that can be seen on the sun varies greatly in different years, showing a full cycle, from high to low and back to high again, in about 11 years.

Structure of Corona Varies

The shape and structure of the solar corona during an eclipse, either natural or man-made, varies depending on whether sunspots are at a high or low point in the 11-year cycle.

At the present sunspot minimum, there are long equatorial streamers and, in the polar regions, short plumes or tufts. When sunspots are at a maximum, the corona extends more nearly equally in all directions. Dr. Roberts believes that magnetic forces acting out from the sunspots push the corona away, forcing it to take the various patterns that are seen at eclipse time or with the coronagraph.

This action, he explains, can be pictured by thinking of the tip of a gigantic umbrella upside down at the sunspot. If there are two sunspots, separated by several hundred thousand miles, then the giant inverted umbrellas covering each would overlap and so the magnetic forces would join.

Dr. Roberts accounts for coronal streamers as being formed where the two giant "umbrellas" meet. Rays and plumes, or tufts, can also be explained by his new theory, which links the various patterns to the earth's magnetic storms.

Fortunately for us, the sun, our nearest neighbor star, is quite a stable star. Except for its relative proximity, only 93,000,000 miles, the sun is a most average star—it is neither extremely large nor extremely small, it is neither very bright nor very dim. Like all other stars in the sky, the sun is a gigantic globe of glowing gas. Its diameter is 864,000 miles, and from it radiant energy of all kinds is being poured forth at a tremendous rate, equivalent to 250,000,000 tons of matter every minute. This reaches us in the form of heat, light and other radiation.

Although scientists are pretty well agreed that the sun's lavish radiation has continued, and will continue, practically unchanged for hundreds of millions of years, only in the last 50 years or so have they begun to make systematic observations of the "other radiation," from X-rays to radio waves.

Weather-Like Phenomena

There are many similarities, Dr. Roberts points out, between the words used to describe our weather and the appearance of the sun's atmosphere, where the vast clouds of gas seem to behave in a somewhat weather-like way. Some of the terms for describing its continual motion are clouds, tornadoes, rain and cyclones.

The two principal features of the sun's atmosphere are the chromosphere with its prominences, and the corona.

"Prominences are huge clouds of atmospheric gases extending high above the solar surface," Dr. Roberts explained. "They possess a very jagged, irregular shape that is continually changing. They are supported in delicate equilibrium with the powerful force of solar gravitation, which is more than 25 times as potent as the earth's gravitation.

"The corona, on the other hand, surrounds the sun like a giant halo, and radiates a soft, pearly light. This light is partly caused by streams of electrons in the sun's atmosphere, dense enough that they scatter the brilliant sunlight that passes through them, but still very tenuous by all earthly standards."

Science News Letter, July 17, 1954

DENTISTRY

Protect Mouth in Sports

➤ MANY MOTHERS and probably a few fathers will cheer the University of Illinois dental scientists in Chicago who declare all schoolboys playing football and similar games should wear mouth protectors to avoid broken teeth and other mouth injuries.

More than half the injuries suffered by high school and college football players occur in the mouth area, the dentists, Drs. George Watts, Archie Woolard and Carl Singer, state. Even in grammer school, boys taking part in contact sports probably suffer an astounding number of dental injuries.

"Schools spend an average of 90 to $120 annually to outfit each football player with protective clothing, which affords him protection only for those regions in which 48% of the injuries occur," the dentists state.

"If the public is convinced of and educated to the necessity of mouth protectors in contact sports, it will insist that they be made available to the young people participating in any and all contact sports."

They made an experiment at St. Rita's high school in Chicago where they devised mouth protectors for the 26 members of the school's football team.

"Although the football season had only just begun, the team had already incurred four dental injuries before the mouth protectors became available," dentists report in the *Journal of the American Dental Association* (July).

The injuries included three broken front teeth and a fractured jaw.

"At the end of the season," they reported, "dental injuries had been reduced 100%. The opposing teams in the same games had suffered an average of two injuries in and about the oral cavity."

Vellum rubber and vellum acrylic materials were found to be satisfactory substances for mouth protectors.

Science News Letter, July 17, 1954

HEMATOLOGY

"Drumsticks" in Blood Show Sex Difference

➤ "DRUMSTICKS" in blood cells will tell a person's sex. If six of the "drumsticks" are found in 500 neutrophil cells of the blood, the blood came from a female. If none are found, the blood came from a male.

This "drumstick" blood test for sex is announced by Drs. William M. Davidson and D. Robertson Smith of King's College Hospital Medical School, London, in a report to the *British Medical Journal* (July 3).

The "drumstick" is a little bump, shaped like a drumstick, that juts out from one lobe of the blood cell nucleus. It is made up of chromatin, easily stainable part of the cell nucleus which is the carrier of the genes in inheritance.

The new sex-differentiating test may be of medico-legal interest and, the doctors state, has already proved valuable in checking the origin of some blood specimens prepared for microscopic examination.

Science News Letter, July 17, 1954

GENERAL SCIENCE

Number of Scientists Is Increasing in U. S.

➤ THE NUMBER of scientists and engineers is increasing in the United States, but the 500,000 engineers and 200,000 scientists constitute less than a half of one percent of our total population.

Dr. Harry C. Kelly of the National Science Foundation, reporting these figures in *Science* (July 2), states:

"One of the grave problems facing the nation is how to use these crucial skills and, at the same time, preserve the freedom essential to the advancement of knowledge."

Nearly half of the high school graduates who have the intelligence to do college work do not go on to college, Dr. Kelly pointed out, and an appreciable number of those who enter college do not finish.

The rate of producing well-trained scientists and engineers seems to be higher in the Soviet Union than in the United States, Dr. Kelly warned. He estimates there are more than 400,000 engineers and 150,000 scientists in the Soviet Union.

Science News Letter, July 17, 1954