

## A MAHOMEDAN VIEW OF COMETS. THE VIEW OF THE ANCIENT IRÂNIANS (PISHINIGÂNS).<sup>1</sup>

### I

We are on the eve of seeing Halley's comet this year or early next year. Some observers have already seen it with their powerful telescopes.

The Directors of the Heidelberg and the Cambridge Observatories have already seen it. The Director of the latter Observatory has announced that its appearance is like that of a star of the 14th or 15th magnitude. At this juncture, I hope that an account of the comets given by some Mahomedan historians will be found interesting, I think that a part of account will be of some interest even to scientific men because, if I do not mistake, the account of the comets by Abûl Fazl, which will form the principal part of my paper will be presented for the first time before the students of cometography. I propose dealing with the following matter in this paper :

1. The version of some Mahomedan historians about comets ;
2. The identification of the comets seen or described by them ;
3. An inquiry into the views of Mahomedan writers on comets.

List of the Mahomedan authors referred to in the paper.

The Mahomedan authors whose versions I propose giving, or whom I am going to refer in this paper are the following :

1. Maçoudi, who lived at the end of the third century and in the first half of the fourth century. There is only one reference to a comet in his *Murûdj adh-Dhahab* (Prairies of gold).

2. Abûl Fazl, the celebrated Prime Minister of king Akbar of India. He describes in his *Akbar-nâmeh* a comet that he had seen in the 22nd year of the reign of Akbar (985 Hijri, 1577-78 A.D). Before describing this comet, he writes as it were, a long introduction giving not only his view of the phenomenon of the appearance of a comet, but the view of the learned of his time. While doing so, he refers to Greek, Roman, Egyptian and Hindu writers on the subject also. Having given his introduction, he describes three comets that had appeared before his time. Of course, this must be on the authority of some previous writers whom he does not name. This account of the comets will, I hope, interest some scientific men. As far as I know that portion of the *Akbar-nâmeh* which gives this

<sup>1</sup> This paper had, at first, appeared in an issue of the "Revue du Monde Musulman" (40 Année No. 1) The Editor spoke of the paper as containing "curieuses et erudites recherches sur un point mal connu de l'histoire et de la science musulmanes."

long account of the comets is not hitherto translated into any other language. I give my own translation in which I have followed the text edited for the Asiatic Society of Bengal by Maulawi Abd-ur-Rahim.

3. Ahmad-bin Mahmud's *Nigâristan* written in 1552 A.D.
4. Nizâm-ud-din the author of the *Tabakât-i-Akbarî*.
5. Badaoni, the author of the *Muntakhab-al-Tawârikh*.
6. Jahângir's *Waka'ât-i-Jahângiri*.
7. Mutamad khân's *Ikbâl-nâme-h-i-Jahângiri*.

I will now give the version of the Mahomedan historians I have named above. I will give the versions of four in the words of their translators. The rest I have translated from the original.

I will give at first Abûl Fazl's version about the comets as it is the largest and fullest. As said above, I give my own translation of his version in the Akbar-nâme-h: <sup>1</sup>

## II.

ABUL FAZL'S VERSION OF THE COMETS OF 1264,  
1400, 1401, 1433, AND 1577 IN HIS ABKAR-NAMEH.

"In the matter of the appearance of a tailed comet which appeared after sunset (*lit.* after the time of the sitting of the great luminary which bestows favours upon the world—on the chair of the crust of the Earth).

"A Preface is written for a complete comprehension of the description of the symbol of the Heavens.

"When the rays of the world-illuminating sun fall on the moist earth, it is heated by the lustre of that exalted luminary, and some of the particles of water, becoming lighter, rise upwards, and mixing with particles of air take an upward direction. This mixture is called "vapour" (*bokhâr*).

"When the parched earth becomes the seat of the heat of the illuminator of the world (*i.e.* when it is heated by the sun), the essence of moisture from its embuscade is attached to dryness. Then by the influence of the heat, particles of earth being heated become lighter and after mixing themselves with air fly above and that inter-mixture is called steam (*dakhân*).

Each of these is of two kinds. One is confined to the Earth, and springs, streamlets and streams come into appearance,<sup>2</sup>

<sup>1</sup> Maulawi Abd-ur-Rahim's Text for The Asiatic Society of Bengal vol. III, pp. 221 224.

<sup>2</sup> This refers to the action of what Abûl Fazl calls *dakhân* or steam. Here he explains, not in a clear or distinct way, how streams and springs are formed. Modern science also attributes to the formation of steam the rise of springs, etc. Prof. Anstead's following description elucidates what Abûl Fazl says:

“The second, appearing on the surface, rises up pompously. From this are formed clouds, rain, hail, thunder, lightning and such other phenomena. Books of natural science give explanatory accounts of these very clearly.

“Now, let a little of the manifestation of that wonderful image (*viz.* the comet) be written for the pleasure of the gardenground of information (*i.e.* I will now write something about the phenomenon of a comet for the information of my readers.)

“It is not concealed from (*i.e.* it is known to) the writers of wisdom, that every time Mars attains ascendancy over the tract of a country, it makes the land of the country dry, and foul vapour and steam arise in large quantities, especially, in the commencement of the year or the season, when Mars is in the 10th and when the unhappy constellation may be that of *bâdî* (*i.e.* that of Gemini, Aquarius and Libra) and of *atashî* (*i.e.* of Aries, Leo and Sagittarius) and when the Moon or Mercury is in the *bâdî* (*i.e.* in Gemini, Aquarius and Libra) so that it looks towards them with an eye of amity. Anyhow, fields are then devastated and the beginning of a famine is in sight; sickness is prevalent; calamities gain strength, and the thread of the pursuit of knowledge is broken.

“In short, when the tenacious thick vapour (rising) from its seat, attaches itself to the first layers of atmosphere which are heated, it acquires a pleasant look (*i.e.* is illuminated), just as the lamp-black of a lamp becomes illumined from its contact with a lighted candle. It is then called *shahâb* (*i.e.* meteor). When it begins coming down to the earth, common people think, that it is a star that is coming down. If that does not happen on account of its connection, it is not illuminated, but burns and, profiting by the different kinds of weather, assumes different forms, like those of a man with locks of hair, a person having a tail, a person holding a lance in his hand, an animal with horns

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“Of the water that falls on the earth as rain, we have seen that a certain part runs off the surface by rivers into the sea, or is evaporated back again into the atmosphere within a very short time. The remaining part disappears. It passes into the earth's crust, being absorbed into the soil and surface-rocks, or entering the innumerable crevices and fissures that exist in all rocks near the surface. Making its way through permeable rocks, such as sand, or passing into natural reservoirs or along some underground channel, it circulates through the earth for a time, longer or shorter according to circumstances, and comes at length once more to the surface. If it falls in a district greatly above the sea level, it may issue in springs at some lower part of the same country, or, by the pressure it exerts when the rocks are full, may force out other water that has already performed a long journey. If it falls near the sea, it may still be brought back into circulation, for we know that the temperature of the interior of the earth is higher than at the surface; and it is quite possible that a little water, penetrating the depths at which it would be converted into steam, may exercise a pressure sufficient to overcome the force of gravity and help to force up large columns of water from great depths, which may either rise through fissures at a high temperature in thermal springs, or, oozing upwards, may again become cooled before reaching the surface. It may and does re-appear in this way naturally and at ordinary temperatures. All water obtained or obtainable from the interior of the earth is called *spring water*; and all sources of water within the earth are called *springs*.” (*Physical Geography*, by Prof. Ansted, 1871, p. 213).

or the like. Depending on the differences of its position, it fades soon, or lasts long. At times, dreadful red<sup>1</sup> or black forms appear in it. The red forms when thick add to the terror. When thicker, it is the black forms that cause terror. In the ancient language, such a form is named *sawâbi-i-najum*<sup>2</sup> or *Zawat'ul azwâb*<sup>3</sup>. Every one (of these forms) has a different name according to its feature. Thus the one with locks is called *Zuzavâbê* (i.e. the possessor of locks of hair) and the one with a tail is called *Zuzanâb* (i.e. the possessor of a tail).

"In Indian books, more than 100 (names) are recounted. In Greek books, 7 kinds are recognized and all are considered to be of the nature of Saturn or Mars. Those with locks of hair and those with tails are known to be more unlucky. Batlimus (Ptolemy) says that between the hairy comets and the sun, there is the difference of 11 constellations. Some Greeks are of opinion that the hairy comets appear towards the West in the early part of the evening. Certainly from the repeated sight (of such phenomena) such a supposition can be made.

"The wise men of India divide them into two kinds and take them to be auspicious and inauspicious (respectively). All are unanimous in saying this, that its (i.e. the comet's) influence is reflected upon the country over whose zenith it passes or whose best inhabitants see it. It moves according to the position of the constellation in which it appears and in accordance with the strength of the motion of the region of fire<sup>4</sup>. Its influences appear in proportion to (the time of) its stay, (i.e.) the longer it appears, the greater its influences as to good or bad luck to the country. In the writings of the ancients, *nirangs* (نیرنگ, incantations) for (counteracting) these influences are mentioned more than can be described.

"Out of all (these comets) one hairy comet appeared in the year 662 Hijri<sup>5</sup>. The increaser of the splendour of the world (Farugh afzâ-i-âlam) was in the sign of Leo and had gone about 11 fingers<sup>6</sup> down the earth (i.e. had set) in the night. The stranger thing was that (i.e. the comet) appeared to be of the proportion of the head of a big man and emitted steam from its front. It passed (i.e. appeared) in the countries of Tibet, Turkestan, China, Kashghar, Farghana, Ma'wara'u'n-nahr

<sup>1</sup> Cf. the description of the appearance of Halley's comet in 1835 by Mr. Heward: "It glowed like a red-hot coal of oblong form." It appeared like "a blazing rocket." (The Story of Halley's comet, in *The Nineteenth Century* of September 1909, p. 523).

<sup>2</sup> Lit. "a keeper of the ward-robe of the stars."

<sup>3</sup> I. e. "mistress of locks."

<sup>4</sup> Compare with these the words. "The Chariot of Fire" applied to a comet by Mr. E. Vincent Heward in his "Story of Halley's Comet", *The Nineteenth Century* of September 1909, p. 512.

<sup>5</sup> A. C. 1264.

<sup>6</sup> A kind of measure.

(Transoxania) and Khorasan. It appeared for 85 days. In all these countries, there arose rebellions. In Transoxania and Khorassan calamities of thunder<sup>1</sup> and lightning and such others appeared.

"Many years and months had passed over this event and then in 803<sup>2</sup>, a tailed comet appeared in the zenith at Rûm (Constantinople). Maulâna Abdallalasan and Mahiad-din Maghrabi with other astrologers of that time informed Timur, that, it appears from what the wise and the experienced have said, that an army (coming) from the direction of the East will be victorious in that country and a general from that country will assist (him). Timur (*lit.* that illuminator of the face of fortune), who was always expecting an invasion of the country, but whose companions of poor intelligence did not acquiesce, attended to that (prediction) and convinced the great and the small (of his court) of the truth (*lit.* gem) of his resolution and of the insight of the star-seers.

"In the year 837<sup>3</sup>, on the occasion of a new moon in the first part of Libra, a tailed comet appeared (*lit.* gave brilliancy to the day) near the 17th lunar mansion in the North. It rose and set with it. After the lapse of several days, its special motion appeared. From that 17th lunar mansion in the North, (a form like that of) a lance-holder separated (*lit.* assumed the face of separation), and in eight months, took the path of the Camel. A great pestilence spreading misery (round about) appeared in Herat and its dependencies. Every day more than a thousand persons died. Mirza Ibrâhim, the Governor of Fars and Mirza Bysangar Arghun, the king of Badakhshan, and Shaikh Zainuddin Khâfi died in this calamity. A fierce quarrel, which took place between Mirza Shâh-rokh and Sikandar Karâ-Yusef, was also in consequence of this (comet).

"The learned in the mysteries of the Heavens are convinced of this, that if it appears within the boundaries of a country, its king or his vicegerent dies. If it is inclined towards the boundary, the property (*i.e.* the country of the governor) passes away from his hands<sup>4</sup> and plague and diseases add afflictions to the sickness of the country. Sudden deaths occur among the common people.

<sup>1</sup> Taking the word to be ra'ad رعد, The Bengal Asiatic Society's text gives the word as kayâd (کاید) which is the last star in the tail of the Lesser Bear. It also means a governor. But these seem to have no proper meaning here. In the foot-note, it gives rayad (راید) as found in another manuscript. I think it is mistaken for ra'ad (رعد) which suits well with the next word (براق) barâk, flashing.

<sup>2</sup> A. D. 1401.

<sup>3</sup> A. D. 1433.

<sup>4</sup> Cf. the words of Louis le Debonnaire on seeing Halley's comet in 837 A.D. He said "A change of reign and the death of a prince are announced by this sign" (The story of Halley's comet, in *The Nineteenth Century* of September, 1909, p. 518).

“A thousand thanks to God, that owing to the benedictions of the holy soul of the King (Akbar), influences and misfortunes have disappeared from his dominions. If, in case, such a terrible sign (*i.e.* a comet) appears, a great calamity does not overtake this country. In spite of such divine protection, that intelligent person of the assembly of information (*i.e.* the intelligent well-informed king Akbar) ordered alms to be distributed on a large scale according to the customs of the Mahomedans and Brahmans and people of all places became cheerful. The most beautiful thing of this great liberality (*i.e.* the result of this alms-giving) was this : On the day Arad (Arshisang), the 25th of the Ilâhi month Abân, at the time when the sun made his conspicuous appearance in the sign Scorpio, this heavenly sign (*i.e.* the tailed comet) kindled its brilliant face in the sign of Sagittarius, faced towards the West (and) inclined towards the North. It had a long tail. It had reached such a limit, that in many towns they saw it for five months. The well-informed astrologers, and those skilled in the mysteries belonging to the higher (*i.e.* celestial) assembly, explained it thus :

That among some of the inhabited parts Hindustan, there will be a scarcity of grain, and they specified some particular places. The time of the ruler of Irân will come to an end, and in Irak and Khorasan there will arise disturbances.” All, that was said, came to pass without anything being less or diminished. A short time after, a caravan came from Iran. Some of its well-informed men of truthful mind informed His Majesty of the death of Shah Tahmasp and of the murder of Sultan Haidar and of the accession to the throne of Shah Ismail.

The purport of all this detailed account is this : The king of heavenly abode (*i.e.* king Tahmasp) died in Kazvin in the beginning of the Ilâhi month Khordâd<sup>1</sup>.”

### III.

#### VERSION FROM OTHER MAHOMEDAN WORKS.

I will now give the version of the other Mahomedan writers in the order in which I have named them above.

Maçoudi's  
Murûdj udh-  
Dhahab.

Maçoudi, speaking of the events of the Hijri year 299 (911-12 A.C.), thus speaks of the appearance of a comet in that year :

“Une grêle énorme, composée de grêlons pesant un *ritl*, poids de Bagdad, tombe sur Koufah en même temps qu'une bourrasque de sirocco, au mois de ramadan ; plusieurs maisons et édi-

<sup>1</sup> Here follows an account, as to how king Tahmasp died, and Sultan Haidar was murdered and Shah Ismail came to the throne.

frices sont renversés. Ce sinistre est suivi d'un tremblement de terre qui coûte la vie à un grand nombre d'habitants. Ces désastres eurent lieu à Koufah en 299.—La même année est signalée par un tremblement de terre en Egypte et par l'apparition d'une comète <sup>1</sup>.

In the year 330 (Hijri)<sup>3</sup> there appeared a Comet whose tail appeared from the East to the West. It remained for eighteen days. From the influence of this inauspicious sign, one *jarib* <sup>4</sup> of wheat cost 320 golden-*miskáls*<sup>5</sup>. When one ear of corn was worth a beast of burden<sup>6</sup> the price of wheat rose so high. Men ate one another out of hunger. In the time of famine a plague appeared, so (virulent) that people had not the strength of burying the dead.

“At this period, at the time of evening prayer, a comet appeared in the sky towards Arabia, inclining to the North, and continued very awful for two hours. The opinion of the Astrologers was that the effects would not be felt in Hindustán, but probably in Khorásán and Irák. Shortly afterwards, Shah Ismail, son of Shah Tahmasp Safavi departed this life, and great troubles arose in Persia”—<sup>8</sup>.

I have given Elliot's translation, but have corrected it in one place. The first part of the passage, as given by Nizâm-ud-din, runs thus : ذکر ظاهر شدن دور دانه درین ایام در وقت نماز شام در طرف عرب مائل بشعال دور دانه روی (9) آسان ظاهر شد

Elliot seems to be wrong in translating the word “dar taraf-i Arab” by “towards the East”. The word “Arab” does not mean “East”. It simply means ‘Arabia’. So, the words should be

<sup>1</sup> MACOUDI, traduit par Barbier de Meynard, vol. VIII, p. 281-82.

<sup>2</sup> In this translation, I have followed the text published in 1245 Hijri = 1820 A. D., at the instance of Captain George Jervis (کپتان جورج جرویس صاحب) p. 70, l. 16 et seq. Vide ELLIOT'S *History of India*, vol. II, appendix, p. 585.

<sup>3</sup> *l. c.* 941-942 A. D.

<sup>4</sup> Jarib is “a cron measure equal to four qafiz”. Qafiz is a measure containing about 64 lbs. in weight” (Steingass)

<sup>5</sup> “A weight of a dram and three-sevenths” (Steingass).

<sup>6</sup> Parvin. It also means Pleiades.

<sup>7</sup> The beginning of the 23rd year of Jahangir's reign corresponded with Tuesday, the 2nd Muharram 986 H. (11th March 1578).

<sup>8</sup> Elliot's *History of India*, vol. V, p. 407.

<sup>9</sup> Tabakát-i Akbari. *Munshi Naval Kishore's* lithographed edition of 1875 A.D. (1292 Hijri), p. 339, lls. 3-4.

translated "towards Arabia". Now, as Arabia is in the West, the words may be translated "towards the West." This translation will then tally with the statements of Badaoni and Abûl Fazl, who say that the comet appeared in the West (مغرب, maghreb).

There is one thing to be noticed in Nizâm-ud-dîn's writing: He uses the word "dur-daneh" (دور دانر) for a comet. I do not find the word in the well-known *Persian-English dictionaries* of Richardson and Steingass nor in the *English-Persian dictionary* of Woolaston. The *Tabakât-i Akbari* alone uses it for "a comet." I think this word is an attempt to render into Persian "Gurcheher," the Pahlavi word for comet, which can also be read "dur cheher." We will speak of the Pahlavi word at some length later on.

"Among the unexpected events (one) was this that in the same year a comet appeared from the direction of the west. When Shah Mansûr left a long tail from behind in the corner of his turban, they named him (in joke) 'a tailed comet'. The effects of this comet appeared in that country."

Badaoni, like Abûl Fazl, places the event in the 22nd year of king Akbar's reign, while Nizam-ud-din, as seen above, places it in the 23rd year. Elliot thus explains the discrepancy :

"The twenty-second year began on the 20th Zi-l hijja, 984 and being a solar year, it extended over the whole of Hijja 985, and ended on the 1st day of 986. The oversight of this fact has given rise to some confusion in the dates about this period; and the events here recorded as having occurred in the twenty-third year of the reign are placed by Abûl Fazl in the twenty-second<sup>2</sup>."

When identifying the comet of king Akbar's reign later on, we will see that it appeared in 1577, the 22nd year of Akbar's reign.

The version of the author of the *Wakiât-i Jahangiri* about the two comets that appeared in 1618 in king Jahangir's reign runs thus: (ELLIOT'S *History of India*, vol., VI. p. 363).

"Saturday, 17th Zi-l ka'da<sup>3</sup> Several nights before this, a little before dawn, a luminous vapour, in the form of a column,

<sup>1</sup> Lees and Ahmad Ali's *Text*, vol. II, p. 240, I. 16; p. 241, I. 5. I give my translation from this text. *Vide* Lowe's translation, vol. II, p. 248. *Vide* also *L'Empereur Akbar* par le Comte F. A. De Noer traduit de l'allemand par G. Bonet-Maury, vol. I, p. 262.

<sup>2</sup> Elliot's *History of India*, vol. V, p. 403, no. 1.

<sup>3</sup> The year was Hijri 1027, A.D. 1618. The date corresponds to 10th March 1618. *Vide* Elliot's *History of India*, Vol. VI, p. 356.



had made its appearance, and every succeeding night it arose half an hour earlier than on the preceding night. When it had attained its full development, it looked like a spear with the two ends thin, but thick about the middle. It was a little curved like a reaping-sickle, with its back towards the South, and its edge towards the North. On the date above-mentioned, it rose three hours before sunrise. The astronomers measured its size with their astrolabes, and, on an average of different observations, it was found to extend 24 degrees. Its course was in the empyrean heaven, but it had a proper motion of its own, independent of that firmament, as it was retrograde—first appearing in the sign of the Scorpio, then in that of the Scales. Its declination was southerly. Astrologers call such a phenomenon a spear, and have written that it portends evil to the chiefs of Arabia, and the establishment of an enemy's power over them, God only knows if this be true!

“ Sixteen nights after its first appearance, a comet appeared in the same quarter, having a shining nucleus, with a tail in appearance about two or three yards long, but in the tail there was no light or splendour. Up to the present time, nearly eight years have elapsed since its first appearance, and when it disappears, I shall take care to record it, as well as the effects which have resulted from it. ”

From the above extract, perhaps one may be led to suppose that the comet continued to appear for eight years. We will explain this matter later on while identifying this comet.

The version of Mutamadkhan, in his *Ikbâl Nâme-h-i Jahân-giri*, about the first of the comets of 1618  
 Mutamadkhân's *giri*, about the first of the comets of 1618  
 I k b â l - n â m e h - i runs thus, (ELLIOT'S: *History of India*, vol.  
 Jahângiri. VI, pp. 406-7) :

“ On the 16th of December, an hour and a quarter before the dawn of the day, there appeared in the atmosphere a vaporous matter in the shape of a column, and it was seen half an hour earlier every succeeding night. When it appeared in its full form, it resembled the shape of a javelin. It was thin at both ends, and thick and crooked in the middle like a sickle. Its back was towards the south, and its face towards the north. The astronomers measured its size by means of an astrolable, and upon a comparison of different observations, it was found to extend over 24 degrees. It moved with the highest of the heavens, but had a proper motion of its own; so that it first appeared in the sign of Scorpio, and in a short time left it, and entered that of Libra. It also had a southerly declination. Astrologers, in their books, mention such a phenomenon under the name of a javelin. Sixteen nights after its appearance, a star was seen in the

same direction, the head of which was luminous; but its tail, which was two or three yards long, emitted no light. It was in consequence of its appearance that a pestilential disorder (*wabâ o tá'ân*) spread throughout this extensive country of Hindûstân, which exceeded everything known and recorded in former ages, nor is there any mention made of such in the authentic works of the Hindûs. The pestilence arose in the country one year before the appearance of the phenomenon, and continued to rage for eight years. It was also through the effects of this phenomenon that a misunderstanding arose between His Majesty and the fortunate Prince Shâh Jahân. The disturbances which thus originated lasted seven or eight years. What blood was shed in the country! and what families were ruined!

“At this time it was learnt from the petition of Bahadur Khân, governor of Kandahâr, that in the environs and dependencies of the city, the mice had increased to such an extent that they left no trace of either crops or fruits. With the greatest difficulty, perhaps, only one-fourth of the produce was saved to the cultivators. In the same manner, the fields of melons, and the produce of orchards and vineyards were totally destroyed; and when no fruit and no corn remained in the gardens and in the fields, by degrees the mice all died off.”

#### IV.

#### IDENTIFICATION OF THE COMETS.

We will now proceed to identify the comets described by the above-named Mahomedan authors. Mr. J. Russel Hind's book on comets has been of great use to me in identifying them. The comet referred to by Nizâm-ud-din's *Tabakât-i Akbari* and by Badaoni's *Muntakhab-ut-Tawârikh* is the same as that which is the fourth in the list of Abûl Fazl; so they do not require a separate identification. We will proceed in our work of identification in the chronological order of their appearance. The oldest comet referred to is the one mentioned by Maçoudi.

The comet of Hijrî 299 (911-912 A.D.), referred to by Maçoudi, is Halley's comet in one of its previous revolutions. Mr. Russel Hind, in his book on Comets<sup>1</sup> gives a table of the most probable epochs of the perihelion passages of Halley's comet, commencing from 11 B.C. Therein we find its 13th appearance in 912 A.D. This date corresponds to Maçoudi's Hijri date 299.

<sup>1</sup> *The Comets*, by J. Russel Hind, 1852, p. 57.

Elliot<sup>1</sup> surmised that the comet of Hijri 330 (941-942 A.D.), referred to in the Nigâristân, was Halley's comet, one of whose probable appearance has been reckoned to be in 930 A. D. He surmised that, as there is always a difference of a few months between each period of its appearance, due to the action of planets and to other causes, this difference of nearly 11 years may be accounted. But Russel Hind has, in his book<sup>2</sup> on Comets, given a list of the epochs of its perihelion passages on former occasion, from the date of its last appearance 1835 A.D. to 11 B.C. We do not find in that list its appearance in 941-942 or thereabouts. So for the present, we must take it as an unidentified comet.

The first comet referred to by Abûl Fazl is that of the year 1263-1264 (Hijri 662). This comet is referred to in the Nigâristân. It passed, its perihelion on 6th July 1264 at 6 h., 50' 39", according to the meantime of Greenwich<sup>4</sup>. Mr. Hind says of it that it was a great comet and that "it was accompanied by a train fully 100° long, agreeably to the Chinese description, while European contemporaries tell us, when the head was just clear of the eastern horizon, the tail stretched past the mid-heaven westward, which seems to indicate an extent of more than 90°<sup>5</sup>

Further on, Hind speaks thus of this great comet: "One of the grandest comets mentioned in history is that which made its appearance in the middle of the year 1264. It is recorded in terms of wonder and astonishment by nearly all the historians of the age: no one then living had seen any to be compared to it. It was at the height of its splendour in the month of August, and during the early part of September. When the head was just visible above the eastern horizon in the early morning sky, the tail stretched out past the mid-heaven towards the west, or was fully 100° in length. Both Chinese and European writers testify to its enormous magnitude. In China, the tail was not only 100° long, but appeared curved in the form of a sabre. Its movement was from Leo, through Cancer and Gemini, into Orion. It continued visible until the beginning of October, historians generally agreeing in dating its last appearance on the 2nd of October, or on the night of the death of Pope Urban IV., of which event it seems to have been considered the precursor.

<sup>1</sup> Elliot's *History of India*, vol. III, p. 506, n. 1.

<sup>2</sup> *The Comets*, by J. Russel Hind, 1852, p. 57.

<sup>3</sup> *Fergusson's Astronomy*, explained upon Sir Isaac Newton's principles, by Dav Brewster, 1811, vol. II, p. 360.

<sup>4</sup> *The Comets*, by J. Russel Hind, 1852, p. 127. Hind gives the hour as 1.51

<sup>5</sup> *Ibid* p. 12.

“Some rough approximations to the elements have been attempted in the first instance by Mr. Dunthorne, in the middle of the last century, and subsequently by M. Pingrè, the well-known French writer upon the history of comets<sup>1</sup>”.

According to Russel Hind, the comet of 1556 which according to Fergusson's list passed its perihelion on 21st April was the same comet appearing after a period of 292 years. Then, it was not nearly so conspicuous as in 1264 but still was “a great and brilliant star<sup>2</sup>”. It seems to have gradually lost its brilliancy. Hind<sup>3</sup> predicted its return between 1856-1860. Two comets<sup>4</sup> have appeared within the period in 1859 and 1860, but none has been clearly identified with it.

Abûl Fazl, referring to the sign of Leo, also says, that it was seen in Tibet, Turkestan, China, Kâshghar, Fraghana, Mawara'-unnahr (Transoxania) and Khorassan, and that it continued to appear for 80 days. From this, we see that it was a great comet and was seen even in China in the farthest east. All these facts and the year identify Abûl Fazl's comet of 662 Hijrî as the great comet of 1264.

We are not able to identify the second comet of Abûl Fazl (Hijrî 803 A.D. 1400-1401) with any of the comets in the lists given in modern astronomy.

Coming to his third comet (Hijrî 837, A.D. 1433-1434) I think it is the same as that of 1433 referred to by Russel Hind<sup>5</sup> in his list of comets. It passed its perihelion on the 4th or 5th of November 1433. It was also observed by the Chinese<sup>6</sup>.

The fourth comet referred to by Abûl Fazl (Hijrî 985, A.D. 1576-1577, is the comet IX. of Fergusson's list,<sup>7</sup> which passed its perihelion on 26th of October 1577. Russel Hind also gives this comet in his list<sup>8</sup>. It was of this comet that Tycho Brahé found “that it had no diurnal parallax and that it was therefore situated at a much greater distance than the moon<sup>9</sup>”. This comet has been identified by Elliot<sup>10</sup>.

<sup>1</sup> *Ibid.*, pp. 116-117.

<sup>2</sup> *The Comets*, p. 117.

<sup>3</sup> *Ibid.*, p. 122.

<sup>4</sup> Newcomb's *Astronomy for Everybody*, 1903, p. 274.

<sup>5</sup> *The Comets* by Russel Hind, p. 127.

<sup>6</sup> *Ibid.*, p. 141.

<sup>7</sup> *Fergusson's Astronomy*, by Brewster, Vol. II, p. 360.

<sup>8</sup> *The Comets*, by J. Russel Hind, p. 128.

<sup>9</sup> *Fergusson's Astronomy*, by Brewster, vol. II, p. 355.

<sup>10</sup> Elliot's *History of India*, vol. V, p. 407.

The *Wakiât-i Jahângiri* refers to two comets that appeared in Jahângir's reign. Both appeared in the same year (Hijri 1027 A.D. 1617-1618) and after a short interval. We also find both from Fergusson<sup>1</sup> and Russel Hind<sup>2</sup> that two comets had appeared in 1618. The first had passed its perihelion on the 17th of August 1618 and the second on the 8th of November 1618.

Hind speaks of the second as "a splendid comet" and as "one of the finest ever observed"<sup>3</sup>. But according to the *Wakiât-i Jahangiri*, it was the first that was more splendid. Of the second, he says, that it appeared sixteen nights after the first and that there was no light or splendour in its tail. In connection with this matter of difference between the Mahomedan writer and the later Christian writer, it is worth noting, that according to Hind, the observations of Kepler on the first of the two comets were "somewhat imperfect."<sup>4</sup>

From the description of the *Wakiât-i Jahângiri*, one may be led to think that the comet continued to appear for eight years. But as the *Ikbâl-nâmeh's* description of the same comet, which, to a certain extent, follows that of the *Wakiât-i Jahângiri*, points out, the reference is to the supposed disastrous and unlucky influences of the comet. These were believed to have lasted long for nearly eight years.

We will here give a list of the comets referred to in this paper, which will present to the reader, at one sight, the dates of their appearances and an idea of their identification. In giving the Christian dates of the Hijri years of the Mahomedan authors, I have followed this rule :

"From the given number of Mahomedan years, deduct 3 per cent. and to the remainder add 621·54". The corresponding rule for vice versa is : "From the given number of Christian years, deduct 621·54 and to the remainder add 3 per cent. of the same." Wollaston gives, at the end of his *English-Persian Dictionary*, a list of the Mahomedan years and their corresponding Christian years.

1 *Fergusson's Astronomy*, by Brewster, vol. II, p. 360.

2 *The Comets*, by Russel Hind, p. 128.

3 *Ibid.*, p. 144.

4 *Ibid.*, p. 144.

The book referring to the comet.	Hijri year.	Christian year.	My identification of the Comet.
1. Murûdj udh-Dhab.	299	911-12	Halley's Comet in 912 A. D.
2. Ahmad-bin Mahmad's Nigâristân.	330	941-42	Unidentified.
3. Abûl Fazl's Akbar-nâmeh.	662	1263-64	The comet which passed its perihelion on 6th July 1264.
4. Ditto .. ..	803	1400-01	Unidentified.
5. Ditto .. ..	837	1433-34	The comet which, according to Russel Hind, passed its perihelion on 4th or 5th November 1433.
6. (a) Abul Fazl's Akbar-nâmeh. (b) Nizam-uddin's Tabakât-i Akbari. (c) Badaoni's Muntakhab-ut-Tawarikh.	985	1577-78	The comet that passed its perihelion on 26th October 1577.
7. The Wakiât-i Jahangiri. (b) and Ikbal-nâmeh	1027	1618	The comet that passed its perihelion on 17th August 1618.
8. The Wakiât-i Jahangiri.	1027	1618	The comet that passed its perihelion on 8th November 1618.

## V

AN INQUIRY INTO THE VIEWS OF THE  
MAHOMEDAN WRITERS ON COMETS.

We will now examine the statements of these Mahomedan authors at some length. All of them, with the exception of Abûl Fazl, have mostly described the appearances of the comets which fell under their own observations or whose observations were noticed by some previous writers whose descriptions they followed. It is Abûl Fazl, alone, who, not only describes the appearances of the comets, but enters into a kind of description about the theory of their formation, etc., so, we will examine his statement, and, where necessary, see how far he is supported by other Mahomedan authors and by other ancient writers.

Abul Fazl's views. The contents of Abûl Fazl's long article on comets in the *Akbar-nâmeh* can be divided and examined under the following heads :

- 1°. The general theory explaining the phenomenon ;
- 2°. The influences attributed to their appearance by the people ;
- 3°. The view of the *pishinigân*, (*i.e.*, the ancients), referred to by him, and their *nirangs* or incantation-prayers to avert the influences of the comets.

Abul Fazl connects this phenomenon with the formation of what he calls *bokhâr* (*i.e.*, vapour) and *dakhân*, (*i.e.*, steam). To speak of it in the modern scientific phraseology, he connects it with the phenomenon of evaporation. He says that its appearance is due to the vapour floating in the air, as the result of the process of evaporation. But, though the vapour is thus always in the air, the appearance of the comet is rare. So he says that its appearance in the heavens is due to a particular position of the planets Mars and Mercury in the heavens.

As to the theory about the presence of vapours in the comet, we find that modern scientists also refer to them and say that the luminosity is due to them. Sir George Gabriel Stokes<sup>1</sup> says on this point :

“There can no longer be any doubt that the nucleus consists, in its inner portions at least, of vapour of some kind, and we must now add incandescent vapour ; nor does there appear to be any reasonable doubt that in most comets this vapour

<sup>1</sup> Nature Series, *Burnett Lectures on Light*, by Sir George Gabriel Stokes, 1892, pp. 210-213.

consists of, or contains, some volatile compound of carbon, unless it be carbon itself vaporized by the heat of the sun. Now it is conceivable that if the nucleus of a comet be endowed with an atmosphere, or perhaps even coated with a liquid, having in a high degree the combination of the transparent and athermanous characters of glass, its temperature when exposed to radiation from the sun might rise much above what we might have expected *a priori*."

Though Abûl Fazl's reference to vapours in the comet is correct even from the modern scientific point of view, his inference that the vapour is the vapour rising from our earth is wrong. He takes it to be an ordinary meteorological phenomenon which is not correct as the comet appears in the ultra-terrestrial regions. Abûl Fazl refers to terrestrial evaporation, while, according to the modern view, it is the evaporation of a volatile liquid of an object in the ultra-terrestrial regions. The *Ikbâl-nameh-i Jahângiri*<sup>1</sup> also connects the phenomenon with a vaporous matter in the atmosphere. The Wakiât-i-Jahângiri also speaks of "a luminous vapour."<sup>2</sup>

It is one of the features, which a comet generally takes, that seems to have led Abûl Fazl and others to assume that it is a terrestrial meteorological phenomenon. As pointed out by Prof. Newcomb,<sup>3</sup> one of the three features which a comet embodies is that of the nucleus which is surrounded by "a cloudy nebulous mass like a little bunch of fog, shading off very gradually towards the edge." The comet "looks like a star shining through a patch of mist or fog." So, it is this misty or foggy appearance that seems to have led Abûl Fazl and others to conceive the appearance of a comet to be a terrestrial phenomenon occurring within the limits of the strata of the earth's atmosphere.

Thus, Abûl Fazl and some other Mahomedan authors partially reflect the views of the early ages of science. Fergusson says: "In the early ages of science, the comets were regarded as an assemblage of small stars that had accidentally coalesced into one body, and afterwards they were believed to be simple meteors or exhalations generated by inflammable vapours in the earth's atmosphere."<sup>4</sup>

The view that comets are atmospheric phenomena was held upto as late as Tycho Brahé's time. Astronomer Heath thus speaks on this point: "The ancient philosophers believed that comets existed in the earth's atmosphere. This idea was first

<sup>1</sup> Elliot's *History of India*, vol. VI, p. 406.

<sup>2</sup> Elliot's *History of India*, vol. VI, p. 363.

<sup>3</sup> *Astronomy for Everybody*; a popular exposition of the wonders of the Heavens, by Prof. Simon Newcomb, with an introduction by Sir Robert S. Ball, 1903, p. 255.

<sup>4</sup> Fergusson's *Astronomy*, by Dr. Brewster, 1811, vol. II, p. 354-55.



exploded by Tycho Brahé, who showed, by actual measurements, that the comet of 1577 moved in a space at a distance from the earth farther away than the moon, and therefore far beyond the confines of the earth's atmosphere<sup>1</sup>.

Abul Fazl's view about the forms assumed by the comets.

While explaining the origin of the appearance of the comet, Abul Fazl speaks of the various forms which the comets assume. He says that the comets assume the following forms :

- (a) A man with locks of hair ;
- (b) A person having a tail ;
- (c) A person holding a lance in his hand ;
- (d) An animal.

(a) The first form mentioned by Abul Fazl, viz., that of a person with locks, is that which is also referred to by modern scientific writers on comets. They say that the nucleus or the central nebulous mass is surrounded by a hairy mass. The very word "comet" is derived from "coma," the latin word for hair because it looks hairy. This hairy portion is called "coma." The nucleus and the coma together form what is called "head." We find that the use of the word "head" for a part of the body of the comet, which is hairy, is ancient. The Bundelesh,<sup>2</sup> a Pahlavi book of the Parsees, speaks of the head and tail (royashman va dûmb) of a comet.

One of the several Persian words for a comet is "zuzuâb," i.e., the possessor of locks of hair. A story is told of Prof. Barnard showing a photograph of a comet to a lady. On looking at it, she is reported to have said : "Why ! that comet looks as if it had been out all night."<sup>3</sup> That remark can be more true from the point of view of its hairy portion than from that of its tail.

(b) The second form of the comet, referred to by Abul Fazl, is that of a person with a tail. One of the several Persian words for a comet is "zuzânâb", i.e., the possessor of a tail. Our general notion of a comet is this : that it is a tailed star, and that, as such, it always carries a tail. So, Abul Fazl's distinction between the comets, as those with locks of hair or hairy comets and tailed comets, appears strange at first thought. But we must remember that, at times, the comet is not seen in all its perfection. Generally, the nucleus or the part which forms the hairy portion is not seen at all, and at other times, it is the tail that is not seen at all. Prof. Newcomb says

<sup>1</sup> *The Twentieth Century Atlas of Popular Astronomy*, by Thomas Heath, 1903, p. 93.

<sup>2</sup> Chap. XXVIII, 44, S. B. E., vol. 1880, p. 113.

<sup>3</sup> *Modern Astronomy*, by Turner, 1901, p. 226.

on this point: "Comets differ enormously in brightness. Sometimes a telescopic comet has no visible tail; this however is the case only when the object is extremely faint. Sometimes also, the nucleus is almost wholly wanting." Again, we must remember that the observations in India in the times of Abûl Fazl (1551-1602 A.D.) were made with the naked eye and not with telescopes. The *Wakiât-i Jahângiri*, while speaking of a comet in the time of Jehangir, the successor of Akbar (in 1618), also says that in its tail "there was no light or splendour."<sup>1</sup>

According to Badaoni, the author of the *Muntakhab-ut Towârikh*, the tail of a comet, which had appeared in 985 Hijri (1577-78 A.D.) in the reign of king Akbar (1542-1505 A.D.), had suggested a joke in the case of a courtier. Shah Mançûr, who occupied the post of Divan, used to keep the end of his turban hanging behind him over his head. The recent appearance of the comet suggested the idea that the end of the turban hung over the back of his head like the tail of the comet. So, in joke, he was called *Sitarah-i dunbala* (ستارهٔ دنباله) <sup>2</sup> i.e., a tailed star or comet.

(c) The third form attributed by Abûl Fazl to a comet, viz., that of a person with a lance (nezeh) in his hand, is one which is not referred to by modern scientific writers on comets, but it is referred to by Pliny.<sup>3</sup> Other Mahomedan authors besides Abûl Fazl have attributed to comets forms of instruments. The *Wakiât-i Jahangiri*, while speaking of a comet that appeared in the 13th year of the reign of Jahangiri (Hijri 1027, A.D. 1618), says that it appeared "like a spear with the two ends thin but thick about the middle."<sup>3</sup> The *Ikbâl-nameh-Jahângiri* also speaks of the form as that of a javelin<sup>5</sup>.

Some European writers also refer to the comets as assuming the forms of instruments. For example, Sigebert says of the comet that appeared in 1066, the year of the Norman conquest, that to its train "hung a fiery sword not unlike a dragon's tail." In another place we read of a comet appearing like a Turkish scimitar.<sup>7</sup>

(d) The fourth form supposed to be assumed by the comets according to Abûl Fazl is that of an animal. The Pahlavi *Bundehesh* also seems to refer to this form.

<sup>1</sup> Elliot's *History of India*, vol. VI, p. 364.

<sup>2</sup> *The Muntakhab at-tawarikh*, edited by Dr. Lees and Munshi Ahmad Ali, 1865, vol. II, p. 240, l. 18; Lowe's translation, 1884, vol. II., p. 248. Elliot's *History of India*, vol. V, p. 407, n<sup>o</sup> 3.

<sup>3</sup> Pliny's *Natural History*, vol. II, chap. XXII. Bostock and Riley's translation, 1855, vol. I., p. 56.

<sup>4</sup> Elliot's *History of India*, vol. VI, p. 363.

<sup>5</sup> *Ibid.*, p. 406.

<sup>6</sup> The story of Halley's Comet, *The Nineteenth Century* of September 1909, p. 519.

<sup>7</sup> *Ibid.*, p. 520.

Pliny<sup>1</sup> refers to the following forms assumed by the comets :— sword, dart, horn, deity in a human form, spear, spire, knot of fire, and flute.

## VI.

## THE INFLUENCE ATTRIBUTED BY THE PEOPLE TO A COMET'S APPEARANCE.

Mr. Vincent Heward in his "Story of Halley's Comet<sup>2</sup>" says of Halley's comet that "it is closely associated with events which have contributed largely towards moulding the destiny of Europe." One can say that that statement is true, to a great or less extent, of many great comets. Abûl Fazl's statement about the beliefs in a comet's influence is a reflection of the general belief on this subject.

Abûl Fazl, on the authority of ancient writers whom he calls "writers of wisdom", says that, as a result of the evil influences of a comet "a famine is in sight, sickness is prevalent, and calamities gain strength." Further on, he refers to the dethronement of kings, etc. If by the "writers of wisdom" he means the *pishinigân* or "the ancients" referred to by him in another passage, we will see, later on, that the Pahlavi Bundelesh refers to all these calamities mentioned by Abûl Fazl. We find from other Mahomedan authors also that the fear about the evil influences of the comets was well nigh general.

The following statement of Fergusson is a reflection of what, according to Abûl Fazl, was the general belief of those in earlier times. Fergusson says : "During the ages of barbarism and superstition, they were regarded as the harbingers of awful convulsions, both in the political and in the physical world. Wars, pestilence and famine, the dethronement of kings, the fall of nations and the more alarming convulsions of the globe, were the dreadful evils which they presented to the diseased and terrified imaginations of men. . . Even at the beginning of the 18th century, the friend and companion of Newton (Mr. Whiston) regarded them "as the abode of the damned"<sup>3</sup>.

There are a number of theories about the origin and cause of the deluge. One of these is, that it must be due to a comet

<sup>1</sup> Pliny's *Natural History*, vol. II, chap. XXII and XXIII, Bostock and Riley's translation, vol. I, pp. 55-58.

<sup>2</sup> *The Nineteenth Century* of September 1909, n° 391, p. 509.

<sup>3</sup> *Fergusson's Astronomy* by Dr. Brewster, 1811, vol. II, p. 352.

which may have come into collision with the earth. Fergusson and also Dr. Whiston, an astronomer—a contemporary and friend of Newton,—held this view. Fergusson says as follows on this point: “We must confess, that if a natural cause is to be sought for that great event, we can explain it only by the shock of some celestial body. The transient effect of a comet passing near the Earth, could scarcely amount to any great convulsion; but if the earth were actually to receive a shock from one of these bodies, the consequences would be awful. A new direction would be given to its rotatory motion, and ‘the globe would revolve round a new axis. The seas, forsaking their ancient beds, would be hurried by their centrifugal force to the new equatorial regions; islands and continents, the abodes of men and animals, would be covered by the universal rush of waters to the new equator, and every prestige of human industry and genius at once destroyed. The chances against such an event are, however, so very numerous, that there is no dread of its occurrence.”<sup>1</sup>

Halley is reported to have said of the comet that bears his name that “if so large a body with so rapid a motion were to strike the Earth—a thing by no means impossible—the shock might reduce this beautiful world to its original chaos.”<sup>2</sup>

It seems that the very mention by those whom Abûl Fazl calls “writers of wisdom,” of the chances, however remote, of a catastrophe, has led many men, even of the intelligent class, to be afraid of the phenomenon. It has led them to prayers and ceremonies to avert such misfortunes. They attributed their escape to their devout prayers. Though they believed that the general disaster was averted, they attributed partial disasters, like that of an invasion or of a dethronement, a famine or a pestilence to that phenomenon.

Again, it was not only in India and Persia that such a fear was general. We find that it was common in many nations both ancient and modern. Abûl Fazl, in his account of the comets, refers to ancient Greece, Egypt and Rome. All these countries had superstitious fears of these comets. Among the Greeks, Aristotle, among the Romans, Ammianus Marcellinus and Pliny, and among Egyptians, Ptolemy refer to this fact.

Ammianus Marcellinus is reported to have said that “comets foretold the ruin of great conditions.”<sup>3</sup>

<sup>1</sup> *Fergusson's Astronomy*, p. 353.

<sup>2</sup> *The Nineteenth Century* of September 1909, p. 513.

<sup>3</sup> *Encyclopædia of Antiquities*, by Rev. Fosbroke, 1825, vol. II, p. 675.

Pliny devotes two chapters (Bk. II, chaps. XXII and XXIII) to comets.<sup>1</sup> He divides them into several classes according to their form and appearance. In his long description of form and appearance, we find the following forms referred to by Abûl Fazl:

1. "Shaggy with bloody locks and surrounded with bristles like hair." Some "have a mane hanging down from their lower parts like a long beard."
2. "They shine like a sword." One had the appearance of a spear.

According to Pliny "it portends something unfavourable."<sup>2</sup> These unfavourable prognostications depend upon the different forms and appearances that it assumes.

Pliny refers to a comet that appeared in the time of Cæsar (44 A.D.). Halley has identified this comet with that of 1680 A.D. whose appearance is said to have led both Newton and Halley to believe that "the comets were perhaps controlled in their movements by the same influence as that which ... held the moon in its orbit."<sup>3</sup> It was the study of the observations of this comet in 1680 that led Halley to observe and study more carefully the comet which appeared in 1682, whose next appearance he foretold, and which is known by his name.

According to Ptolemy, referred to by Abûl Fazl, "comets presented an omen especially unfavourable to kings."<sup>4</sup> Milton is believed to refer to this opinion when he says of a comet in his *Paradise Lost*. "And with fear of change perplexes monarchs." Milton thus speaks of the belief referred to by Abûl Fazl that pestilence and war result from the appearance of a comet:

. . . . . On the other side,  
Incensed with indignation, Satan stood  
Unterrified, and like a comet burn'd,  
That fires the length of Ophiuchus huge  
In the arctic sky, and from his horrid hair,  
Shakes pestilence and war.<sup>5</sup> . . . . .

Gibbon<sup>6</sup>, on the authority of Halley and others, gives an account of the different appearances of the comet of 44 A.D., referred to by Pliny. It has the period of 575 years. While speaking of its appearance in the time of Justinian, Gibbon says that "the nations, who gazed with astonishment, expected wars

<sup>1</sup> *The Natural History* of Pliny, translated by Bostock and Riley, 1855, vol. I, pp. 55-58. <sup>2</sup> *Ibid.*, p. 57.

<sup>3</sup> "The Story of Halley's Comet," by E. V. Heward in *The Nineteenth Century*, no. 391, September 1909, p. 509.

<sup>4</sup> *Ibid.*, p. 57, no. 4.

<sup>5</sup> *Paradise Lost*, Bk. II, 11, p. 70 etsge.

<sup>6</sup> *The Decline and Fall of Roman Empire*, 1844, vol. III, p. 160.

and calamities from their baneful influence; and these expectations were abundantly fulfilled."<sup>1</sup> He enumerates its following appearances:—

1. Its appearance in 1767 B.C. is connected with the tradition which Varro has preserved "that under the reign of Oxyges, the father of Grecian antiquity, the planet Venus changed her colour, size, figure and course."<sup>2</sup>

2. Its second appearance in 1193 B.C. "is darkly implied in the fable of Electra, the seventh of the Pleiads, who have been reduced to six since the time of the Trojan war. That nymph, the wife of Dardenus, was unable to support the ruin of her country; she abandoned the dances of her sister orbs, fled from the Zodiac to the North pole, and obtained, from her dishevelled locks, the name of the comet."<sup>3</sup> From this description we find, that the comet is classed as a nymph, just as it is styled as a *pari* (fairy) in the Avesta and Pahlavi, as will be seen later on.

3. The third appearance was in 618 B.C. "a date that exactly agrees with the tremendous comet of the Sybil, and perhaps of Pliny."<sup>4</sup>

4. The fourth appearance was in 44 B.C. when it appeared as a long-haired star in Rome. It was believed to have "conveyed to heaven the divine soul of the dictator (Cæsar)."<sup>5</sup>

5. The fifth appearance was, as said above, in 531 A.D. during the reign of Justinian.

6. The sixth appearance was in 1106 A.D. Even the Chinese have a record of this appearance. This was the time of the Crusades, and both Crusaders and Saracens took omens from its appearance.

7. The last appearance was in 1680 A.D.

## VII.

### THE PĪSHĪNĪGĀN (i. e. THE ANCIENT IRANIANS AND THEIR NIRANGS, REFERRED TO BY ABŪL FAZL.

Abūl Fazl, in his long account of the comets, refers to the *Pishinigan* or the ancients and says that they had many *nirangs* to counteract evil influences like those resulting from the appearance of comets. Let us examine here in a separate section the following points on this subject.

A. Who were the *pishinigan*?

B. What were their *nirangs*?

C. What had the *pishinigan* to say about the comets?

<sup>1</sup> *Ibid.* <sup>2</sup> *Ibid.* <sup>3</sup> *Ibid.*, pp. 160-161.

<sup>4</sup> *The Decline and Fall of Roman Empire*, p. 161. <sup>5</sup> *Ibid.*

The *pishî nigân* or the ancients, referred to by Abûl Fazl, were the ancient Persians who professed the Mazdaçân faith. In the Pahlavi Dinkard<sup>1</sup>, the *pishî nigân* are identified with the *poriyo- tkêshân*. This word is used in the Persian translation, from the Pahlavi, of the letter of Tosar or Tansar, the Chief Priest and the Prime Minister of the court of Ardashir Babagan, the founder of the Sassanian dynasty, to Jasnaçshâh, the king of Tabaristân. Tansar has used this word<sup>2</sup>, as well as the word *avalyân*<sup>3</sup> (اوليان), in the sense, as Darmesteter<sup>4</sup> has said, of *poriyo- tkaêshân*, who were the ancient Mazdaçânans of Persia in the time of Zoroaster.

The word *nirang* used by Abûl Fazl is originally a Pahlavi word. Darmesteter says: "*Nirang* est le terme pehlvi pour les actes liturgiques et par suite pour les indications liturgiques<sup>5</sup>." The word signifies more than this. It has the following different significations:—1. Ritual. 2. A prayer formula used on particular occasions and in particular ceremonies. 3. A prayer formula used as a charm or amulet for averting an evil.

As an example of the use of the word in the first sense, the Parsees have a ritual or ceremony called *Nirang-din* or *nirang-i din* (*lit.* the ritual of religion). It is a long ceremony for the consecration of the *gaô-mez* or the urine of a sacred bull. From the name of the ceremony, urine itself is at times called *nirang*. Again, there is a Pahlavi book which is called *Nirangistân*, because it refers to rituals.

I think that the Pahlavi word *nirang* is another reading of the Pahlavi word *nirui* or *niru* which is Persian *niru* (نیرو), meaning strength or power. The same Pahlavi word that can be read *nirui* is read *nirang*. A *nirang*, whether it is a ritual, a prayer formula, a charm or amulet, or an incantation, gives to its performer, possessor, or reciter, power or strength, especially mental power or strength as the result of faith.

<sup>1</sup> *The Dinkard*, by Dastur Dr. Peshotan Behramji Sanjana, vol. IX, Pahlavi text, p. 451, l. 20. *Vide The Zand Pahlavi Glossary*, by Dastur Hoshangji and Dr. Haug. Introduction, p. xxxv, b. 2. Poryotkêshân i pishinigan. *Vide* also the text of the *Sad-dar-i Beher-i tavil*, chap. XIII, wherein king Jamshed is spoken of as one of the pishinigan.

<sup>2</sup> *Journal Asiatique*, 9<sup>e</sup> série, t. III, Mars-avril 1894, p. 212, l. 3.

<sup>3</sup> *Ibid.*, p. 211, l. 12.

<sup>4</sup> *Ibid.*, Mai-juin 1874, pp. 514-15.

<sup>5</sup> *L'Z nd Avesta*, I, Introduction, p. 89.

In the Pâzend Afrin-i Gâhambar<sup>1</sup> and in the Afrin-i Arda-farvash, we find the word *niru* in the sense of 'strength,' used with cognate words. We read there *Aoj, zur, niru, tagi, amavandi, piro-gari hamâ fravash-i ashoân be-rasâd, i.e.,* "May the strength, vigour, power, force, success, victory all reach the holy spirits of the pious<sup>2</sup>". This word, *niru*, when it occurs similarly in the Afrin-i Rapithavin occurs as *nirui*. The sentence runs thus: "Pâ aoj, va zor va niru-i varz pirozgar-i Dadâr Ahura Mazda", i.e., "With the strength and vigour and power of the triumphant splendour of Dâdâr] Ahuramazd<sup>3</sup>". This word *niru-i* as written here, may be clearly read *nirang*.

Dr. Steingass<sup>4</sup> gives a Persian word *niruyish* نیرویش as meaning "divine decree, fate", and by putting a mark of interrogation before it, seems to have some doubt about the word. I think this word is the same as "*nirui*", which, in the above passage, is associated with divine splendour. The final *i* (ی) which forms abstract nouns in Persian are written in Pahlavi and Pazend with a letter ج which can be read both *sh* and "*ya*." For example the Persian "shadi" for joy, which is Avesta *shâiti*, is written in Pahlavi "shadih". But in the Pâzend, the word is written and read "Shâdish". We have a number of such readings of abstract nouns in the Pâzend Afrin-i Haft Ameshâshpandân<sup>5</sup>. So, Dr. Steingass's Persian word *niruish* is nothing but *nirui*, which has originated the word *nirang*.

From this short examination of the etymology and meaning of the word, we see that the word "*nirang*" has acquired the sense of incantation, charm, etc., because it gives power or strength to those who have faith in them.

We have a number of *nirangs* still existing among some of the Pazend and Persian books of the Parsees<sup>6</sup> intended to be recited on certain occasions to avert certain maladies, evils, and evil influences. I have given some of the *nirangs*.

A few Parsee  
Nirangs.

<sup>1</sup> *The Text of the Fravashi, Afringâns and Afrins*, published by Ervad Tehmuras Dinshaw Anklesaria, 1883, p. 196. Afrin-i Gâhambar, 4.

<sup>2</sup> *Ibid.*, p. 178. Darmesteter translates this sentence thus: Que la vigueur, la force la puissance, la fermeté, l'ascendant victorieux viennent aux Fravashis des Saints" 1 » *Le Zend Avesta*, III, p. 181.

<sup>3</sup> Mr. Tehmuras's *Text*, p. 223, Afrin-i Raphithavan, 21.

<sup>4</sup> *Persian-English Dictionary*, p. 1441.

<sup>5</sup> Afrin-i Haft Ameshaspand, 15, Ervad Tehmuras's *Text*, p. 191.

<sup>6</sup> *Vide* Revayet of Dârâb Hormazdyâr. Bombay University Library Manuscript. Vol. I, folios 155-165.



in my papers<sup>1</sup> read before the Anthropological Society of Bombay. Among the nirangs that now exist, we do not find any special nirang enjoined to be recited on the appearance of a comet. But it seems certain, that latterly, in ancient Persia, some of the natural phenomena were believed to bring with them some calamities. As I have said in my paper on "A few ancient beliefs about eclipse and a few superstitions based on these beliefs"<sup>2</sup>, it was usual among the Parsees, until a few years ago, to say prayers on such occasions and to recite especially the Mâh bokhtâr Nyâish in the praise of the moon during lunar eclipses. Mr. Gaspard Drouville<sup>3</sup> said of the Zoroastrians in Persia in the early part of this century that: "Ils adressent leurs prieres au soleil, et les jours d'éclipse sont pour eux jours de desolation et de deuil; ils se prosternent alors la face contre terre et ne se relèvent qu'au retour des rayons de cet astre".

We will see further on, that the comets were believed, as it were, to belong to the class of *paris*, or fairies. So we have several Parsee Nirangs still existing, and still recited by many—though not on occasions of the appearance of comets only—in which *paris* (fairies) are mentioned, and it is prayed that their influence may be averted. One of these nirangs is that known as the "Nirang of the Vannant Yasht". The other is that known as the "Nirang of the Haoma Yasht"<sup>4</sup>. The third nirang of this kind is the "Nirang-i kusti"<sup>5</sup>, i.e., the prayer recited on putting on the sacred thread. The fourth is that known as the Nirang-i dur kardan-i Zulam-i divân va darujân<sup>6</sup> i.e., the Incantation for averting the oppressive influence of the Demons and Drujs.

Now, we come to the third part of this section. Let us examine here briefly what the Pahlavi books of *pishinigân* or ancient Persians have to say generally on the subject of comets. Before considering this subject, we must first of all note, that in the Pahlavi Bundesh, wherever comets are referred to, they are generally referred to together with meteors.

C. What have  
pishinigân to say  
about comets?

What the Pahlavi books of the *pishinigân* or ancient Persians have to say generally on the subject of comets.

Before considering this subject, we must first of all note, that in the Pahlavi Bundesh, wherever comets are referred to, they are generally referred to together with meteors.

<sup>1</sup> (a) Charms or amulets for some diseases of the Eye. *The Journal of the Anthropological Society of Bombay*, vol. III, 1894, p. 338 et seq.; (b) Nirang-i Jashan-i Burzigarân, *ibid.*, vol. V 1900, p. 398; (c) Incantations for cutting the hair and the nails, *ibid.*, vol. VIII.

<sup>2</sup> *Journal of the Anthropological Society of Bombay*, vol. III, n<sup>o</sup>. 6, p. 360.

<sup>3</sup> *Voyage en Perse, fait en 1813*, t. II, p. 193.

<sup>4</sup> Vide Spiegel's *Avesta*, translated by Bleeck. *Khordeh Avesta*, vol. III, p. 190, I. XV. Vide *The Pazend Texts*, edited by Ervad Edalji Kershaspi Antia and published by the Trustees of the Parsee Punchayet of Bombay, p. 174.

<sup>5</sup> Spiegel. *Ibid.*, p. 4.

<sup>6</sup> Vide the Pazend Texts, edited by E. K. Antia, pp. 181-82.

Almost all scientific writers of the present day treat of Comets and Meteors in the same chapter or division<sup>1</sup>. They think of these as being two phenomena of well nigh the same kind. Some of the meteoric showers are believed to be the disintegrated parts of a comet. For example, the Perseides are believed to be connected with Swift's Comet or the Comet III. of 1862. The Andromedes are believed to be the disintegrated portion of Biela's Comet. The Lyrids are connected with the comet I of 1861. The Leonides are connected with the comet known as the Temple. Prof. Newcomb connects these together and, while speaking of them under the heading "Connection of Comets and Meteors", says :

"These objects had originally formed part of the comet and had gradually separated from it. When a comet is disintegrated . . . those portions of its mass which are not completely dissipated continue to revolve around the sun as minute particles, which get gradually separated from each other in consequence of there being no sufficient bond of attraction, but they still follow each other in line in nearly the same orbit."<sup>2</sup>

The Pahlavi Bundelesh, though it does not specifically refer to any connection between the comets and meteors, speaks of them together. At times, both these bodies are mixed up together.

Reference to the comets in the Bundelesh. It refers to the comets in chapters xxxv, 18, 31. The fifth chapter, which is a chapter on a part of Astronomy, after speaking of the planets, speaks of two heavenly bodies as "*Gurcheher va duzdo mushpar dumb-homand*." Dr. West translates these words as "Gocheher and the thievish Mushpar, provided with tails"<sup>3</sup>. Here the word "Gocheher," as suggested by Dr. West, refers to meteors. The word "Mushpar" from its epithet *dumb-homand*, i.e. "with tails" is evidently for the comet. For this heavenly body of Mushpar (comet), it is added: "The sun has attached Mushpar to its own radiance by mutual agreement, so that he may be less able to do harm"<sup>4</sup>.

In the 28th chapter we have the words "Gocheher royashman va dumb va mush parik-i dumb-homand" i.e. Gocheher head and tail, and the tailed mush parik. Here, we find that both the words "Gocheher" and "Mushparik" refer to comets. The words "head and tail" attached to Gocheher show that the word "Gocheher" also refers to comets.

<sup>1</sup> *The Twentieth Century Atlas of Popular Astronomy*, by Thomas Heath, 1903, chap. XIII, p. 92.

<sup>2</sup> Prof. Newcomb's *Astronomy for Everybody*, pp. 281-283.

<sup>3</sup> S. B. E., vol. V, 180, pp. 21-22.

<sup>4</sup> *Ibid.*, p. 22.

Then we find two more references to Gocheher in the 30th chapter of the Bundelesh. In the first place, it says : "Gucheher chegun dayan sepeher min tahi binâ barâ val zamik nafrunet <sup>1</sup>" Dr. West thus translates the sentence : "As Gochihar falls in the celestial sphere from a moon-beam on the earth<sup>2</sup>." Here he akes the word "Gochihar" as referring to a meteor. But Windisthmann reads the word as "Gurzcheher" and translates it as "Komet Keulenkopf" i.e. "a club-headed comet". Justi, reading it Gurcheher, says of it that it is "name eines Kometen" i.e. the name of a comet. Again, we read in the same chapter (Chap. xxx, 31) : "Gocheher mâr pavan zak ayokshesh vatakhtah Suzet" i.e. "Gocheher burns the serpent in the melted meta."

Pahlavi words  
for comets. From all these references in the Bundelesh, we find that the comets are known as (a) "Gocheher" and (b) "Mush or Mush-parik."

(a) As to the word Gocheher, we find that the word itself varies in various manuscripts, and, even when written in the same way in some manuscripts, it is read by scholars in various ways, because some of the letters of the Pahlavi alphabet admit of various readings. Taking both these facts into consideration, we find that the word can be, and is, read as : Guchihar, Gurchihar, Gurgchihar, Gurzchihar, Durchihar, Gurzdâr, Gurgdâr. The words may respectively mean "cow-faced, boar-faced, wolf-faced, mace or club-faced, far-faced, club-keeper, wolf-keeper". Some of the several words for a comet in modern Persian as given by Richardson in his *English-Persian Dictionary* are juzahr (جو زهر) guzchahar (گوز چهر), guzchaharah (گوز چهره). Dr. Steingass, in his *Persian-English Dictionary*, gives the words gawaz-chihr (p. 1102, گاوز چهر) and jauzahr (p. 378, جو زهر) for a comet. Nizâm-ud-din in his *Tabakât-i Akbari* gives the word "dur-daneh" (دردانه) for a comet. All these words then are derived from the Pahlavi word "Gurchihar," which can be, and which is, read variously in Persian. The Persian words for a comet settle this, viz. that the Pahlavi word "Gurchihr" and its equivalent readings in the Bundelesh more generally refer to "comets" than to "meteors".

Now, coming to the meaning of the Pahlavi word, we find that the "comet" has derived its name, either from its apparent

<sup>1</sup> Vide my *Bundelesh*, p. 158.

<sup>2</sup> S. B. E., V, p. 125, chap. XXX, 18.

form of an animal like the cow, boar, or wolf, or of an instrument like the mace or club. These Pahlavi words then show that Abûl Fazl, when he said that the comet assumed the forms of animals or of instruments like the spear or javelin, had the support of the Pahlavi writings, the writings of the ancient Persians whom he called the *pishinigân*, i.e. the ancients.

(b) Coming to the second word in Pahlavi for a comet, viz. *Mushpar*, we do not find that it has given an equivalent word to Persian for a comet. The word occurs twice in the *Bundehesh* (Chap. v., 1, 2 and Chap. xxviii, 44). That the word is used for a comet is evident, because it has the appellation *dumb homand*, i.e. "with a tail", attached to it in both the places. As the words "*royashman va dumb*" i.e. "head and tail" are attached to the word *Gochihar*, and as the word "dumb" *homand* i.e. "with tail" is attached to "*Mushpar*," I conclude, that the Pahlavi writers divided comets into the following two classes :

1. Those which were quite distinct, and which appeared, both with their heads (or to speak in the modern scientific language) with their nucleus and coma, and their tails ;
2. Those which appeared rather indistinct, i.e. those whose tails only appeared.

I think Abûl Fazl's division of the comets into two classes, viz. (1) the *Zawât'ul-zawâb*, i.e. those with locks of hair and the *Zuzanâb* i.e. those with tails, corresponds to the above division of the Pahlavi *Bundehesh*, viz. the *Guchihar* and the *Mushpar*.

As to the meaning of the word *Mush-par*, it is difficult to settle it. In an old text of the *Bundehesh*, in one place (chapter XXVIII, 4), the word is given as *Mush-parik*<sup>1</sup>. This *Mush-par* or *Mush-pairik* is the *Mush-pairika* of the *Avesta* (*Yasna* XVI, 8 LXVIII, 8), where the words *Mush* and *pairika* seem to have been used as two separate words. The *Avesta* word *pairika* is the same as Pahlavi *parik*, Persian *pari*, English *fairy*. Thus we find, that "Mush", the *Avesta* and Pahlavi word for a comet, has the word *pairika* or *parik* or *par*, meaning fairy, attached to it, both in the *Avesta* and in the Pahlavi. Similarly, we find that the "Meteors" which belong to the same class of bodies as the "comets", are referred to in the *Avesta* (*Tir yasht* 8) as belonging to a class of fairies.

It appears from some of the Pahlavi books, that at one time, the ancient Persians distinguished between the Sun, the Moon and the Fixed Stars on the one hand, and the Planets, the Comets and Meteors on the other hand. The former belonged

<sup>1</sup> S. B. E., vol. V, 1880, p. 22, n. 1.

to the class of the creation of Spenta Mainyu, *i.e.* the Good Spirit and the latter to that of the creation of the Evil Spirit <sup>1</sup>. In the Pahlavi Zâdsparam (chap. IV, 3), the Planets are represented as being opposed to the Sun and the Moon. The reason, why the Sun, the Moon and the Fixed Stars are represented as belonging to the creations of the Good Spirit and the Planet and the Comets and Meteors to those of the Evil Spirit, seems to be this: What is orderly and systematic is said to move in the path of Asha *i.e.* Righteousness or Order. What is disorderly and unsystematic is opposed to Asha and is said to move in the path of the Dravant *i.e.* the wandering. Now "planets", as their very English word (from its Greek root signifying to wander) implies, are "wandering stars", as compared with "fixed stars". So, they are represented to belong to the class of the Evil Spirit.

The fairies, according to the ideas of the ancient Persians, belonged to the class of the creations of Evil Spirit. Pairik, Parik, Par or Pari, the Iranian word for a fairy, comes from a root "par" meaning "to tempt, to enchant." The ancient word *fairy* also comes from a similar root (fiér, to enchant). Thus, the wandering bodies of comets and meteors were termed fairies, as belonging to the class of the creatures of the Evil Spirit.

This idea of considering the Planets and the Comets and meteors as belonging to the class of the Evil Spirit, seems to be a later one. It does not seem to be early Avestaic. This appears from the very names of the planets. They all bear the names of some of the Yazatas or good beings named in the Avesta. For example, the planet Jupiter is called Ormazd (Ahura Mazda). Mars is called Beharâm (Verethragna). Venus is called Nâhid (Anâhita). The Ulamâ-i Islâm <sup>2</sup> says, that Ahura Mazda had given these planets good names. Thus, the idea of attributing evil influences to the meteors and comets, which we see in later Pahlavi books and in the Persian books of Mahomedan authors, seems to be a later Iranian one.

We find a reference to the comets (Mush-pairika) in the Avesta also. They are referred to in the Yasna (xvi 8, LXVII 8). The Pahlavi translators of the Avesta render Mush-parika by Mush-parik <sup>3</sup>. The Persian rendering of this is "mush yâni

<sup>1</sup> *The Bundehesh*, chap. XXVIII, 43-45; S. B. E., vol. V, 1880, p. 113-114.

<sup>2</sup> *Fragments relatifs à la Religion de Zoroastre*, Extraits des Manuscrits Persans de la Bibliothèque du Roi, Paris, 1829, p. 5. Vide Blochet's article "Le Livre intitulé L'Oulamâ-i-Islam" in the *Revue de l'Histoire des Religions*, 1898.

<sup>3</sup> Spiegel's *Pahlavi Vendidad*, p. 96, l. 1.

pari harâmzad <sup>1</sup> " i.e. "Mush" i.e. "the ill-born fairy." In the above Yasna, we find faint allusions to the belief, that the appearances of the comets were opposed to the prosperity of a country.

Now, as to the word Musha, which forms the first part of the word Mush-parika, Mush-parik, or Mush-par, it comes from the Aryan root "mush" to injure. The word seems to be the same as Persian Mush موش, English "mouse." So, perhaps, one may take it that one of the animal forms which the comet, according to Abûl Fazl, was believed to assume, was that of the "mouse." Prof. Harlez derives the word from the root "mush" "to steal," which we find in the Sanskrit word *mushnâmi* i.e. a thief. If we take that to be the proper root of the word, the Pahlavi word "duzina" (Persian duzd دزد) i.e. "a thief," which we find in the Bundeshesh applied to Mush-par, supports that assumption. Dr. Mills<sup>2</sup> asks: "Is it possible that a plague of mice is meant, 'mush' being here undeclinable?" This reminds us of what is said in the Mahomedan work, above mentioned, the *Ikbâl-namêh-i Jahângirî*. There, in the account of the phenomenon of a comet that appeared in the 13th year of king Jahangir, it is said: "In the environs and dependencies of the city, the mice had increased to such an extent that they left no trace of either crops or fruits. With the greatest difficulty, perhaps, only one-fourth of the produce was saved to the cultivators. In the same manner, the fields of melons and the produce of orchards and vine-yards were totally destroyed, and when no fruit and no corn remained in the gardens and in the fields, by degrees the mice all died off <sup>3</sup>."

The Bundeshesh (Chap. v) says of the comet that "the sun has attached Mush-par (i.e. the comet) to its own radiance by mutual agreement, so that he may be less able to do harm <sup>4</sup>." This statement refers to the movement of the comet round the Sun alluded to by Abûl Fazl and referred by modern scientific writers, who say that, moving under the influence of the Sun, it always describes a conic section, the curve of which is in the form of an eclipse, a parabola or an hyperbola.

The evil influences believed to be resulting from the appearance of a comet as mentioned by Abûl Fazl are thus referred to in the Bundeshesh: "By them, these ten worldly creatures, that is, the sky, water, earth, vegetation, animals, metals, wind, light, fire, and mankind, are corrupted with all this vileness ;

<sup>1</sup> My manuscript of the Avesta-Pahlavi-Persian Yaçna, vol. I, p. 183.

<sup>2</sup> S. B. E., vol. XXXI, p. 257, n° 2, Yaçna XVI, 8.

<sup>3</sup> Elliot's *History of India*, vol. VI, p. 407.

<sup>4</sup> S. B. E., vol. V, 1880, p. 22.

and from them calamity, captivity, disease, death, and other evils and corruptions ever come to water, vegetation and the other creatures which exist in the world<sup>1</sup>".

The Bundehesh thus refers to the terror struck among the people by the appearance of a comet: "The distress of the earth becomes such like as that of a sheep when a wolf falls upon it <sup>2</sup>." The Avesta<sup>3</sup> Pahlavi, Pazend<sup>4</sup> and Persian <sup>5</sup> books, when they went to speak of a great alarm or terror, use this simile, viz. "that of the sheep being frightened by the coming of a wolf in their midst."

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<sup>1</sup> *Bundehesh*, chap. XXVIII; S. B. E., vol. V, p. 114.

<sup>2</sup> *Ibid.*, chap. XXX, 18; S. B. E., vol. V, p. 125.

<sup>3</sup> *Vendidad*, XIX, 33.

<sup>4</sup> Afrin-i Ardâfarosh.

<sup>5</sup> *Le Livre des rois* par Mohl, vol. I, p. 365. "Il apercut ses hommes de goerre qui avalent eur de Pelephant comrae un e brebis quand oile voitla face du loup."