Let's
Ina M. Borman

Elementary science is a "do" science. One way children solve their problems is by experimenting. It is essential that the real purpose for doing an experiment be kept in mind. Pupils ought to do experiments themselves. Plan experiments carefully, and keep the simple as possible.

This issue of The Kansas School Naturalist is devoted to a group of experiments that require simple apparatus to perform. Each experiment was developed from the following viewpoints:

1. Problem
   - This is the real reason for the experiment.

2. Materials needed
   - It is important to have all essential materials at hand in order to perform an experiment effectively.

3. What to do
   - Directions for doing the experiment are given under this heading, but you may modify the experiment to meet the needs of your own class.

4. Conclusion
   - From the experiment child should be able to come to a conclusion concerning the problem. Several questions suggested under this heading may guide in arriving at satisfactory conclusions.
Let's Experiment
Ina M. Borman and Helen M. Douglass

Elementary science is a “doing” science. One way children can solve their problems is by experimenting. It is essential that there be a real purpose for doing an experiment; thus you have a problem that can be solved better by doing an experiment than by reading about it. An experiment should cause children to think and to reach conclusions. Pupils ought to do the experiments themselves. Plan experiments carefully, and keep them as simple as possible.

This issue of *The Kansas School Naturalist* is devoted to a group of experiments that require simple apparatus to perform. Each experiment was developed from the following viewpoints:

1. **Problem**
   This is the real reason for the experiment.

2. **Materials needed**
   It is important to have all essential materials at hand in order to perform an experiment effectively.

3. **What to do**
   Directions for doing the experiment are given under this heading, but you may modify the experiment to meet the needs of your own class.

4. **Conclusion**
   From the experiment children should be able to come to some conclusion concerning the problem. Several questions, suggested under this heading, may be guides in arriving at satisfactory conclusions. Of course, there may be other questions that the children wish and need to discuss.

This issue includes experiments dealing with only three broad areas—air pressure and humidity, magnetism and electricity, and some activities of living things. It is hoped that additional experiments may be included in future issues of *The Kansas School Naturalist*.

The suggested grade levels are based on our use of the experiments in Thomas W. Butcher Children’s School, on the campus of the Kansas State Teachers College. We believe these grade levels are appropriate, but recognize that the experiments may be useful at levels other than the suggested ones.

**PREVIOUS ISSUES**

Those printed in boldface type are still available, free of charge except Poisonous Snakes of Kansas, which is sold for 25¢ per copy postpaid, to pay for the increased printing costs due to the color plates.

The out-of-print issues may be found in many school and public libraries in Kansas.
AIR AND AIR PRESSURE

THE ATMOSPHERE

Primary Problem
To show that air is all around us

Materials
Sponge, pan, water

What to do
Squeeze a dry sponge. Notice what happens. Place the sponge in a pan of water. Notice that the sponge floats. While holding it under water squeeze the sponge. What did you see happen? After a while the sponge becomes saturated with water. Notice that the sponge sinks.

Conclusion
1. What were the bubbles you saw?
2. Why did the sponge float?
3. Why did the sponge sink?
4. How does this experiment show you that air is all about you?

AIR PRESSURE I

Primary Problem
To show that air has "push," that it can exert pressure

Materials
Toy balloon, book

What to do
Place the balloon flat on the table with the open end extending over the table just a little. Put a book on top of the balloon. Now blow up the balloon. Notice that the book will be forced up.

Conclusion
1. What caused the book to be forced up?
2. Why does confined air have more push than the air about us?
3. How does this experiment show that air has push?

AIR PRESSURE II

Primary and intermediate Problem
To show that air exerts pressure; that air occupies space

Materials
Container for water, water, kitchen match, small piece of clay, glass tumbler

What to do
In the bottom of the glass tumbler, place a small piece of clay. Stick the bottom end of the kitchen match in the clay. Almost fill the container with water. Invert the glass tumbler and push it straight down into the container of water. Notice that the water did not fill the glass. Now bring the tumbler straight up out of the water, keeping it inverted, and place on a paper towel. The paper towel will absorb the water from the rim of the glass. Why didn't the match get wet? Remove the match and light it.

Conclusion
1. What was in the glass besides the match and the clay?
2. Why didn't the water go into the glass?
3. How does this experiment show that air exerts pressure and occupies space?

ATMOSPHERIC MOISTURE

Primary and intermediate Problem
To discover that there is water in the air

Materials
Hand mirror or a small piece of glass

What to do
Place a hand mirror or a piece of glass in a refrigerator for ten minutes. Remove the mirror from the refrigerator and hold it in the air. What did you see happening? As a variation of this experiment, breathe on the mirror or glass after removing it from the refrigerator. What did you see happening?

Conclusion
1. Where did the moisture come from that was on the mirror or the glass?
RESSURE

Materials
- Glass tumbler with straight sides, thermometer, red marking pencil, ruler

What to do
Fill the glass with water. Make a red mark on the glass exactly where the water line is. Place the glass on the window sill. Using a thermometer, record the temperature. Each day mark with red the water line and keep a record of the day’s temperature. At the end of a week, check the first water line with the last water. Use a ruler to measure the distance. Examine the daily temperature records to discover the number of degrees of change, either higher or lower.

Conclusion
1. How do you account for the change in the water line day by day?
2. Why might the water line be lowered more during one day than another?
3. What may cause more rapid evaporation of water?

CONDENSATION

Primary Problem
To discover what causes water vapor to condense

Materials
- Glass tumbler, cake coloring, ice cubes, teaspoon

What to do
Fill the glass tumbler half full of water. Now add two or three ice cubes to the water and stir with the spoon. Notice what has happened to the outside of the tumbler. (The effect may be seen more clearly if you put a drop or two of cake coloring in the water.)

Conclusion
1. Where did the moisture come from that was on the outside of the glass?
2. Why did you put ice cubes in the water?
3. What caused the condensation of water on the outside of the glass?
5. If there isn't a defroster in the car, why does it help to open the window of the car?

CLOUDS

Primary and intermediate

Problem
To show how clouds are formed

Materials
Two quart jars, two jar rings, cotton or tissue paper, two hot water bottles, solder, soldering iron, flux, sandpaper

What to do
Clean the surface of the jar rings with sandpaper. Apply flux to the surface of the jar rings. Solder the tops of the two jar rings together. Care should be taken to keep the tops of the rings together as the solder melts and flows between the top surfaces and before it solidifies. Snap clothes pins will help you hold the lids securely while you are soldering. When the melted solder cools, the lids are fastened together. Screw one quart jar in one ring and the second quart jar in the other ring. Put a piece of slightly dampened cotton in one jar before screwing it into the ring. Place a hot water bottle filled with hot water on the table. Place the jars on the hot water bottle. Now on top of the jars, place a hot water bottle that has been filled with ice water or ice cubes. See what happens in the quart jars. Now reverse the position of the water bottles. What happened? Try the same experiment with the quart jars in an upright position. What did you discover?

Conclusion
1. How does this experiment explain cloud formation?
2. Why was it necessary to have hot water in one of the water bottles and ice cold water in the other one?
3. What causes fog? How does fog differ from clouds?

AIR MOVEMENT AND AIR PRESSURE

Intermediate

Problem
To study some effects of air movement on air pressure

Materials
Two books of the same size, a sheet of typing paper, soda straw

What to do
Place the books about six inches apart on the top of a table. Put the typing paper on top of the books. Using straw, blow between the books and the paper. Place the straw at the beginning of the opening between books and under the paper.

Conclusion
1. What happened to the paper?
2. What caused the paper to be in the position you observed it to be in?
3. How did this experiment prove to you that increasing the speed of air increased the pressure of air?

II. Sixth and upper grades

Materials
Straight pin, wooden thread, card three inches square

What to do
Push the pin through the center three inch square card and insert it in the hole of the spool. Turn the card upside down, that is so the card is below the spool. Hold the card lightly against the spool with a
paper on top of the books. Using a soda straw, blow between the books and under the paper. Place the straw at the very beginning of the opening between the books and under the paper.

**CONCLUSION**
1. What happened to the paper? 
2. What caused the paper to be in the position you observed it to be? 
3. How did this experiment prove that increasing the speed of air decreases the pressure of air?

**II. Sixth and upper grades**

**MATERIALS**
Straight pin, wooden thread spool, card three inches square

**WHAT TO DO**
Push the pin through the center of the three inch square card and insert the pin in the hole of the spool. Turn the spool and card upside down, that is so that the card is below the spool. Hold the card lightly against the spool with a finger.

Now blow through the hole in the other end of the spool, and as you do this remove your finger from the card.

**CONCLUSION**
1. What happened to the card when you blew through the opening in the spool? 
2. How do you account for what happened to the card? 
3. At what point was the air pressure reduced by the fast moving air?

Robert F. Clarke, who has been a member of the Editorial Committee of The Kansas School Naturalist, is absent on leave, continuing his work toward a doctorate in herpetology at the University of Oklahoma. He is the author of *Turtles in Kansas*, which appeared in April, 1956, and *Poisonous Snakes of Kansas*, February, 1959. He also drew many pictures and took many photographs for other issues.

These second grade pupils are watering plants growing in planters which the pupils have constructed from coffee cans. The "roofs" were made from popsicle sticks.
ANIMALS AND PLANTS

INCUBATION

Problem
To incubate chicken eggs

Materials
Incubator, chicken eggs, thermometer, sponge

What to do
Regulate the temperature of your incubator by placing a thermometer in the area where the eggs will be placed. When the temperature is 99 degrees F. minimum or 101 degrees F. maximum, adjust the set screw of the thermostat. Now the light will go on whenever the temperature is below the desired level and go off when the proper temperature is reached. Secure a dozen fertile eggs from a hatchery or from a farmer. Mark the eggs on one side with an "X." Place the eggs in the incubator where the eggs are located. The eggs should be turned every day. The "X" on the eggs helps you to know how far they should be turned. Chicks hatch after about twenty-one days. After the chicks have hatched, place them the second or third day lower part of the incubator. Be sure the temperature is sufficient to keep the birds warm. Feed the chicks mash with starter obtained from your feed store.

Conclusion
1. Why is it so important to have the proper temperature for incubating chicken eggs?
2. Why should the eggs be turned every day?
3. Why is it necessary to have a sponge where the eggs are?
4. What did you observe on the end of the young chick's bill?

INCUBATION OF CHICK EMBRYO

Upper grades

Problem
To incubate chicken eggs

Materials
Incubator, chicken eggs, thermometer, sponge, shallow dish

What to do
Regulate the temperature of the incubator and begin incubation as described above. After the eggs have been incubated for three days, select one egg from each group and remove it from the incubator. Crack open the egg and pour the contents into a shallow dish that has previously been warmed for about 10 minutes in the incubator. Observe the embryo. Notice the tiny heart pulse. Repeat the above procedure every three days until the egg is ready to hatch. Examine the embryo each time you open the egg. Notice the growth of the embryo from the earliest stage until the egg is ready to hatch.

Conclusion
1. What differences did you observe in the embryo from the first observation to the last observation?
2. How long does it take for an egg to hatch?
days. After the chicks have hatched, place them the second or third day in the lower part of the incubator. Be sure that the temperature is sufficient to keep the birds warm. Feed the chicks mash or chick starter obtained from your local feed store.

**Conclusion**

1. Why is it so important to have the proper temperature for incubating chicken eggs?
2. Why should the eggs be turned every day?
3. Why is it necessary to have a wet sponge where the eggs are?
4. What did you observe on the tip end of the young chick’s bill?

**INCUBATION OF CHICK EMBRYO**

**Primary and Intermediate**

**Problem**

To incubate chicken eggs

**Materials**

Incubator, chicken eggs, thermometer, sponge, shallow dish

**What to do**

Regulate the temperature of the incubator and begin incubation as directed above. After the eggs have been incubated for three days, select one egg from the group and remove it from the incubator. Crack open the egg and pour the contents into a shallow dish that has previously been warmed for about fifteen minutes in the incubator. Observe the embryo. Notice the tiny heart pulsating. Repeat the above procedure every three days until the egg is ready to hatch. Examine the embryo each time you open an egg. Notice the growth of the embryo from the earliest stage until the egg is ready to hatch.

**Conclusion**

1. What differences did you observe in the embryo from the first observation to the last observation?
2. How long does it take for an egg to hatch?
3. Why is it important to keep a constant temperature in incubating eggs?
4. Why should the shallow dish be warmed before putting the specimen in it?

**ANIMAL RESPONSES**

**Primary and Intermediate**

**Problem**

To discover how house flies react to light and/or to temperature

**Materials**

Three quart jars, one small can of black enamel or paint, paint brush, two jar rings, solder, soldering iron, flux, sandpaper

**What to do**

This experiment makes use of the same double-jar arrangement as used in “Clouds,” page 6, where instructions for building it are given. Paint one of the quart jars with the black enamel or paint. Put the paint on the outside of the jar. When the paint is dry, screw the soldered double ring on to it. Place several flies in one of the clear jars and screw it into the ring. The flies are free to move from one jar to the other. Which way do they go? Remove the black jar and replace it with a clear jar. Again the flies are free to move from one jar to the other. On a cold day place the jars so that one is outside the window and the other is in the room. Observe what is happening.

**Conclusion**

1. In what area did you find the flies?
2. What temperature did the flies prefer?
3. What does this experiment tell you about flies?
4. Why are these experiments sometimes called “Little Climates?”

"Small lizards, toads, or other small animals may be used in the jars. Flies or other insects usually show responses more readily, however.

PLANT RESPONSE TO LIGHT I

Primary Problem
To discover how green plants react to light

Materials
Three potted geranium plants or foliage plants

What to do
Place the three healthy growing potted plants on the window ledge where they will receive direct rays from the sun. Number the pots. Three days after placing the potted plants on the ledge, turn pot number 1 one quarter of the way around, then turn pot number 2 half way around. Leave pot number 3 just the way you placed it the first time. Be sure to keep the plants well watered.

One week after you turned the pots, observe the plants and note what has happened.

Conclusion
1. Why did the leaves all seem to be turned toward the window?
2. In order to have well shaped plants on the ledge in your schoolroom what must you do to them?

PLANT RESPONSE TO LIGHT II

Primary and Intermediate Problem
To discover how green plants react to the light

Materials
Large cigar box or show box, black paper, small flower pot containing a small plant such as bean, nasturtium, Wandering Jew or ivy, glue, file cards

What to do
Place the potted plant in the box and close the lid securely. Now put the box on the window ledge. Water the plant frequently. Make note of the date you put the box in the window. When you see the plant growing out the small opening, make a note of that date.

Conclusion
1. How long did it take the plant to grow around the two hazards?
2. What color was the plant inside the box?
3. How do you account for this color in the box?
4. What color was the plant growing out the small opening?
5. How do you account for the difference in color?
6. What conclusions can you draw from this experiment?

FORCING PLANTS

Late primary and intermediate Problem
To discover how to plant bulbs for forcing

Materials
Three six-inch flower pots, three cirth bulbs, soil, peat moss, sand

What to do
Cover the hole in the center of the pot with a small stone. Put about two inches of sand in the bottom of the pot. Mix moss and rich soil together. Add the mixture to the flower pot. (Within two to three inches of the top of the pot, place the amount of soil to put in the pot depends on the size of the bulb.) Place the bulb on the table of the pot and add the mixture around it. Be sure the top bulb is above the soil, as shown. Water the bulbs. After having sealed in the well drained spot out of your room, dig a trench 18 inches deep a little wider than your flower pot. two inches layer of sand in the bottom of the trench. Place the potted bulbs in the trench and cover with soil of leaves, straw or hay. Then cover the pots with the dirt that had been removed from the trench. Mound up the dirt. About the middle of February begin to water the pots indoors. Put them in a dark place beside your room and invert another flower pot over the top of the bulb, as shown.
A small flower pot containing a small plant such as bean, nasturtium, Wanderwurz or ivy, glue, file cards.

**IT TO DO**

1. Place the potted plant in the box and the lid securely. Now put the box on the window ledge. Water the plant gently. Make note of the date you put the box in the window. When you see the plant growing out the small opening, make a note of that date.

**CONCLUSION**

How long did it take the plant to grow around the two hazards?
What color was the plant inside the box?
How do you account for this color in the box?
What color was the plant growing out the small opening?
How do you account for the difference in color?
What conclusions can you draw from this experiment?

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**FORCING PLANTS**

*Late primary and intermediate*

**PROBLEM**

To discover how to plant bulbs for forcing.

**MATERIALS**

Three six-inch flower pots, three hyacinth bulbs, soil, peat moss, spade, sand

**WHAT TO DO**

Cover the hole in the flower pot with a small stone. Put about two inches of sand in the bottom of the pot. Mix peat moss and rich soil together. Add this mixture to the flower pot to within two or three inches of the top of the pot. (The amount of soil to put in the pot depends on the size of the bulb.) Place the bulb in the center of the pot and add the soil mixture around it. Be sure the top of the bulb is above the soil, as shown in A. Water the bulbs. After having selected a well drained spot out on your school ground, dig a trench 18 inches deep and a little wider than your flower pots. Put two inches layer of sand in the bottom of the trench. Place the potted hyacinth bulbs in the trench and cover with a layer of leaves, straw or hay. Then cover the pots with the dirt that had been removed from the trench. Mound up the soil. About the middle of February bring the pots indoors. Put them in a dark place in your room and invert another flower pot over the top of the bulb, as shown in B.

Keep the bulbs watered. After two weeks bring the pots into the school room and place them on the window ledge.

**CONCLUSION**

1. What did you notice about the bulbs when you first brought them into the room in February?
2. After two weeks in the dark, what did you see had happened to the bulbs?
3. Why were the leaves yellow?
4. Why is this called forcing a bulb?

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**TRANSPIRATION**

*Primary and intermediate*

**PROBLEM**

To show that plants give off moisture.

**MATERIALS**

Potted geranium or other foliage plant, plastic bag, string

**WHAT TO DO**

Place the plastic bag over the plant. Be sure that the bag is large enough so that the plant will not be damaged. Tie the bag securely around the stem of the plant. Place the plant on the window ledge. After an hour or more, observe what is happening inside the bag.

**CONCLUSION**

1. How do you account for the moisture on the plastic bag?
2. What does this tell us about plants?

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THE COVER PICTURE shows sixth grade pupils in Thomas W. Butcher Childrens School, on the campus of the Kansas State Teachers College, working with student teacher Herbert Simmons. They are listening to crystal radio sets which they have constructed.

Miss Borman and Miss Douglas are at work on a "Childrens Books" issue of The Kansas School Naturalist, which will probably be the January or March number. This will be the third in a series, the others having been in February 1955 and December 1956. Both are out of print but may be found in many school and public libraries.

IF YOU CHANGE your mailing address during the school year, be sure to send us both the old and the new addresses. The Kansas School Naturalist is sent by second class mail, which is not forwarded.
MAGNETISM

First grade

Problem
To discover what kind of materials a magnet will pick up

Materials
Bar or horseshoe magnet, variety of materials such as copper wire, pins, small nails, tacks, rubber band, paper, small piece of wood, glass paper clip, brass screw, wood screw

What to do
Using a bar magnet or a horseshoe magnet, try to pick up each of the materials listed, as well as others you may select. Notice that the magnets picked up certain types of material and did not pick up other types of material. Make a pile of those things the magnets did pick up and a pile of those things the magnets did not pick up.

Conclusion
1. What materials did the magnets pick up?
2. What materials did the magnets not pick up?
3. What conclusion can you draw from this experiment?

MAGNETIC ATTRACTION

Primary

Problem
To determine where the strongest attraction is on a bar or horseshoe magnet

Materials
Bar or horseshoe magnet, many iron objects such as nails, tacks, pins, paper clips

What to do
Hold the middle of a magnet near different iron objects. What happened? Hold the end or ends of a magnet near different iron objects. What happened? Dip the magnet into a box of small iron tacks. To what part of the magnet did the tacks tend to cling?

Conclusion
1. How do you account for the differences in the three different procedures?
2. What conclusions can you draw from these differences?

MAGNETIC POLES

Intermediate

Problem
To show how the “Law of Magnetism” works

Materials
Two bar magnets, piece of string

What to do
Suspend the bar magnet from any convenient support. Allow the bar magnet to come to rest. Now bring the N end of the second magnet near the N end of the suspended magnet. Then bring the S end of the second magnet near the S end of the suspended magnet. Then bring the N end of the second magnet near the S end of the suspended magnet. (See illustration.)

Conclusion
1. How do you account for the differences in the three different procedures?
2. What conclusions can you draw from these differences?

LINES OF FORCE

Intermediate

Problem
To show lines of magnetic force

Materials
Two bar or two horseshoe magnets, two small blocks of wood, piece of paper or stiff paper, piece of typing paper, iron filings

What to do
Place two blocks of wood on the floor five or six inches apart. Between the blocks of wood place the bar or horseshoe magnets in such a way that the ends of the magnets are about an inch and a half apart. Now put the piece of paper or stiff paper just above the poles of the magnets. Tap the paper just above the poles to make the iron filings scatter. Notice how the iron filings arrange themselves around the magnetic poles. Describe the arrangement or make a sketch of it.

Conclusion
1. Why did the iron filings arrange themselves around the poles in this manner?
2. What part of the law of magnetism does this experiment illustrate?

Repeat the above experiment, except this time remove one of the magnets between the blocks, or turn one magnet over so that the poles are arranged differently than they were the first time.

1. How does the arrangement of the iron filings differ from that of the first experiment?
2. What part of the law of magnetism does this second experiment illustrate?
LESSON

How do you account for the differences in the three different procedures?
What conclusions can you draw from these differences?

MAGNETIC POLES

Intermediate

To show lines of magnetic force

MATERIALS

Two bar or two horseshoe magnets, two small blocks of wood, piece of glass or stiff paper, piece of typing paper, iron filings

WHAT TO DO

Place two blocks of wood on the table five or six inches apart. Between these blocks of wood place the bar or horseshoe magnets in such a way that the ends of the magnets are about an inch and a half apart. Now put the piece of glass or stiff paper on top of the blocks. On top of the glass or stiff paper, place the sheet of typing paper. Sprinkle iron filings on the paper (Be sure that the iron filings are not too dense.) just above the poles of the magnets. Tap the paper just a little with the rubber tip end of a pencil. Notice how the iron filings arrange themselves around the magnetic poles. Describe the arrangement or make a sketch of it.

CONCLUSION

1. Why did the iron filings arrange themselves around the poles in this manner?
2. What part of the law of magnetism does this second experiment illustrate?

Intermediate and upper grades

MAGNETIC COMPASS

Intermediate and upper grades

Problem

To make a compass

Materials

Large steel darning needle, glass jar and lid, model cement or quick drying glue

WHAT TO DO

Magnetize the darning needle by stroking it across the end of a bar magnet. In order for the needle to be well magnetized, stroke it across the pole fifty to a hundred times. Be sure to move the needle across the end of the magnet (pole) in the same direction.

Now suspend the magnetized needle from a thread. The thread needs to be tied around the needle in the proper place so that the needle is balanced in a horizontal position. When the balance has been accomplished, place a small drop of glue or cement on the thread and needle. This is to hold the thread in place. Now fasten the other end of the thread to the lower side of the jar lid with model cement or glue. Place the jar lid on the jar with the needle hanging inside the jar. (See illustration.) Allow the needle to come to rest. What did you observe? Bring a bar magnet near the end of the needle. Notice what happened.

Conclusion

1. What direction was the needle pointing when it came to rest?
2. What effect did the bar magnet have on the position of the needle?
3. Why should the end of the compass that is pointing to the north magnetic pole be called the “north seeking pole”?

4. Why should the end of the compass that is pointing to the south magnetic pole of the earth be called the “south seeking pole”?

**ELECTROMAGNET**

**Intermediate**

**Problem**

To make an electromagnet

**Materials**

Spike or a bolt, five feet of insulated bell wire, dry cell, tacks or iron filings

**What to Do**

First find the center of the five feet of insulated bell wire. At the center point begin to wrap the wire around the spike or bolt. When you have made five turns of wire, test the electromagnet by attaching the free ends of the wire to the dry cell. Put the end of the spike or bolt in a jar of tacks. Notice how many tacks are attracted by this electromagnet, and record the number.

Then disconnect the terminals and wind ten more turns around the same electromagnet. Connect the ends of the wire to the dry cell again and notice how many tacks are attracted this time. Record this number.

Once more disconnect the terminals and wind ten more turns around the same electromagnet. Connect the ends of the wire to the dry cell and notice how many tacks are attracted by this electromagnet. Record the number.

**Conclusion**

1. What is the effect of increasing the number of turns of wire around the spike or bolt in making an electromagnet?
2. Where are electromagnets used?
3. What advantage does an electromagnet have over a permanent magnet?
What to do (parallel circuit)

Arrange a push button or knife blade switch, three miniature light bulbs, and sockets in a circuit, using a dry cell, in such a manner that when one light bulb is unscrewed from the socket, the other two light bulbs will remain lighted.

Conclusion

1. What is this type of circuit called?
2. Where is such an arrangement of lights sometimes used?
3. What advantages are there to this arrangement?

Recent Books That Include Many Other Types of Experiments

AUDUBON SCREEN TOUR SERIES

The Biology Department of the Kansas State Teachers College of Emporia is sponsoring its fourth Audubon Screen Tour Series during the school year, 1960-61. This series consists of five all-color motion pictures of wildlife, scenics, plant science, and conservation personally narrated by leading naturalists. These pictures are presented in Albert Taylor Hall at 7:30 p.m. on the dates listed below. Plan to attend one or more of the remaining screen tours with some of your students. Both group and single admission tickets are available. For additional information write to Dr. David Parmelee, Biology Department, KSTC, Emporia.

Patricia B. Witherspoon, Kangaroo Continent, Tuesday, October 18, 1960
John Moyer, Jungle Trek in India, Tuesday, November 15, 1960
Emerson Scott, Pika Country, Friday, February 3, 1961
Charles E. Mohr, Pastures of the Sea, Tuesday, March 7, 1961

IT IS NOT TOO EARLY to plan to attend the 1961 Workshop in Conservation, which will be a part of the 1961 Summer Session of the Kansas State Teachers College of Emporia, during June and July.

As in the past several years, the Workshop will cover water, soil, grassland, and wildlife conservation, with emphasis throughout on conservation teaching. Such topics as geography and climate of Kansas, water resources, soil erosion problems and control, grass as a resource, bird banding, wildflowers, conservation clubs, and conservation teaching in various grades will be discussed. There will be lectures, demonstrations, discussion groups, films, slides, field trips, projects, and individual and group reports. You may enroll for undergraduate or graduate credit.

Exact dates, fees, and other details will appear in later issues of The Kansas School Naturalist.