Gordon MacKenzie

The Young Naturalist

YOUNG NATURALISTS CLUB F. O. N.

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The Gulls of the Great Lakes

Part I (first of a two-part series)

We often see gulls in Ontario. They may be circling over a garbage dump, congregating where people throw food to them, or flying purposefully along the lakeshore. But how often do we take a second look at them? To do so is rewarding, for there are many species of gulls, some commonly seen, others among the rarest bird visitors to Ontario.

Identifying the different species of gulls adds greatly to the interest of field trips. We begin to realize that some species of gulls are with us all year, some visit us only during migration time, and others come to our relatively mild climate only in the depth of winter when they are driven south from their Arctic homes. You have to brave the winter weather to see these gulls.

Six Species to Find

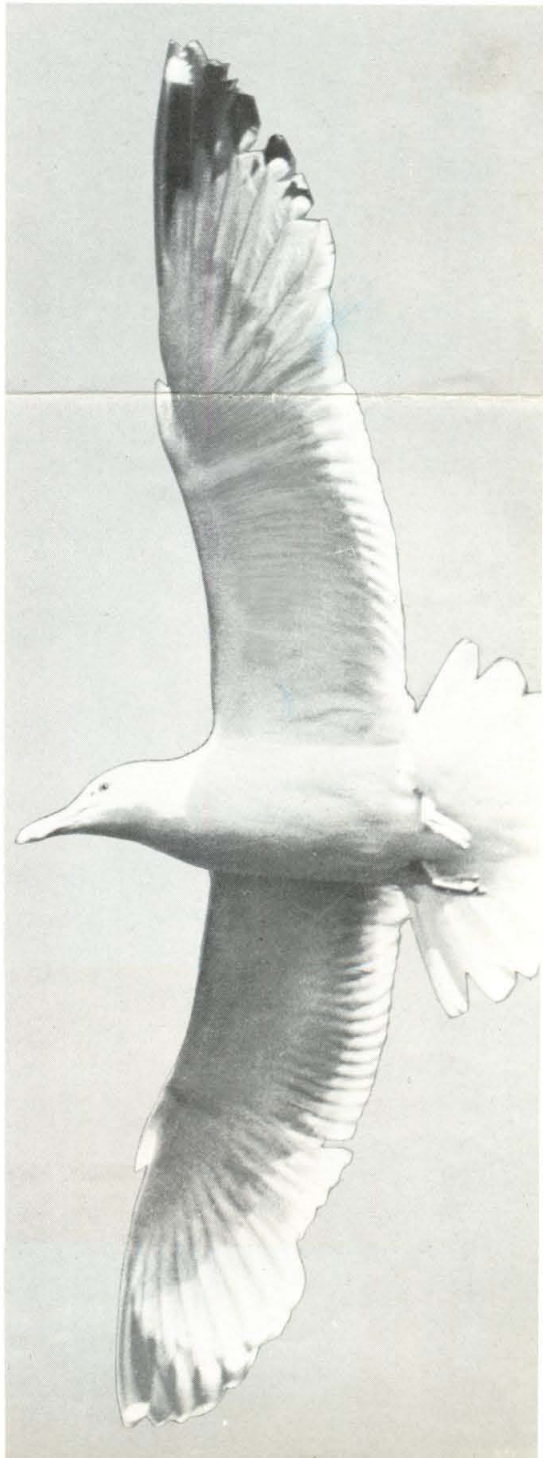
There are six species of gulls that you can reasonably expect to find in Ontario, but one of these is rare. To separate the six species you have to look carefully at the following characteristics: (1) size; (2) colour of mantle ("mantle" is a term used to describe the back and upper wings); (3) colour and size of bill; (4) colour of head; and (5) the wing-tips. Identification of gulls is complicated by the fact that young birds have a different plumage from the adults for the first year or two of their lives. However, if we learn to separate the different species of adult gulls, then we can tackle the more difficult problem of the young birds.

The Great Black-backed Gull

One of the easiest to recognize is the largest of all, the Great Black-backed Gull. Apart from his large size, he is the only species with a black mantle, and this is very conspicuous as he flies by. The Great Black-backed Gull is extending his range considerably, and is now seen in Ontario much more commonly than before. Although largely a winter visitor, in the past two years one or two pairs have been seen occupying suitable breeding islands in Lake Ontario. Perhaps this species will soon be one of our regular breeding birds.

The smallest of the six gulls is also not too difficult to recognize. It is the Bonaparte's Gull. This species passes through some parts of Ontario in great numbers. Several hundreds of Bonaparte's Gulls can be seen, for example, on the marsh at Hamilton in April as they pass north to their breeding grounds. Some non-breeding birds spend the whole summer on the Great Lakes, but it is normally during migration time when this species can be

See GULLS — Page 6



Dept. of Lands and Forests Photo

The Herring Gull, shown here in graceful flight, has pink legs.

HOW OIL IS PRODUCED

Part IV —The Final Instalment of a Series "Oil in Southwestern Ontario."

Perhaps the most important thing that we have learned about oil and gas is that these fluids, along with water, are lodged in the pores of rocks. When these pores are inter-connected, the rock is said to be permeable. This means that the fluids in the pores, when under pressure, can move around and actually flow through the rock. Producing oil and gas is simply a matter of extracting these fluids from the pores and permeable rock, a rock that is called the reservoir rock. It can be done in several ways, all of which are dependent upon the distribution of the fluids in the reservoir.

As a beginning let us consider a reservoir that has natural gas, oil, and water in it. The gas, being lightest, is above the oil, and water, being the heaviest, is underneath the oil. Under these conditions, the pressure of the natural gas is usually sufficient to drive out the oil by the simple expansion of the gas, after the reservoir has been penetrated by a drill hole. Sometimes such wells have a tendency to *blow* and become gushers. Many people think a gusher is a good sign, but actually it is not. When gushers blow out it is a waste of oil and often a sign of poor engineering practice in drilling the well, although sometimes it cannot be avoided.

The proper way to produce oil from the reservoir that we have taken as an example, is shown in the accompanying diagrams. These illustrate that the production must be very slow; the reason for this is that, when the production is fast, the water will migrate to the bottom of the hole and, as we say, "cone up", shutting off a lot of oil that is still left in the reservoir. Also, the pressure dies off quickly, and an inefficient production occurs all round. Wells with a natural flow due to the gas pressure can be controlled by means of a *choke* on the well, and slow production will ensure the maximum recovery for the reservoir.

Not all oil fields have a gas cap; sometimes there is just oil and water. Under these conditions it is usually necessary to pump the well artificially. Oil well pumps are great huge things and are operated by a motor; they are like a big teeter-totter. As a matter of fact, many oil fields will convert to a pumping mechanism after the energy in the gas cap has been used up.

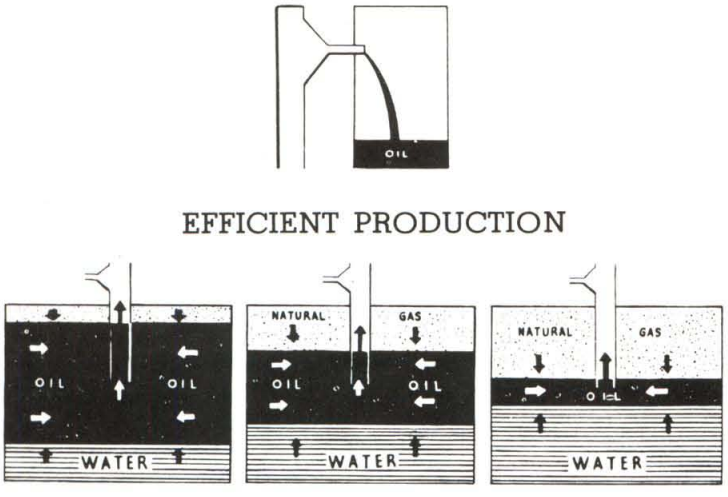
Imperial Oil Limited

Oil well pumps are commonly used. They are like big teeter-totters.

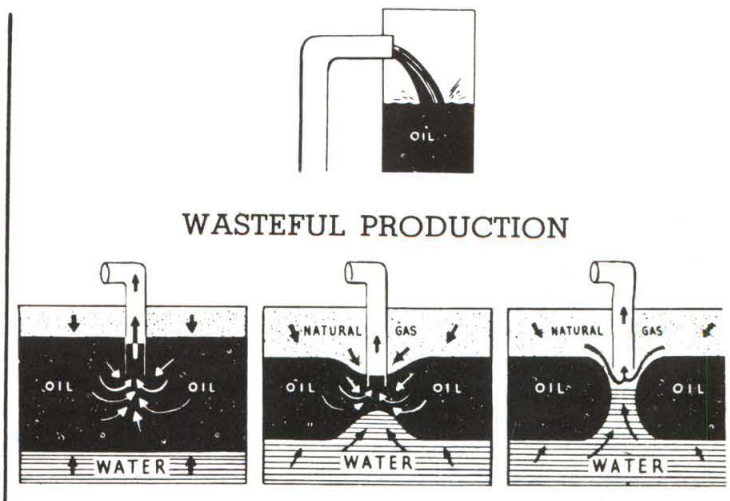
The natural flow and pumping methods are the initial phases of oil production in any field. However, after the field has been studied and all the oil has been produced efficiently by one of the above means, engineers give consideration to what is called *second recovery*. This is a process whereby either additional gas is pumped into the gas cap to increase the pressure to force out more oil, or water is injected under pressure around the edges of the field to flush out oil that may be still left in the reservoir. These methods produce a tremendous amount of oil from so-called "exhausted fields". In Southwestern Ontario secondary recovery by water flooding has given a great resurgence to the industry in that area.

Exhausted oil and gas fields do not outlive their usefulness however, because they can be used as great storage areas. This is especially true of Southwestern Ontario where natural gas from Texas and Western Canada is stored in old abandoned gas fields during the summer months when demands are light, and then delivered to the consumers in fall and winter. Such techniques ensure low prices and constant supply.

WALTER M. TOVELL



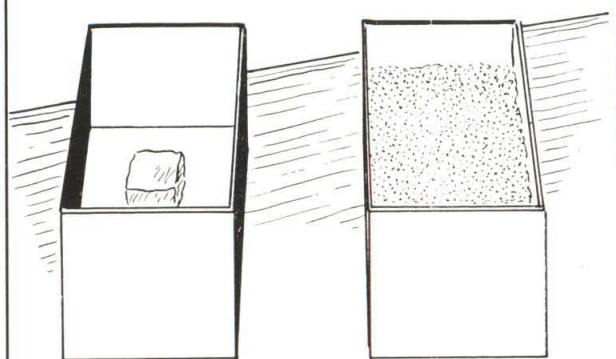
Restricting the flow increases ultimate yield



Uncontrolled oil production is very wasteful

THE YOUNG EXPERIMENTER

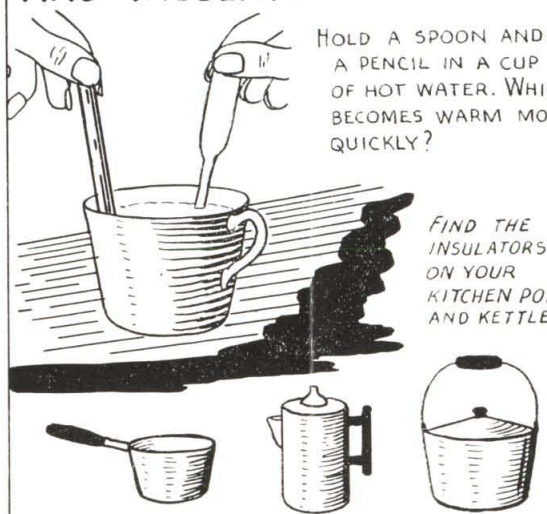
INSULATION:



PLACE AN ICE CUBE IN AN EMPTY CHALK BOX. BURY A SECOND ICE CUBE IN SAWDUST IN ANOTHER CHALK BOX. COVER EACH BOX WHICH CUBE OF ICE MELTS FIRST? WHY?

HOW IS THIS PRINCIPLE APPLIED IN THE INSULATION OF HOUSES?

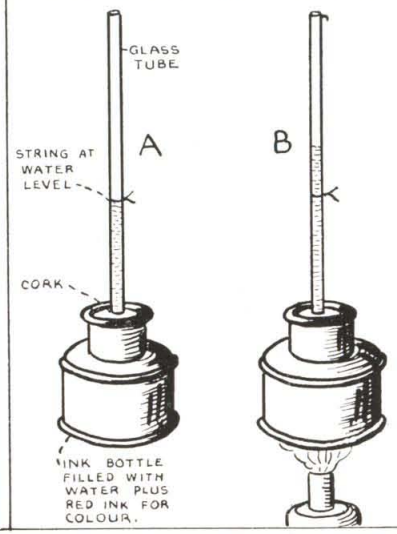
AND INSULATORS:



HOLD A SPOON AND A PENCIL IN A CUP OF HOT WATER. WHICH BECOMES WARM MORE QUICKLY?

FIND THE INSULATORS ON YOUR KITCHEN POTS AND KETTLES.

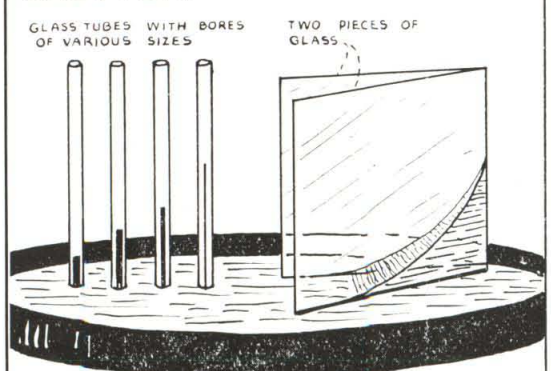
HOW A THERMOMETER WORKS:



ASSEMBLE THE MATERIALS AS SHOWN IN A. THEN HEAT THE BOTTLE (B). WHAT HAPPENS? WHY?

HOW IS THIS EXPERIMENT USEFUL IN UNDERSTANDING THE WORKING OF THE THERMOMETER?

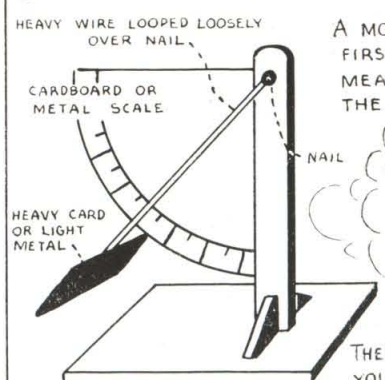
BLOTTERS:



USE EITHER THE TUBES, OR THE GLASS, OR BOTH COLOUR THE WATER WITH RED INK. THE WATER RISES BECAUSE OF "CAPILLARY ACTION".

CAN YOU UNDERSTAND BETTER HOW A BLOTTER HELPS TO DRY THE INK?

SOMETHING TO MAKE!



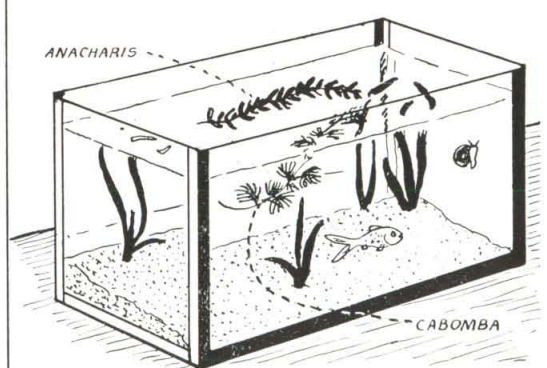
A MODEL OF EGNATIO DANTI'S FIRST ANEMOMETER FOR MEASURING THE FORCE OF THE WIND:

SIZE - ACCORDING TO CHOICE.

THE FOLLOWING TABLE WILL HELP YOU IN MARKING THE SCALE:

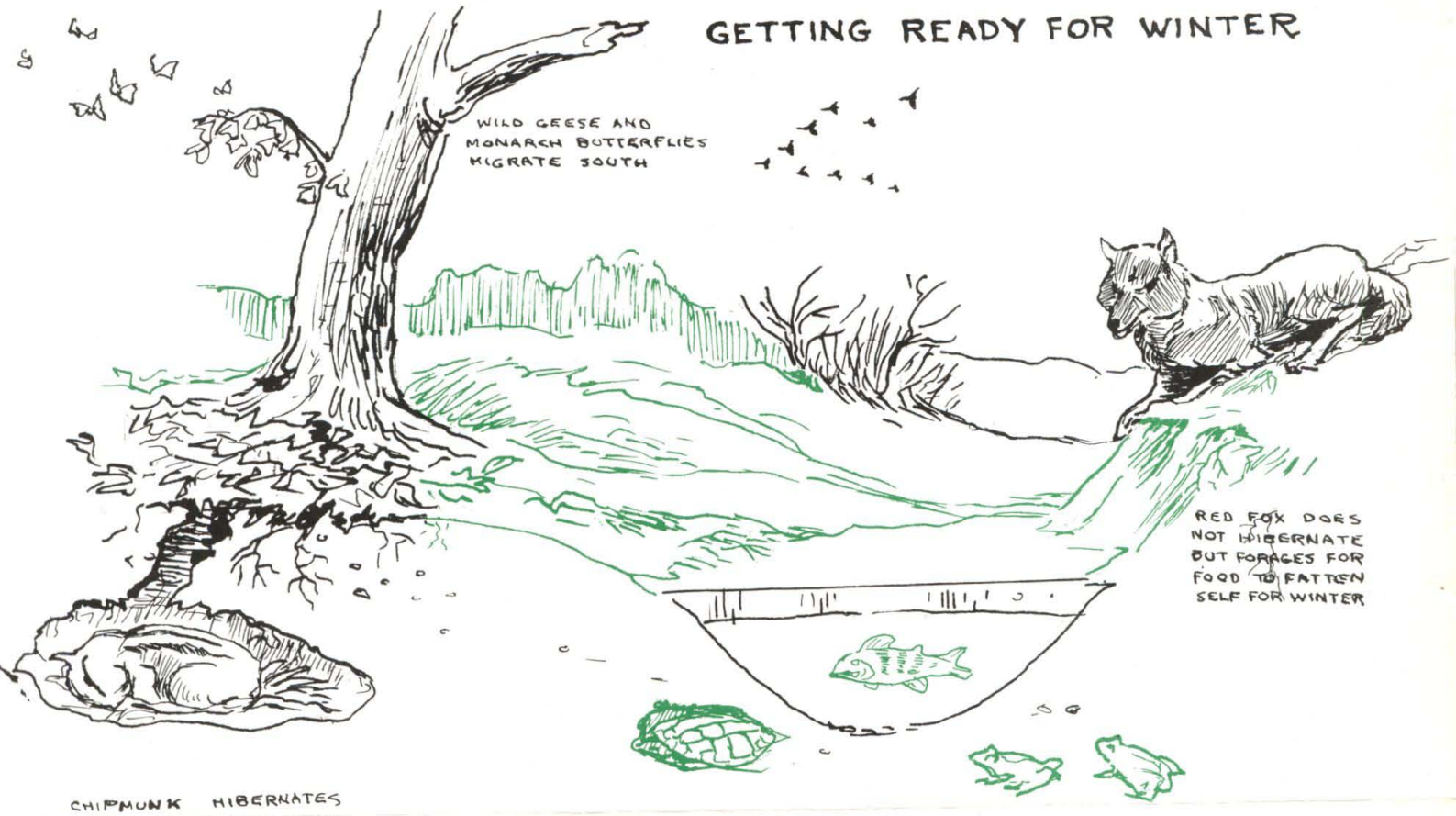
SMOKE RISES STRAIGHT UP - 0 m.p.h.	*SMALL TREES SWAY - 19-24 m.p.h.*
SMOKE MOVES, FACE FEELS WIND - 1-7 m.p.h.	*HARD TO WALK - 25-38 m.p.h.*
HANDKERCHIEF EXTENDED - 8-12 m.p.h.	*TREE LIMBS BROKEN - 39 m.p.h. and up.*
SMALL BRANCHES MOVE - 13-18 m.p.h.	*m.p.h. = miles per hour.*

AQUARIUM WEEDS:

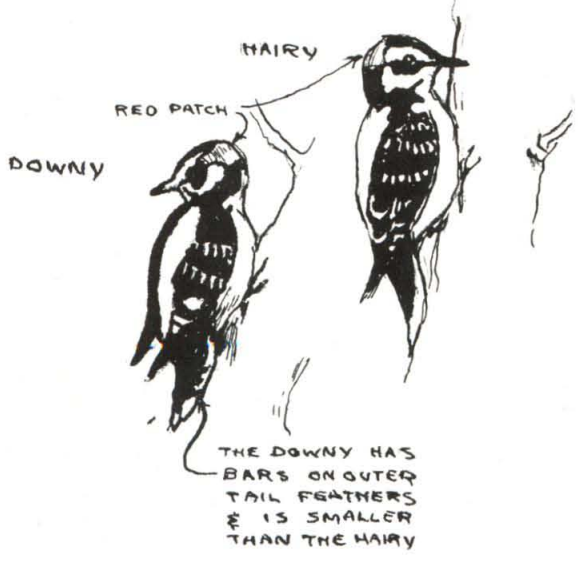


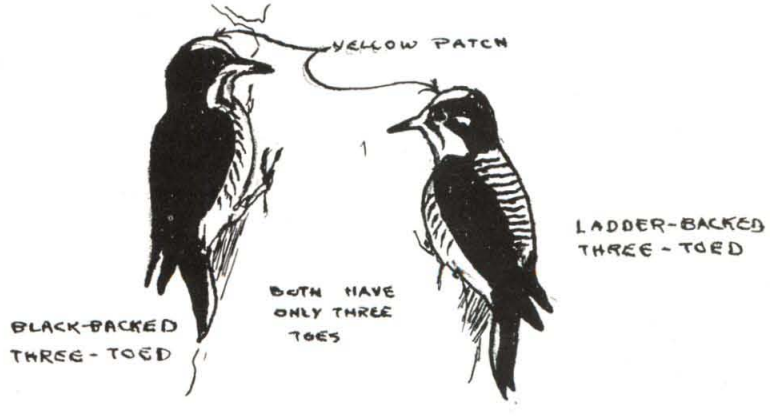
INSTEAD OF PLANTING, SUCH WEEDS AS ANACHARIS AND CABOMBA, TRY LETTING THEM FLOAT FREELY ON THE SURFACE. ANY ADVANTAGES? DISADVANTAGES? D. FARWELL.

GETTING READY FOR WINTER



TWO EASILY-CONFUSED PAIRS OF WOODPECKERS THAT STAY WITH US ALL WINTER





Where Do Insects Spend the Winter?

In early fall the Monarch Butterflies take off across the Great Lakes. We all know by now that they migrate far south. Some other butterflies go south, too, though not so far.

But what about the rest of the countless multitudes of insects that build up as summer goes on? What do they do about the severities of winter?

The answer is as varied as the insect species themselves.

Most of the insects we knew last summer are dead. They could not survive, and even if they did, there would be no food for them in the first warm days next spring. It was the abundance of plants throughout the summer that produced the vast numbers of insects, and the same thing will happen again next year.

Before they die, a great many species of insects lay eggs and over-winter in this form. Some lay special eggs with protective coats. Aphids, the familiar plant-lice, belong to this group. We do not see the eggs usually because they are so small, and they are often tucked in cracks. But we know they are there in large numbers from the way in which sharp-eyed birds such as nuthatches and creepers can go on living on them all season. It is a good thing for the plants that so many insect eggs are eaten.

The insect eggs freeze and later thaw, and in many cases this a built-in necessity for them before hatching. It prevents the young from coming out too early and starving to death.

Many insect larvae, also, can stand freezing. Some produce "anti-freeze" to protect their vital organs. Woodpeckers find many of these larvae in dead wood and under bark. A stand of elms killed by Dutch elm disease would be a good place to look for them.

The leaf litter of a woodland and its floor give hiding places for a number of other insects. The cicada is one of these. In some species the larvae live for several years in this situation before emerging as adults.

Other larvae, like those of the June bug, live more than one year under the ground. In winter they go down below frost-line, perhaps as much as four feet. The Corn-root Aphid goes by taxi: certain ants carry the eggs below frost-line!

Douglas Sadler

Springtails or "snow fleas" are sometimes seen on the snow in early spring. These insects rarely exceed an eighth of an inch in length. Close-up on left.

We must not forget ponds and streams. Lots of insects live here as larvae over winter, tucked in the mud at the bottom. Mosquito larvae ("wrigglers") don't mind being frozen.

Moth caterpillars often weave themselves silk blankets or cocoons, and you may find these on twigs or under windowsills. But other pupae, brown and bare, hide in the ground without harm.

Often on warm days in winter we may see a woolly-bear caterpillar walking. Similarly in early spring we are amazed to find a "raggedy-ann" of a Mourning-cloak Butterfly. It is left from last year and has over-wintered in adult form. Some other butterflies do this, too.

If you want to find adult insects, look in the felted mullein rosettes. You can nearly always find thrips wintering cosily there. Hollow stumps and such places hide queen bees and wasps. The rest of their colonies died when frost came, and the queens will start all over again next year.

Some insects appreciate the buildings we put up. In barns for instance, we may find hundreds of cluster flies tucked away. They emerge on warm days. One winter a farmer near London, Ontario, had a very unusual visitor from the West, a Say's Phoebe. This flycatcher has to take its food on the wing. The farmer kept it alive all winter by collecting cluster flies from his barn every day and thawing them out. The bird flew from an apple tree branch and caught the flies the farmer released from his bedroom window!

There are a few insects that come out while the snow is still around. We call them "snow-fleas" or "springtails" and it is an unforgettable sight to see them leaping madly all over a snowbank.

Perhaps this winter you will find other examples of insects overwintering.

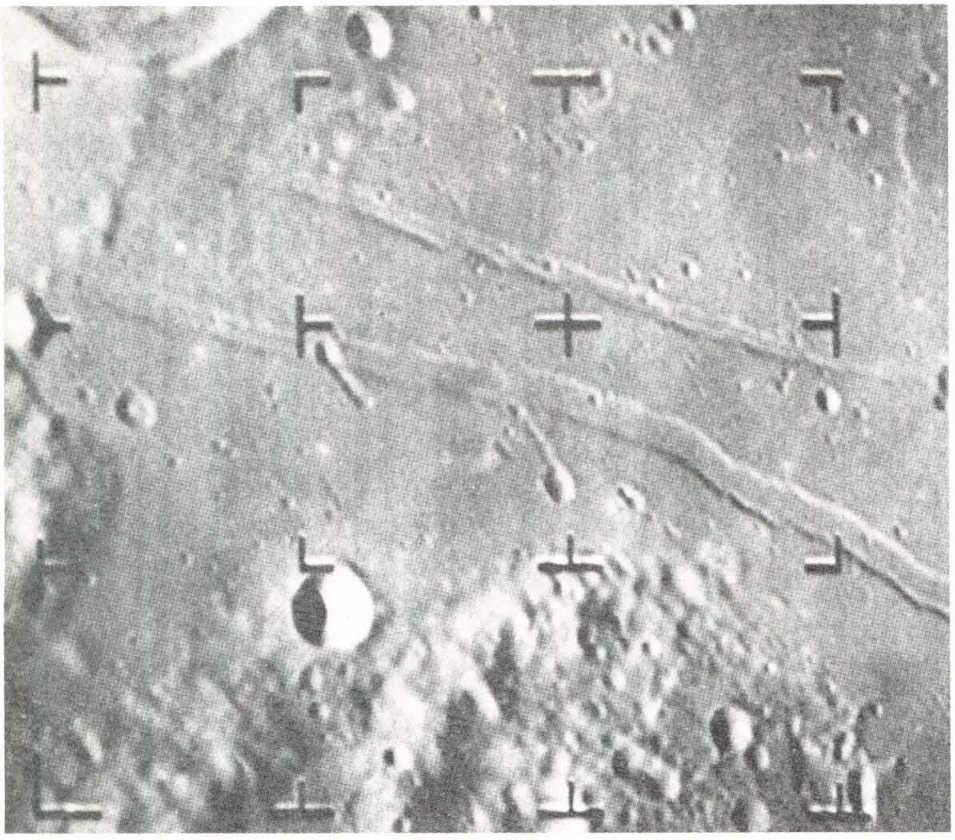
DOUGLAS SADLER

GULLS — From Page 1

seen. In late spring and early fall, Bonaparte's is easy to recognize since it has a black head. Outside the breeding season, however, this characteristic disappears. Then the best way to tell it is by the white leading edge of the wing. This is not difficult to see when the bird is viewed from above.

The two commonest gulls that breed in Ontario, and which can be seen in parts of the province at all seasons of the year, are the Herring Gull and the Ring-billed Gull. These two are rather similar and it takes a careful look to separate them. Both have grey mantles and black wing-tips. The Ring-billed Gull, however, is noticeably smaller than the Herring. It has yellowish legs whereas the Herring Gull has pink legs and, most characteristic of all, it has a black ring around its bill. But be careful: some young Herring Gulls also have a ring around their bill.

Fred Cooke



N.A.S.A.

The Moon: This photograph of part of its surface was taken by Ranger 8. It shows unusual grooves (centre), as well as several large and small craters.

Journey to the Moon

Within a few years, man will undertake the most exciting voyage of exploration in history — a trip to the moon. What might man expect to find when he first sets foot on the moon?

I. The Lunar Sky

Our explorer emerges from his capsule to find himself on a rough, rock-strewn plain, surrounded on all sides by craters large and small. These craters have been blasted out by meteors. On the earth such meteors would burn up high in the atmosphere, but the moon has no atmosphere. Any atmosphere which ever existed escaped long ago from the weak gravitational pull of the moon.

As the astronaut looks upward, he sees a beautiful sight. Although the bright sun shines downward like a searchlight, the rest of the sky is pitch black. Bright stars and planets are clearly visible, most prominent being the great illuminated globe called Earth. Despite the majesty of the scene, the astronaut is aware of the dangers of the airless surroundings. Not only is he unprotected against meteors but he has no shield against the sun's harmful ultraviolet and X-rays, which would be absorbed by an atmosphere. With no protective blanket of air, there are vast extremes in the temperature: +200°F. at midday, —200°F. at midnight.

On the moon, however, there are 14 earth days between sunrise and sunset, because the moon takes 28 days to spin once on its axis. As the sun sinks abruptly below the horizon, there is no twilight, no spectacular sunset, for these only occur if there is an atmosphere. However, as the sun disappears from sight, the sky is suddenly dominated by the beautiful planet Earth. Sixteen times larger, and one hundred times brighter than the moon appears to us, the earth shows intricate patterns of land and sea, snow, forest and desert, cloud and sunshine. Furthermore, the earth's position in the lunar sky remains relatively fixed, for as the moon spins on its axis, it also moves in an orbit around the earth, always keeping the same face turned toward the earth.

Thus, under the constant flood of earthlight, the astronaut continues his exploration of the lunar 'geography".

JOHN R. PERCY

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Gordon MacKenzie

The Young Naturalist

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Two Raccoons Take the Long Way Home

Department of Lands and Forests

The raccoon runs like most tree climbers, with front feet placed together. However, this animal feels much safer up a tree, for he cannot run quickly.

The two young raccoons could not have been more than six weeks old when they became our pets. A farmer friend brought them in to us to raise after their mother had been killed by a dog.

We named them Happy and Grumpy, and in a week or ten days they were as tame and playful as kittens. They loved to romp in the garden and for a time made no attempt to run away; in fact, at the least strange noise they waddled back to their cage.

Like all wild animals, however, they had the instinctive desire to be free. When I went out one morning, in the third week of their captivity, they were gone. I searched the neighbourhood to no avail, and gave them up for lost.

Next morning my farmer friend telephoned and told me that he had two more little raccoons in the old stump in his corn patch. He asked if I would like to take care of them also. I put a couple of cookies in my pocket and hurried out to the farm, hoping but not daring to believe that it could be Happy and Grumpy. Sure enough it was!

They had travelled five miles, through a large subdivision heavily populated with dogs. They had crossed a busy highway, swum a river, and found their way through a mile of swamp and bush back to where they were born!

I watched them playing in the stubble of last year's corn for awhile, then

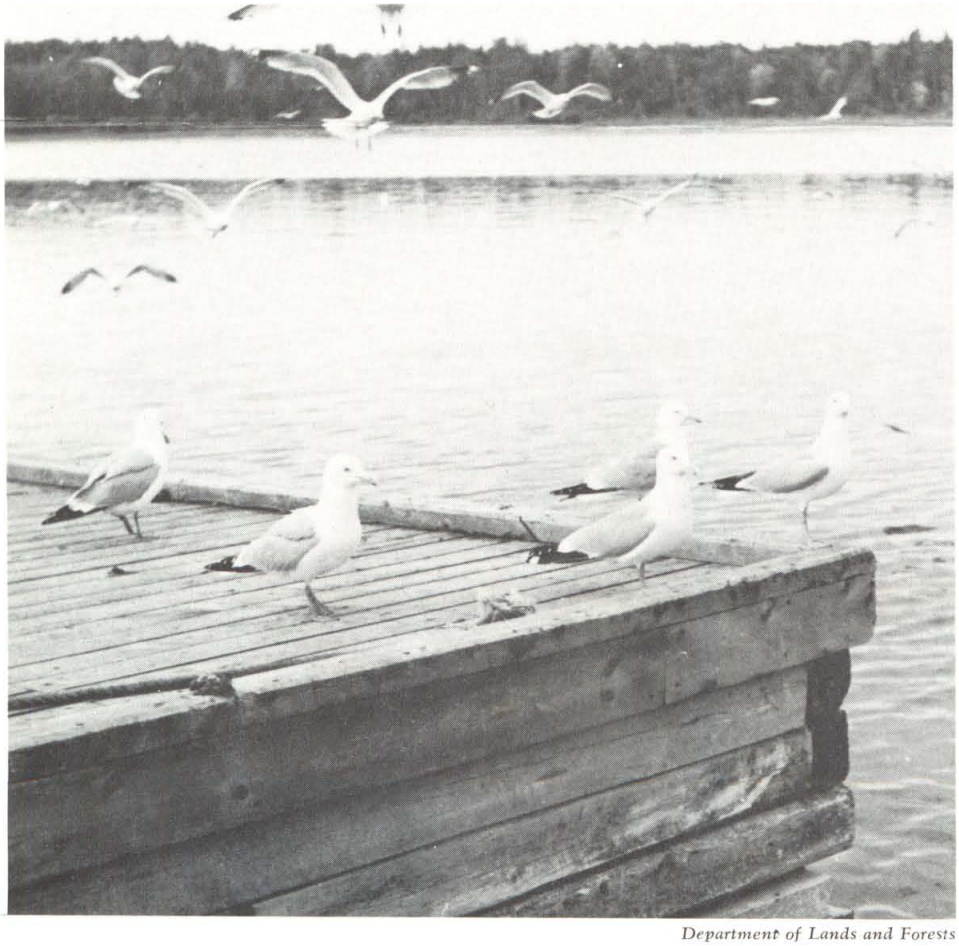
See RACCOONS — Page 2

The Gulls of the Great Lakes

Part II: The Glaucous and Iceland Gull

To me, the most exciting of all the gulls are the two uncommon winter visitors from the north. Like many northern birds, they are whiter than their southern relatives. In winter they come and scavenge where open water can still be found. They can often be seen at those favourite haunts of birds and bird-watchers, the garbage dumps and sewage outlets. The larger of the two species is the Glaucous Gull, a bird as large as the Great Black-backed Gull. It is the commoner of the two; at times, in December and March up to fifty have been seen together at the garbage dump in Kingston. The adult and the young birds can easily be separated from the commoner gulls in that they do not have black wing-tips, but white ones. There are no black markings at all on the Glaucous Gull. It is more usual to see the immature birds in Southern Ontario in the winter, but it is quite possible to see an adult bird with his pale grey mantle and pure white wing-tips.

The Iceland Gull is the other uncommon northern visitor. It also has no black on the wing-tips and is very similar to the Glaucous Gull. Care should be taken with the identification of this species, and you should take careful field notes if you suspect you have seen an Iceland Gull. If possible, check your observations with an experienced bird-watcher to see whether he agrees with your identification. It is usually smaller than the Glaucous Gull and is a more graceful bird. The Iceland Gull also has a much smaller bill than the Glaucous.



Department of Lands and Forests

The Herring Gull is the most widespread and common gull in Ontario. Wherever commercial fishing is carried on, this gull will be found in numbers.

For the really adventurous junior naturalists, there is a very interesting problem connected with the Iceland Gull, a problem which Ontario naturalists have not been able to solve. Perhaps you may help to discover the answer.

There are two distinct races of the Iceland Gull, one which has white wing-tips and the other, known as Kumlein's Gull, which has grey wing-tips. Both races visit the Great Lakes but no one knows which race is the more frequent. It seems that one race is more common in certain localities, and that the other race is more likely to be seen in other places. I have seen Kumlein's Gull at Kingston and Niagara Falls, and the other race with white wing-tips at Hamilton. Which race occurs in your locality? Perhaps you can find both races. This question can be tackled only when you really know how to identify all the gulls. So if you are one of those naturalists who thought that gulls were not very interesting, now is the time to learn how to recognize the different species. Before long you may be able to answer a question that has been puzzling Ontario bird-watchers for several years.

FRED COOKE

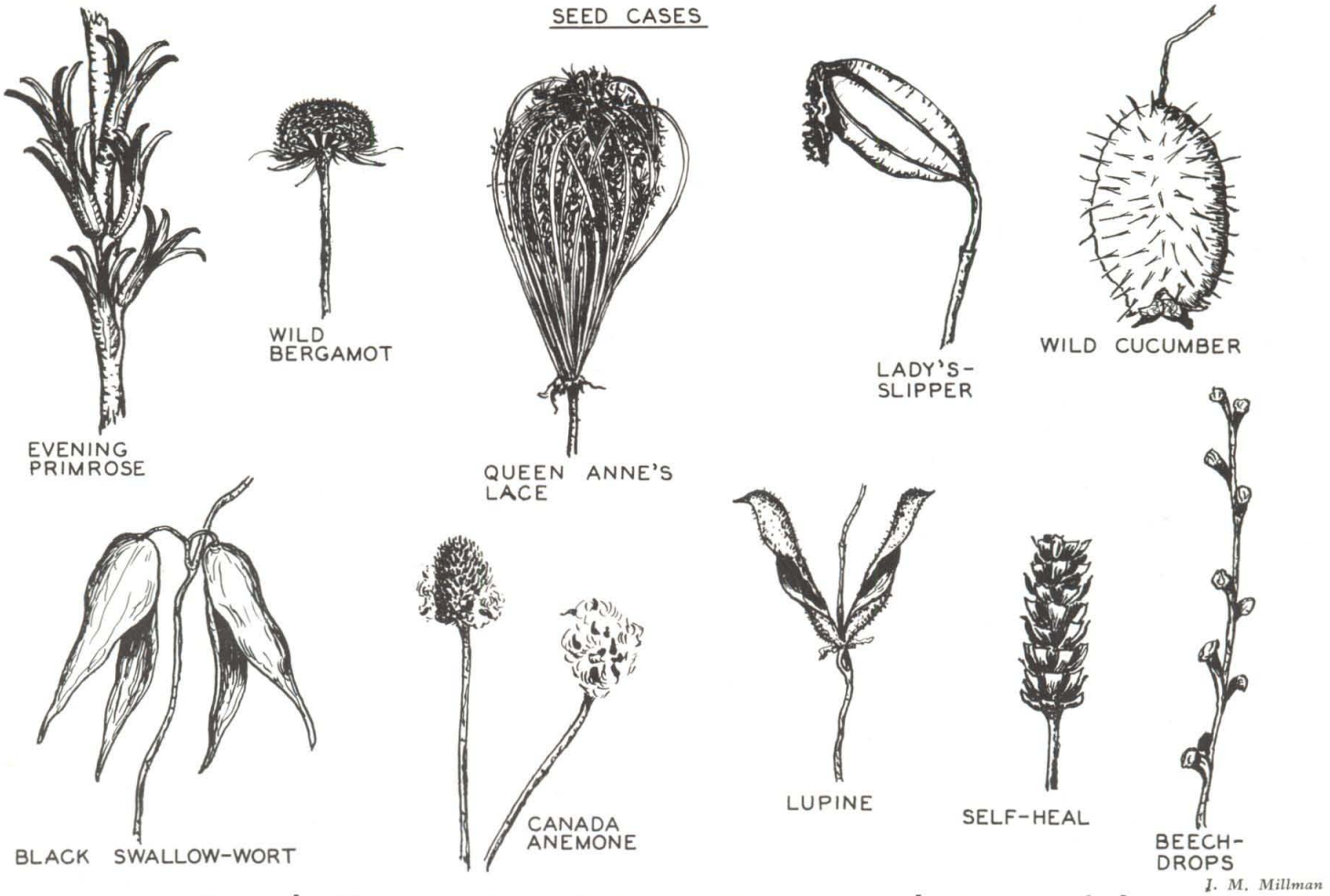
NOTE: See Page 4 of this issue for a feature page "Wintering Gulls of the Lower Great Lakes". These drawings, by Paul Geraghty, show the six gulls discussed by Dr. Fred Cooke in the December and January issues of *The Young Naturalist.*

Panic is the greatest enemy of persons lost in the woods. A clear head and a good compass have helped many "lost" sportsmen back to camp.

RACCOONS — From Page 1

left and went back to town without them. I knew that they were by now well able to take care of themselves, and would be much happier in their natural habitat.

ELLEN GRIMSTER



J. M. Millman

Seed Cases Are Interesting – and Beautiful

When the snow lies on the ground and we are on nature outings, we are inclined to think that our study must be limited to observation of winter birds and animal tracks. This is not so by any means. Winter rambles provide an opportunity to study trees and shrubs. We also have a wonderful chance to learn about the seed cases and fruits of many flowering plants. The investigation of seed containers and fruits can be an extremely interesting pastime, particularly since it involves a certain amount of "detective work". We may readily make a collection of these complex and wonderful structures and, if we are short of space for storing specimens, it is not too difficult to sketch or paint them instead. Seed cases are often very beautiful in design.

Before starting out to study winter seed cases, there are certain things that we should keep in mind. First, only some of our flowering plants leave enough evidence above the snow to tell us how their seeds were produced and stored. Some plants leave little trace of themselves above ground in winter. Their life is carried over the cold months in the form of roots or seeds stored below the surface. Second, there are not many books on botany that illustrate seed containers, and it is sometimes difficult to identify what has been found. Of course, one of the best ways to find out is to ask an experienced naturalist. If this is not possible, you may have to do some detective work as suggested above.

When you find a plant with seed cases that you cannot identify, keep several specimens and mark the place very carefully, noting the kind of plant that it seems to be and how it was growing. Then return to this exact spot the next spring or summer and examine what has come up. With some care and a little luck you can make the identification. Sometimes too, you may mark a plant in the summer and return in fall or winter to see the kind of seed cases that have been produced.

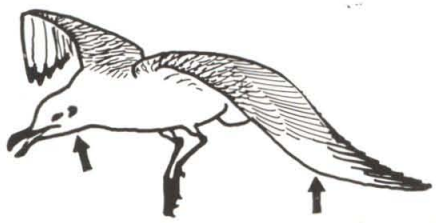
You will have noticed that we have been talking about "seed cases" and not about seeds. It is natural for most plants to release their seeds as soon as they are mature, in late summer or early fall. The seeds will then be in the ground ready to start growing when moisture and temperature conditions are satisfactory in spring. In the middle of winter, therefore, all we are likely to find are the empty seed containers or receptacles. However, this does not make our study any less interesting. By examining what you find, you can tell quite a lot about what kind of plant will grow in that area next season, even though everything is covered by a blanket of snow and ice.

I have illustrated a few of the seed cases you will be likely to find. Some of these plants are weeds but don't forget that many of our most beautiful orchids and other flowers leave seed cases that may be located in winter. Besides seed containers, there are many kinds of berries that stay on the shrubs most of the winter. Together with a number of "evergreen" plants, they too are an interesting subject for study on winter outings, and we may have a discussion about these in a later issue of *The Young Naturalist.*

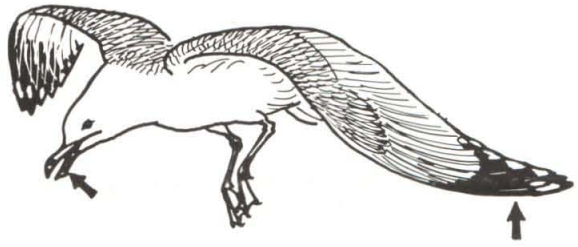
J. M. Millman

Wintering Gulls of the Lower Great Lakes

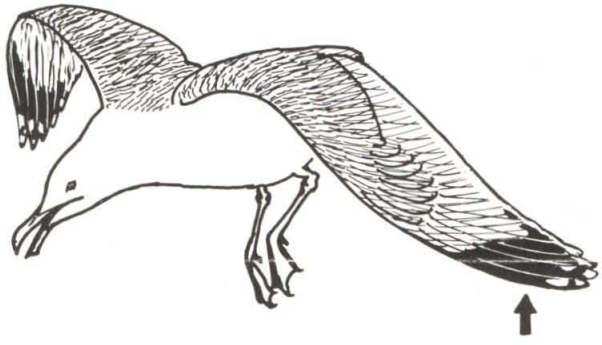
Bonaparte's Gull



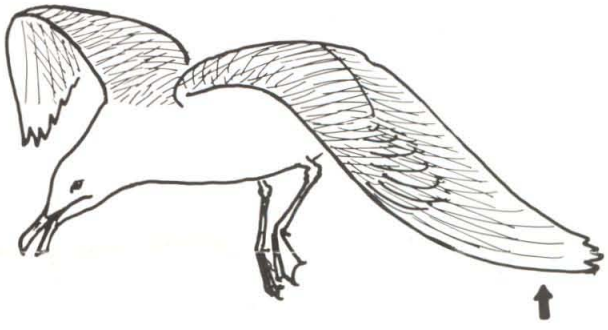
Ring-billed Gull



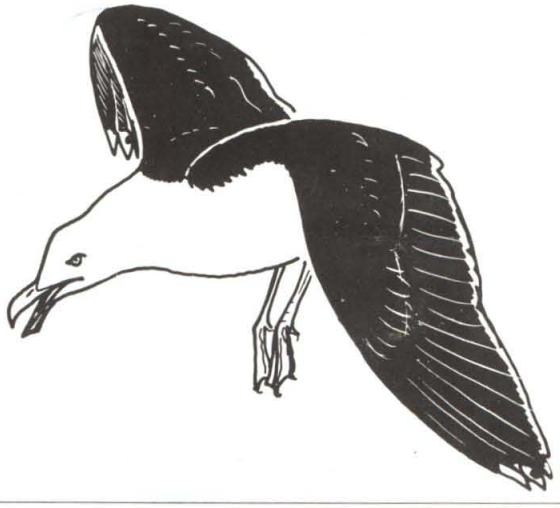
Herring Gull



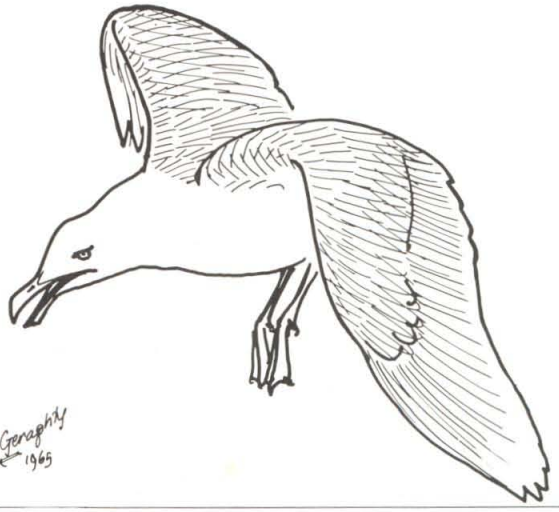
Iceland Gull



Great Black-backed Gull



Glaucous Gull



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