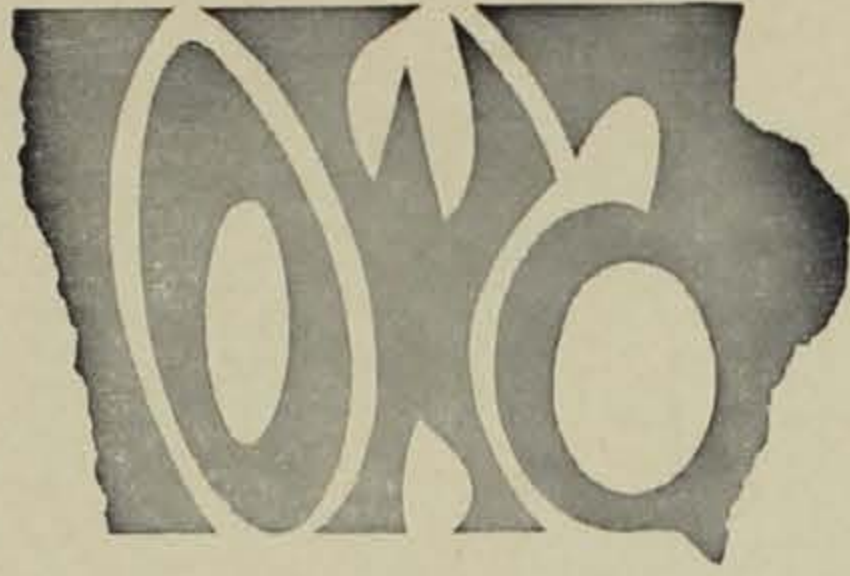
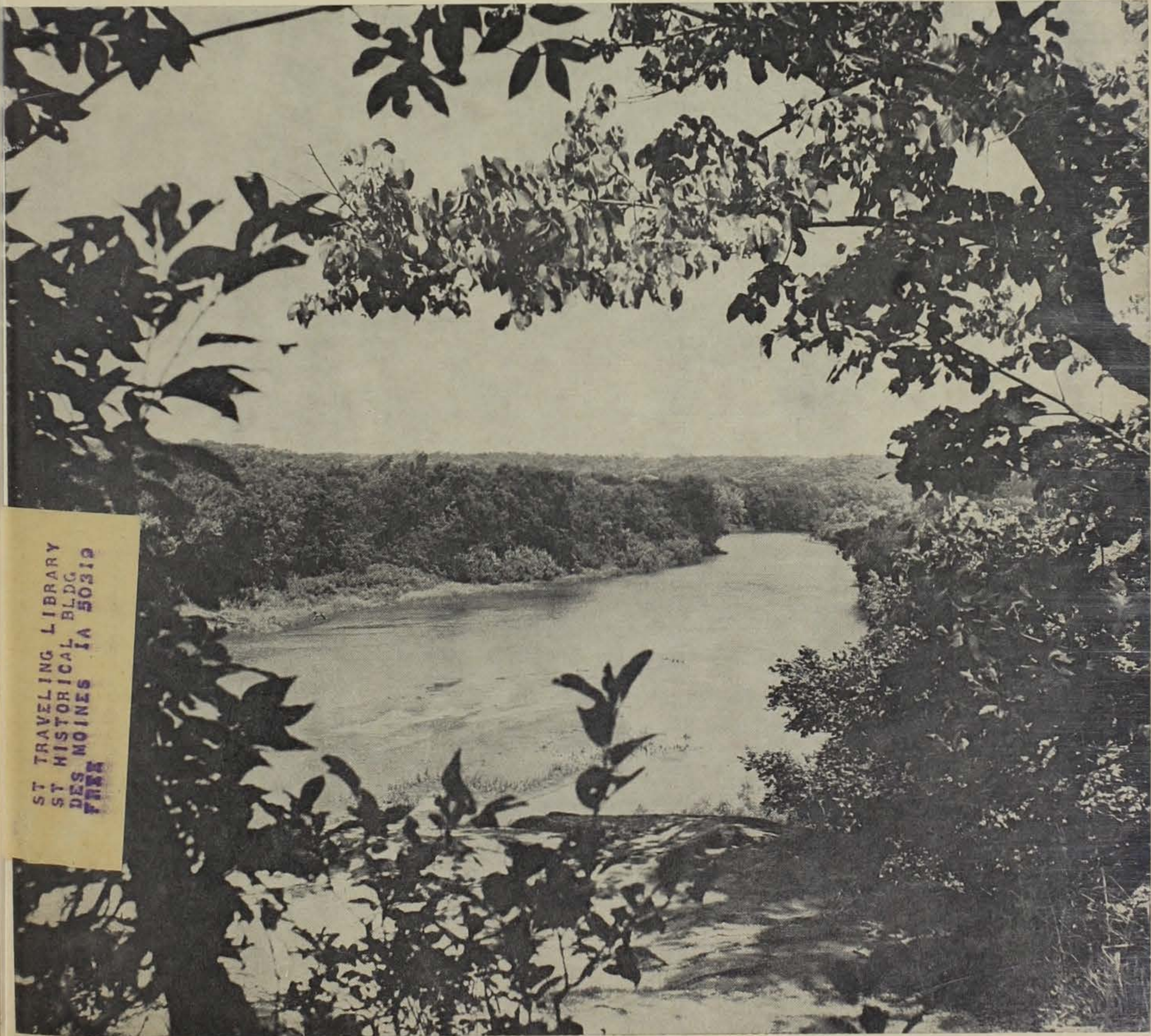


JUNE 1971



CONSERVATIONIST



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FRED A. PRIEWERT, Director

COMMISSION MINUTES

May 4, 1971
Des Moines, Iowa

Accepted a land acquisition option for one acre on the Walters Creek Watershed, Adams County; an amendment to land rights agreement, Walters Creek Watershed; an amendment to land rights agreement, Badger Creek Watershed, Madison County.

Authorized the preparation of an amendment to the present Management Agreement between Sioux City, the Corps of Engineers and the State Conservation Commission to include the development of a small boat marina by Cimmred, Inc., leasee of the City of Sioux City, with the stipulation that a provision be made for a state-owned water patrol boat facility.

Approved two negotiated settlements on condemnation awards at the Volga River Lake site, Fayette County, totaling 269 acres and 170 acres.

Authorized the director to issue, under Section 111.5, Code of 1971, an order for the removal of obstructions in the Mississippi River.

Approved the dedication of Brush Creek Canyon, Fayette County, and Caylor Prairie, Dickinson County, as state preserves.

Moved that authority be granted the Coordinator's Office of County Conservation Activities to prepare an addition to the existing management agreement on the 240-acre Spring Lake State Park. This agreement will require that any monies remitted under Greene County Conservation Board insurance policies on the trailer house used as a residence in this park would be turned over to the County Conservation Board for the express purpose of replacing the custodian's residence. Final agreement is subject to approval of the members of the Greene County Conservation Board, their Board of Supervisors, the State Conservation Commission and Executive Council.

Approved the following project for submission to the Bureau of Outdoor Recreation: City of Boone, Franklin Park, development.

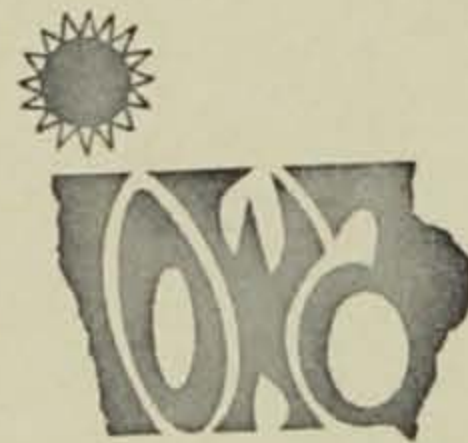
Awarded the contract for the construction of 12 raceways and two control structures at Big Springs Trout Hatchery, Clayton County.

Awarded a contract for Water Control Structures and Access Road at the River-ton Game area, Fremont County.

Approved staff recommendations for docking and mooring permits on Red Rock and Rathbun Lakes.

Approved an agreement between the Second Coast Guard District and the State of Iowa on the enforcement of boating laws. The purpose of the agreement is to set forth and define the specific areas of responsibility of the Coast Guard and the state relative to enforcement of boating laws.

June, 1971



CONSERVATIONIST

DAVID R. EVANS, Editor

WAYNE LONNING, Photographer

ROGER SPARKS, Managing Editor

JERRY LEONARD, Photographer

CONTENTS

Commission Minutes	2
Maynard Reece Painting on Waterfowl Stamp	3
Commission Honors Everett Speaker	4
Editorial	4
Outdoor Photography	5
Wildfires and Their Consequences	6
The Future of Hunting in Iowa	7
The Lowliest Creature	10
Campfire Cookery	11

About the Cover . . .

Overlooking the Des Moines River from Ledges State Park near Boone.

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CINNAMON TEAL

Maynard Reece



HO HUM Maynard Reece Wins It Again

Each year the most talented wildlife artists in the country submit artwork they hope will be chosen for use on the Federal Duck Stamp. The 1971 stamp purchased by several million sportsmen will carry the beautiful painting of cinnamon teal by Maynard Reece of Des Moines.

Winning the coveted honor has become old hat for Mr. Reece as this year's award is the fifth waterfowl stamp with his signature on it. No other artist has accomplished that.

Duck Stamps are required to hunt waterfowl and are available for three dollars from the post office. The stamps are also valued by collectors, bird watchers, and wildlife enthusiasts.

Paintings of fish and wildlife by Maynard Reece appear in a multitude of books, magazines and calendars. But few could gather wider or more well deserved acclaim than the traditional Duck Stamp.



Everett B. Speaker

CONSERVATION COMMISSION HONORS EVERETT SPEAKER

The Iowa Conservation Commission at its May meeting honored Everett B. Speaker, a former ICC director, who died April 16.

The Commission passed the following resolution:

"The Iowa Conservation Commission by this resolution makes known its sincere regret at the passing of Everett Bates Speaker who in 40 years with the Commission had made significant contributions to conservation in Iowa. His dedicated service, sincere interest, gentlemanly bearing and courteous manner will always be remembered."

Mr. Speaker, who was 64, died at Lutheran hospital in Des Moines. Funeral services were held April 19 in Des Moines.

During his 40 years in conservation, Mr. Speaker held a variety of offices and received many honors. He was elected an honorary life member of the American Fisheries Society at its 100th anniversary meeting in New York City in 1970. He was secretary-treasurer of the society from 1953 to 1957. Mr. Speaker was instrumental in the formation of the Upper Mississippi River Conservation Committee. He worked diligently to promote and hold together this organization of five states and federal agencies dedicated to interstate uniformity and cooperation for recreational resources. He was both chairman and secretary of this group.

Mr. Speaker served as chairman of the Association of Midwest Fish and Game Commissioners and secretary of the Mississippi Flyway Council.

Editorial

Conservation Begins at

Conservation has about as many definitions as there are people who are aware of the word. For the most part they agree it has something to do with wise use of our natural resources. This usually connotes extraction of various resources from the earth in a prudent manner.

Concern for the way the resources are removed is not new. Washington and Jefferson practiced crop rotation, strip cropping and terracing about two hundred years ago. The harbingers of the modern conservation movement were people such as Gifford Pinchot and Theodore Roosevelt. They brought public attention to the resource problems folding in around our nation. The use of conservation practices has increased many fold since then. Without these practices we would be in worse shape than we are now yet it seems as though conditions are getting no better.

We have always assumed that the agencies extracting natural resources were the cause of all conservation problems. The burden for application of conservation practices has been placed upon the exploiter. This is as it should be yet there is a limit to the application of technology to keep up with ever increasing demands on finite resources. We should ask ourselves if the producers are really the entire cause of the problems. They would not be producing fuel, minerals, forest products, food or what ever if there was not a demand for these things. Looking at it in this light the cause can be traced to the consumer. If we did not demand the various goods and commodities in such great quantities there would be little reason for over-exploitation.

It takes a degree of fortitude to look at a raw gully or a strip mine and admit you had a part in this disgrace. Who me? How could I be responsible for this scar on our landscape? I only work in an office, or sell merchandise or work in a factory, I had nothing to do with it. But you had an indirect part in it because you are a part of a society that makes enormous demands upon our resources. However, it is easier to rationalize this and transfer the guilt feeling to a corporation or governmental agency.

The more commodities you demand the more must be extracted from the earth. The examples are limited only by the number of things you demand. One example is your demand for beverages in throw away cartons, cans, and bottles. It is easier to throw away the used container than to take one back to the store for deposit refund. Multiply your demand by several million times and it amounts to a great deal of material being produced, used and disposed every day.

Milk cartons find their source in the forest. You demand more from the forest so you don't have to carry bottles back to the store. Your demand for throw away bottles causes need for more fuel to be produced to melt the sand and form the bottles. In the case of sheet iron cans the iron ore has to be dug from the ground as well as the coal and limestone to smelt the ore. The smelting process causes air and stream pollution.

Then if you don't throw the used containers along the roadside you pay someone to pick them up and haul them off, dig a big hole and bury them. Recycle them? It's a dream, because all the waste material has to be sorted to be effectively recycled. Most people are unwilling to separate burnable and unburnable materials let alone separate glass, iron, aluminum and paper. If you don't believe this check your incinerator.

Another example of over demand on resources is the case of the automobile. How often do you drive your car when you should be walking? This not only wears the car out sooner bringing about a demand for the many materials it takes to produce a new car, but it uses gasoline which pollutes the air. The gasoline comes from crude oil which is pumped from the earth. The demand for crude oil has

at Home

become so great it is forcing oil companies out to the continental shelf to drill as well as ship crude oil in larger and larger tankers from far away places. Inevitably oil spills occur. The more oil you use the more will be the accidents. Why do you need more crude oil? So you can drive three blocks to the grocery to pick up some throw away items. You wear out your car from over use and your body from under use. How many of the auto hulks decorating our landscape would still be in good condition if they had not been used to drive around the block several times a day? They stand as a monument to people who are afraid to be seen walking because it may be socially degrading.

How much clothing is prematurely discarded for fear someone might think you are not affluent? Multiply this several times and you increase the cotton acreage needed to the point it will include marginal land. With the best soil conservation practices there will be some soil loss and how many use the best soil conservation practices? When you throw that shirt away before it is worn out you are causing some more silt to enter a stream and louse it up for recreation.

How about leaving electric lights burning unnecessarily? Multiply this several million times per night. How much more fossil fuel must be extracted from the earth and turned into an air pollutant to produce electricity just because you can afford it?

How does your diet affect the environment? Do you eat more meat than is required in a balanced diet? The production of meat is an extremely inefficient way to produce food. Less cereal grain acreage is required to produce a given amount of food than feed grain acreage to produce a like amount of food in the form of meat. The less acreage devoted to feed grain the less will be the siltation of streams. Along with more meat production is a need for more pasture land. Today more forest and brush land is being cleared to produce pasture with subsequent reduction in wildlife numbers. How about trading a little piece of deer habitat for a beef steak tonight?

Every product you use originates from the earth. How much that is produced is wasted by you? Lately, have you noticed a need for a larger garbage can? You have made yourself a waster partly because for decades advertizing has subtly hinted that you aren't with it unless you use more and more. As long as you demand more than you need it will be produced regardless of what it does to the earth. You can't depend upon technology to cover up for your over indulgence.

One rationalization of this demand is that it provides jobs for other people. If our demands were less our income would not have to be so great. This would apply to everyone including the ones you are "providing a job for". Instead of working harder to satiate your material desires and destroying your environment you could use the saved work time to satisfy spiritual needs. This could be in the form of contemplation, donating your time for social causes, beautification of your home, and lawn and enjoyment of the arts. You could have more time to enjoy the beauty of the countryside and parks through leisurely strolls instead of zipping by in a fog of carbon monoxide. There would be less tension and less mental and physical ills. As long as you make a fetish of waste, trying to keep up with the neighbors and trying to keep from looking cheap your resources will dwindle at an ever increasing rate. Henry David Thoreau put it nicely, "We make ourselves rich by making our wants few."

Next time you are out polluting the air and you go by a dump heap, strip mine, a denuded forest or an eroded field, pause to consider the basic cause. Does not conservation begin at home?

Bruce Plum, District Forester
Box 568
Fairfield, Iowa 52556

Outdoor Photography

By David Evans

Iowans are fortunate to live in a state with beautiful scenery and a variety of wildlife—all great subjects for photographers. It's not surprising that cameras are now considered a part of the traveling equipment of just about every family.

Nearly every outdoor enthusiast is interested in recording on film his activities . . . the successful hunting and fishing trips, family camping, wildflowers and birds.

Never before have so many cameras, films and gadgets been available to confuse and befuddle the casual photo bug. However, with basic equipment and some simple study anyone can produce pictures that will provide valuable records of your outdoor activities.

Color slides are the outdoorsman's real love—and with good reason. Modern transparency films are capable of revealing nature in all her glory. Some films also enhance and intensify natural colors. It's a good idea to experiment with the several films available and then standardize on a favorite. With constant use, you'll soon learn all its characteristics and limitations. Some amateurs are using one of the various color negative films. From a roll of color negatives, you'll get a set of album-sized color prints. One can also have a slide made for about a quarter, a 5 x 7 color print for \$1.50 and black and white prints if you desire. However, if your primary goal is color slides, pick one of the excellent color slide films.

Opportunities for wildlife photos in good game country come up at the most unexpected times. Keep your camera loaded and ready for the occasional grab shot that presents itself. Luck is a factor in such cases, but the photographer who is ready increases his chances of success. If you have a telephoto lens, keep it handy.

When shooting a moving subject, select a faster shutter speed. Shooting at 1/25th of a second or faster will stop a lot of action and substantially reduce the effect of any camera movement.

While shooting at very slow shutter speeds as 1/30th or slower, try bracing your camera on a solid rest or using a tripod.

Your outdoor photograph can be as simple as your budget will allow. But in photography, results count. Pay attention to details and even the simplest equipment can provide you with excellent photo records of your most enjoyable outdoor activities.

Wild Fires and Their Consequences

By Roger Sparks



Once covered by trees and undergrowth, this loose soil is vulnerable to erosion.

In 1970, 4,437 acres of forested and nonforested land cover was destroyed or damaged in the state, according to the annual wild fire report prepared by the Iowa State Forester for the U.S. Department of Agriculture.

In other years the totals went like this:

- 1967—Over 10,000 acres burned
- 1968—Over 8,500 acres burned
- 1969—Over 2,000 acres burned

(The total acres burned each year varies with the dryness of the season.)

In heavily forested states wildfires are a grave problem, sometimes affecting the total economic status of the state. In Iowa, the economic loss due to wildfire damage is comparatively low. Although

no realistic dollars and cents value can be placed on the damage, fires often cause severe financial loss to the landowner, and they are much more important to all of us than we may think.

A fire recently destroyed a thirteen acre tree planting in central Iowa. Although the damage didn't make the local news, a great deal was lost. Over 12,000 young trees and eight years of labor and care were lost in a few moments. The timber crop was valued in the thousands and the loss of erosion and watershed controls are immeasurable. Besides the trees, rich undergrowth also protected the soil and provided excellent wildlife cover. Because of the fire, heavy losses will be felt on both counts. How valuable is the productive soil the trees

and undergrowth once protected? How valuable was that 13 acres of ideal nesting cover worth? How long will it take to replace the nitrogen stolen from the soil by the fire? What is the esthetic value of trees in Iowa, a state with 7% forest cover? That fire was caused by the nearby burning of a brush pile on a windy day. The fire spread rapidly through the dry grass and into the tree planting. Like this incident most fires in Iowa need not become "wild."

The following is a list of causes of wildfires in Iowa reported to the Conservation Commission during 1970:

NUMBER AND AREA OF FIRES BY CAUSE

Cause	Number of Fires	Area burned (acres)
a. Lightning	0	0
b. Campfire	4	59
c. Smoking	10	146
d. Debris burning	81	1965
e. Incendiary	5	92
f. Equipment use	6	75
g. Railroads	80	1542
h. Children	4	77
i. Miscellaneous	17	481
Total	207	4437

Nearly 2,000 of the total 4,437 burned acres were destroyed by debris burning. "Debris" here may mean fencerows, ditches, dead trees, and limbs, brush piles, crop fields, and weed patches. These areas provide the landowner with some precious benefits such as erosion control and wildlife cover and seldom should be destroyed in the first place. And too often during dry seasons these fires get out of hand and leave acres of land void of cover and protection. How much is the richest soil in the world worth?



District Forester Roy Hatcher checks young pines destroyed by fire.



Ringnecks find cover in corn, but usually fields are harvested and fall plowed before snowstorms.

The Future of Hunting in Iowa

By Gene Klonglan
Asst. Wildlife Biology Supt.

Any realistic discussion by wildlife professionals on the role agriculture will likely play in the future of hunting in Iowa inevitably gravitates toward a pessimistic tone. Important wildlife habitat is being destroyed to make more room for intensified agriculture operations. Marshland homes of waterfowl and furbearers are drained, river bottom timberland is cleared, and deer and squirrels can no longer exist there. Brushy areas along fencerows and waterways or in pastures are cleared, and quail and rabbits are left with no place to live. Abandoned farmsteads are bulldozed out and the pheasant loses his blizzard protection. Many more examples could be counted.

With this continued loss of habitat, further pressure is being put on game populations by the rapid changes in farming methods. The first crop of hay is now cut much earlier than several years ago. Research has shown that the nutritive value of early cut hay is much higher. But what is good for the cow is bad for the pheasant hen nesting in the hayfield. A hatched pheasant nest in these fields is now a rarity.

Half of Iowa's corn crop is now harvested as shelled corn, with an ultimate effect on the pheasant. Once started, the harvest is completed quickly. The farmer then moves in with his multi-



Thick cover near food—an essential combination for quail.

bottomed plow and the fields are turned black in hours—leaving no food or cover to support the ringneck through the rugged Iowa winter.

Many more examples of how modern, intensive, high-speed farming technology has had a detrimental effect on wildlife could be cited. It would not be realistic to think this trend can be reversed, stopped, or even slowed. The farmer has to make a living. If the choice comes down to feeding the pheasants or feeding his family, the decision he must make is obvious.

However, the individual farmer can do a great deal for wildlife on his acres with no, or very little, economic loss to his operation. Wildlife managers are ready and eager to show him the many ways this can be done. But first the farmer must have a deep enough concern for the wild creatures on his land to put forth the extra effort it takes to help them. Most farmers are interested in wildlife, but with their busy schedules they simply do not expand this interest into action.

Even though wildlife managers try to work with as many concerned farmers as possible and stir up interest, they can barely scratch the surface. The real key is basically out of the wildlife manager's control.

Sweeping changes in agriculture are needed that will include things favor-

able to wildlife. The major changes in the last two decades have worked primarily in the other direction to the detriment of wildlife. The prospect does not look good for a sudden switch. But this is the day of rapid change and there are some areas of hope.

Certain aspects of past federal programs have been helpful to wildlife. The conservation reserve of the soil bank days is a good example. Any land retirement program stands a chance of being beneficial to game. Unfortunately, the maximum benefits in the past have not been reached because the voice of the wildlife expert crying for that slight adjustment or addition in the regulation (that would make little or no difference to the farmer but a word of difference to wildlife) has gone unheeded by those administering the programs. There are several ACP practices that can be of aid to wildlife. However, funds for these are often limited and participation depends on farmer concern.

There are other areas of assistance. The major bottleneck preventing high pheasant populations in northern Iowa has developed into a combined shortage of nesting and winter cover. This is the direct result of the disappearance of oats from most farms, with a corresponding increase in soybean acreage. The row crop system of corn and soybeans, followed year after year by more corn and beans,

is not conducive to good pheasant populations.

The ideal crop would be one that could duplicate the place of oats as a nesting site for pheasants and other wildlife, while also providing food for humans and livestock. An exciting prospect is "triticale"—a grain produced by crossing wheat and rye. Researchers feel that within three years, they will have strains that can produce more feed than wheat or corn or any of the small grains in the northern states.

Many other crops are also being tested. However, the major stumbling block confronting any new crop is the lack of established commercial market.

Another way-out prospect, one that would make any weed-conscious landowner shudder, is the sunflower (pheasants and sunflowers have fit hand-in-glove in South Dakota and Kansas). Sunflower oil is a big item on the world market and an important competitor of soybean oil, especially in Europe. In fact, Europeans apparently consider sunflower oil superior to soybean oil. There are a host of problems to be surmounted before sunflowers make any inroads on Iowa soybean acreage. Any new crop will face such hurdles—such as weed disease, and insect control, local market development, machinery, and the farmers' natural resistance to replacing a relatively sure thing with an unknown

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Bulldozer versus bunny habitat . . . rabbits lose.

ut, who had heard of soybeans a few decades ago?

There are changes in soybean culture that might make it more beneficial to game. When planted in rows and then run over with a rotary hoe, followed by cultivators, a bean field offers little nesting cover. But now farmers are planting the rows even closer, which is to the birds' liking. In some instances there is complete chemical control of weeds, thus leaving the ground undisturbed long enough for a hen to lay a clutch and incubate it to a successful hatch. The big question here of course, what effect might the heavy and continued use of such chemicals have on the wildlife population and the environment in general.

How about oats . . . that important key that sustained northern Iowa pheasants for so long. Studies in the early 1950's showed that half to two-thirds of all pheasant chicks were hatched in oat fields (and here we are talking about oats harvested for grain, not cover seedings on federal program acres). One cannot lose millions of acres of such an important crop to wildlife without a resounding effect. The people in northern Iowa are feeling that effect today. Yet every year we see articles in magazines telling farmers how they can fit oats into their operation at a profit. At the moment most farmers don't seem

interested in trying it. But, researchers are working on the development of high protein oats and think such strains may be ready by 1980. When this happens, they believe oats may rebound to somewhere near its former importance.

A lot is heard about pasture renovation and improvement, particularly in southern Iowa. Some think this will be the death knell of good quail populations. Perhaps, but it is possible to do this in a manner that does not wipe out the game species and in some cases it may even result in improved conditions. For example, pheasants may take a liking to pastures of trefoil, brome-grass, alfalfa and orchardgrass, crownvetch, or native grasses, particularly if it replaces an overgrazed, eroded, worn out bluegrass pasture. And if some of the brushy habitat can be retained, quail and rabbits will like it better too.

New methods of tillage should be considered. Fall plowing is detrimental to wildlife winter cover and food supplies. Farmers will not stop fall plowing just to feed the pheasants, but the wind erosion problem that is becoming worse each year may force many of them into adjustments or alternatives that will be of help to game. The chisel plow is one tool that works toward this end. It leaves a considerable amount of the crop residues, including food, on the surface, where the traditional mold-board plow

buries it out of reach. If its use is delayed till spring, both protective cover and food will remain in corn stubble fields.

But traditionally, the neat, black appearance of a fall plowed field is considered "good farming". As a farming operation gets bigger in size, the press of time becomes more urgent. Thus the farmer feels it is necessary to fall plow as much as possible to be sure of getting the crops in on time the next spring. The risk of financial loss resulting from a wet spring with plowing yet to do outweighs, in their mind, the risk of losing some topsoil off the fall plowing (though in the long run the financial loss of the latter may be the greater of the two). Unless the concern over air pollution caused by blowing soil becomes so great as to result in legislation to prevent fall plowing, it appears we must live with it. What then are the chances for modifications that will help stop erosion and aid wildlife?

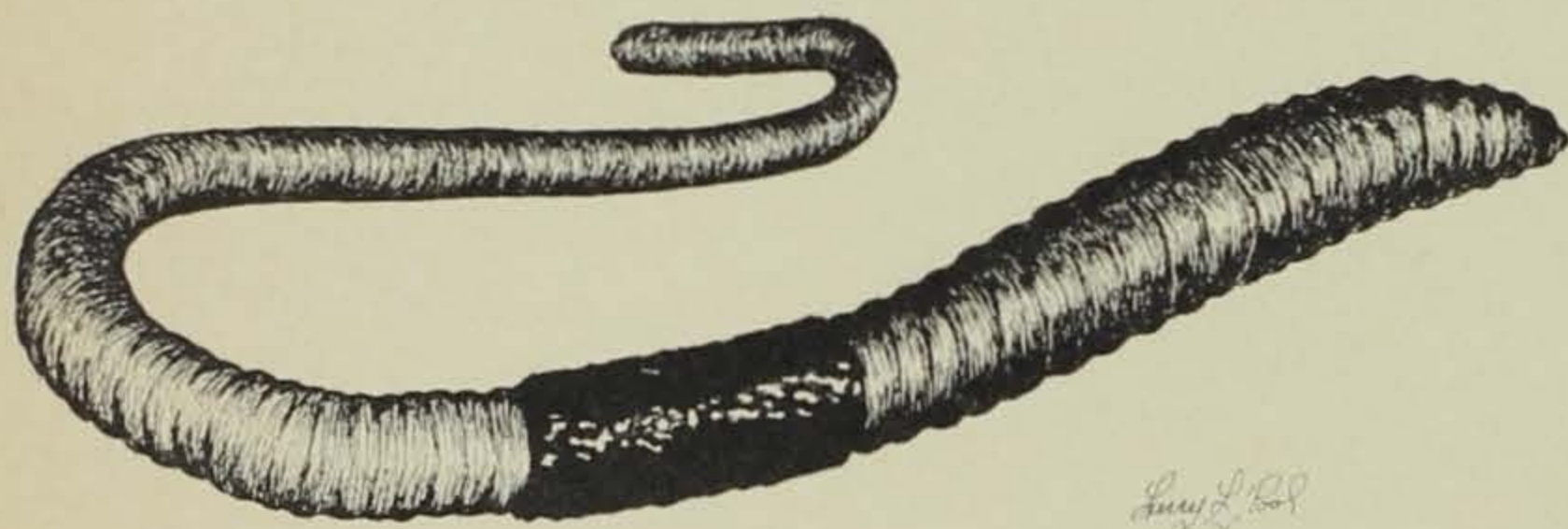
First, we will have to convince the farmer that clean, smooth plowing is not the mark of a good farmer. This may not be an easy task, for it has long been a matter of pride among farmers to produce a plowed field cleaner and smoother than their neighbors'. He must be convinced to "plow dirty", or better yet to not plow at all in the case of soybean land. If he must fall plow, he should leave the surface rough as possible, which goes hand-in-hand with plowing dirty. You would be surprised how much food remains available to wildlife when this is done.

An even better idea is to leave strips of unplowed land through the fields that are fall plowed. There is a new ACP practice geared for this in north central Iowa. If the corn stalks are left untouched till spring in such strips, they will have tremendous value to wildlife. This one practice could have significant effect on wintering northern Iowa pheasant populations. The problem lies in changing farmer traditions and attitudes to accept such wind erosion control practices.

The future of wildlife in Iowa is not completely dark. We will have to accept some radical changes, but these will not necessarily be for the worst. Scientists working in other fields may come up with results that will have a direct bearing on the role of agriculture in the future of Iowa wildlife and hunting. The techniques of cell manipulation developed in cancer research and other lines of pure biological research have just recently been recognized as opening up the possibility of crossing corn with wheat, or wheat with oats, or corn with grain sorghum, perhaps eventually leading to new types of grain fields on the Iowa scene that would be just what the pheasant ordered.

Some think scientific technology may be the death of us all—men and wildlife together. I prefer to think such will not be the case.

Star Performer In Soil Conservation



The Lowest Creature

Reprinted from "VIRGINIA WILDLIFE"

By Anthony Sinopoli

If there were a Hall of Fame in which to honor the most important animals of the world, the most distinguished niche would probably be occupied by a lowly, crawling, blind creature: the earthworm.

For centuries, man has, for sport or by necessity, impaled earthworms on fish hooks; game and song birds relish them; toads, snakes, centipedes stalk them; the maggots of the cluster fly parasitize them.

Even man has at times considered

them a worthy part of his diet. Medieval French gourmets considered certain earthworms a delicacy. Among the Maori people of New Zealand, choice earthworms were reserved for chiefs; commoners could eat them only as their last meal.

The earthworm is a remarkable animal in many respects. It has no eyes, but it can detect light; it lacks ears, yet it can sense vibrations; it is without lungs, but it can "breathe" by absorbing oxygen directly from the moisture on its skin. In addition, the earthworm is a

male and female at the same time, although it cannot be both father and mother to its offspring and must mate.

These attributes alone would qualify earthworms for a prominent place in the animal kingdom. Their star role, however, is played in soil building and soil conservation.

Almost every terrestrial plant and animal depends directly or indirectly upon a thin and impermanent layer of topsoil. In nature, this thin layer is renewed and reused in an endless cycle. It is in the renewal of this valuable and unstable resource that earthworms make their most vital contribution.

How do they accomplish this?

Earthworms are nature's living topsoil factories. Every 24 hours they eat more than their own weight in dead organic matter and mineral soil, and deposit the undigested material in the form of those familiar mounds or "castings." These castings are virtually the richest topsoil, containing a high proportion of readily available elements on which plants thrive.

The amount of topsoil thus deposited each year reaches enormous proportions. It has been estimated that, on the average, 25 tons of castings per acre are deposited each year. In particularly fertile soils, this amount may reach 40 tons per acre.

This may seem to be an unbelievable feat. We must bear in mind, however, the number of earthworms that live under every acre of land. An acre of forest or meadow may contain over two million worms and, under very favorable conditions, concentrations of up to seven million per acre are not uncommon. In some loamy soils a population of almost three million worms per acre brings to the surface approximately 30 tons of castings a year, and in good pasturelands the combined weight of earthworms may exceed that of the cattle that feed on the pasture.

Another factor accounting for such quantities of castings is the huge appetite of earthworms. The ancient philosopher Aristotle called them the "intestines of the earth," and aptly so. The earthworm is actually a crawling digestive tube stripped of all unnecessary organs. Every night, holding fast to its burrow, the earthworm stretches out in every direction in its search for food. Fallen leaves, decaying roots and twigs, dead insects, etc., are pulled down into its burrow. If a morsel is too tough, such as a dry leaf, the worm covers it with its own tenderizer, a saliva-like substance which slowly breaks down the leaf.

In addition to the organic matter, the worm swallows small pebbles and sand grains. This assorted fare is subject to the action of the worm's gizzard, a strongly muscular structure that could be best described as a cross between a stomach and a garbage grinder. The grains of sand and pebbles act as grinding stones and the food is turned into a semiliquid mass from which the worm

assimilates the necessary nutrients. The indigested material is deposited as castings at or near the surface of the soil.

These castings are not just a mixture of animal waste, but clean-smelling, rich topsoil. Analysis of these castings reveals that they contain five times as much nitrogen, seven times as much phosphorus, eleven times as much potash and three times as much magnesium as the surrounding soil. Further, they are relatively neutral regardless of the material whence they came. This neutrality is due to three pairs of unique glands which pour calcium-laden juices on the food as it passes through the worm. These glands, appropriately called calciferous glands, are not found in any other animal.

Besides being neutral and rich in minerals, the castings have the ability to absorb and hold great amounts of water. This is particularly evident in woodlands where earthworms are greatly responsible for the building of "mull," that porous, spongy soil typical of a healthy forest. This type of soil can quickly soak up the heaviest downpours, thus reducing runoffs and preventing erosion. In an experiment designed to determine how fast mull absorbs water as compared to compact soil in which no earthworms lived, amounts of water equivalent to four inches of rainfall were poured respectively on samples of the two soils. It took the compact soil over two hours to absorb the water. The mull, on the other hand, soaked it up in 15 seconds.

A bonus benefit derived from earthworms is their burrowing. Generally they burrow near the surface, but can dig down to 14 feet, especially during cold weather or dry spells. If the soil is sufficiently loose, the worm takes advantage of the natural cracks and spaces between soil particles and builds its

burrow by expanding its body and compressing the soil around itself. If the soil is dense, the worm simply eats its way through it and deposits it at the surface. Thus parts of the subsoil are exposed to the action of the rain and release elements which would otherwise remain locked underground. The soil is honeycombed with a maze of tunnels which provide better movement of air and water. Since most of these tunnels are built in the upper part of the ground, they provide excellent cultivation for the feeder rootlets of plants, that normally grow near the surface. Further, earthworms do not injure live roots as mechanical cultivation would.

To fully appreciate the importance of earthworms, it should be remembered that they are found in every region of the world except where the soil stays frozen to great depths for long periods of time. There are about 2,500 species of them. In size they range from minuscule individuals to giant specimens several feet in length. The largest are the earthworms of Australia, *Megascolides australis*, some of which reach a length of over four feet and can stretch themselves to twelve feet.

Regardless of their size or habitat, they have one thing in common. They constantly plow the soil in a way unequaled by man and contribute immensely to its rebuilding and conservation. No more fitting tribute could be rendered to them than that made by Charles Darwin who said: "The plow is one of the most ancient of man's implements; but long before he existed the land was in fact regularly plowed, and still continues to be plowed by earthworms. It is to be doubted whether there are many animals which have played so important a part in the history of the world as have these lowly organized creatures".



By Dick Ranney

Apple blossoms, robins, fishing trips and family outings in a state park are sure signs of spring. The whole world seems to be alive and kicking. Long hikes, warm sunny days of fishing, bird watching, and bike riding all help to build big appetites. There are so many and varied things to do at this time of year a person doesn't know whether to mow the grass or go fishing.

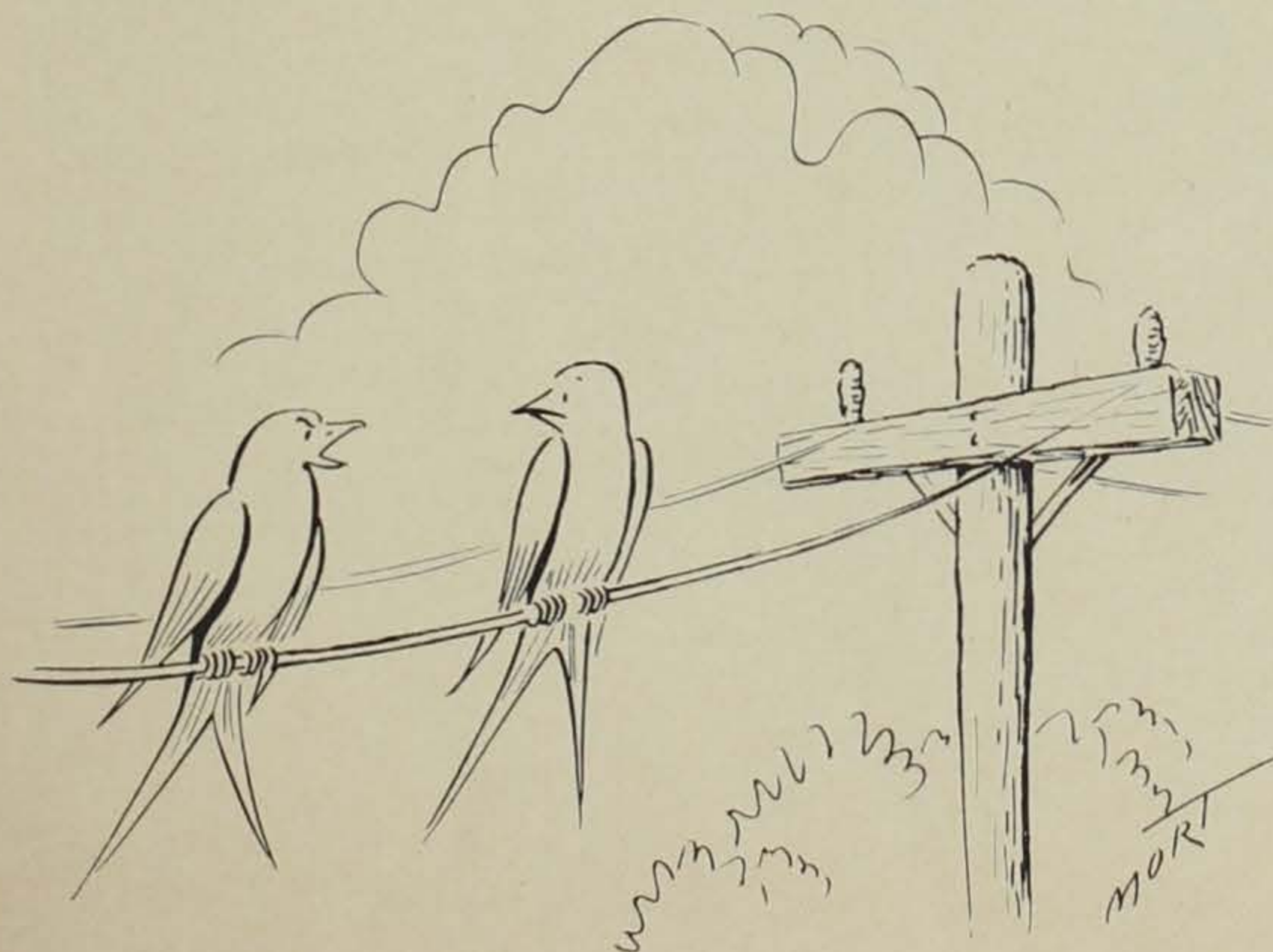
All the static energy of the long winter is released. The song birds carry pieces of sticks and grass, and flutter back and forth in hasty preparation. Strawberries are sugared, campers and boats are made ready; golf clubs, fishing rods, storm windows, yards, outboard motors, sunburns, sore backs, wiener roasts, proms, houses, plantings, paintings and loafing all get their share of attention.

As you sit there letting the warm sun take what is left of the winter cold out of your joints, don't worry about what you are going to fix for Dad and the kids when they come back from fishing, mushroom hunting or looking for spring flowers. You could feed them a cut up cardboard box covered with pizza sauce and they would ask for more. Think simple . . . think eggs.

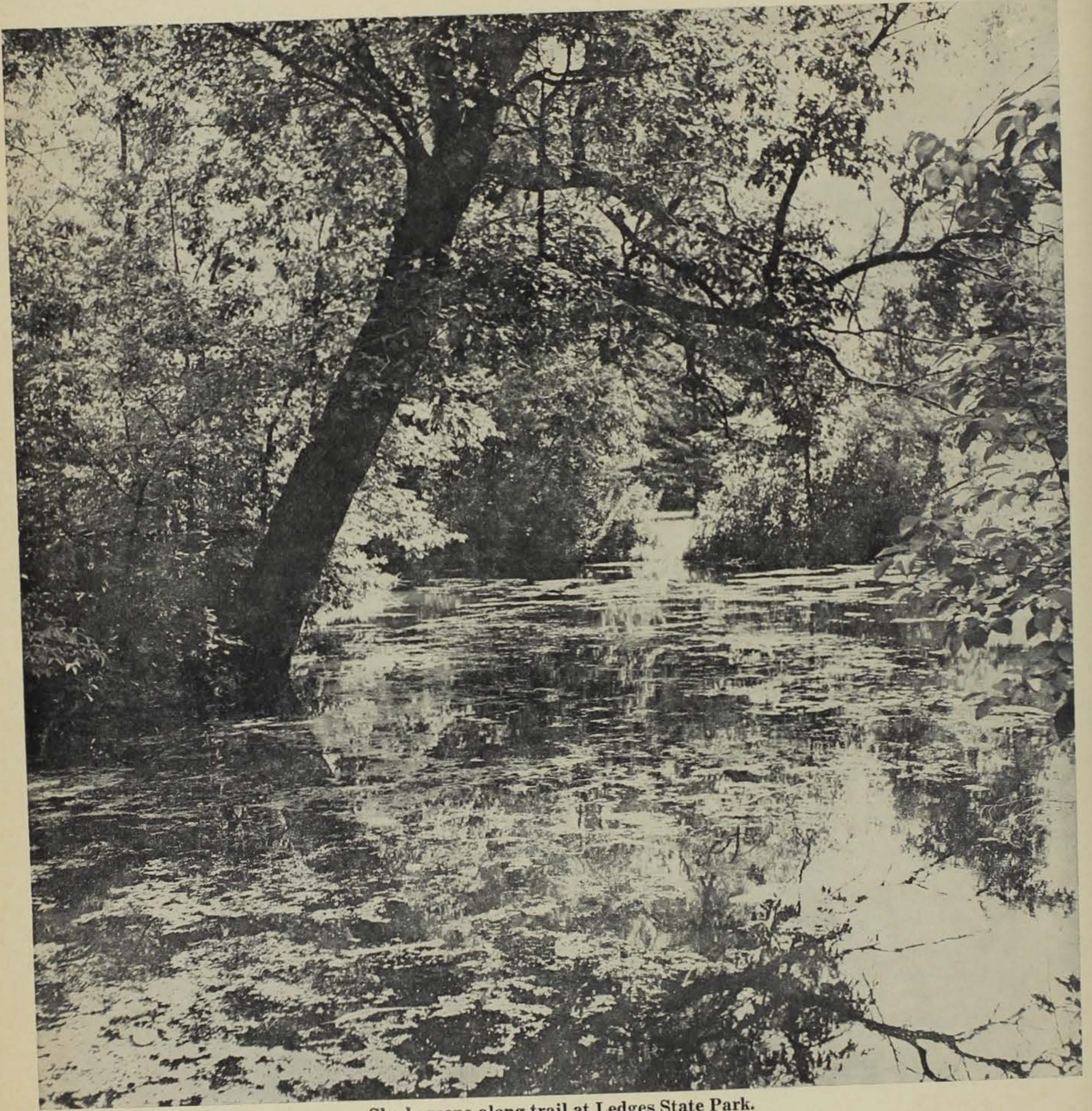
The only advance preparation you need is to pick up a can of roasted, peeled, green chili peppers. They come in a small round can about the size of a can of pimento. Now for most of the day you can go right on painting, fishing or lying there on the patio in the new bathing suit you thought you were too old to wear (the one you had on when the man next door mowed off his wife's peonies). Enjoy yourself knowing when the thundering herd comes back you can feed them in no time.

Scramble as many eggs as it will take to feed your charges. Beating a little milk and margarine into the eggs will make them better. After the eggs are scrambled, spread slices of plain or toasted bread with salad dressing and cover with scrambled eggs. Place a piece or two of the chili peppers on the top, salt and pepper. Some like ketchup.

Serve with iced tea, milk or a cup of coffee. If you will serve these open face sandwiches on a paper plate the only dishes you will have will be the egg bowl, cooking pan, a few forks, and cups or glasses.



"Every year it's the same thing, Capistrano, Capistrano! I want to go to Las Vegas!"



Shady scene along trail at Ledges State Park.