

COMET B, 1881.

With the drawings of the above comet we received from Professor Edward S. Holden the following letter:

WASHBURN OBSERVATORY, }
MADISON, WISCONSIN, }
July 9, 1881. }

To the Editor of "SCIENCE."

MY DEAR SIR—As you request, I send you with this, the drawings of the head of the bright comet which have been made here. The 15½-inch equatorial, with the zone eyepiece (field 25.5, power 145), has been used. The drawings have all been made by me, and in them *the darker the shading, the brighter the corresponding part* of the comet.

Very sincerely yours,
EDWARD S. HOLDEN.

DESCRIPTION OF ILLUSTRATIONS.

Figure 1. June 24, 1881, 14h., m. t.

" 2. " 25, " 10h., m. t. Hazy and outlines of comet not well seen. The drawing shows only the structure of the head. The nucleus is not round, and is eccentric in the envelopes.

Figure 3. June 26, 1881, 11h., 22m., m. t. Hazy and clouds. The dark semi-circular line in upper part of nucleus represents a dark part.

Figure 4. June 27, 1881, 13h., m. t.

" 5. " 28, " 10h., m. t.

" 6. " 29, " 9h., 30m., m. t.

" 7. July 8, " 10h., 35 m.—Moonlight.

The nucleus is not double. There is a dark, narrow channel between the following side of the nucleus and the envelopes, as in the figure.

Figure 8. July 11, 1881, 9h., 30m., m. t.—Strong moonlight and twilight.—In this figure, which is engraved differently to the others, the white part represents light, and the shading darker portions.

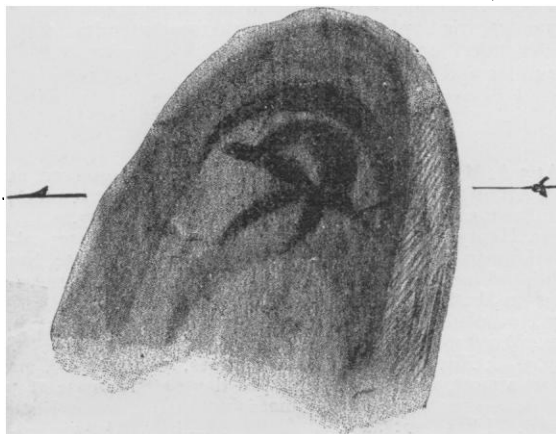


FIGURE 4.

Advices from Europe state that this comet was observed by Dr. Elkin, of the Royal Observatory, Cape of Good Hope, who states that after a week of overcast sky the comet was found there on May 31. Mr. L. A. Eddie, F.R.A.S., of Graham's Town, saw it on May 27, and others claim to have seen it two days earlier. On June 4 the tail was 6° long, coma 20 minutes, and nucleus 20 seconds in diameter; the comet was as bright as α Columbae.

Mr. William Huggins states that "On Friday night, (June 24) I obtained, with one hour's exposure, a photo-

graph on a gelatin plate of the more refrangible part of the spectrum of the comet which is now visible. This photograph shows a pair of bright lines a little way beyond H in the ultra-violet region, which appear to belong to the spectrum of carbon (in some form) which I observed in the visible region of the spectra of telescopic comets in 1866 and 1868. There is also in the photograph a continuous spectrum in which the Fraunhofer lines can be seen. These show that this part of the comet's light was reflected solar light.



FIGURE 3.

This photographic evidence supports the results I obtained in 1868, showing that comets shine partly by reflected solar light, and partly by their own light, the spectrum of which indicates the presence in the comet of carbon, possibly in combination with hydrogen."

The following spectroscopic notes, by W. H. M. Christie, of the Royal Observatory, Greenwich, will be read with interest:

With the Sheepshanks equatorial (6½ inches aperture) the head showed the want of symmetry that has been remarked in some other comets. On June 24 the preceding side was much the brighter, there being a strong brush or

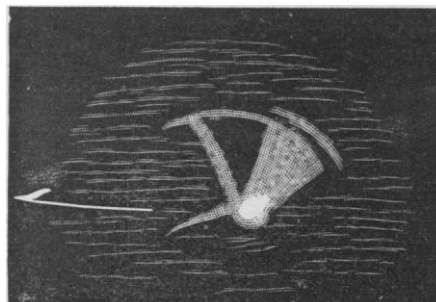


FIGURE 8.

arc of light on that side, with a bright fan close to the nucleus and a much smaller arc on the following side, the two arcs appearing to spring from the nucleus on opposite sides, and higher up to interlace. A very remarkable feature was a straight wisp of light extending from the nucleus nearly along the axis of the tail. On June 25 this had become much less striking, and the appearance of the head had entirely changed. The following side was then much the brighter, and the general appearance was that of a parabolic envelope, with a much brighter unsymmetrical parabola placed within it, the latter having its focus on the following side of the nucleus, and its axis turned round in the direction $n p s f$ from that of the tail.

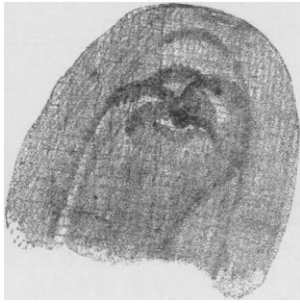


FIG. 5.

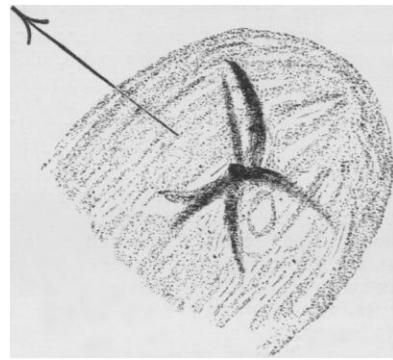


FIG. 2.

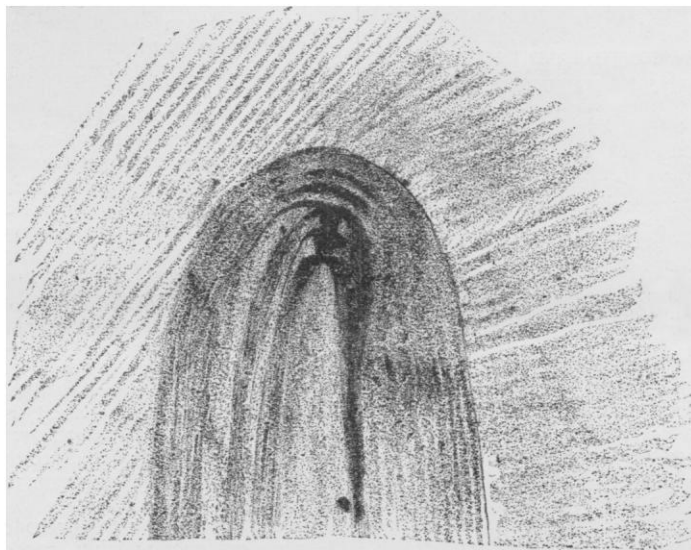


FIG. 1.

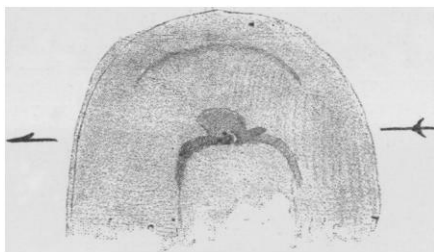


FIG. 7.

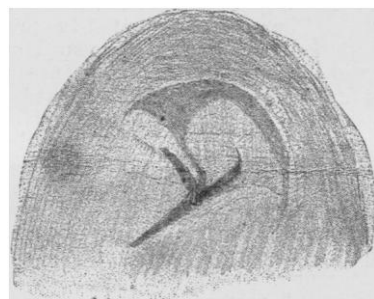


FIG. 6.

Drawings of Comet B, 1881, made by Prof. EDWARD S. HOLDEN, Washburn Observatory, Wis.

The greater part of the head gave a bright continuous spectrum, obliterating the usual cometary bands, but one portion showed three bands, in the green, blue, and violet respectively. Measures of the principal band in the green show that it coincides with the band in the first spectrum of carbon (blue base of flame) at 5165, and not with that of the second spectrum (vacuum-tube) at 5198. The bands in the blue and violet appear to correspond, as nearly as could be estimated, with bands in the first spectrum of carbon. These observations were made with the half-prism spectroscope mounted on the 12½-inch equatorial, a dispersive power of about 18½° from A to H being used, with a magnifying power of 14 on the view-telescope, as in the measures of star-motions in the line of sight. No decided polarisation was detected either in the head or the tail. Cloudy weather has prevented any observation of the comet since June 25.

THE UNITY OF NATURE.

BY THE DUKE OF ARGYLL.

IX.

THE ORIGIN OF RELIGION CONSIDERED IN THE LIGHT OF THE UNITY OF NATURE.

(Continued.)

These conceptions seems to have taken their form from the very violence of the revulsion which they indicate and explain. The peculiar tenet of Buddhism, which is or has been interpreted to be a denial of any Divine Being or of personal or individual immortality, seems the strangest of all doctrines on which to recommend a life of virtue, of self-denial, and of religious contemplation. But the explanation is apparently to be found in the extreme and ridiculous developments which the doctrines of Divine Personality and of individual immortality had taken under the Brahminical system. These developments do indeed seem almost incredible, if we did not know from many other examples the incalculable wanderings of the human imagination in the domain of religious thought. The doctrine of the transmigration of souls at death into the bodies of beasts was a doctrine pushed to such extravagances of conception, and yet believed in with such intense conviction that pious Brahmins did not dare even to breathe the open air lest by accident they should destroy some invisible animalculæ in which was embodied the spirits of their ancestors. Such a notion of immortality might well oppress and afflict the spirit with a sense of intolerable fatigue. Nor is it difficult to understand how that desire of complete attainment, which is, after all, the real hope of immortality, should have been driven to look for it rather in reabsorption into some one universal Essence, and so to reach at last some final rest. Freedom from the burden of the flesh, rendered doubly burdensome by the repeated cycles of animal existence which lay before the Brahmin, was the end most naturally desired. For, indeed, complete annihilation might well be the highest aspiration of souls who had before them such conceptions of personal immortality and its gifts. A similar explanation is probably the true one of the denial of any God. A prejudice had arisen against the very idea of a Divine Being from the concomitant ideas which had become associated with personality. The original Buddhist denial of a God was probably in its heart of hearts merely a denial of the grotesque limitations which had been associated with the popular conceptions of Him. It was a devout and religious aspect of that most unphilosophical negation which in our own days had been called the "Unconditioned." In short, it was only a metaphysical, and not an irreligious, Atheism. But although this was probably the real meaning of the

Buddhistic Atheism in the mind of its original teachers, and although this meaning has reappeared and has found intelligent expression among many of its subsequent expounders, it was in itself one of those fruitful germs of error which are fatal in any system of Religion. The negation of any Divine Being or Agency, at least under any aspect or condition conceivable by Man, makes a vacuum which nothing else can fill. Or rather, it may be said to make a vacuum which every conceivable imagination rushes in to occupy. Accordingly, Buddha himself seems to have taken the place of a Divine Being in the worship of his followers. His was a real personality—his was the ideal life. All history proves that no abstract system of doctrine, no mere rule of life, no dreamy aspiration however high, can serve as an object of worship for any length of time. But a great and a good man can always be deified. And so it has been with Buddha. Still, this deification was, as it were, an usurpation. The worship of himself was no part of the Religion he taught, and the vacuum which he had created in speculative belief was one which his own image, even with all the swellings of tradition, was inadequate to fill. And so Buddhism appears to have run its course through every stage of mystic madness, of gross idolatry, and of true fetish-worship, until, in India at least, it seems likely to be reabsorbed in the Brahminism from which it originally sprang.

And so we are carried back to the origin of that great Religion, Brahminism, which already in the sixth or seventh century before the Christian era had become so degraded as to give rise to the revolt of Buddha. The course of its development can be traced in an elaborate literature which may extend over a period of about 2000 years. That development is beyond all question one of the greatest interest in the history of Religion, because it concerns a region and a race which have high traditional claims to be identified with one of the most ancient homes, and one of the most ancient families of man. And surely it is a most striking result of modern inquiry that in this, one of the oldest literatures of the world, we find that the most ancient religious appellation is Heaven-Father, and that the words "Dyaus-pitar" in which this idea is expressed are the etymological origin of Jupiter *Zeûsπατήρ*—the name for the supreme Deity in the mythology of the Greeks.

We must not allow any preconceived ideas to obscure the plain evidence which arises out of this simple fact. We bow to the authority of Sanskrit scholars when they tell us of it. But we shall do well to watch the philosophical explanations with which they may accompany their intimations of its import. Those who approach the subject with the assumption that the idea of a Divine Being or a Superhuman Personality must be a derivative, and cannot be a primary conception, allow all their language to be colored by the theory that vague perceptions of "The Invisible" or of "The Infinite," in rivers, or in mountains, or in sun and moon and stars, were the earliest religious conceptions of the human mind. But this theory cannot be accepted by those who remember that there is nothing in Nature so near to us as our own nature,—nothing so mysterious and yet so intelligible,—nothing so invisible, yet so suggestive of energy and of power over things that can be seen. Nothing else in Nature speaks to us so constantly or so directly. Neither the Infinite nor the Invisible contains any religious element at all, unless as conditions of a Being of whom invisibility and infinitude are attributes. There is no probability that any abstract conceptions whatever about the nature or properties of material Force can have been among the earliest conceptions of the human mind. Still less is it reasonable to suppose that such conceptions were more natural and more easy conceptions than those founded on our own personality and the personality of parents. Yet it seems as if it were in deference to this theory that Professor