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LISTENING TO THE SUN ON SHORTWAVE

WHEN Galileo looked through his telescope at the Milky Way he brought the world to the threshold of a new era in scientific discovery and progress, and to-day, as the years pass and existing instruments are improved or new ones brought into being, man's vision of the universe is still expanding. Astronomers the world over are even now eagerly awaiting the results of the first observations to be made with the giant 200-inch telescope on Mount Palomar, California.

Not least among recent scientific advances was the employment—dating from the war—of radio and radar as effective instruments for astronomical observation. Many will remember the mild sensation caused a while ago when American experimenters successfully made radar contact with the moon, but less is known about the work of a group of Australian scientists who in 1946 first made observations of the sun's radiation in terms of radio frequencies. Using a micro-wave radio receiver equipped with a special antenna that could be pointed towards the sun, they observed not only the varying micro-wave radiation of the sun, but even the disturbance of that radiation produced by sunspots. Previously, the connection between the sun and radio had been noticed when magnetic storms (caused by solar flares) interrupted shortwave radio communications through their effect on the ionized layers of the earth's upper atmosphere, from which radio waves are reflected.

Clouds Don't Matter

At present visiting New Zealand is Dr. C. W. Allen, an Australian solar astronomer who has been working for



DR. C. W. ALLEN

He doesn't mind the grey days

some years in this field and who is now on his way to two world conferences being held in Europe next August—that of the International Astronomical Union at Zurich, and that of the International Union of Geodesy and Geophysics at Oslo. The Listener met Dr. Allen last week at Wellington's Carter Observatory. The sky (as in most other parts of New Zealand at the time) was overcast, and it was raining.

"You mightn't think it's much of a day for astronomical work," he said, "but cloud doesn't affect the kind of sun-rays I'm investigating." He told us that although he was a solar astronomer, the particular field in which he was working at the moment was the investigation of "solar noises" by means of radio.

"They're not really noises in the sense that a noise is caused by a pressure-wave hitting the ear-drum," he said. "We call this radiation 'noise'—solar noise if it comes from the sun, or cosmic noise if it comes from the stars generally—to distinguish it from cosmic rays, which are quite another thing. We pick up the radiation on a special shortwave receiver. If you turn the set up high so that it makes a hissing noise"—he demonstrated what that sounded like—"you can hear the solar noise coming through slightly louder and in short bursts"—he demonstrated what they would sound like too. The waves were recorded on instruments and collated in various ways, he added.

We asked him what practical use was being made of the information gathered. In the first place, he said, solar noises formed a kind of extension of the sun's spectrum. He explained how the sun's light is analysed by means of a spectro-scope into its constituent colours, or wavelengths, for more detailed study. As different substances had different wavelengths, study of the spectrum revealed the different elements in the sun's atmosphere—helium was one, for instance. Solar noise was like another colour being added to the spectrum ("like a kind of ultra-ultra-infra-red," he said) and the observation of it should give more information about the physical conditions of the chromosphere (the upper part of the sun's atmosphere) and the corona, especially of those active features which are not yet fully understood. "Actually the whole physical picture of the sun's influence on the earth is not yet fully understood," he said, "but we are learning more all the time."

We asked him what he meant by the active features of the sun's atmosphere about which it was hoped to learn more.

Radar Started It

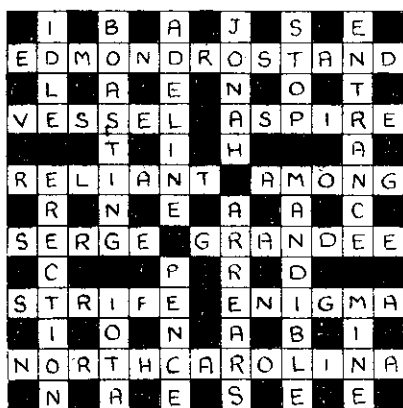
"We first got on to solar noise during the war," he explained. "Radar operators noticed that when they pointed their sets towards the sun they got very high noise-level coming through. They also found that this noise-level was extraordinarily variable, and one of the things that we have since found in observations is that whereas radiation from the sun in the visible spectrum is surprisingly constant, the 'solar noise' radiation we get—in the 60-megacycle band anyway—varies enormously, which shows it is a different kind of radiation. Furthermore, this radiation is associated with other forms of solar activity such as we observe in sun spots."

"Would eclipses help your research?" "Yes. At the eclipse in South America last year observation of solar noise was carried out. The value of the eclipse is that it enables us to localise our source of sound. Normally, you understand, we get solar noise radiations from the sun's whole mass, but from eclipses we have found that the active (i.e., variable) radiation we get on certain wavelengths seems to come more from the central part of that mass, while the non-active stuff comes from the whole area. Results like these are used to find out more about the actual condition of the

(continued on next page)

"THE LISTENER" CROSSWORD

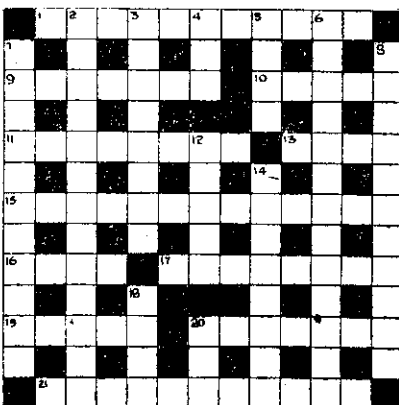
(Solution to No. 394)



Clues Down

- O, cobble it, Jean (anag.)
- Neglect part of a commission.
- Colourful cry?
- "The ——— doth protest too much, methinks." ("Hamlet," Act 3, Sc. 2.)
- Even if I had been a lathe-worker it would take something very drastic to make me do this. (4, 2, 2, 5.)
- Earth source. (anag.)
- Monster tear? I protest
- Attack with stone.
- Written exposition with a pleasant introduction.
- Hindustani.
- Half sister.

No. 395 (Constructed by R.W.C.)



Clues Across

- The sparrow who killed Cock Robin was evidently one.
- "——— with them that do ———" (Romans, 12, 15.)
- Mournful ridge.
- "And all his ——— that come after him ———" (Spender, in "Merry Wives of Windsor.")
- Mixture of oils.
- Heroine's music gives rise to wicked deeds — and how! (7, 6.)
- This periodical payment is apparently cause for a tear?
- "I do desire we may be better ———" (Orlando to Jacques in "As You Like It.")
- Found in a dumb errand boy.
- In parts. (anag.)
- Secluded.



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