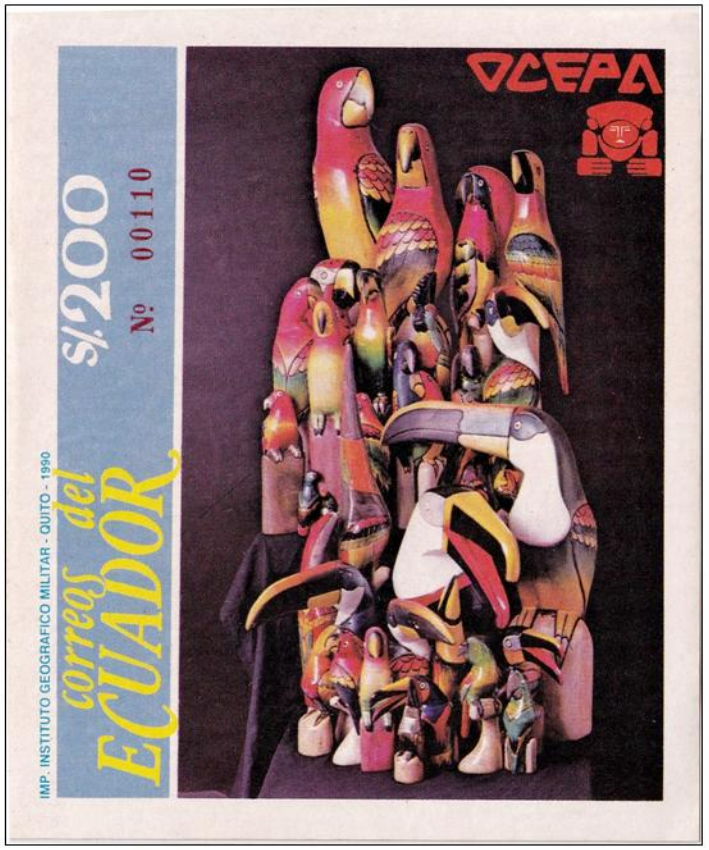
Toco Toucan - Paper Variety and Imperf color trials
Stamps were Surcharged for Child Welfare. Issued 23.12.1967

ITEMS MATTED IN BLACK ARE DIFFICULT TO ACQUIRE

BIBLIOGRAPHY : *The Life of Birds- David Attenborough, The Living World of Audubon-Roland C. Clement, Birds of Prey-Alan Richards; Lords of the Air-Smithsonian Inst. Press; The Sibley guide to Bird Life and behavior - Sibley D.*
USEFUL WEBSITES : http://www.aou.org ; http:www.birdlife.net ; http://www.oceanwanderers.com

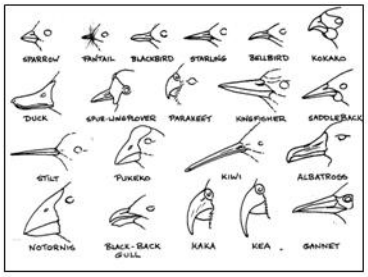
2. PANORAMA OF BEAKS

Beaks changed as the birds developed different tastes for fruits, seeds, or insects picked from the ground or cacti. Long, pointed beaks made some of them more fit for picking seeds out of cactus fruits. Shorter, stouter beaks served best for eating seeds found on the ground. Eventually, the immigrants evolved into 14 separate species, each with its own song, food preferences, and beak shapes.



PANORAMA OF BEAKS
Imperf MS- Limited Edition, as this one is serially numbered 00110 of 25000 issued

Beaks of Grey Parrot Frama Se-tenant Lowest ATM was issued for 0.48 Euros



Diagrammatic explanation of types of Beaks suitable for type of food.

Warbler finches, for example, catch insects in beaks that are sharper and more slender than those of cactus eaters.

Beak of a Toucan-Advertisement Meter Cancel-on a window cover

Redstart Bird - Issued 1988, Perf & Imperf

Salvin's Prion- a Marine Bird- Die Card -Issued 01.01.1994

3. PRIMITIVE BEAKS

Error- Black omitted
A Pre Historic Bird- *Pterosauria*,
Issued 1991

PRESENCE OF TEETH

Unlike jaws of the Mammals, bills of the birds do not have teeth. They have a living outer covering, which grows significantly to make up for wear and tear.

Red Breasted Merganser- Essentially a water bird has teeth like serrations in its beak for catching fish
A stamps Booklet, Issued by Finland on 20.09.1993

The ***Ichthyornithiformes*** is an order of extinct toothed fossil birds that could fly. Because of their teeth they are placed together with the ***Hesperornithiformes*** in the super order ***Odontognathae***. The theory that-"***Birds are glorified Reptiles:***, is proved from the evidences that prove that prehistoric birds like ***Rhamphorynchus*** & ***Pterodactyls*** had teeth, in their beaks. Some strange evidences are also seen in the modern birds like Red Breasted Merganser.

Meter cancellation depicting first ever known bird Archaeopteryx

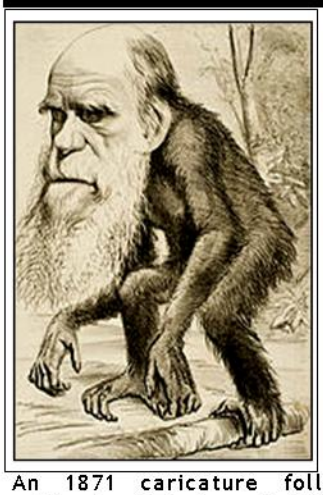
Restoration of Tropeognathus
It was a flying Dianosaur having teeth in its beak
Pictorial Postmark revealing presence of teeth in this prehistoric bird or shall we say a lying dinosaur.
An Exhibition cover tied with ATM Frama

CHARLES ROBERT DARWIN FRS (12 February 1809-19 April 1882)

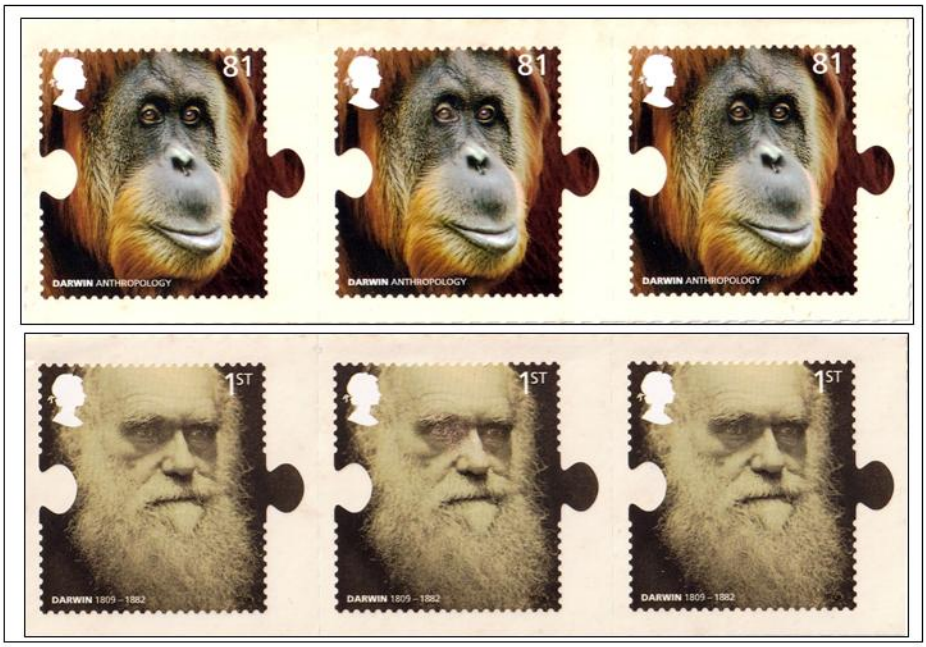
He was an English naturalist. He established that all species of life have descended over time from common ancestry, and proposed the scientific theory that this branching pattern of evolution resulted from a process that he called ***natural selection***. When Charles Darwin first saw the ***Galapagos Islands*** he described them as ***10 islands "situated under the equator."*** Noting differences in the feeding habits of the finches, Darwin wrote that cactus finches "may often be seen climbing about the flowers of the great cactus trees."

Seeing the diversity of beaks and other structures in the closely related finches, he wrote in his notebook, "***one might really fancy that one species had been taken and modified for different ends.***"

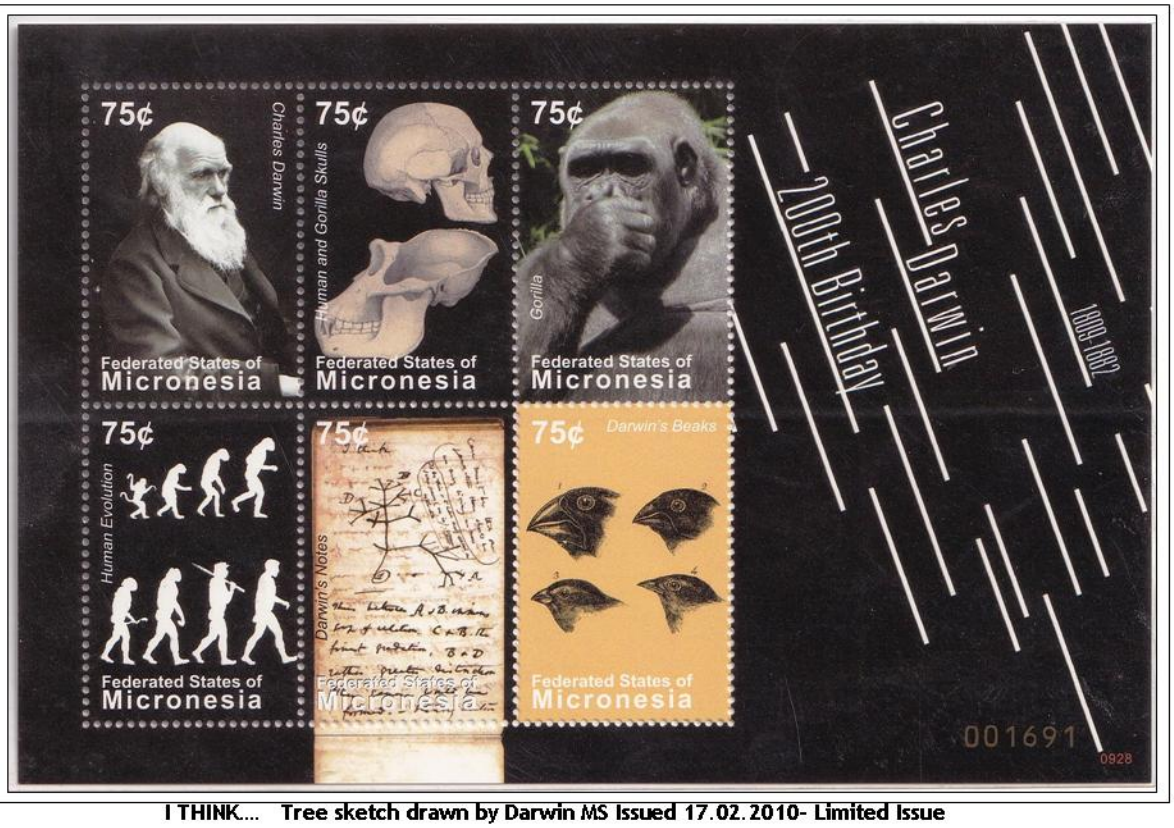
I THINK....



An 1871 caricature following publication of *The Descent of Man* was typical of many showing Darwin with an ape body, identifying him in popular culture as the leading author of evolutionary theory.



Gutter pairs Odd shaped, Self Adhesive. The design identifies the caricature of an Ape with that of Charles Darwin



In mid-July 1837 Darwin started his "B" notebook on *Transmutation of Species*, and on page 36 wrote -

"I think" above his first evolutionary tree.he wrote, *"an immigrant first settled on one of the islands, ..it would undoubtedly be exposed to different conditions in the different islands (where) it would have to compete with a different set of organisms. .. Then, natural selection would probably favor different varieties in the different islands."*

I THINK.... Tree sketch drawn by Darwin MS Issued 17.02.2010- Limited Issue

ADAPTIVE RADIATION

Darwin's finches are the emblems of evolution. Cataloging the birds Darwin collected in 1835 helped him formulate his theory of evolution because he realized that all the finch species arose from one ancestral form that had adapted to a variety of feeding conditions. Today the finches are considered a perfect example of adaptive radiation, in which one species diversifies into many to exploit a wide range of habitats.

Four of the 14 finch species found on the Galápagos Archipelago, are thought to have evolved by an adaptive radiation that diversified their beak shapes to adapt them to different food sources.

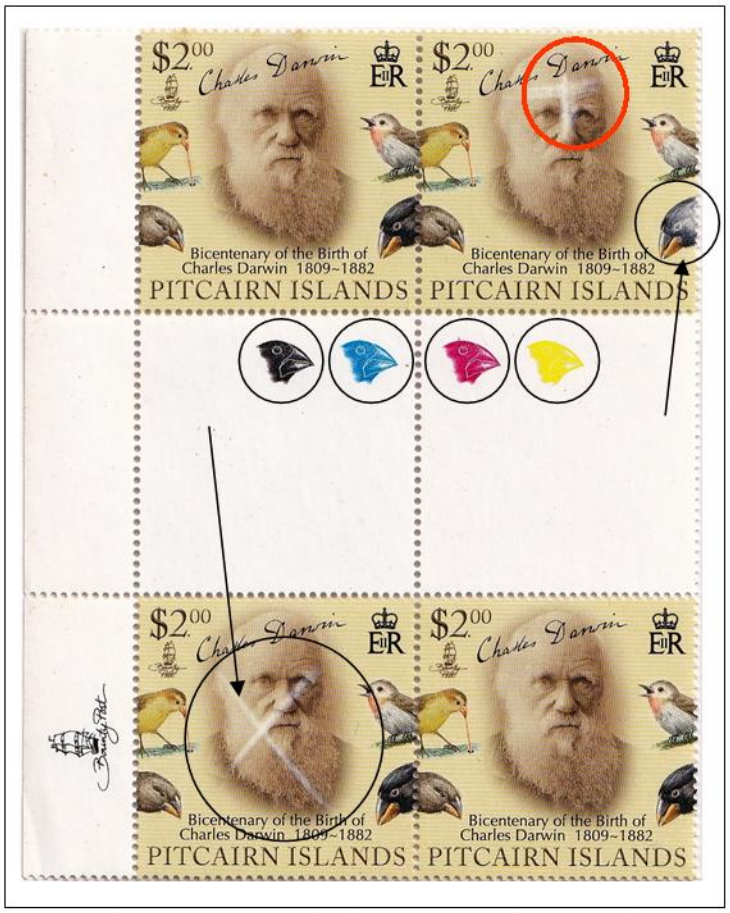
Adaptive radiation, a characteristic example of ***cladogenesis***, can be graphically illustrated as a "bush", or clade, of coexisting species (on the tree of life).

In evolutionary biology, adaptive radiation is the evolution of ecological and phenotypic diversity within a rapidly multiplying lineage.

Galapagos Finches - Odd Shaped- Gutter Pairs–Self Adhesive

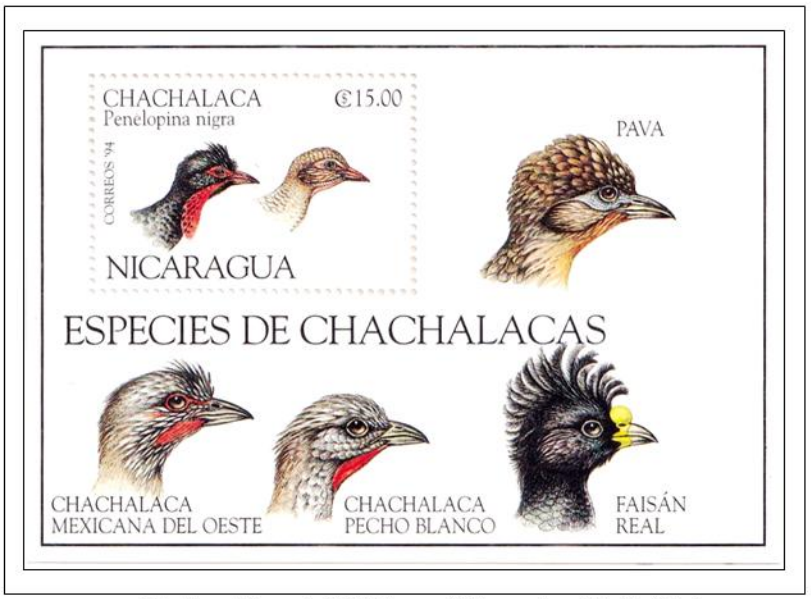
Decimal Definitive Stamps Booklet depicting Pond life and Birds Like Moorhen and Dabchick or Little Grebe. No such adaptive radiation is noticed among such birds Booklet was Issued in Oct 1986

ERROR-
DRY PRINT NOTICED ON LEFT FINCH ON UPPER STAMP
GUTTER PAIR - ISSUED 10.02.1982
CHARLES DARWIN
THIS ONE IS PART OF 4v SET



Charles Darwin with Galapagos Finches
Issued on 24.06.2009
Gutter margins carry color control marks in the form of Beaks of Galapagos Finches

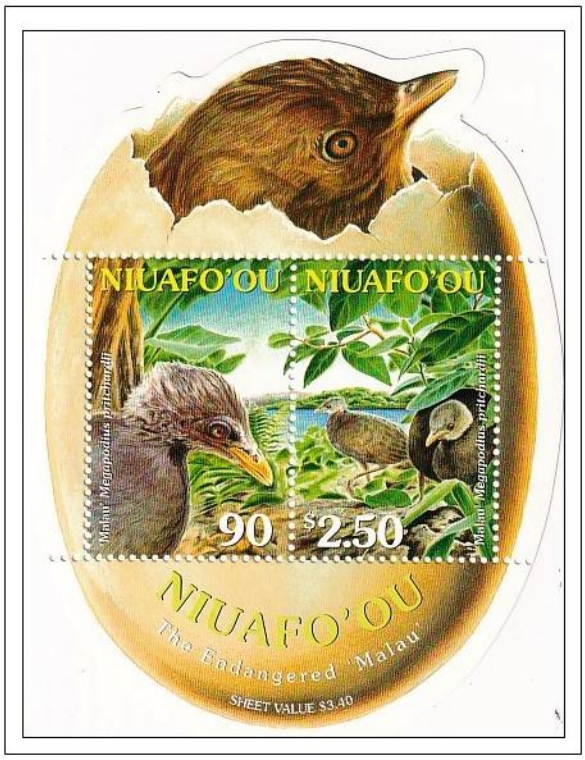
Starting with a recent single ancestor, this process of adaptive radiation results in the speciation and phenotypic adaptation of an array of species exhibiting different morphological and physiological traits with which they can exploit a range of divergent environments.



Highland Guan- A WWF issue- MS issued on 20.12.1994

BRUSH YOUR BEAK - AMAZING BIRDS WITH TEETH

Do birds have teeth? Ask any biologist and the answer will be "absolutely not!", but "absolute" is a relative term and when one stretches the definitions of what makes a bird or a tooth, birds with teeth aren't absolutely impossible anymore.



Odd Shaped MS-Issued 09.04.2002
Endangered Malau Bird

Breakout The Egg Teeth

When the going gets tough, the tough get... an egg tooth?

Yes indeed, birds have evolved egg teeth (an Egg Tooth, actually) on the end of the beak to assist about-to-be-born baby birds in breaking through their eggshells from the inside.

Self Adhesive - Odd Shaped- Chick breaking out of the egg shell

Not Your Average Baby Teeth

Awww, cute cuddly baby birds! Hear them go *"cheep cheep cheep"*. Gently touch their warm, soft, downy feathers. Watch them open their tiny mouths wide and... *Oh. My. Gawd!!*

Many species of birds have, to a greater or lesser degree, spiky tooth-like rearward-facing spines in their mouths that ensure what goes in won't get out.

Error- Color Variety
Brown Fronted Woodpeckers have chisel like beaks. Issued

Goose Grazes Grasses

Goose is very common in Europe and western Asia. This is no "silly goose", at least not if those rows of teeth along its upper and lower jaws mean anything, disconcertingly un-birdlike choppers.

Gape is wide open - Newborn chicks being fed by mother. Down-rated and ovpt Issued 18.12.1980

Endangered Birds of India - Manipur Bush Quails-Mother & Chick - Error Color Variety Issued 05.10.2006

Tooth-like serrations called Tomia run along the outside edges of the Greylag's beak, top and bottom, and help it neatly clip the shoots and grasses that make up the major portion of its meals.

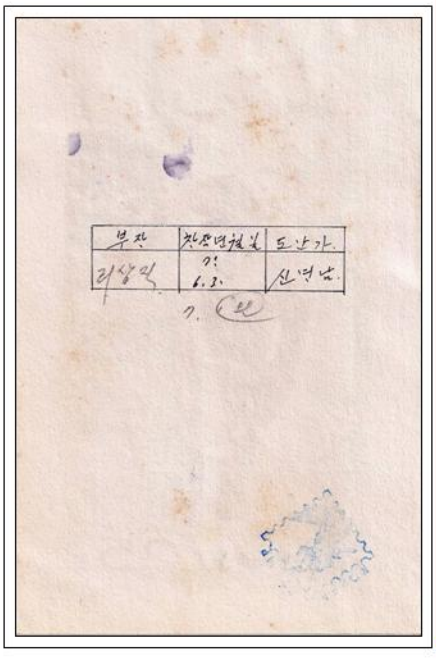
Stamps Booklet commercially used

CURIOUS BEAKS - THE FACT FILE - WHAT IS GAPE?

In **bird** anatomy, the **gape** is the interior of the open mouth of a **bird**,
and the **gape** flange is the region where the two mandibles join together at the base of the beak.
The width of the **gape** can be a factor in the choice of food.

Specimen

Shade Variety - Error



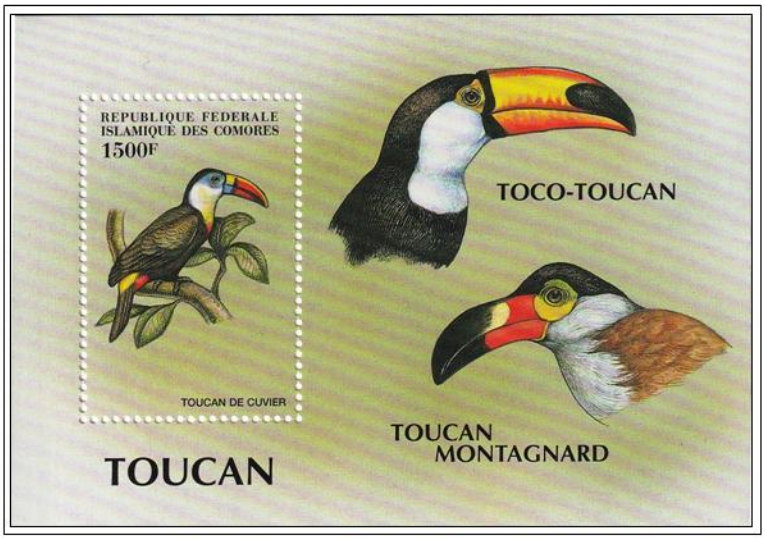
Reverse side of the Proof depicting official Seal and approval for printing

White bellied Woodpecker feedings its chicks - Issued 05.08.1978
ORIGINAL ARTWORK– OFFICIAL PROOF FROM ARCHIVES

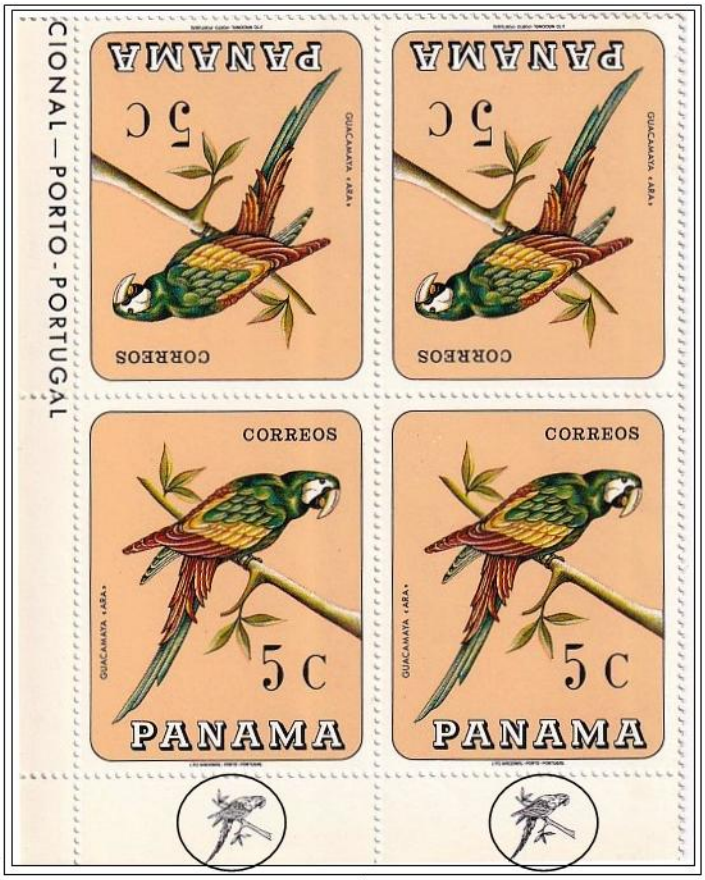
CURIOUS BEAKS AND IT'S TYPES - THE FACT FILES

Toucan Chew

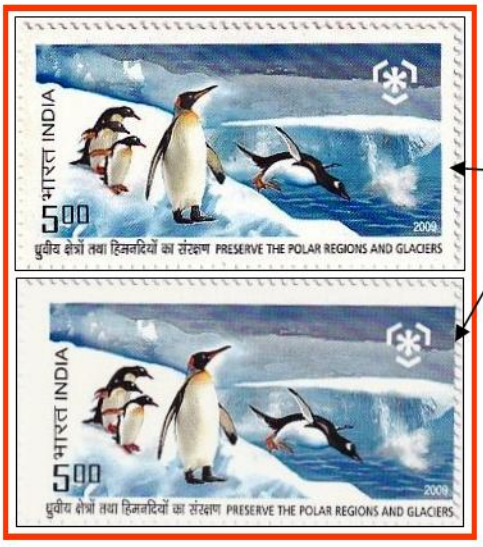
"It's hard to soar with eagles when you're surrounded by turkeys" Or Toucans, for that matter. It's hard to take toucans seriously - between their ridiculously enlarged beaks and an unfortunate association with Froot Loops breakfast cereal its a wonder they haven't been laughed out of the rainforest by now.



White Throated Toucan- MS Issued 25.01.1999



Macaw has the bite strength of 500 to 700 pounds per square inch, which is close to that of a large dog bite →



Error- Emperor Penguins - Perforation Shift
Preserve the polar regions and glaciers
Issued 1912.2009

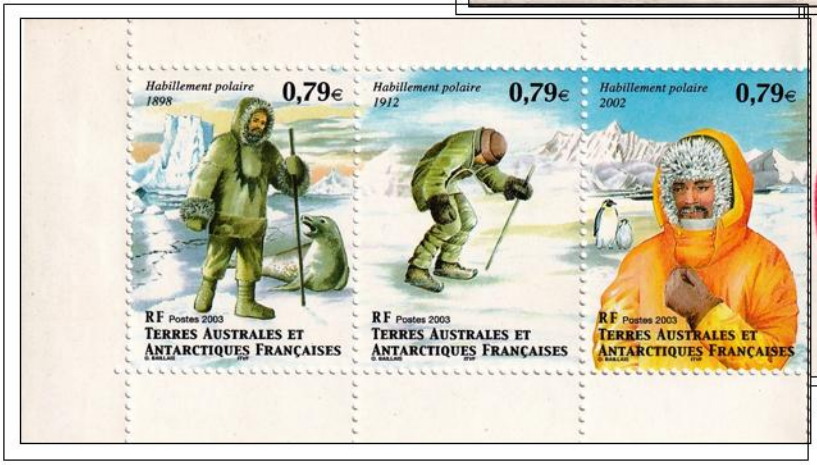
Tete-beche Corner Block
Bottom Selvedge of the block depicts the bird Chestnut-fronted Macaw
Issued 20.07.1967

The penguins have spine-covered tongue and similarly bristly upper palate. The spines function much as teeth would, holding captured fish securely as the penguin prepares to swallow it.

Penguins Use Tongue Fu

Penguins are chock full of amazing evolutionary adaptations that enable them to perform as efficient fish-catching, meal-processing machines that turn speed-eating into a lifestyle.

A 5v Stamps Booklet issued on 01.01.1993 on Polar Clothings, depicts Emperor Penguins in the 3rd stamp on the right. →



Polar Flight Covers of 1978 and 1979 missions , tied with label and pictorial flight post marks of Penguins.

CURIOUS BEAKS—THE FACT FILES - TYPES OF BEAKS CONTD..

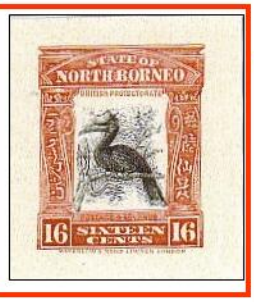
Color variety-House Sparrow

Granivorous Beaks

By definition, a bird is granivorous when it **eats** mostly **seeds** and grain. ... Flower **seeds**, including sunflowers, coneflowers, and wildflowers. Grass and weed **seeds**, including dandelions. Birdseed mixes, including white proso millet, milo **seed**, and Nyjer.

Error- Double Ovpt. Bananaquit Bird Issue 19.09.1983

ATM-FRAMA-ERROR- "g" shifted right on picture frame -all stamps affected



Rhinoceros Hornbill Imperf Proof Issued 01.07.1909

Error- PPF Pre Printing Fold Left Stamps Affected

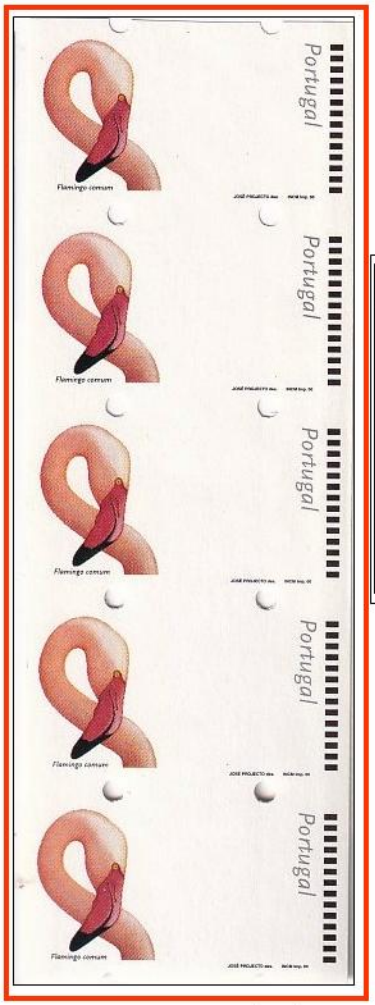
Jungle Fowl (Rooster) most domesticated bird in the world is granivorous

BENT BILL OR ROMAN NOSE

When young birds hatch, their bills often look quite different from the adult form of the same species.

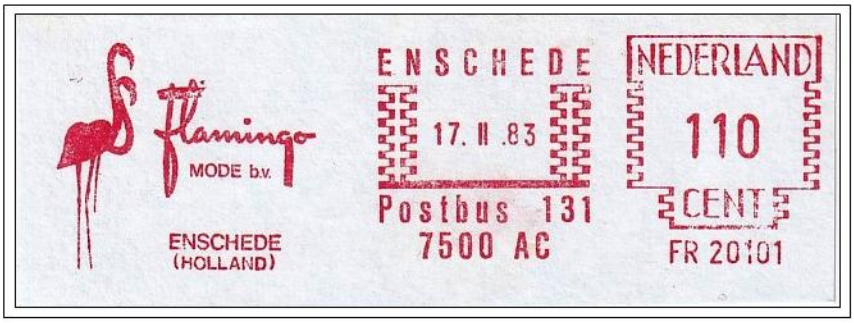
Young song birds typically have bills with a wide gape and brightly colored margins two adaptations that encourage the parent birds to cram them with food. Newly hatched *flamingos*, show few signs of the adult's *bent bill* or *"Roman nose"*, while young herons hatch with short bills.

These bill shapes develop by *algometric growth*.



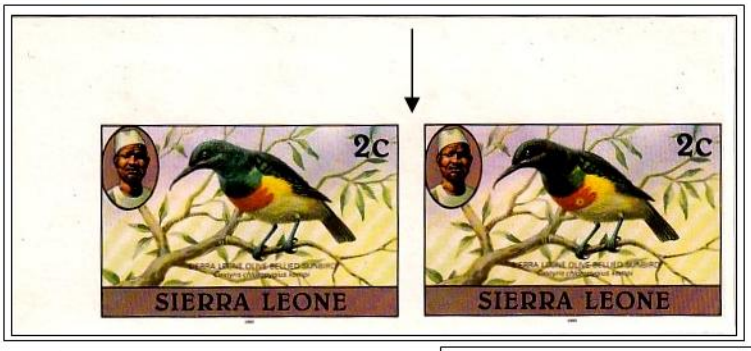
ATM -FRAMA. Denominations missing

METER CANCELLATION—WINDOW COVER FRANCE 17.5.1974



METER CANCELLATION -NEDERLAND Dt 17.11.1983

CURIOUS BEAKS—THE FACT FILES - TYPES OF BEAKS CONTD..



Sap Sucker Beaks

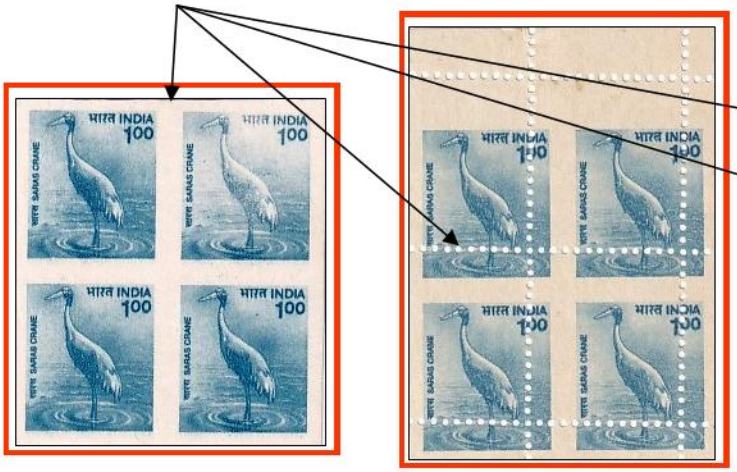
Sapsuckers, almost all Hummingbirds, Sunbirds and a specialized group of woodpeckers, are sap suckers. Some Woodpeckers after pecking neat rows of small holes in trees to cause the sugary liquid to flow, the birds lick it up with tongues tipped with stiff hairs.

Malachite Sunbird-Imperf Color Trial-20.04.1981

Mud Probing beaks

The herons and bitterns are carnivorous and feed on a variety of live aquatic prey like fish, reptiles, amphibians, crustaceans, mollusks and aquatic insects. The necks are able to kink in an s-shape, due to the modified shape of the sixth vertebrae. The neck is able to retract and extend, and is retracted during flight, unlike most other long-necked birds.

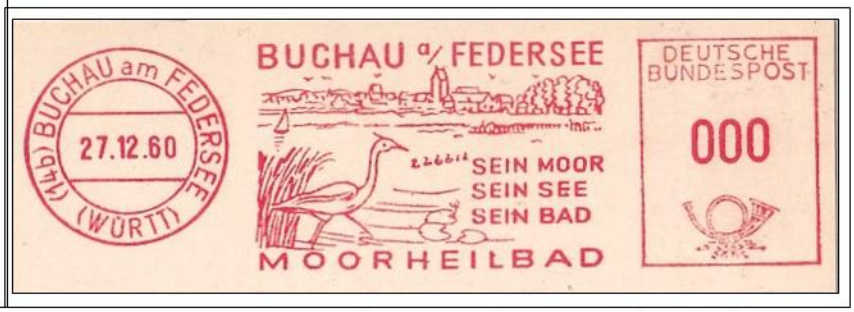
Purple throated Carib surcharged
40c On 8c,
Issued on 15.12. 1973



The neck is longer in the day herons than the night herons and bitterns. **Storks** have straight, long bills, which they use to catch prey, such as fish, frogs and toads, rodents, and insects such as grasshoppers

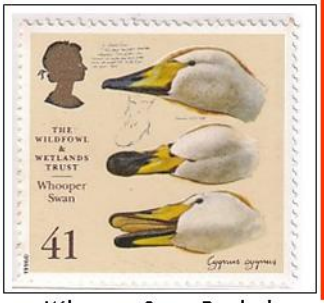
Sarus Crane- 1/- (R to L) Definitive Issue Color Variety, Dramatic shift of Perforation and an Imperf Block- Issued 20.07.2000, watermarked.

Postmark on Postcard-Japan



Post Horn-Meter Cancel- Stylized Wader Birds and ducklings-Specimen

Painted Stork- Imperf Block Definitive-Issued 20.09.2001 watermarked



Whooper Swan Beaks have filter and thin serrations

Error—Imperforated in between Tete-beche pair. Wetlands conservation-IOWA migratory waterfowl stamp, expiry date Feb 28, 1985

Insectivorous Beaks

Many birds have at least a partially insectivorous diet, and insects are a critical source of protein for many growing nestlings. While young birds are still dependent on their parents for food, they may be fed mostly insects, even if their mature diet will be much different. To be considered insectivorous, a bird does not necessarily need a diet of exclusive insects, but the insect proportion is quite significant.

Error-Red Shifted , Oriole Birds Issued-17.03.1991

Error-color variety-gutter pair Moorhen Birds,Issued-16.01.1980

1897 **Great Argus A pheasant bird** *Error perforation shift*

1901 Overprint and color variety British Protector-ate

Hand painted fancy cover with fancy cancellation of a pigeon, posted From Pigeon, West Virginia, USA, on 01 JUL, 1937

Stylized birds- Some crested birds, like pigeons, parrots and birds of prey appeared as Coat Of Arms on Non Judicial Stamp papers of many erstwhile feudatory states in British India period, like this one from Sarakar Bhopalgarh State, priced at pre decimal currency of Two Annas.

CURIOUS BEAKS—THE FACT FILES - TYPES OF BEAKS CONTD..

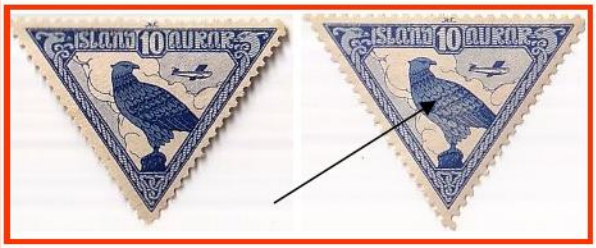
Pescatarian Beaks

Most simply, a pescatarian is someone who doesn't eat meat, but does eat **fish**. The term pescatarian was coined in the early 1990s and is a combination of the Italian word for **fish**, "pesce," and the word "vegetarian." Sometimes it's spelled "pescetarian," but this means the same thing. Mostly Water birds and marine birds, including some birds of prey have such type of beaks.

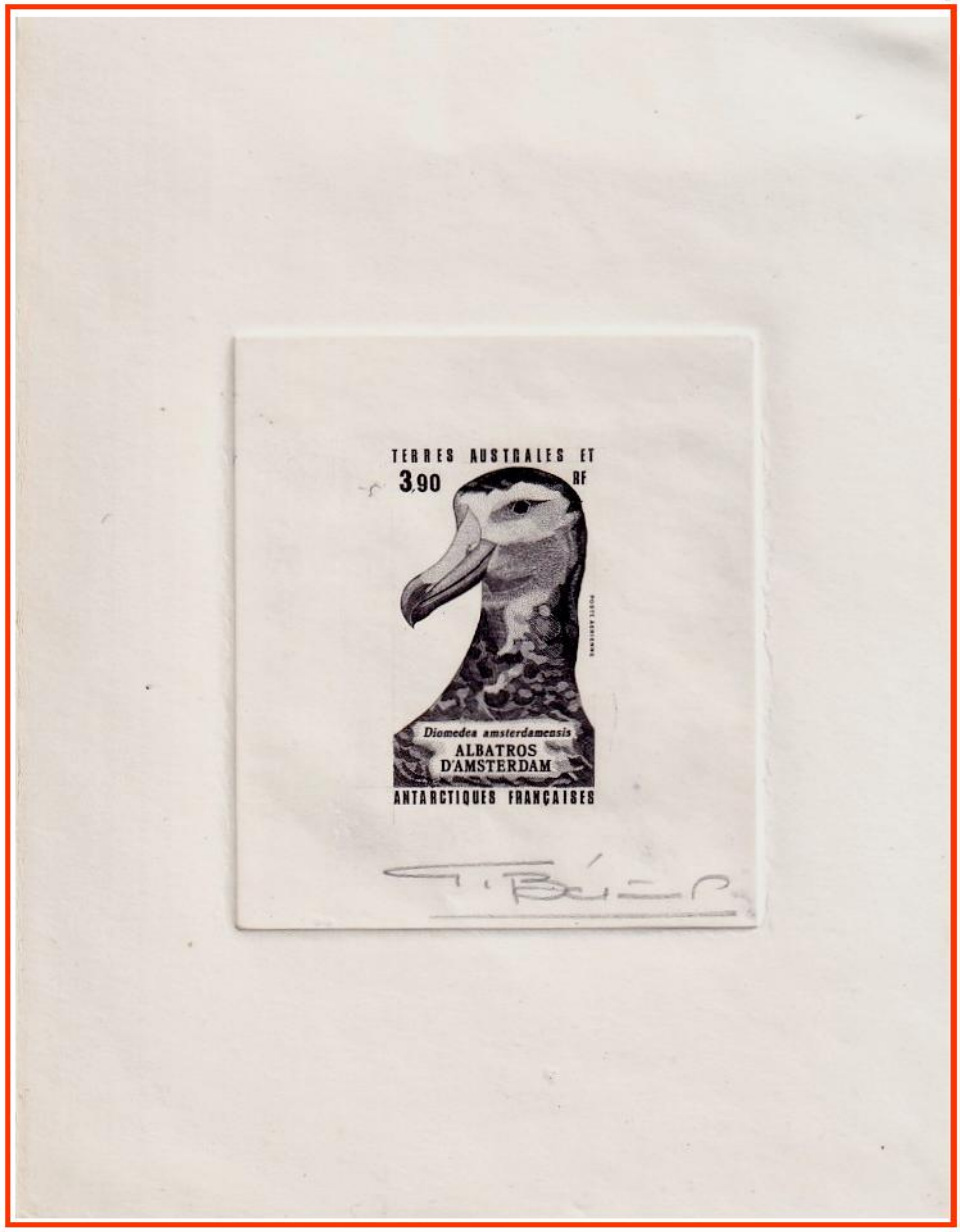
Essays-Unissued-Red Omitted–Kingfisher

Western Osprey-Color Variety-Issued 30.12.1992

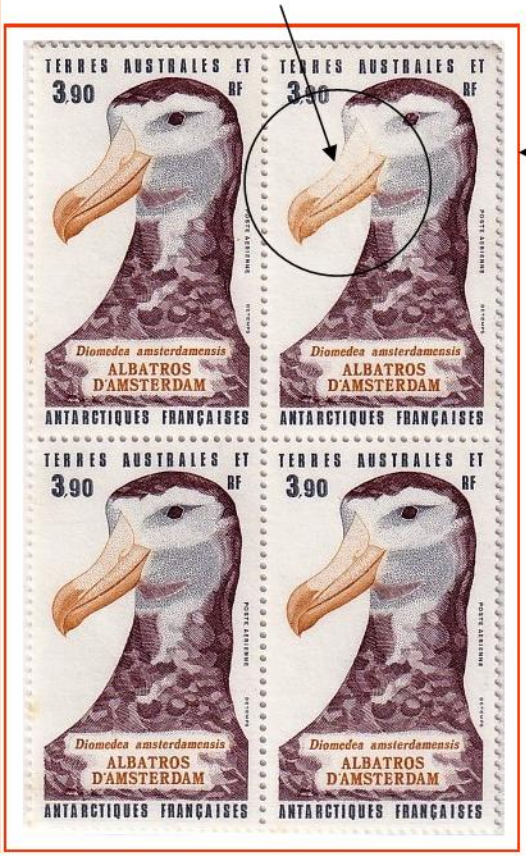
Mallard Birds at National parks: Saloum, Djoudj, Niokolo-Koba, Basse Casamance -Imperf Block-Issued 23.03.1992



Gyrfalcon-Issued on 01.01.1930-Color Variety



Amsterdam Albatross -Artist Signe Proof

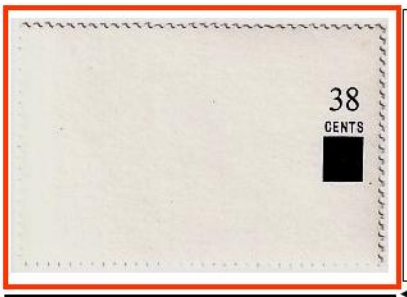


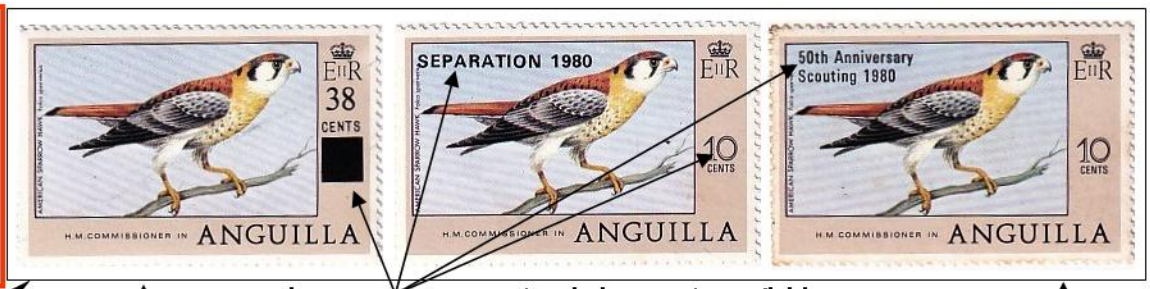
Error- Partial Dry Print - Top Right Stamp Affected Amsterdam Albatross -Issued 01.01.1985 Antarctic Wildlife

CURIOUS BEAKS AND IT'S TYPES - THE FACT FILES CONTD.

Hooked Beak - Meat Eaters

All raptors have the same beak design, curved at the tip with sharp cutting edges to tear apart prey that will easily fit into the mouth. The beaks have evolved over time based on the type of prey eaten. For example, the American Kestrel has a small beak for eating small prey, like mice and insects.





Albino -With Surcharge Ovpt

American Kestrel - Error and Varieties-Issued as Definitive on 20.02.1978

ATM-Frama -Error-Color Variety

Hooked Beak of Bald Eagle is sharp as razor and bent to slice off chunk of meat of its prey. Commemorative cover, 8th Annual Alaska Bald Eagle Festival

Kinesis-The Bite

Most birds with the important exception of birds of prey and parrots, catch & hold their food with their beaks alone. Many birds can raise the upper half of their bill, something known as Kinesis.

ERROR- RED & BLACK OMITTED
Lord Derby's Parakeet-
Issued 10.07.1975

Red Lory- Birds of the Antwerp Zoo- Minister's proof-Limited Issue to the VIPs amongst postal authorities seeking approval of the final design of the stamp. Issued 23.06.1962

Omnivorous Beaks (All Purpose Beaks) - Common Ravens are omnivorous foraging generalists, particularly fond of carrion and garbage. Their powerful bill enables them to feed on carcasses, small vertebrates, bird eggs, nestlings, insects, invertebrates (mollusks), seeds and fruits. These intelligent birds are known to temporarily cache buried food, hunt cooperatively in groups and post a sentinel when feeding. As ground gleaners, they forage by picking prey and food from the ground and vegetation as they walk (rather than hop).

Masked Wood Swallow -Error-Pink Omitted
Issued 01.07.1980 as Definitive

Australian Magpie - PERF & IMPERF
Issued 04.08.1986 at Stampex-86

CROWS - Propaganda stamps- Sheet-let with simulated perforations. Issued during political solidarity by Poland during 1986

North Dakota Crow Control Stamps Booklet
Issued 1945 by North Dakota Game & Fish Department to control crow menace in the city. Buyer's name is required to be endorsed on purchase.

BEAK AS A MULTI FUNCTION TOOL

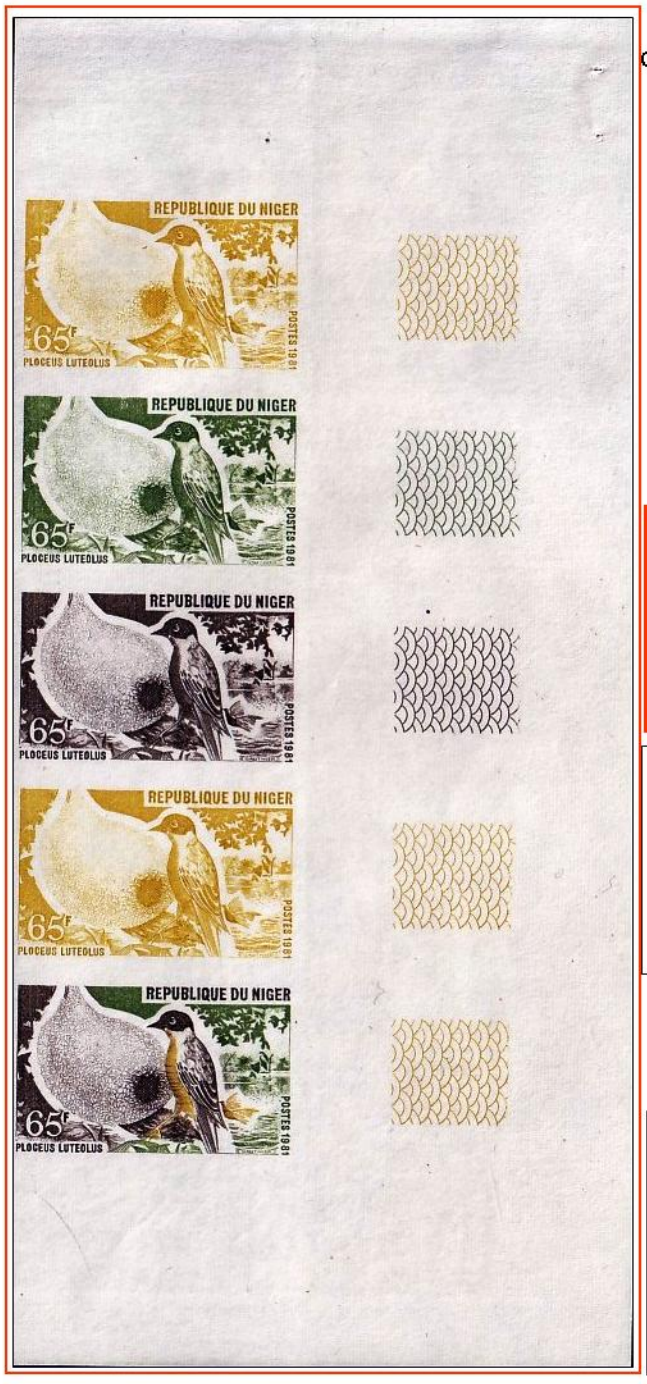
Does having a beak make up for *not* having teeth, paws, hands, antlers, horns or spines? It has to. Birds must rely on their beaks to carry out many different tasks.

Preening

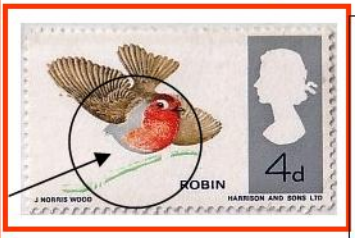
Drinking Nesting

Anhinga does not have waterproof feathers- It often preens its wings for oiling and drying with its beak. Ovpt. and Down-rated Block-Issued 16.12.1960

The number one use for the beak is to gather or capture food. Some beaks are specialized to be just right for certain diets. Birds with these bills use them the same way we use a spoon to eat ice cream or a fork to eat salad.



Weaving a Nest- Little Weaver-Composite Marginal Imperf Block of progressive color trials-Issued 18.11.1967



Singing Robin Error-Missing Legs Upper Stamp-Issued 08.08.1966

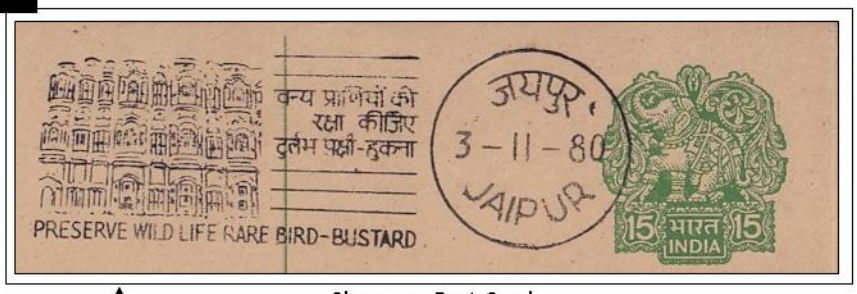
Beak full of fishes -Pelican Surcharged -Issued10.12.1962

Horned Beaks for defending Southern Cassowary -Issued 12.06.1974

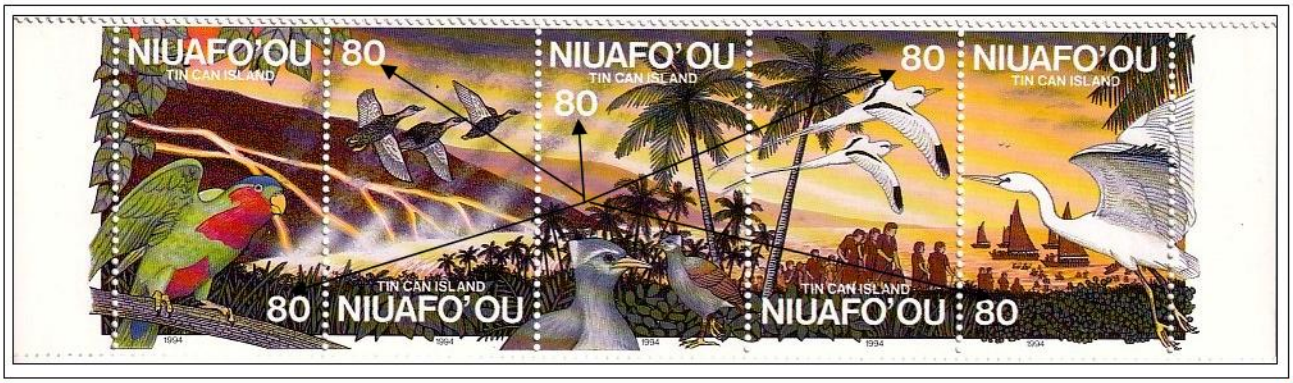
BEAK EVOLVED... THE AFTER...

OVERTURE BY THE BIRDS

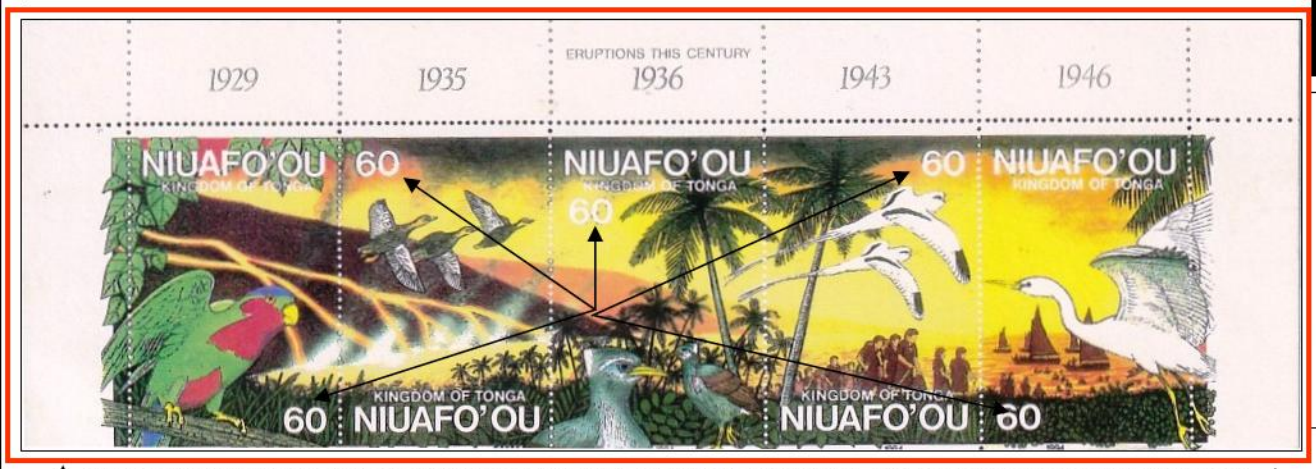
"We would have you to wit, that on eggs though we sit,
And are spiked on the spit, and are baked in a pan;
Birds are older by far than your ancestors are,
And made love and made war, ere the making of man!"
- Andrew Lang



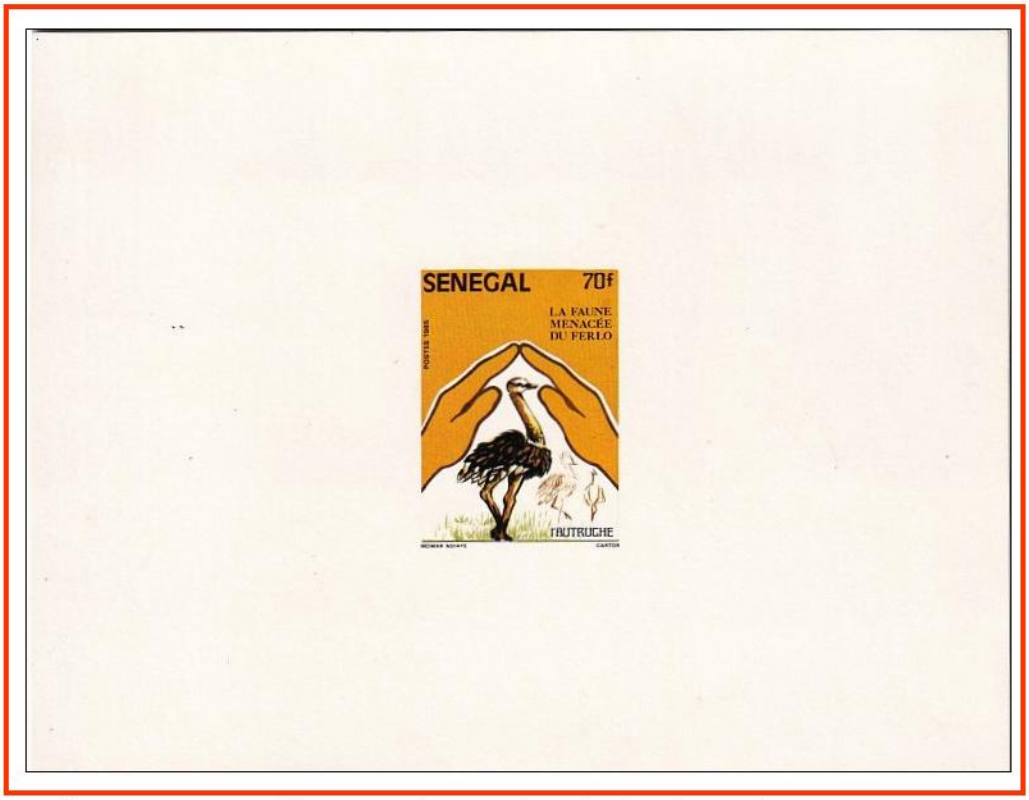
Slogan on Post Card
Preserve wild life -Rare Bird-Bustard, Jaipur, India



EXTINCTION IS FOREVEVER LET US PRESERVE LIFE



Eruptions of 20th Century-Destruction of Life on Earth- Essay. Denomination of 60s was upped to 80s in Final Issue
Issued on 21.09.1994 for the Tin Can Islands, by NIUAFO'OU, Kingdom of Tonga. This is from ARCHIVES



Ostrich Conservation at Ferlo National Park Senegal
Issued 19.02.1987–Deluxe Proof with stamp

Beaks of the Extinct Birds Self Adhesive
Odd Shaped Stamp Booklet Limited Issue