

The New Star and its Discoverer.

BY RUDOLPH DE CORDOVA.



DR. THOMAS D. ANDERSON, of Edinburgh, who has been so fortunate as to discover the new star, is still a comparatively young man, for he is not yet fifty. His first introduction to practical astronomy was made when he was a child of five, and his father, who took a great interest in the phenomena relating to comets, led him to the front door one night to show him Donati's comet, which had then attained its greatest size and brilliancy. Pointing to the blazing light in the heavens, he declared to the child that "however long he might live, it was impossible that he would ever again behold so great a marvel." Strange prophecy for a man to make to the discoverer of the brightest star which has been seen for three hundred years.

The childish love of the stars planted in the discoverer by his father grew with his growth. Even when he was reading hard at the University of Edinburgh for his M.A. degree, and while he was preparing for the ministry, he used to devote a good deal of time to reading astronomical literature and to studying the heavens. His short-sightedness, born no doubt of the constant poring over books, became so great when aggravated by the labour of sermon-writing that he had, after a few years, to give up his ministry and to decline the invitation of more than one Scottish Congregational church to be its pastor. This change in his career was not forgotten in connection with his recent discovery of the new star, for a North of England paper printed the news with this remarkable and sensational headline: "He could not see to preach. He could see the stars."

It was in 1892 that Dr. Anderson made his *début* among astronomical discoverers, for he discovered a new star then of the fifth magnitude in the crowd of faint stars that occupied the southern part of the great constellation Auriga, the star to which astronomers allude as *Nova Aurigæ* or *T Aurigæ*. This star not only made a

sensation at the time, but it is doubly interesting as being the first new star whose spectrum was photographed. Since then, encouraged by Professor Copeland, the Astronomer Royal of Scotland, Dr. Anderson has gone on examining the heavens, as he says himself, in a much more persistent and methodical way than he had done up to that time. "The principal result of these nightly wanderings along the aisles and cloisters of the heavenly temple has been the discovery of a number—some thirty-three all told—of hitherto undetected variable stars. One or two of these have proved especially interesting, and are being watched by astronomers with great diligence as they pass through their unceasing changes in brightness."

To these new stars astronomers have given the name of *Novæ*, Sir Norman Lockyer defining a nova as "a body which suddenly appears, then diminishes its brightness, and, finally, disappears *as a star*." To this celebrated astronomer I am indebted for the photographs of the star and apparatus which illustrate this article, as well as for much kindly help in its preparation, and I take this opportunity of expressing my acknowledgments to him.

The life-history of the new star, which was discovered at 2.40 a.m. on February 22nd, or, according to the reckoning in use among astronomers, on February 21st, 14hrs. 40min., is extremely interesting.

That discovery, it is worth noting, was made practically with the naked eye, or rather with eyes aided only by the spectacles which Dr. Anderson wears habitually. The discovery was not the result of premeditated and regular search, for, as a matter of fact, Dr. Anderson was examining quite a different part of the heavens, and was comparing the view of it which he got through his telescope with one of the charts in Argelander's great atlas of the Northern Hemisphere, in order, as he has said in his note to me, "to see if he could find any noteworthy discrepancy between the two. On rising from my tele-



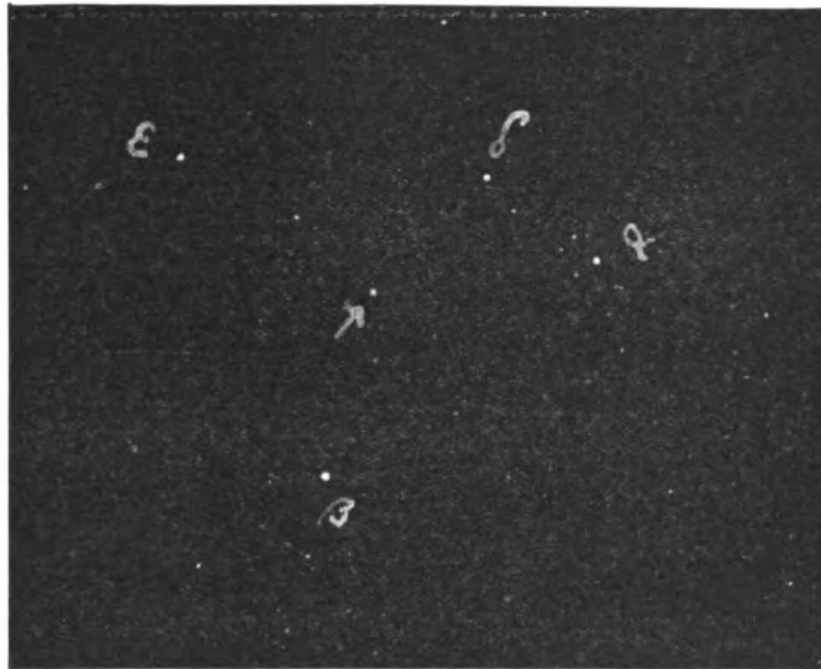
DR. THOMAS D. ANDERSON, THE DISCOVERER OF THE NEW STAR.
From a Photo. by W. K. Monro, Edinburgh.

scope," he goes on, "in one of those fits of weariness which overcome even the most enthusiastic stargazer, instead of proceeding straight to the chart I put on my spectacles and gazed round on the heavens as they were then displayed in their full splendour in front of me. And what did I see? There in the glorious constellation of Perseus, shining with a brightness that somewhat surpassed the third magnitude, was a new-born star. Oh, what an absurd sonnet is that in which Keats brackets together the discovery of an ocean and the discovery of a new celestial world. As if the finding of any terrestrial sheet of water, however large, could be compared for a moment as a source of joy with the first glimpse of a new glory in the already glorious firmament!"

With regard to Nova Persei, as the new star is called, Dr. Anderson modestly says: "My sole merit is that of having been the first to see the great wonder and to have made its acquaintance while it was still in its infancy on the morning of the 22nd of February, while other observers espied it either in its sturdy youth on the evening of that day, or in the full strength of manhood in the evening of the 23rd. Luck, too, had a great deal to do with the matter; a delay of an hour and a half would have spoilt my chances, for by that time all the region of the sky containing the constellation Perseus had been covered by a pall of clouds."

When Dr. Anderson first saw it it was, as he has stated personally to me, "shining with a brightness that somewhat surpassed the third magnitude."

In the course of a few hours, on the evening of February 22nd, between 6 and 7.30, when seen at the Observatory at South Kensington, it had so brightened that it was rather brighter than a first magnitude star, at which brightness it remained until the 25th. Astronomically considered, according to the paper read by Sir Norman Lockyer before the Royal Society on February 28th, the star was on February 23rd "at least 10,000 times brighter than it was four days previously." Ten



THE ARROW INDICATES THE POSITION OF THE NEW STAR IN PERSEUS.
From a Photo. taken at the Solar Physics Observatory, S.W., March 6, 1901.

thousand times brighter within a hundred hours! and yet still to our eyes only a bright speck in the heavens.

By February 27th the star had diminished greatly. Happily, however, many spectra have already been obtained of it, so that when sufficient time has elapsed for their complete study we shall have an accurate record of the chemical composition of the new star. So far one fact has come out with undoubted strength, that hydrogen forms a very large proportion of its composition, as shown not only by the spectrum but by the bright red colour which the star has assumed. The change in colour is undoubtedly due to the cooling which the star is undergoing. This may be accurately compared to what takes place when a poker is put into the fire and allowed to become intensely hot and slowly cooled. The red heat gets duller and duller until it dies away, though, even then, the iron will be too hot to be handled with comfort, so that the star, even after it has faded entirely out of sight, because it has become too cold to give out rays of light that our eyes can see, may remain for centuries too hot to sustain life as we understand it.

The first question which everyone will naturally ask at the unexpected appearance in the heavens of a new star is: What is its position? The question is easily answered by a reference to the accompanying illustration. The position of the new star is indicated by the bright dot to which the arrow-

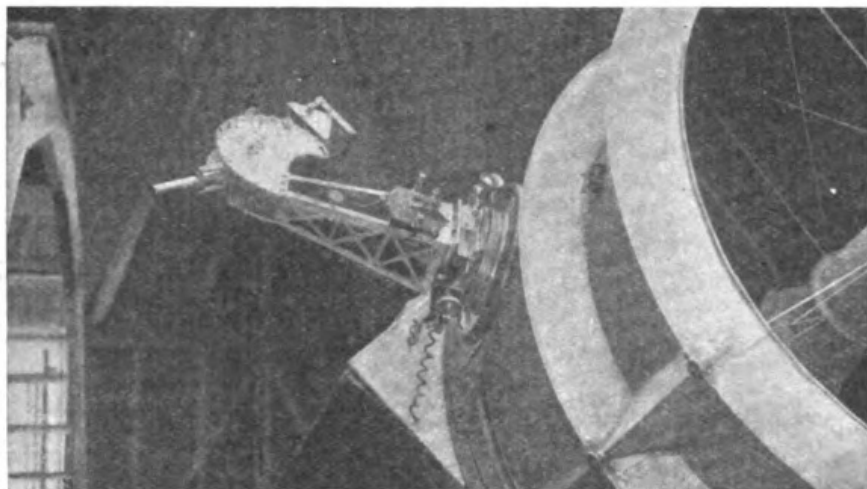
head points. In the illustration certain Greek letters will be seen affixed to bright points which are the photographic representations of the large stars in the constellation Perseus. These stars are known as Alpha, Beta, Gamma, Delta, and so on. If a straight line is drawn from Alpha to Beta Persei, the new star is seen to be to the north and west of that line.

To the question how far off this new star is no answer can possibly be given, for the simple reason that it has no parallax, and therefore we have no method of calculating its position. Even if we had, however, it is questionable whether anyone could possibly appreciate the distance, seeing that it would be expressed in thousands of millions of miles—possibly in tens of thousands, if not in hundreds of thousands of millions. It has been conjectured that it is many thousand times farther off than the sun itself, and with

face of such a phenomenon as the appearance of a new star is how it has come to be born. In the great universe of space, as in the relatively infinitesimal world of life to which we belong, the same law would seem to hold good, for this new birth depends on two factors, neither of which alone is capable of producing it. These novæ, in fact, are due to the coming together into collision of two swarms of meteorites. In the collision the particles, moving at a great rate, naturally became heated to a very high degree and began to give out light, as all objects do when heated to a sufficiently high temperature.

How do we know the novæ are produced by the dash of meteoritic swarms? By means of the spectroscope, from which we have derived our great, though even to-day imperfect, knowledge of the heavenly bodies. A spectrum of the new star and of Alpha Persei show that they differ very markedly. The

are certain bright lines in the nova spectrum which do not appear in the other, and as Sir Norman Lockyer says in the "Sun's Place in Nature," "the same set of particles cannot be producing bright and dark lines at the same time." Obviously, therefore, the dark lines come from one body and the bright ones from another, or, as he says in regard to the spectrum of an earlier nova discovered in February,



THE TWO-PRISM SPECTROSCOPE MOUNTED ON THE 30IN. REFLECTOR FOR OBTAINING THE PHOTOGRAPHS OF THE SPECTRUM OF THE NOVA AT THE SOLAR PHYSICS OBSERVATORY.

that statement of immensity of distance I might content myself.

Perhaps, however, a more vivid way of putting the star's place may be to record Sir Norman Lockyer's own view on the subject. This is that the appearance of the star is due to events which occurred anywhere from a quarter to half a century ago, during which period the light has been travelling to our earth. Reflect for a moment that light travels at the rate of 186,000 miles a second, and then let those who have a taste for figures on an enormous scale do the multiplying for themselves. The figures even for twenty-five years, instead of fifty, will, no doubt, prove sufficiently large even for their edification.

The next question we naturally ask in the

1892, "the photographs which were taken of the spectrum of this same body put beyond all question the fact that we were really dealing with two bodies and not with one."

Calculations derived from the comparison of the lines of the spectra of the two swarms show that they came together when they were moving at the rate of about 700 miles a second.

The spectrum is photographed by attaching the spectroscope to the eye-piece of the telescope as shown in the last illustration. The ray of light passes through the prism, is broken up into its constituent parts, and these falling on a sensitive plate in a camera, are so photographed in the ordinary way.