

ART. X.—*Contributions towards a History of the Star-Showers of Former Times*; communicated by EDWARD C. HERRICK, Rec. Sec. of the Conn. Acad.

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A FULL account of the showers of shooting stars which have visited our planet, would much enlarge our knowledge of the system of bodies from which we receive these brilliant strangers. But a mere catalogue even, of all these displays is too much to hope for, inasmuch as some of them have doubtless been concealed by clouds, and others witnessed only by barbarians. Of those which have been preserved by the historian, a complete collection cannot at present be made in this country, owing to the insufficiency of our means of historical inquiry. A large portion of the materials for the present paper was collected in a search which I made in 1837 and 1838, for the purpose of obtaining evidence of the annual occurrence in August of an unusual number of shooting stars. The publication of the paper has been delayed in the hope that it might be rendered less incomplete; but I have now concluded to offer it in its present state, trusting that those who have the opportunity, will supply its deficiencies and correct its errors.*

(1.) 1768 *years before Christ*. "In the fiftieth year of the reign of the emperor Kié or Li-Koué, i. e. the year 1768 [before Christ] the Chinese saw stars falling:" [des étoiles tomber.]—*Cométographie par M. Pingré*, Paris, 1783, t. 1, p. 248, 4to.; quoted from the *Monarchiæ Sinicæ Synopsis Chronologica*, annexed to Vol. 2, of *Voyages de Mel. Thévenot*, Paris, 1696.

This statement is quite indefinite, and I cite it with some hesitation. The most probable meaning seems to be that a large number of shooting stars was seen; but it remains to be determined whether the original record warrants the construction here assumed.

(2.) 686 B. C. In the reign of the Emperor Le-wang, B. C. 686, "the stars disappeared, and meteors fell like rain."—*Medhurst's China*, London, 1838, Svo. App. No. 1, p. 570.

* A partial list of the dates of these meteoric showers, was given in Vol. xxxiv, p. 182, and also in Vol. xxxv, p. 367.

Vol. xl, No. 2.—Jan.—March, 1841.

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This at first view appears to be a very clear case, but its resemblance to an instance mentioned in the Catalogue of Bolides, &c. observed in China, (Abel-Rémusat, Jour. de Phys. 1819,) which reads thus—"687 ans avant J. C. ** les étoiles ne paroissent pas, ** il tomba une étoile en forme de pluie,"—induces the suspicion that the Chinese annalist may mean to state only the appearance of a single meteor which exploded into fragments. See note under No. (6.)

(3.) A. D. 7. "In the thirty sixth year of his reign, [i. e. of Synin who began to reign in the year of Synmu 632, before Christ 29 years,] it rain'd Stars from Heaven, in Japan."—*Hist. of Japan, by Engelb. Kämpfer, M. D.*, trans. by J. G. Scheuchzer, London, 1728, folio, Vol. 1, p. 162.*

(4.) A. D. 532. "In the same year [A. D. 532] there happened a great chasing of stars from evening until morning, so that every one was amazed, and cried out—The stars are falling! We never knew any thing like it!"

"Τῷ δ' αὐτῷ ἔτει καὶ ἀστέρων γέγονε δρόμος πολλὸς ἀπὸ ἐσπέρας ἕως ἀγούρου· ὥστε πάντας ἐπληήτισθαι, καὶ λέγειν, ὅτι οἱ ἀστέρες πλπτουσι, καὶ οὐκ οἶδαμεν ποτὲ τοιοῦτο πρᾶγμα."—*Theophanis Chronographia: Hist. Byzant. Script. Corp.* ed. Venet. fol. 1729, tom. 6, p. 126.

The following account of the same event is given by Cedrenus: "In the same year there was a great running of stars, so that all were astonished, and exclaimed—See! the stars are falling! We don't know what is to happen."—*Geo. Cedreni Comp. Hist.*; *Hist. Byz. Sc. Corp.* tom. 7, p. 292.—Stated also in Jo. Malalæ Chronog. l. 18, p. 477, cons. B. G. Niehbuhr, Bonnæ, Svo. 1838.

This is the shower referred to A. D. 533, in Chladni's *Feuer-Meteore*, p. 88.†

* In the same work are the two following accounts, which may perhaps relate to meteoric showers.

A. D. 11. "In the 40th year of his reign, [i. e. of Synin,] on a clear and serene day, there arose of a sudden in China, a violent storm of thunder and lightning: Comets, *Fiery-Dragons and uncommon Meteors appeared in the Air, and it rain'd fire from Heaven.*" p. 163.

A. D. 771. "In the second year of his reign, [i. e. of Koonin,] there happened a storm of thunder and lightning dreadful beyond expression. *It rained fire from Heaven, like stars, and the air was filled with a frightful noise.*" p. 175.

† In E. H. Burritt's *Geography of the Heavens*, (5th ed. 1838, 12mo.) p. 161, it is said that "as early as the year 472, in the month of November, a phenomenon of this kind [a shower of shooting stars] took place near Constantinople. As Theophanes relates, 'the sky appeared to be on fire with the coruscations of the flying meteors.'" This is a mistake. It was a shower of volcanic dust from Vesuvius.

(5.) A. D. 558. "Some time after this, there was a great running of stars from evening until morning, so that every one was greatly terrified, and exclaimed,—'the stars are falling.'"

"Μετὰ δὲ χρόνον τινὰ, γέγονεν ἀστέρων δρόμος ἀφ' ἑσπέρας ἕως πρωῆς, ὅστε πάντας ἐπερεκπλήχτισθαι καὶ λέγειν, διὰ πίπτουσιν οἱ ἀστέρες."—*Geo. Cedreni Compend. Historiarum*; Hist. Byz. Sc. Corp. tom. 7, p. 304.

(6.) A. D. 585. "In the 8th moon, on the day Ou-chin [September 4?] there appeared many hundred shooting stars scattering themselves on all sides."

"A la 8^e lune, le jour Ou-chin, il parut plusieurs centaines d' étoiles coulantes qui tombèrent en se dispersant de tous côtés."—*Catalogue des Bolides et des Aérolithes observés à la Chine, etc. tiré des livres Chinois, par M. Abel-Rémusat: Jour. de Phys.* 1819, t. 88, p. 356.*

(7.) A. D. 611. A shower of shooting stars is referred to by Sojuty, as having occurred this year. See No. (29.)

(8.) A. D. 744 or 747. "And the stars came forth shooting exceedingly."

"And steorran foran swythe scotienda."—*Chron. Saxonicum*, edit. Gibson, 4to. Oxon. 1692, p. 55.

(9.) A. D. 750. "At that time happened a fearful sight and a strange portent resulting from an appearance in the sky. It began about candle-lighting and was visible during the whole night, causing surprise and great fear in all the beholders. For

* This Catalogue is derived chiefly from the compilation of a Chinese author, Ma-tou-an-lin, who has given a chronological account of fire-balls, meteorites, &c. down to A. D. 1221. Abel-Rémusat has generally omitted those cases where the meteor did not explode, so that it is quite probable that the original list comprises several star-showers. Some of the following instances cited by Rémusat, may perhaps prove to be such showers, but they cannot be so considered without further evidence. Some of them appear to be only single meteors which left trains of sparks.

637 B. C. En été, à la 4^e lune, le jour Sin-mao (5^e de la lune) les étoiles ne paroissoient pas, quoique la nuit fût claire, il tomba une étoile en forme de pluie.

15 B. C. A la 2^e lune, le jour Kouei-wei, après minuit, il tomba une étoile en forme de pluie.

269 A. D. A la 7^e lune, une étoile tomba en pluie du côté de l'ouest.

288 A. D. A la 8^e lune, le jour Ji-tseu, nouvelle pluie d'étoiles.

532 A. D. A la 7^e lune, le jour Kia-tchin, une étoile tomba en pluie.

837 A. D. A la 9^e lune, le jour Ting-yeou il y eut une étoile de la grosseur d'un boisseau, etc. Plusieurs centaines de petites étoiles la suivoient.

1002 A. D. A la 9^e lune, le jour Phing-chin, il y eut une étoile qui sortit de l'Orient, etc. Plusieurs dizaines de petites étoiles la suivoient et tombèrent avec elle.

it seemed to them as though all the stars left their appointed places in the heavens, and descended towards the earth. But when they came near the ground, they were one and all suddenly dissipated without doing any damage whatever. Many assert that this astonishing sight was witnessed throughout the whole world."

"Συνηρέχθη γὰρ τηρικαῦτα θέαμα φοβερόν καὶ τεράστιον ξένον ἐξ ἀερίου γενέσθαι συμπύματος· ἵπερ περὶ λόχρων ἀφ᾽ ἑαυτῶν, διὰ πάσης ἐφαίνετο νυκτὸς, ἐκπλήξιν καὶ δόλος μέγα τοῖς θεωμένοις ἐμποιοῦν ἅπασιν. Ἐδόκει γὰρ αὐτοῖς ὡς οἱ ἀστέρες ἅπαντες τοῦ τεταγμένου αὐτοῖς οὐρανοῦ χάρον παρ * * * ἰοῦμενοι κατὰ γῆς ἐφέροντο. Οἱ δὲ περιγέιοι γενόμενοι ἀθρόον διεκλόοντο, ἥμισυ τὴν οἰανοῦν βλάβην ποιησάμενοι πάποτε. Φασὶ δὲ πολλοὶ ὡς διὰ πάσης τῆς οἰκουμένης τὸ τοιοῦτον ἐξαίσιον διεδεικνύετο θέαμα."—*Sancti Nicephori Patr. Constantinop. Breviarium Hist. Hist. Byz. Scr. Corp. tom. 7, p. 33.*

(10.) A. D. 764. "In the same year, in the month of March, stars were seen falling from heaven, so that all the beholders imagined that the end of the world had come. There was also a great drought, and the fountains were dried up."

"Τῷ δ' αὐτῷ ἔτει μηνὶ Μαρτίῳ ἀστέρες ἐκ τοῦ οὐρανοῦ πίπτοντες ὤφθησαν, ὡς πάντας τοὺς ὄρῳντας τὴν τοῦ παρόντος αἰῶνος ἐπολαμβάνειν εἶναι συντέλειαν· ἀχρὺς τε πόλιν γέγονεν, ὡς ξηρανθῆναι καὶ πηγᾶς."—*Stephanis Chronographia: Hist. Byz. Scr. Corp. tom. 6, p. 291.*—See also *Hist. Miscellæ, lib. 22, Muratori: Rer. Ital. Scr. tom. 1, p. 159:—Calvisii Opus Chronol. fol. 1685, p. 634.*

This is the shower referred to A. D. 763, in Chaldni's *Feuer-Meteore*, p. 88.

(11.) A. D. 765. "On ~~Saturday~~ ^{Friday}, the fourth day of January, A. D. 765, stars were seen falling as it were from heaven."

"Anno 1076, [Græcorum; Christi 765,] mense Canun posteriori, (Januario,) die 4, feria 6, stellæ quasi e cælo decidere visæ sunt."—*Dionysius Patriarcha, in Assemanni Biblioth. Orient., tom. 2, p. 112. Romæ, 1721, folio.**

(12.) A. D. 829. "An Earthquake at Aix a few Days before Easter, and a violent Hurricane. Another Comet in Aries. And for several Days together, very many little twinkling Fires like Stars, ran up and down in the Air; great Tempests of Wind followed. *Chr. Magdeb.—General Chronological History of the*

* In the Saxon Chronicle, under date of A. D. 793, it is stated that *fiery dragons* [a common term for very brilliant meteoric fire-balls,] *were seen flying through the air.* It does not appear whether they were numerous.

Air, Weather, &c. [by Dr. Thos. Short.] 2 vols. Svo. Lond. 1749. Vol. I, p. 86.

This account is not altogether intelligible, and I have not been able to find any other testimony concerning the occurrence.

(13.) A. D. 855. October 17. "This year there was a fall of stars during the night preceding the first day of the month Djomadi II, (Hegira 241,) which continued from the beginning of the night until dawn. At the same period earthquakes were felt in all parts of the world."

"Dans cette année (savoir 241) il arriva une chute d'étoiles dans la nuit (c'est-à dire qui précède le jeudi) dans la nouvelle lune, (le premier quartier,) du Dschumadi II, et qui dura depuis le commencement de la nuit jusqu'à l'aurore. Il y eut en même temps des tremblements de terre dans le monde entier."—*Tarich el-Mansury, Cod. 521. Acad. Sci. fol. 51; cited by M. Fraehn, in a communication to the Imp. Acad. Sci. of St. Petersburg, Dec. 1, 1837; quoted in L'Institut, Paris, No. 252, p. 350. Oct. 25, 1838.*

(14.) A. D. 899. November 14. "In the year 286 (of the Hegira,) there was an earthquake in Egypt, on Wednesday, the 7th of the month Djolkaada, from midnight until morning, and the stars called Schuhub, (luminous meteors,) were in extraordinary commotion, going from east to west, and from north to south, in such a manner that no mortal could look at the heavens."

"Dans l'année 286, il y eut en Egypte, un tremblement de terre le mercredi 7 du mois de Sulkade, depuis le milieu de la nuit jusqu'au matin, et les étoiles qu'on nomme Schuhub, (i. e. le météore lumineux) s'agitèrent d'une manière extraordinaire en se mouvant de l'est à l'ouest et du nord au sud, de façon qu'aucun mortel ne pouvait jeter les yeux sur le ciel."—*Elmacini Histor. Saracen., Arab. et Lat., op. Erpenii, p. 181, quoted by M. Fraehn, L'Institut, No. 252, p. 350.*

(15.) A. D. 901. "The whole hemisphere was filled with those meteors called falling stars, the ninth of Dhu'lhajja, (288th year of the Hegira,) [A. D. 901, November 25,] from midnight till morning, to the great surprise of the beholders, in Egypt."—*Modern Part of the Universal History. Svo. Vol. 2, p. 281. Lond. 1780.*

(16.) A. D. 902. "In the month Djolkaada of the year 289, (of the Hegira,) died king Ibrahim ben Ahmet, and during the same

night were seen great numbers of stars, which moved, as if they had been darted through the atmosphere, from a culminating point, and rushed down on the right and left, like rain. On account of this phenomenon, this year was called the year of stars."

"Dans la lune Dylcada de l'année 289, mourut le roi Ibrahim ben Ahmet, et dans le même nuit, on vit un nombre considérable d'étoiles, qui comme si elles eussent été lancées dans les airs, partaient d'un point culminant et se précipitaient à droite et à gauche sous forme de pluie. C'est à cause de ce phénomène que cette année a pris le nom d'Année des étoiles." *Conde: Hist. de la Domination des Maures en Espagne*, I, 397, quoted by *M. Fraehn*, (as above,) who states that the date is the 24th or 25th October, A. D. 902. First quoted in part by *Von Hammer*, *Comptes Rend. Acad. Sci.*, 1837, I, 293.

The following probably refers to the same occurrence: "Anno Dominicæ Incarnationis 902, urbs Tauromenis a Sarracenis capta est. Eodem anno in nocte visi sunt igniculi in modum stellarum per aera discurrentes: qua nocte Rex Africae residens super Cosen-tiam Calabriae civitatem, Dei judicio, mortuus est."—*Chronicon Romualdi II, Archiepisc. Salernitani*: in *Muratori, Rer. Ital. Scr.* t. vii, p. 160.

(17.) A. D. 912 or 913. "I will here add what I have seen in a commentator on the Astronomical Aphorisms of Ptolemy, the last of which begins thus: 'Shooting stars indicate dryness of the air; if they all go towards the same quarter of the heavens, they foreshow winds which will blow from that quarter, but if they scatter in all parts of the heavens they indicate the drying up of the water, disturbances in the atmosphere, and the incursions of armies moving in various directions.' The commentator remarks, 'I remember that in the year 290 [of the Hegira, beginning Dec. 4, A. D. 902] there were seen in Egypt burning meteors which scattered themselves through the sky and filled the whole expanse; they caused great terror and increased continually.* A short time after, a great dearth of water was felt in this country: the Nile rose only thirteen cubits, and violent disturbances arose which caused the ruin of the dynasty of the Toulounis in Egypt. In the year 300 [beginning Aug. 17, A. D. 912] the same phenomena were seen in all parts of the sky; the flow

* If the dates are correct, this must be a case different from No. (16.)

of the Nile was bad, and there were troubles and agitations in the country.' These are doubtless very strong signs, but they are common to all regions; and not peculiar to Egypt. We have seen a recurrence of the same phenomena in the present year 596, [beginning Oct. 22, 1199.] At the beginning of the year, the stars were seen coursing through the heavens, and afterward the water was very low. During the same year the sovereign of Egypt was dethroned by his uncle Melic-aladel."—Translated from "*Relation de l'Égypte, par Abd-allatif, médecin Arabe de Bagdad, etc.; traduit et enrichi de notes historiques et critiques: par M. Silvestre De Sacy.*" Paris, 1810, 4to. book 2, chap. 2, p. 340. First quoted in part by M. Fraehn, (sup.)

The passages occur at pp. 117 and 118 of the Tübingen edition of 1789.

(18.) A. D. 931 or 934. "In the same year appeared signs in the heavens among the stars, which appeared some falling and others blazing like torches, on the fourteenth day of October, the second day of the moon."

"934. Indictione 4. Defunctus est Joannes Abbas II Kal. Aprilis, fer. 2. Et in ipso Anno apparuerunt signa in Cælo de stellis, quæ videbantur hominibus aliæ cadere, aliæ fulgere sicut faculæ xiv die intrante mense Octobri Luna 2."—*Notes found on a Calendar; and printed at the end of Chronicon Cavense: Muratori, Rerum Italicarum Scriptores.* 26 tom. fol. Mediol. 1723, etc. t. vii, p. 961.

The date on the margin is A. D. 934. The year of the Indiction requires A. D. 931: the moon's age agrees about equally well with either.

(19.) A. D. ~~935~~. In the year 323, [Hegira,] "several violent shocks of an earthquake were felt in Egypt, the third of Dhu'l-kaada: [Oct. 5, A. D. 935,] about the same time, many of those meteors called falling stars, of a very remarkable kind, likewise appeared in Egypt."—*Modern Part of the Universal History.* 8vo. Lond. Vol. 2. 1780. p. 333. (*Hist. of the Arabs.*)

The following is cited by M. Fraehn: "Le 3 du Sulkade de l'an 323, il y eut en Égypte, un tremblement de terre, et les étoiles lumineuses étaient dans un mouvement violent."—*Eutychii Annal.*, II, 529.

It is plain that the exact date of the shower cannot be inferred from either of these accounts.

(20.) A. D. 1029. "In the year 420, in the month Radjab, [beginning July 16, A. D. 1029,] fell many stars with great noise and very vivid light."

"Dans l'an 420, au mois de Redscheb, il tomba beaucoup d'étoiles, avec accompagnement d'un bruit extraordinaire et de lumières tres vives."—*Soyuti, Hist. Cair. fol. 338. First quoted by Von Hammer: Comptes Rend. 1837, I, p. 293. Cited also by M. Fraehn.*

Was this a shower of shooting stars, or only the fall of a number of meteoric stones?

(21.) A. D. 1060. In the *Comptes Rendus* of the French Academy of Sciences, (1837, I, 532,) it is stated that M. de Paravey had found in an ancient history of Anjou, an account of a remarkable fall of shooting stars which happened A. D. 1060. The date of the month was not mentioned in the history. It is to be hoped that the passage will be given in full.

(22.) A. D. 1090. "M. Muncke states that in the year 1090, according to the chronicles of that period, shooting stars appeared in considerable numbers, during several consecutive nights."—*Trans. from M. Quetelet's Catalogue des Principales Apparitions d'Etoiles Filantes: (Brux. 1839,) p. 28; where reference is made to Gehler's Dict. of Physics, viii, 1025.*

This may possibly be a typographical error for A. D. 1096.

(23.) A. D. 1094. "At this period, so many stars fell from heaven that they could not be counted. In France the inhabitants were amazed to see one of them of great size, fall to the earth, and they poured water on the spot, when to their exceeding astonishment, smoke issued from the ground with a hissing noise."

"A. D. 1094. Rex autem Willielmus [sic] omnes fines Walliæ hostiliter ingressus * * * Eodem tempore tot stellæ de cœlo cadere visæ sunt, quòd non poterant numerari. Inter quas, cum unam magnam quidem labi in Gallia gens stuperet, notatoque loco, aquam ibi fudisset, fumum cum stridoris sono de terra exire, obstupuit vehementer."—*Matth. Paris Mon. Alb. Angli Hist. major, etc. fol. Lond. 1640, p. 18.*

"The year 1094 was very remarkable for the number and fashion of gliding stars, which seemed to dash together in manner of a conflict."—*Sir J. Hayward, cited in Guthrie's History of England. fol. 1744. Vol. i, p. 423.*

It is not improbable that these events belong to the next year.

(24.) A. D. 1095. April 4. "This year Easter was on the 8th of the Kalends of April. And, after Easter, on the festival of St. Ambrose, that is on the 2d of the Nones [4th day,] of April, over almost all this land and for nearly the whole of the night, stars were seen falling from heaven in manifold ways, not one or two at a time, but so thickly that no man could count them."

"MXCV. On thisum geare wæron Eastron on viii kl. Apr. And tha uppon Eastron on see Ambrosius mæsse-niht, that is ii Non. Apr., wæs gesewen for-neah ofer eall this land swilce for-neah ealle tha niht swithe mæni-fealdlice steorran of heofenan feollan, naht be anan oththe twam, ac swa thiclice thæt hit nan mann ateallan ne mihte."—*Chron. Sax. ed. Gibson.* Oxon. 1692. 4to. p. 202.

This instance was first quoted, anonymously, from Wilken's History of the Crusades, (*Geschichte der Kreuzzüge*, Leipzig, 1807,) in *Comptes Rendus Acad. Sci.* (1836, II, 145.) Wilken (th. 1, s. 75,) quotes Baldric's Chronicle, which states that the shooting stars were on that occasion so numerous, "ut grando, nisi lucerent, pro densitate putarentur." The date is erroneously given, April *twenty fifth*, in Wilken. It is thus copied into the *Comptes Rendus*, from which work the false date has been extensively propagated. Calvisius (*Opus Chronolog.*, etc. fol. Franc. ad Mœn. 1685, p. 743,) also gives the subjoined quotation from Baldric, which shows the origin of the mistake. The moon was in fact in the twenty fifth day of the lunation, on the 4th day of the month of April of that year. Notices of this great meteoric shower are found in many different authors, some of which are given below. Its exact date is most satisfactorily determined.

"1095. Stellæ in cælo die 4. April. fer. 4, Lunâ 25, visæ sunt inter se pugnare, in tanta frequentia, ut numerari non possent."—*Baldricus.*

"Anno autem Dominicæ Incarnationis millesimo nonagesimo quinto, Indictione tertia, pridie Nonas Aprilis, quartâ feriâ post octavas Paschæ, à quarta ferme vigilia noctis, usque in crepusculum, stellæ innumerabiles de cælo, versus occidentalem plagam, ubiq. terrarum cadere visæ sunt."—*Chron. Sac. Monast. Casin.*; in *Muratori Rer. Ital. Scr.* t. iv, p. 497.

1094 ["verius 1095"] Ind. ii. mense Aprilis Urbanus Papa Placentiæ Synodum celebravit et iv Nonas ejusdem mensis Aprilis fuit terribile signum in stellis, ita quòd a mediæ noctis tempore usque

manè visæ sunt innumera stellæ mixtim ex omni parte Cœli decurrisse, et in terram decidisse.—*Romualdi Salern. Chron.*, in Muratori, *Rer. It. Scr.* t. vii, p. 177.

Anno 1095, mense Aprilis in nocte diei 4, subito visi sunt igniculi cadere de cœlo, quasi stellæ per totam Apuliam, qui repleverunt universam superficiem terræ, et ex tunc cœperunt Galliæ populi, imò totius Italiæ pergere ad sepulchrum Domini cum armis ferentes in humero dextro Crucis signum.—*Lupi Protospata Rer. in Reg. Neapol. Gest. Chron.*, in Muratori, *Rer. It. Scr.* t. v, p. 47.

1095. Pridie Nonas Aprilis visæ sunt in nocte stellæ, quasi de cœlo cadere.—*Rog. de Hovenden, Annales, pars prior.* fol. Lond. 1596. fol. 266.

(25.) 1096. "During many nights stars were seen to rain down at intervals, but so thick and fast, that one would have said they were flakes from the celestial orbs."

"On vit durant plusieurs nuits pleuvoir des Etoiles par intervalles, mais si dru et menu, qu'on eût dit que c'étoient des bluettes du débris des orbes célestes."—*De Mezeray: Abrégé Chronologique de l'Hist. de France.* Amst. 1755. 4to. t. ii, p. 156.

"In 1096 nono [Qu. nonis] Aprilis in Depositione Sancti Ambrosii, [Aprilis 4?] visæ fuerunt in multis locis frequenter in illa nocte stellæ, quæ ceciderunt de cœlo, et in Ascensione Domini, quæ fuit in illo et eodem anno, et in festivitate Sancti Ambrosii cecidit magna nix."—*Chron. Parmense*, in Muratori, *Rer. It. Scr.* t. ix, p. 760.

Chladni has mentioned the meteors of this year, (*Feuer-Meteore*, pp. 88, 89,) referring for authority to *Historiæ francicæ fragmentum*; in Duchesne: *Hist. Franc. Script.* t. iv, p. 90.*

(26.) A. D. 1106. "On the twelfth of February, at Bari, a town in Italy, were seen by day several stars in the sky, sometimes apparently running together, and sometimes apparently falling to the earth."

"Pridie idus Februarii apud Barum Italiæ oppidum conspectæ sunt aliquot stellæ in cœlo per diem, nunc quasi inter sese concurrentes, nunc quasi in terram cadentes."—*Hist. Eccl. Magdeb.* tom. vi, p. 1712.

* In (Short's) *Genl. Chr. Hist. of the Air, &c.*, it is said that in A. D. 1099, "many frightful prodigies were seen: * * * stars seemed to fall to the earth, &c." Vol. 1, p. 104.

"A comet was visible in February, from 3 o'clock to 9 for twenty five days at the same hour. * * * In Judea this comet was seen fifty days decreasing. * * * Shortly after the Stars seemed to rain down from Heaven."—*Clark's Mirrour*.—[Short's] *Gen. Chron. Hist. of the Air, &c.* Vol. I, p. 107.

The following passage (nearly identical with that above given,) is quoted from Schnurrer's *Die Krankheiten des Menschengeschlechts*, 1825, (Bd. 1, s. 230,) by M. A. Erman, in *Poggendorff's Annalen der Physik*, B. 48, s. 585, (1839.)

"Anno 1106, pridie Idus Februar. apud Baram Italiae stellæ visæ sunt in cælo per diem, nunc quasi inter se concurrentes, nunc quasi in terram cadentes."

The foregoing is cited by Erman in support of his hypothesis that the meteoric stream from which are derived the shooting stars which at the present time are seen about the 10th of August, intervenes between the earth and sun about the 6th of February. The account does indeed seem to assert that the meteors were seen in the day time, but it is evident that unless they were at least as brilliant as the planet Venus, they would not be visible in such circumstances. There was no eclipse of the sun on this day. Perhaps the story may be cleared up by reference to the *Annales Boicorum* of Aventinus, from which many fearful prodigies are quoted in the Magdeburgh Ecclesiastical History, as happening at this time. Without the quotation from *Clark's Mirrour*, it would be doubtful whether the number of meteors seen at this time was larger than usual.

(27.) A. D. 1122. April 4. In the year of our Lord 1122, on the day before the nones of April, at the fourth watch of the night, while the brethren were chanting the Synaxis nocturnal, innumerable stars were seen falling, and as it were raining down, throughout the world."

"Hoc interea tempore, anno Dominicæ Incarnationis ejus millesimo centesimo vicesimo secundo, pridie Nonas Aprilis, quarta vigilia noctis, cum Fratres nocturnalem Synaxim decantarent, stellæ de Cælo innumerabiles cadere, et quasi pluere visæ sunt, ubique per totum orbem terrarum."—*Chronica Sacri Monasterii Casinensis*, lib. 4, cap. lxxix, in Muratori, *Rer. It. Scr.* t. iv, p. 546.

1122. Stellæ innumeræ quasi pluere visæ sunt pridie Non. Aprilis horâ matutinâ.—*Anonymi Monachi Cassinensis Breve Chronicon*; in Muratori, *Rer. It. Scr.* t. v, p. 61.

1122. Indictione decimaquinta Stellæ innumerabiles visæ sunt cadere per totum orbem pridie . . . Aprilis hora matutina.—*Chron. Fossæ Novæ*, in Muratori, *Rer. It. Scr.* t. vii, p. 868.

(28.) A. D. 1199. "At the beginning of the year [596 of the Hegira, commencing Oct. 22, 1199] the stars were seen coursing through the heavens, &c." See quotation from Abd-allatif's Account of Egypt, under No. (17.)

(29.) A. D. 1202. In the year 599, on the night preceding Sunday the last day of the month Moharrem, [October 19, A. D. 1202,] the stars rushed across the heavens from east to west, and glided to the right and left, like grasshoppers in a field. This continued until dawn. The inhabitants cried out with terror, and fervently implored the mercy of the Most High. A similar occurrence happened in the year of the holy mission of the Prophet, [A. D. 611,] as well as in the year 241, [A. D. 855.]

"En l'an 599, dans la nuit du dimanche, dans le dernier jour du Muharrem, les étoiles s'élançèrent au ciel dans une direction de l'est à l'ouest, et s'échappèrent çà et là tant à droite qu'à gauche, comme des sauterelles sur un champ. Ceci dura jusqu'à l'aurore. Les hommes jetèrent des cris d'épouvante et implorèrent à grand cri la miséricorde du Tres-Haut. La même chose, au reste, avait eu lieu dans l'année de la sainte mission du Prophète, ainsi que dans l'année 241."—*Soyuty's Hist. of Cairo*, fol. 342, quoted by M. Fraehn, (as above.) First cited in part by Von Hammer, *Comptes Ren. Acad. Sci.* 1837, I, 294.

"Au commencement de l'an 599 on vit à Bagdad les étoiles tomber çà et là, et comme des sauterelles s'élançant d'un lieu dans un autre. Celà dura jusqu'à l'aurore. Les hommes poussèrent des cris et implorèrent par des prières le Dieu tout puissant."—*Scheby, in T. Duwel el-Islam. Cod. Acad. Sci.* No. 254. Cited by M. Fraehn.

"Dans l'année 599 on vit un mouvement d'oscillation des étoiles pendant toute la nuit du dernier [jour] de Muharrem."—*Haddschy Chalfa, Chronological Tables.* Cited by M. Fraehn. *L'Institut*, No. 252.

(30.) A. D. 1243, July 26. "In this year, on the 7th of the Kalends of August, the night was most serene and the air exceedingly pure, so that the milky way was as manifest as in the clearest winter night, although the moon was in her eighth day. And to our surprise, stars were seen falling from heaven, swiftly

darting on all sides. * * * Most remarkably, thirty or forty were seen to shoot or fall at the same instant, so that two or three would fly together in the same track. Of course, if these had been real stars, (which no man of sense supposes,) not one would have been left in the sky. It belongs to the astrologers to interpret this portentous appearance; but to all the beholders it was a most stupendous and wonderful spectacle."

"Et eodem anno, videlicet septimo Calend. Augusti, fuit nox serenissima, aërque purissimus, ita quòd Lactea, sicut solet placidissima nocte hyemali contingere, manifestè apparebat, Luna existente octava. Et ecce stellæ cadere de cælo videbantur, velociter sese jaculantes hac et illac. Non tamen, ut de more contingit, quædam faculæ per modum stellarum subruentes (quod, sicut determinatum est in libro *Metheorum Aristotelis*, naturaliter contingit,) sicut fulgur ex tonitru: sed in uno instanti, præter solitum, triginta vel quadraginta saltitare vel cadere viderentur, ita scilicet, quòd duæ vel tres simul uno tramite, volare se mentirentur. Unde, si veræ stellæ fuissent (quod nullius sapientis est sentire) nec una in cælo remansisset. Considerent Astrologi, quid hujusmodi portentum significet; sed omnibus intuentibus, videbatur nimis stupendum et prodigiosum.*—*Matt. Paris Mon. Alb. Angli Hist. Major.* fol. Lond. 1640, p. 602.

"1243. Eodem mense [i. e. Julii] discursus Siderum de nocte visus est in Festo Sancti Jacobi [26to.] ita ut unum contra alterum quasi hostem insurgerent, et inter se hostiliter dimicarent."—*Ric. de St. Germano Chronicon*, in Muratori, *Rer. It. Scr.* t. vii, p. 1052.

(31.) A. D. 1366, Oct. 22. "In the year 1366, on the day after the festival of the eleven thousand virgins, [Oct. 22,] from midnight until daylight, stars were seen falling in streams from heaven, and in such multitudes that no man could count them."

"Eodem anno (i. e. 1366) die sequenti post festum xi millia virginum, ab hora matutina usque ad horam primam† visæ sunt quasi stellæ de cælo cadere continua [continue?] et in tanta multitudine, quod nemo narrare sufficit."—*Chronicon Ecclesiæ Pra-*

* This quotation was published in my paper of November, 1837, (this Jour. Vol. 33, p. 358.)

† The hour of *matins* ranged between midnight and one o'clock in the morning; the *prime* began at day break or sometimes at sunrise. There is no reason to suppose that this display was seen in the day time.

gensis.—Script. Rer. Bohem. pars II, p. 389. Prag. 1784. Quoted by Boguslawski, Jr. in *Poggendorff's Annalen der Physik und Chem.* B. 48, s. 612, 1839.

(32.) A. D. 1398. "Many stars of a fiery appearance fell down. At this time pestilence invaded nearly the whole of Italy."

"Anno Domini MCCCLXXXVIII. Multæ stellæ ad modum ignis ceciderunt, quas Asub vocant. Tunc pestis totam fere Italiam invasit."—*Annales Forolivienses*, in Muratori, *Rer. It. Scr.* tom. xxii, p. 200.

(33.) A. D. 1399. "An eclipse of the sun happened on the second of the Calends of October. [Sept. 30.] Stars like fire were also seen falling from heaven in many parts of Italy."

"Anno Domini MCCCIC. Eclipsis Solis facta est secundo Calend. Octobris. Stellæ quoque instar ignis de cælo cadentes in plerisque Italiæ locis visæ sunt."—*Annales Forolivienses*, in Muratori, *Rer. It. Scr.* t. xxii, p. 200.

(34.) A. D. 1635, 1636. "During the whole summer of 1635, no less than during that of 1636, signs of this sort were seen, viz. burning stars running together in the heavens in great numbers and falling to the earth."

"Hujus quoque generis varia signa pestem Noviomagensem prænunciare visa sunt: Tota enim æstate anni 1635, non minus quam anni 1636, hujusmodi indicia se prodiderunt: Nempe, stellarum ardentium in cælo oberrantium magnus concursus, et in terram prolapsio."—*Diermerbroeck: Op. omnia.* fol. Ultraj. 1685: *De Peste*, p. 10. Quoted in *Webster's Hist. Epidem. and Pestilen. Diseases*, Vol. 2, p. 89.

If this is to be interpreted literally, it must be considered an extravagant account. In (Short's) *Gen. Chron. Hist. of the Air, &c.*, is the following statement, (the time of year being uncertain,)—"From March to August, 1636, not one drop of rain. This Numigen plague raged most at new and full moon. It was presaged by great Justling and Falling of fiery Stars south or west, many fewer birds than ordinary, &c."—Vol. I, p. 314.*

* Rev. W. B. Clarke, in *Loudon's Mag. Nat. Hist.*, 1834, Vol. 7, p. 294, states that, "On August 18, 1716, meteors were seen all over Europe, from 8 P. M. to 3 A. M."—"On January 4, 1717, there was a shower of fire at Quesnoy."—The first case is probably a display of the aurora borealis: the latter was probably a lightning-bolt, or possibly a large meteoric fire-ball.—(*Hist. de l'Acad. de France*, 1717, p. 8, II.)

(35.) A. D. 1743. October 4. "A clear Night, great Shooting of Stars between 9 and 10 a Clock, all shot from S. W. to N. E. [Qu. N. E. to S. W.] one like a comet in the Meridian very large, and like Fire, with a long broad Train of Fire after it, which lasted several minutes; after that was a Train like a Row of thick small Stars for twenty Minutes together, which dipt N."—*General Chronological Hist. of the Air, Weather, &c.* [by Dr. Thos. Short.] Lond. 1749. 8vo. Vol. II, p. 313.

The dates of the catalogue thus far, are of the Julian style: those which follow, are of the Gregorian.*

(36.) A. D. 1799. November 12. A great shower of shooting stars, seen chiefly between midnight and morning, in various parts of Europe and America. The light of the moon (then at the full,) greatly impaired the splendor of the display.—*Ellicott's Journal*. 4to. 1814. p. 248.—*Humboldt: Voyage*, tom. 4. liv. 4. ch. 10. 8vo.—*Gilbert's Ann. der Physik*, Bd. 6: 191, 12: 217, 15: 109.

(37.) A. D. 1803. April 20. A great shower of shooting stars after midnight, seen in the northern and middle portions of the United States. Sky clear and moon only a few hours before the change.—*This Jour.* Vol. 36, p. 358.†

(38.) A. D. 1832. November 13. An extensive shower of shooting stars seen between midnight and morning, in various and widely distant parts of the globe. The moon (five days past the full,) much diminished the brilliancy of the spectacle.—*Bib. Univ. de Genève*. 1832; t. 3: 189.—*Comptes Rend.* vi. 562.

(39.) A. D. 1833. November 13. A great shower of shooting stars seen between midnight and morning in various parts of

* In this catalogue I intend to confine myself to *showers* of shooting stars, and omit many instances, occurring chiefly in August, in which meteors have been seen in uncommon, but not very large numbers. Of these meteoric displays some may perhaps merit a place in this list, e. g. those of Aug. 9, 1779, Aug. 9, 1798, Dec. 6, 1798, and Aug. 9, 1837. An extensive collection of these cases is given by M. Quetelet in his *Catalogue des Principales Apparitions des Etoiles Filantes*, (4to. Bruxelles, 1839.) It may be well to restrict the term *meteoric shower* to those instances where the meteors appear at a rate not less than 1000 per hour.

† In E. H. Burritt's *Geography of the Heavens*, (12mo. 1838, p. 161,) it is said, "a shower of stars exactly similar took place in Canada between the 3d and 4th of July, 1814, and another at Montreal, in Nov. 1819." "Another was witnessed in the autumn of 1818, in the North Sea, &c." Probably neither of these occurrences was a shower of shooting stars. On the 3d and 4th of July, 1814, there fell on the river St. Lawrence, Canada, a quantity of dust or ashes, the air being very hazy and smoky.—*Tilloch's Phil. Mag.* Lond. 44: 91. That of 1818, was doubtless a display of the aurora borealis.

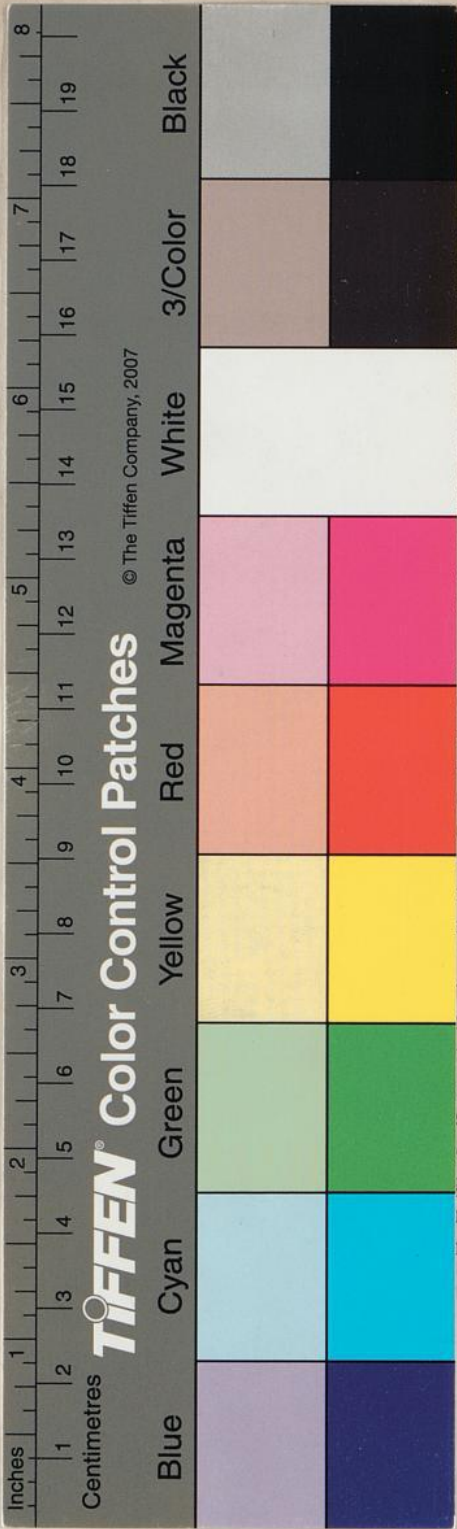
North America. The meteors appeared to diverge from the vicinity of γ Leonis, and were most abundant about 4 A. M. Sky clear and moon in the second day past the change.—*This Jour.* Vols. 25, 26, &c.

Recapitulation: dates reduced to Gregorian style.

1. B. C. 1768.	14. A. D. 899. Nov. 18.	27. A. D. 1122. April 11.
2. " 686.	15. " 901. Nov. 30.	28. " 1199. Oct. ?
3. A. D. 7.	16. " 902. Oct. 30.	29. " 1202. Oct. 26.
4. " 532.	17. " 912 or 913.	30. " 1243. Aug. 2.
5. " 558.	18. " 931 or 934. Oct. 19.	31. " 1366. Oct. 30.
6. " 585. Sept. 6?	19. " 935. Oct. ?	32. " 1398.
7. " 611.	20. " 1029. July or Aug.	33. " 1399. Oct. ?
8. " 744 or 747.	21. " 1060.	34. " 1635, 1636.
9. " 750.	22. " 1090.	35. " 1743. Oct. 15.
10. " 764. ? March.	23. " 1094.	36. " 1799. Nov. 12.
11. " 765. Jan. 8.	24. " 1095. April 10.	37. " 1803. April 20.
12. " 829.	25. " 1096. April 10?	38. " 1832. Nov. 13.
13. " 855. Oct. 21.	26. " 1106. Feb. 19.	39. " 1833. Nov. 13.

The limits prescribed to this paper will permit only a very brief discussion of the preceding catalogue. The region of country included by these showers, down to that of A. D. 1799, extends from England to China, about 130° in longitude, and from about 20° to 51° N. latitude. The table above shows the dates (whenever they could be found,) reduced to the Gregorian calendar, which, thus stated, will indicate with sufficient accuracy the point of the earth's orbit, in each instance intersected by the meteoric stream. It is reasonable to presume that some of the dates are erroneous, and that some of the cases were not actually meteoric showers. Much caution is therefore necessary in tracing the correspondence of dates between these ancient star-showers and those of the present age, especially as our knowledge is so imperfect regarding the meteoric seasons which now exist. The shower of April 20, 1803, may be the lineal successor of those of April 10, 1095 and 1122. That of August 2, 1243, may be the ancestor of the meteoric sprinklings of August 10, seen at the present day. It does not appear certain which of these ancient showers is represented by the modern shower of November 13. There is some reason to suppose that those showers which are described as continuing all night, (e. g. Nos. 4, 5, 9,) may have occurred in the summer season.

Previous to 1833, we have no precise observations on the position of the point of *radiation* during any meteoric shower, but



appeared to diverge from the vicin-
 st abundant about 4 A. M. Sky
 day past the change.—*This Jour.*

reduced to Gregorian style.

1. Nov. 18.	27. A. D. 1122.	April 11.
2. Nov. 30.	28. "	1199. Oct. ?
3. Oct. 30.	29. "	1202. Oct. 26.
4. or 913.	30. "	1243. Aug. 2.
5. or 934. Oct. 19.	31. "	1366. Oct. 30.
6. Oct. ?	32. "	1398.
7. July or Aug.	33. "	1399. Oct. ?
8.	34. "	1635, 1636.
9.	35. "	1743. Oct. 15.
10.	36. "	1799. Nov. 12.
11. April 10.	37. "	1803. April 20.
12. April 10?	38. "	1832. Nov. 13.
13. Feb. 19.	39. "	1833. Nov. 13.

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some slight indications that such radiant was noticed, occur in Nos. 14, 16, 29, 35. No comparison as to this particular can be made between the ancient and the modern meteoric displays.*

If the foregoing catalogue comprised all the star-showers that have ever occurred, it would be easy to determine the *cycle* of the shower of any particular date. In the present state of our knowledge, it may be inferred that the cycle of the November shower is about *thirty four* years. There is of course some ground for expecting about the year 1867, a recurrence of the splendid displays of November 13, 1832 and 1833. It is remarkable that Humboldt mentions that the earthquakes of 1766 in South America, were preceded by phenomena like those of November 12, 1799. I have searched several American newspapers of the former period, but find no trace of any such meteoric display in the United States. The cycle of the April shower may be about *twenty seven* years; but it does not appear that any unusual number of meteors was seen in April, 1830. It is, however, not to be supposed that the cycle remains constant through successive ages.

A just theory of shooting stars must explain all the meteoric showers enumerated in the foregoing list, so far as they are truly stated. It must likewise account for all the meteoric seasons which exist at the present time, and also for the shooting stars of daily occurrence, which, taking into view the whole globe, are exceedingly numerous. The most probable hypothesis is, that there are revolving around the sun, millions of small planetary and nebulous bodies, of various magnitudes and densities; and that when any of these dart through our atmosphere, they become ignited and are seen as *shooting stars*. To ascertain the mode in which they are arranged in the solar system, is an important object of inquiry. A *single* zone or ring of such bodies is insufficient to account for all the known phenomena.

* The following passage from Ptolemy (differing somewhat from that quoted under No. 17.) deserves notice here, as showing that observations upon the directions of shooting stars were not unknown in his time.—“Discursiones et jaculationes stellarum si ab uno angulo prorumpant, inde quoque ventum emittunt. Sin occurrant inter se, ventorumque prælia suscitant. Sin vero de quatuor plagis ruant, hyemes varias ferunt, atque etiam fulmina, tonitrua, et quæ alia hujusmodi sunt.”—*Claud. Ptol. lib. de judiciis, interp. J. Camerario, fol. Basil. 1551, p. 403.*

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