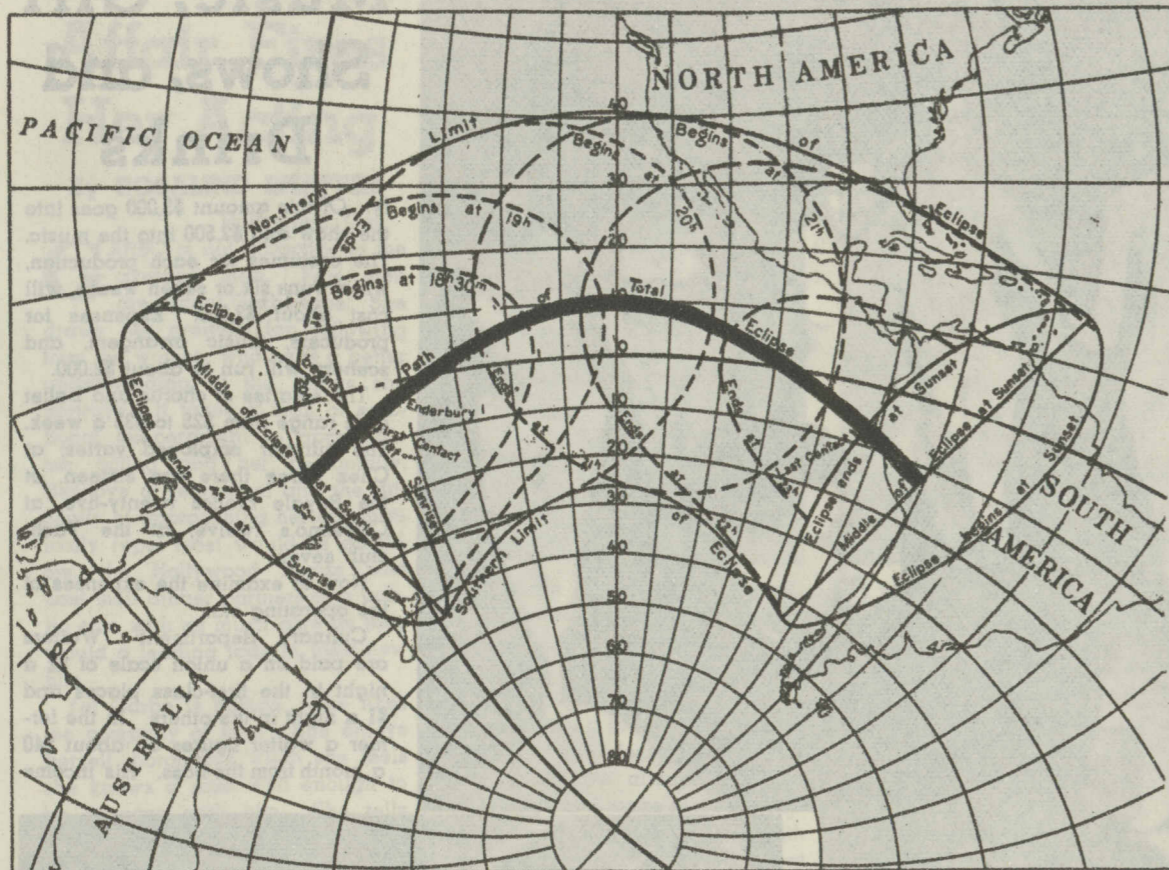


The Graphic Laboratory of Popular Science



Map showing extent of the total eclipse of the sun which will take place next month over the Pacific ocean.

Sages Wait for Total Eclipse

By DR. THOMAS M. BECK

IN LESS than a month will occur an astronomical event which has not been equaled during the last 1,200 years and will not be repeated for centuries to come. It is an eclipse of the sun which will last for about seven minutes, or almost twice as long as such an event usually lasts.

Astronomers and astrophysicists would welcome this eclipse with unalloyed pleasure were it not for the irremediable fact that it occurs in its entirety only over the broad expanses of the Pacific ocean. The few islands that it passes over are true desert islands, small coral reefs devoid of fresh water and vegetation and totally unfit for human habitation. It is difficult to conceive where the moon's shadow could have found another path, 8,000 miles long and 170 miles wide that would have made human observation so difficult.

However, portions of this celestial show will be seen in habitable parts of the earth. The natives of

The Question Box

Why is the eclipse of next month arousing so much astronomical interest? It will last longer than any of the last 1,200 years.

Why does it start the day after it ends? It passes over the international date line.

What are the difficulties of observing it? It cannot be seen in its entirety from any habitable part of the earth.

What uncertainty may undo the careful preparations of the various astronomical expeditions? The possibility of cloudy weather.

What is the value of observations of an eclipse? It is expected to give information on the nature of the sun's atmosphere, on cosmic rays, and on the effects of sunlight on the earth's atmosphere.

These questions are discussed in detail by Dr. Beck in the accompanying article.

ing cone of full shadow, called the umbra, in which the complete eclipse is visible.

Now, the distances from the sun and the moon to the tip of the umbra are in exactly the same proportion as the diameters of those bodies. By pure coincidence their diameters are also almost propor-

tionally to their respective distances to the earth.

This means that when the moon is directly between the earth and the sun its umbra is barely long enough to reach to the earth. Consequently the full shadow that reaches the earth's surface, being very close to the tip of the cone, is usually less than a hundred miles wide, although the width of the partial shadow is about 4,000 miles.

Since the earth is so close to the tip of the umbra, slight changes in its relative distance from the sun and moon will cause the width of the moon's full shadow to fluctuate greatly. If in Figure 1 the earth were moved a little closer to the moon the full shadow would become considerably larger. If it were moved farther away it would soon be entirely beyond the reach of the umbra and no total eclipse could be seen. The closer the moon is to the earth the larger the shadow it casts and the longer the eclipse lasts. Conversely, the eclipse is best when the sun is farthest from the earth.

Now, if the paths of the earth around the sun and of the moon around the earth were perfect circles all solar eclipses would be the same, because the distances of the three bodies from each other would be definitely fixed at the time of an eclipse. But the two orbits are slightly oval, like the outline of a football, and neither the sun nor the earth is in the exact center of the orbit of its respective satellite.

Consequently once each year the distance between the earth and the sun is at a minimum and six months later at a maximum. Similarly, every twenty-seven days the moon passes from a position of maximum distance to a minimum and then back again. The variation between the two extremes amounts to about 3.5 per cent of the distance between the sun and the earth and about 14 per cent of the distance from the earth to the moon.

The approaching eclipse, as mentioned above, will occur on June 8. On June 7 the moon will be closer to the earth than at any time during the month, and on July 1 the sun will be at its greatest distance of the year. As a result this eclipse will take place when the moon is almost as close to us as it will ever get and the sun is almost as far. Therefore the amount of full shadow falling on the earth's surface will be much greater than usual and it will take longer for the shadow to move over a particular point.

In spite of the unfavorable location of this eclipse, astronomers are taking an unusual interest in it. In addition to other expeditions, spread from Polynesia to Peru, one supported by the United States navy and the National Geographic society is planning to make observations on Enderbury Island, a desolate reef in mid-Pacific. The scientists will be there for a month before the event, making preparations. They will live on a navy tender, which must carry even the men's supply of drinking water.

Why do they go to all that trouble when the chances of success are problematical? For one thing, the instant of apparent contact between the sun and the moon provides the best possible check upon the accuracy of the tables of celestial motion, upon which our time standards are ultimately based. Second, certain details of the sun's surface can best be studied when most of that surface is covered.

During a total eclipse the sun's circumference seems to be surrounded by a faint greenish haze, seemingly distorted by the solar magnetic field. This is known as the corona, the nature of which is not yet completely understood.

(Acme photo.)

An aerial photograph's picture of a complete eclipse. Observe the fiery corona.

Mostly About Dogs By BOB BECKER

Gadgets Make Care of Dog Easy Matter

GADGETS and accessories are so numerous and helpful that it now is easy to take care of a dog. There is available today just about everything that an owner needs to keep his pet looking well and in good health. We were in a pedigree shop the other day looking at all the things designed for dogs. Among other accessories we noticed the following:

FOOD DISHES—A combination food and water tray . . . has removable dishes, easily cleaned, and another dish designed to prevent dogs from gulping their food. The latter is made of earthenware and has several finger sized objects rising from the base which the dog has to work around before it can get to the food. However, it's rather foolish for any one to worry about a dog gulping its food. That's its natural way of eating. They have been gulpers for thousands of years. . . . There are special spaniel dishes which are cone-shaped so that the dog's long ears fall over the side of the dish instead of into it.

COLLARS AND LEASHES—Many women who own dogs like to have collars and leashes of several colors so that they can have their pet's accessories match their own shoes and handbags. Since British tan has become so prominent for women's bags and shoes during the coronation season, the pedigree shops have ordered leashes and collars of that color. The British coronation has even affected dog fashions! Scotch plaid collars

DOG BEDS AND CARRYING CASES—If your dog insists on sleeping in the best chair in the house, buy him a doggy Morris chair. This is not really a chair, but a heavy pad with a back and side rest. It can be placed on the floor or in a large chair. It is filled with kapok treated with cedar to make it verminproof. Then there are the ordinary beds made of cedar with verminproof cushions, but the newest thing is a "chair-bed." This is a double-deck affair with cushions on both decks. The dog sleeps in the lower deck at night, and during the day the bed can be moved to a window so that the pet can jump up on the upper deck and gaze out and also absorb the sun's rays. For larger dogs there are mats. Along the same line is the carrier case. These are made in the smart airplane luggage finish and when closed look like an ordinary suitcase. There is a verminproof cushion inside the bag which keeps the animal comfortable during the day and folds into a bed for him at night. These bags come in several sizes.

PLAYTHINGS—There are scores of amusing playthings for dogs. For instance, a rubber baby shoe with a whistle inside; this same type of thing in the shape of an elephant or turtle; a rubber bone which crackles like a real one when the pup chews on it; chemically treated bones (real ones)



The Great Dane pup, Venus von Lindenhof, in the arms of Air Hostess Ruth Gutknecht is about to start a journey by plane. The Doberman, Muck von Brunia, from the same kennel, is well known to dog show visitors, as it has competed in many shows in America.

One has hard rubber balls suspended by straps from the collar. These balls bang against his legs when he runs after an automobile, chickens, or sheep. 9. "Dog pa-

jamias" which can be slipped over dogs while they're in the house to prevent shedding on rugs and furniture. 10. Slicker raincoat jackets for wet weather.

DOG NOTES

A new March record for dog registrations was established this year when 7,925 dogs were entered on the record books of the American Kennel club. This compares with 7,750 recorded in the same month last year. Cocker spaniels again led in registrations with 1,286, while Boston terriers were second with 963.

Comparative figures for the 10 leading breeds are as follows:

	March, 1937	March, 1936
Cocker spaniel	1,286	1,104
Boston terrier	963	1,049
Scottish terrier	829	866
Fox terrier (both coats)	631	781
Greyhound	479	125
Pekingese	366	417
English springer spaniel	303	294
Beagle	303	367
Chow chow	303	382
Doberman pinscher	181	157

Hears Music," by Donald McCaskey, M.D., appearing in the current issue of the American Kennel Gazette. Dr. McCaskey has owned dogs all his life, and at various times he has bred some outstanding pure-bred specimens.

"I have often wondered," writes Dr. McCaskey, "how often and to what degree the dog feels that we misunderstand his 'love of music.' I have particular reference to his 'singing,' which we think is just a terrible howl. To my ears, it is not melodious. There is no harmony, nor rhythm. But to the dog, it must certainly represent some type of an outpouring of his sentiments, musically.

"Here is a specific experience of a pure-bred dog with song . . . of a collie of mine named Judge. I was then a country doctor in Lancaster county, Pennsylvania, and was breeding collies. Judge was granddaddy by the elder J. P. Morgan's Wishaw Clinker. Everywhere I traveled Judge insisted on being my secret service protector. "Occasionally, at home I would bring out the old guitar and go to work with song—some old sea chanty or other primitive piece learned out of past experiences before the mast or out over this tough old world from Peking to Paris. Sometimes I'd be at the piano, singing.

"Judge would become glued fast in a spot in front of me, like a fly on tanglefoot paper. It wasn't pain he was reacting to, for his whole attitude was happiness, yet he knew, from the guitar songs especially, that he was being deeply stirred. The phenomenon was very definite. When I would sing loud, up would go his nose high, like a coyote, and he'd start his song, too . . . and his old tail would thump the floor."

Perhaps we do not understand the emotions of our dogs, but a howl sometimes sounds very mournful.



A prize-winning toy Manchester terrier, Champion Hoover's King Edward, owned by Lulu A. Hoover. The toy Manchester, or black-and-tan, as it was generally known, is one of the favorites among diminutive pets. The variety has been known as a distinct breed for more than a hundred years. (Tribune photo.)

for the Scottish breeds are also prominently displayed, and there is a new collar and leash on the market made of whalehide. It is very strong and will stretch slightly.

GROOMING EQUIPMENT—Since dry cleaning preparations have appeared on the market many owners of white or nearly white dogs may clean their pets without soap and water. Then there is plain chalk for cleaning. It comes in both powder and cake form. This may be rubbed into the dog's coat and then brushed out, bringing much of the dirt with it. A big variety of cake soaps and liquid shampoos are also on sale; the flea soaps are especially valuable from now on through the summer months when insect pests are present. Pine oil disinfectant, which eliminates odor, is excellent for the bath, prevents attacks by fleas, and is a fragrant deodorant around kennels. We use pine oil on all of our dogs, winter and summer. A brush is a much needed accessory. Every pet should be brushed to keep it clean and to stimulate hair and skin. Owners should get the type of brush suitable for the breed, as a dog with a thick, long coat needs a different kind of brush than that used on a short haired dog. Stripping combs and nail clippers and files are other handy accessories.

Among the other interesting and serviceable accessories that may intrigue a dog owner are:

1. Dog boots in rubber and leather.
2. Name plates on which the name and address of the dog and the owner can be engraved for placing on the collar.
3. A clever feeding spoon with a nipple attachment. This can be used for administering medicine or feeding milk to young puppies.
4. A "silent whistle" with a tone so high pitched that human ears can hardly hear it, although the acute ears of a dog pick up the sound a long distance away. This sort of a whistle naturally doesn't bother the neighbors like the ordinary whistle. It's useful for training hunting dogs, too.
5. Wooden dumbbells for training to retrieve.
6. A rubber washer which can be used in the tub to get the soap into the coat and also for rinsing the dog after a bath.
7. A cork mat to be used under the feeding dish to keep it from being pushed around the floor. (This mat has a place where the dog's name can be painted!)
8. A couple of clever gadgets that are fixed to the collar to keep the dog from running fast.

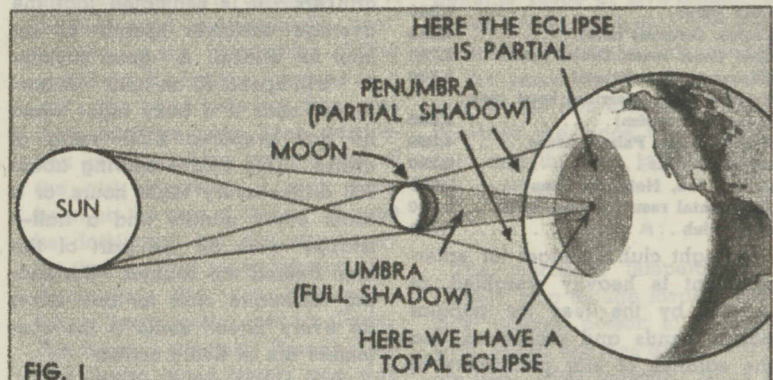
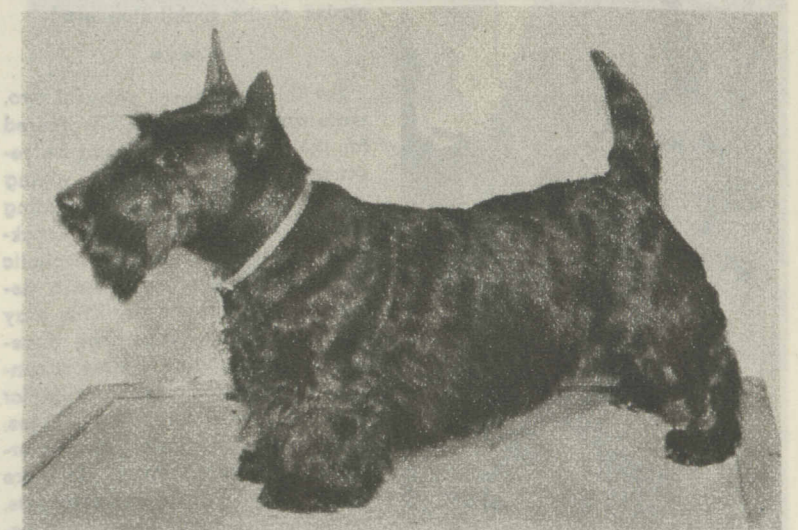


Diagram showing the nature of an eclipse of the sun. The dimensions, of course, are out of proportion.

certain of the Fiji Islands will see the sun rise on the morning of June 9 already in eclipse, and the sight will be interrupted in Peru by sunset on the preceding day, June 8. Unfortunately, this incompleteness, together with the fact that the eclipse must be observed through a much heavier layer of air, will detract from the value of observations made at these points.

The fact that this eclipse ends or the day before it starts may seem startling to the layman at first, but the explanation is quite simple. The moon's shadow takes about four hours to swing eastward across the Pacific, but in so doing it crosses the international date line, where the calendar is set back a day on all eastward voyages.

Why should this particular eclipse be an exceptional one as to duration? A solar eclipse is seen when the moon's shadow falls upon the observer. The shadow cast by an object such as the moon when illuminated by a larger body such as the sun is not as simple as one might suppose. It consists of two parts (see Figure 1)—a widening cone of partial shadow, called the penumbra, in which only a partial eclipse is apparent, and a conver-



Well groomed and alert, this Scottish terrier is called Bernagh Whisper and is owned by Thomas H. Mullins, nationally known Irish terrier judge. Whisper was photographed a few minutes after she won best of breed in a dog show. (Tribune photo.)