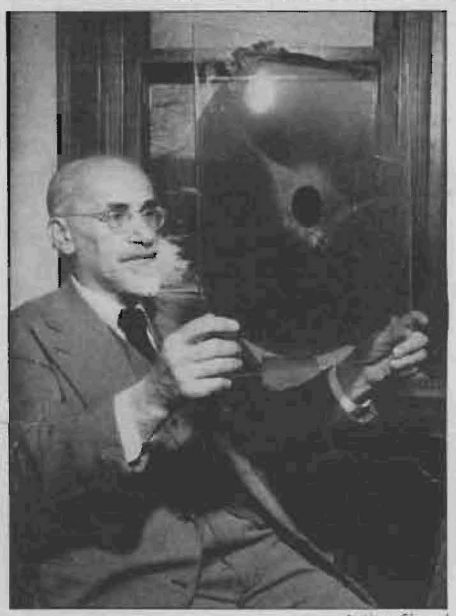
SCIENCE

Decision in Khartoum

Dr. George van Biesbroeck, Belgian-born and 72, was a happy astronomer this week. Stroking his white goatee and skipping cheerfully around his office in Wisconsin's Yerkes Observatory, he told how he had checked with elegant precision the basic scientific law of the universe: Einstein's relativity.

In 1916, Einstein announced that one consequence of his theory would be that light should be bent slightly when it passes through a strong gravitational field. The only practical way to observe this effect was to photograph stars beyond the sun during a solar eclipse. Since their light passes near the sun and through its powerful gravitation, it should be deflected



Arthur Siegel

ASTRONOMER VAN BIESBROECK
After E-day, a shift in the sky.

a little, making the stars seem to shift their positions. The amount of the shift could be measured by photographing the same starfield months later, when the earth's travel around its orbit had placed the sun in a different position and left the stars alone in the night sky.

Such measurements were made soon after Einstein's announcement and several times thereafter. The star shift showed up all right, and Einstein was considered vindicated, but the amount of the shift never came anywhere near his prediction. Observational errors or weather difficulties during the eclipses always balled things up.

So when an eclipse was due at Khartoum in the Sudan last winter, Dr. van Biesbroeck laid plans to do the job for good & all. He took to Khartoum a special telescope, 20 ft. long, and set it up in a fenced and guarded patch of desert belonging to the Sudanese Geodetic Service.

Greatest threat to his enterprise was a "maboob" (sandstorm) which blasted

Khartoum three days before the eclipse. But the maboob subsided well before E-day, and Dr. van Biesbroeck got two good pictures of the starfield beyond the blacked-out sun. Then he wrapped his telescope in tarpaulin and flew back to Wisconsin. His precious plates, 17 inches square, never left his side for a moment.

Last August Dr. van Biesbroeck returned to the Sudan. Khartoum had not changed; the same caravans of groaning camels kicked up dust from the desert. But the brilliant stars in the desert sky had, he was sure, changed slightly. He unwrapped his telescope, chasing a dozen lizards out of the tarpaulin. Waiting five days for a night of good "seeing," he photographed the starfield in Aquarius where the sun had been six months before. Then back he flew to Wisconsin to start his long computations.

The final figure, checked over & over, was almost too pat to believe. Einstein's theory predicts that a star whose light just grazes the sun should appear to shift its position by 1.75 seconds of arc.* The figure computed from Van Biesbroeck's photographs showed a shift of 1.70 seconds of arc. The Supreme Court of Observation had by unanimous decision confirmed Einstein's law.

Busy Pipe

An ordinary one-inch copper pipe, says Professor Harold Barlow of University College in London, can be tricked into carrying 1) a heavy load of power, 2) 2,000 telephone messages, and 3) 20 distinct television programs—and all at the same time.

Dr. Barlow, wartime head of the R.A.F.'s radio research station at Farnborough, is now considered Britain's leading authority on microwaves. He has found that waves 8.6 mm. long (40,000 megacycles) can be forced to travel long distances, with very little loss, through the kind of copper pipe that plumbers use.

In Dr. Barlow's system, the 8.6-mm. waves will stick to the inside of the pipe. On the outside surface travel somewhat longer waves (10,000 megacycles). If properly started on their journeys, the two sets of waves will not bother one another. The metal of the pipe can carry electric power, and neither the inside nor outside waves will interfere with it.

Dr. Barlow believes that plain copper pipe can replace multi-wire telephone cables as well as coaxial television cables (copper tubes with insulated copper cores). It is much cheaper than either of them. Chief remaining obstacle is the high cost of the magnetron tubes that must be used in its repeater stations, but he thinks their price can be cut down by large-scale manufacture.

The British Electricity Authority and the Post Office (which runs Britain's telephone system) are both interested in Dr. Barlow's copper pipes. One promising use: to bring electric power, television and chitchat across the Channel from France.

* From the earth the full moon covers about half a degree or 1,800 seconds of arc.