As for English, there is no subject in the curriculum that lends itself better to the purpose of vocational guidance. The following merely indicate how the guidance idea may be used to motivate the work:

1. Oral and written reports on occupations in which children are interested.
2. Group discussions or debates bringing out the relative advantages of various occupations.
3. Dramatizations of working situations, such as, an interview with an employer.
4. Letters of application.
5. Parallel reading having vocational content, especially biography.
6. Placing less emphasis on literary style and more on the lives of the characters for the purpose of determining the reasons for success or the lack of it.

The traditional high school and college instructors have been accused of being too blindly devoted to their subjects to be able to see pupil needs.

Where this is true, can we blame the children for refusing to worship our gods when they fail them so miserably?

The Y. M. C. A. boys' clubs, scouts, and other like organizations have the advantage of the public schools in that they are younger and less bound by tradition and it is rather significant that more interest is shown in the activities that they sponsor.

The success of any attempt to establish a plan for guidance is conditioned by the extent to which the curriculum is vocationalized. If it is not possible at the start to affect a complete reorganization of the curriculum, we can compromise by shifting the spot light so that it will illuminate those features of our work which point the way to successful and happy living.

BESSIE L. CORKEY.

A STUDY OF THE STARS

A Fifth Grade Unit of Study

AT THE beginning of the term, the children listed the things which might be studied in Nature. They mentioned birds, trees, flowers, animals, and insects, all of which they had studied in other grades. Finally, the subject of stars was suggested by some one. But the suggestion did not meet with much enthusiasm, so the matter was left over for a few days. During those few days several questions arose which gave occasion to refer to the subject of stars, and what might be learned from the study of them. When the time came to select the unit to be studied, the majority voted for stars.

A good introduction into the study increased the interest of the class; this interest continued throughout the entire unit. Some of the children were so keenly interested as to hunt out other constellations than those studied in class. One child copied and enlarged a chart of the skies showing the various constellations and their locations for that time of year. A number of clippings and pictures were brought in for the bulletin board. The children's minds were active with questions which they wished to have answered. The result was the evolution of this unit on astronomy, called "A Study of the Stars."

I. *Experiences*

A. General:

1. Facts which were already known were suggested by the children.
2. Facts which they would like to know were suggested by the children.
3. Facts were organized under topics for study.

NOTE: We have adjusted our discussion to an outline, because of the length required for a diary form. Consequently the work appears as formal when written down, but it was worked with the children in an integrated program of work. Most of the problems, questions, and leads were direct suggestions by the children.

Three student teachers assisted in the preparation of this unit: Misses Louise Cave, Ruth Holt, and Mary Wine.

4. Facts were summarized following the study of each generalization.
5. A number of demonstrations were given:
   a. with cotton held over lighted candle to show that heated air rises.
   b. with three children, one representing the sun, one the earth, and one the moon, to show revolution and rotation of the latter two.
   c. with flashlight and globe to show the seasons and day and night.
   d. with orange (one-half peeled) to show the phases of the moon.
6. A number of diagrams were given as shown under "Concrete Data" in outline.
7. Notebooks were kept by the children of their summaries, diagrams, stories, and other material which they collected.
8. Children's questions were listed and marked off as answers were found. A few samples follow:
   a. How do we know the sun is as large as it is?
   b. Why doesn't the sun fall if it is in space?
   c. Do the planets go around the sun in a straight line?
   d. Why is the sunset red and different colors?
   e. Why doesn't the sun burn up?
   f. If it were possible to get out in space and drop a ball, which planet would it go to?
9. Children met at night to study the stars and to find the various constellations they had studied about.

B. Specific:
1. Science:
   a. Generalization 1—(See outcomes)
      1. Listened to the poem, "The Spacious Firmament on High," and the Greek myth about Phæton.
      2. Read in Gehr's *Nature Study* to find out what the solar system consists of.
      3. Listed all the things they wished to know about the sun and found answers to these questions.
      4. Organized the questions listed into an outline of study before they began to look up data.
      5. Learned the names of the planets.
      6. Examined a chart showing comparative sizes of the planets and the sun.
      7. Read to find what satellites are.
      8. Examined a chart showing the distances of planets from the sun.
      9. Examined charts showing the positions of them and the sun.
      10. Retold myths about the planets.
   b. Generalization 2—(See outcomes)
      1. Listed all the things they wished to know about the earth.
      2. Read to find out about the things listed.
      3. Read to find out "What keeps us on the earth."
      4. Examined chart comparing size of the earth, moon, and sun.
      5. Examined chart showing the orbit of the earth and the moon.
      6. Read to find out what moons are.
      7. Made a report on the composition of the moon.
      8. Read to find out about the eclipse of the sun.

c. Generalization 3 — (See outcomes)
   1. Read to find out what stars are.
   2. Read to find out what constellations are.
   3. Listened to reports on:
      a. Twinkling stars
      b. Shooting stars and fireballs
   4. Read to get information on the Milky Way.
   5. Reported on the North Star and the Dippers.
   6. Reported on the appearance and location of other constellations.
   7. Tried to locate these constellations in the sky.

2. Arithmetic:
   a. Found the rate at which the earth rotates.
   b. Found the rate at which other planets and the moon rotate and revolve.
   c. Located places by means of longitude and latitude, giving distance and direction from a given place.
3. Reading:
   a. Refer to reading experiences under science.
4. Literature:
   a. Listened to stories read and told to the class.
   b. Retold stories to the class.
5. Spelling:
   a. Learned to spell some of the necessary terms.
   b. Made sentences with the terms spelled so as to understand their meanings.
   c. Learned to spell and pronounce the names of the planets.
6. Writing:
   a. Wrote summaries neatly.
7. Language:
   a. Made summary sentences of each topic studied.
   b. Wrote stories about the myths of the planets and constellations after hearing them in class.
8. Music:
   a. Learned the following songs:
      1. Twinkle, Twinkle Little Star
      2. Stars of the Summer Night
8. Fine Arts
   a. Made a diagram showing the mythological relationship of the planets.
   b. Made a chart placing planets in the solar system showing relative sizes.
   c. Drew diagrams of the various constellations.
   d. Made a chart showing the zones on the earth.

II. OUTCOMES

Science

Generalizations

1. The sun is the center of the solar system, which is composed of eight planets and their satellites.
2. The earth, the planet on which we live, is third in distance from the sun and revolves around the sun, at the same time rotating on its axis.
3. Stars are not a part of the solar system, but are collected in groups called constellations.
4. There are many old myths and legends connected with the solar system and the constellations.

Abilities

1. To use astronomical terms understandingly.
2. To understand of what the solar system is composed.
3. To understand the earth's relation to the sun and other bodies of the universe.
4. To discuss and arrive at conclusions about questions which they wish to know.

Attitudes

1. Appreciation of the vastness of the universe.
2. Appreciation of the nature of the skies.
3. Desire to know more about the solar system and the stars.

	Generalizations	*Abilities*	*Attitudes*
Arithmetic	1. A knowledge of the fundamentals in arithmetic is necessary.	1. To work with numbers. 2. To apply processes as needed.	1. That arithmetic enables people to understand many facts about stars and the universe.
Reading	1. Reading is one way of getting subject matter.	1. To get information from the printed page.	1. A desire to read to find information.
Literature	1. A study of mythology will contrast the old with the present ideas of the solar system.	1. To read myths understandingly. 2. To separate truth from mythology.	1. Appreciation of the difference in the beliefs of the ancient and present-day people on the subject of the solar system. 2. Appreciation of the relation of the planets' names to mythology.
Spelling	1. The spelling and pronunciation of the terms used is necessary to understand the study of the stars.	1. To spell the terms used in the star unit. 2. To know the pronunciation of terms used. 3. To interpret the meaning of the terms.	1. A desire to spell and pronounce correctly the names of all the planets. 2. An appreciation of the correct spelling of words. 3. A desire to understand the meaning of new terms.
Writing	1. A legible handwriting is necessary to make ourselves understood on paper.	1. To write a legible hand.	1. A desire to have a neat, well-written paper and notebook.
Language	1. Expression of thought orally and in writing is an aid in understanding subject matter.	1. To punctuate correctly. 2. To write paragraphs correctly. 3. To re-write myths and stories with correct details.	1. Appreciation of well-written stories. 2. Desire for clear expression of thought.
Music	1. Singing of songs is one way of understanding subject matter.	1. To sing in the right time and with a good tone.	1. An enjoyment of singing.
Fine Arts	1. Drawing impresses certain facts on the mind.	1. To make charts showing the relation of parts of the solar system. 2. To make drawings of various star groups.	1. Desire to express things concretely and neatly in drawing.

III. MATERIALS

SCIENCE: GENERALIZATION 1

References and Concrete Data

1. Solar System
   a. Harper's Fourth Reader, 110-113
   b. Earth and Its People, 27, 28
   c. Good Reading, Fifth Reader, 268-272
   d. World Book, Vol. 11, 6921-6924; 6679
   e. Book of the Stars, 369, 370
   f. Key to the Almanac, 204-213
   g. The Sky Family, 1; 8-12; 25; 36
   h. Field Book of the Stars, 115-121

Outlines and Significant Facts

1. The solar system is composed of the sun, eight planets and their satellites.
2. Facts about the sun:
   a. size—the diameter is 109 times as great as the earth's.
   b. distance—93,000,000 miles from the earth.
   c. position—center of the solar system.
   d. composition—same as the earth but materials are in gaseous and liquid forms.

References and Concrete Data

i. Geography, Book One, 2; 45
j. Lessons in Astronomy, 146
k. Nature Study, Book Two, 189-192
l. Young Folks' Book of the Heavens, 56; 86-93; 114-115; 139-140
m. Stories of the Stars, 3-7

2. Planets
   a. Young Folks' Book of the Heavens, 70-75; 86-93; 114-115; 139-140
   b. Sky Family, 11; 27; 30; 32; 90
   c. Book of Stars for Young People, 372-374; 380
   d. World Book, Vol. 10, 6398
   e. Field Book of Stars, 119
   f. Key to Almanac, 208
   g. Descriptive Astronomy, 56

3. Charts
   a. New Physical Geography, 10
   b. Sky Family, 2
   c. Nature Study, Book Two, 191
   d. Young Folks' Book of the Heavens, 56.

Outlines and Significant Facts

   e. properties—holds planets in place; gives heat and light.
   f. effects on man—provides heat, light, health (vitamins), and energy.

3. Planets in order of size are: Mercury, Mars, Venus, Earth, Uranus, Neptune, Saturn, Jupiter.
4. Planets in order of nearness to the sun are: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.
5. The planets are different from stars because they:
   a. appear brighter to us
   b. have a steady light
   c. revolve around the sun
   d. reflect sun's light, having none of their own.
6. Satellites are the moons of a planet, and revolve around the planet.
7. Significant facts:
   a. An astronomer is one who makes a study of the heavens.
   b. Gravity is magnetism.
   c. Orbit is the path which the planets make around the sun.

SCIENCE: GENERALIZATION 2

1. Readings
   a. Geography, Book One, 2; 45; 67; 73
   b. Nature Study, Book Two, 193
   c. Book of Stars for Young People, 369, 370
   d. Good Reading, Fifth Reader, 268-271
   e. Young Folks' Book of Heavens, 17, 18
   f. Sky Family, 21
   g. World Book, 4640
   h. New Physical Geography, 8; 341
   i. Our Surroundings, 17; 18

2. Charts
   a. Young Folks' Book of Heavens, 4; 13; 22; 24-25.
   b. New Physical Geography, 10
   c. Geography, Book One
3. Other Concrete Material: globe, flashlight, candle, cotton, orange.

1. Earth is one of the 8 planets
   a. dimensions and shape
      diameter—7,918 miles
      circumference—25,000 miles
      shape—spherical
   b. movements
      revolves in orbit in one year's time.
      rotates on axis every 24 hours, causing day and night.
      inclination of the earth on its axis as it revolves around the sun causes seasons.
   c. division lines
      longitude and latitude—to determine location on the earth's surface.
      equator, tropics, circles—to mark off zones.
   d. force—has a force called gravity, which draws and holds objects to it.
2. The moon is a satellite of the earth.
   a. dimensions and location
      diameter—2,160 miles.
      volume 1-49 that of earth.
      distance from earth—240,000 miles.
   b. movements
      moves around the earth in 29 days and 13 hours.
      turns on axis in 29 days and 13 hours.
      requires same time to turn on axis as to revolve around earth.
   c. light—not illuminating, reflects sun's light; sun is 465,000 times brighter.
   d. surface—irregular
      Man in Moon caused by shadows of mountains.
   e. phases—caused by the angle at which we see the sun's light reflected on the moon.
   f. effect on tides—pull of sun and moon together causes a rise and fall of water on the earth's surface.
   g. eclipse—an eclipse of the sun occurs when the moon gets between the earth and the sun.

References and Concrete Data

SCIENCE: GENERALIZATION 3

1. Readings
   a. Nature Study, Book Two, 194-196
   b. Good Reading, Fourth Reader, 142-146
   c. Good Reading, Fifth Reader, 273-281
   d. Guide to the Constellations, 97
   e. Key to the Almanac, 218-219, 144-146
   f. Nature Study Magazine, Apr., 1929, p. 158
   g. Young Folks' Book of Heavens, 193; 230, 231; 237
   h. Field Book of Stars, 30; 124
   i. Star People, 1-11
   j. Stories of the Stars, 7-32
   k. The Looking Glass, 81-98
   l. Book of the Stars, 15; 343
2. Charts
   See references as above.

Outlines and Significant Facts

1. Stars
   a. definition—name applied to all heavenly bodies visible as a small spot of light.
   b. number—hundreds of millions; two or three thousand visible to the naked eye.
   c. composition—masses of intensely hot vapors compressed together by the gravitation of their parts.
   d. size—a bright star has a diameter of 1,160,000 miles.
   e. description—each star is a fiery globe. They look like points of light. They are very vivid in color.
   f. movement—variation in position is caused by the rotation of the earth on its axis.
   g. distance from the earth—25,000,000,000 miles.
2. Constellations are groups of stars.
   a. Big Dipper
   b. Little Dipper
   c. Milky Way
   d. Orion
   e. Pleiades
   f. Andromeda
   g. Cephus
   h. Cassiopeia

LITERATURE

1. Myths of constellations
   a. See references under Science Generalization Three.
   b. Good Reading—Books Three, Four, Five, and Six.
   c. New Stories and Old—a Third Reader.
2. Myths of planets, sun, moon
   a. World Book
   b. Hiawatha, Longfellow
   c. Young Folks' Book of Heaven, Chapters 1, 2, 3.
3. Poems
   a. One Hundred and One Famous Poems, 26
   b. Good Reading, Book Five, 282
   c. Stories of the Stars, 2
   d. Child's Own Book of Verse
   e. Poems for Children.
   *See narratives at close of paper.

1. Myths of the sun, moon, planets, and constellations.
2. Poems
   a. Hiawatha—Lonfellow
   b. The Moon—Bliss Carman
   c. The Waning Moon—Celia Thaxter
   d. To the Evening Star—William Blake
   e. Lady Moon—Lord Houghton
   f. Night and Day—R. L. Stevenson
   g. The Moon—R. L. Stevenson
   h. Stars—Sara Teasdale
   i. Twinkle, Twinkle, Little Star—Jane Taylor

*See narratives at close for other material.

SPELLING

Mercury	Neptune
Venus	satellite
Mars	illuminate
Earth	eclipse
Jupiter	total
Saturn	orbit
Uranus	group
planets	visible
universe	constellation
summary	solar system

LANGUAGE

Smith—McMurry, Language Series—Book One
Any material needed by class.

1. For subjects for stories, see Outline under Literature.
2. For skills developed, complete sentences and any punctuation which they need as they write.

ARITHMETIC

1. Dividing the circumference of a body into the circumference of its orbit gives the rate at which the body revolves.
2. Latitude is measured north and south from the equator.
3. Longitude is measured east and west from the prime meridian.
4. There are 360 degrees in a circle.
5. There are 30 days in a month.

IV. BIBLIOGRAPHY

Barton—*A Guide to the Constellations.* McGraw-Hill Book Company, Inc.
Cook, R. J.—*One Hundred and One Famous Poems.* The Cable Co.
Davis—*Elementary Physical Geography.* Ginn and Co.
Davis—*Elementary Meteorology.* Ginn and Co.
Deihl—*The Looking Glass.* Albert Whitman and Co.
Denton—*The Sky Family.* F. A. Owen Publishing Co.
Frye-Atwood—*Geography,* Books One and Two. Ginn and Co.
Gehr—*Nature Study,* Book Two. American Book Co.
Harper—*Fourth Reader.* American Book Co.
Heatwole—*Key to the Almanac and the Sidereal Heavens.* Mennonite Publishing House.
Howe—*Descriptive Astronomy.*
Jackson—*Astronomical Geography.* D. C. Heath.
Johnson—*Star People.* Macmillan.
Manly, Rickert, Leubrie—*Good Reading,* Books 3, 4, 5, 6. Scribner's
Martin—*New Stories and Old, a Third Reader.* Scribner's.
McFee—*Stories of the Stars.* F. A. Owen Publishing Co.
Olcott—*A Field Book of the Stars.* G. P. Putnam's Sons.
Olcott—*The Book of the Stars for Young People.* G. P. Putnam's Sons.
Proctor—*Young Folk's Book of the Heavens* Little, Brown and Co.
Skinner, Wicker—*Child's Own Book of Verse.* Macmillan.
Smith-McMurry—*Language, Book One.* Johnson Publishing Co.
Tarr and Von Engeln—*New Physical Geography.* Macmillan.
Thaxter—*Poems for Children.* Houghton Mifflin.
Winslow—*The Earth and Its People.* D. C. Heath.
World Book—*Encyclopedia.* M. F. Quarrie and Co.
Young—*Lessons in Astronomy.*

*NARRATIVES

Science

1. To impress distance of sun from earth.
   If a child had an arm long enough to reach the sun and burn its fingers, the sensation would not reach its brain for 150 years.

Literature

1. Uranus was god of heaven, husband of Gaea (earth) who was goddess of earth. They had one child, Saturn.
2. Saturn—a name derived from the Latin word *sero* meaning I sow. He presided over agriculture. He overthrew his father and became god of the universe. He lived happily until the birth of his first child, then he remembered that an oracle had told him that his child should dethrone him. To prevent this disaster he swallowed his first child. Four others he also swallowed. When his sixth child was born, his wife hid the baby and, wrapping some clothes about a stone, gave him the stone to swallow in its place. He swallowed it without noticing the substitute. When the child grew up, he dethroned his father and caused him to be banished to Italy. There he set up the most powerful kingdom, teaching people agriculture and useful arts. Every December a feast or Saturnalia is held in his honor by the Romans. Saturday is named for him.
3. Jupiter was the son of Saturn. When he overthrew his father, he took first choice of the kingdom, leaving his brothers the rest. Pluto was given the underworld and Neptune the sea. Jupiter chose the sky so he could also preside over men. He was therefore god of the sky. Jupiter married for his first wife, the first goddess of wisdom, Metis. Becoming alarmed that his first child would be wiser than he, he swallowed his wife. From his head sprang up the goddess Minerva who proved to be just and wise. To Jupiter were born many children, four of whom were Mars, Mercury, Venus, and Apollo.
4. Neptune was god of the sea; he also created the horse. He was worshiped by sailors and those who had to do with horses. Neptune in his anger tried to overthrow his brother Jupiter. For punishment Jupiter made him build a wall around Troy. Apollo played on his lyre which caused stones to fly into place; thus Neptune soon had his wall completed.
5. Eclipse of the moon
   Ancient people in China believed the eclipse to be a mighty dragon which was coming to swallow the sun. If he succeeded, the world would come to an end. The people, at first signs of an eclipse, ran into the street and began to make a terrific noise with drums, whistles, trumpets, and sticks to scare the monster away. Hi and Ho lived in 2000 B. C. They were astronomers and it was their duty to inform people when an eclipse was going to appear. This business was carried on in courts. Hi and Ho lived merrily and well at court and forgot their duty. All at once the sun disappeared, no one had been warned and there was great excitement throughout China. This caused Hi and Ho to lose their heads.
6. Sun and Moon were brother and sister. One night, while playing a game in the dark with some other children, Malina the girl, was much annoyed by one boy teasing her. Smearing her hands with soot, she rubbed them over his face so she would know him by daylight and her brother could punish him. When daylight came, she saw that it was her brother's face which she had blackened. This frightened her so, that she ran away. Her brother ran after her until they came to the place where the earth and sky meet. They both flew upward into the sky. Malina became the sun, and her brother became the moon.
7. A Poem. By Ann Penway

I WONDER

Nobody knows,
But don't you suppose
The wise old man in the moon
Uses the dipper, big and bright,
To drink from the Milky Way each night,
Since the dish ran off with the spoon?

ALICE FOWLER