

List of Indian meteorites.

(With Plate XII.)

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[Communicated by Dr. L. J. Spencer, F.R.S., read November 1, 1932.]

AT the suggestion of, and with much assistance from, Dr. L. J. Spencer, Keeper of Minerals in the British Museum,¹ I have examined and, as far as possible, verified and corrected the recorded places of fall of all reported Indian meteorites. The original records were consulted, and as far as possible the places found on the large scale (usually 1 inch = 1 mile) maps in the India Office. This left a residuum regarding which inquiries were made of District Officers in India, to several of whom I am indebted for useful information which has been embodied in the list.

In this list the falls are entered under their original names in alphabetical order by Provinces in British India, but in one list for all the Indian States, and the positions are indicated on the map (plate XII). The correct names of the places of fall are given in each case, in some only the spelling has required correction in accordance with the Government of India standard system,² in others the vernacular name has clearly been mistransliterated, and in many cases the name of the district or province has been changed since the fall. Wherever possible the exact date and time of fall, the latitude and longitude of the place thereof, and its distance from some big place or railway station have been given.

¹ The large series of Indian meteorites preserved in the British Museum includes representatives of 86 of the 106 recorded falls, with many exceptional specimens; e.g. the fine Parnallee stone of 60½ kg. (133 lb.) and the complete Nedagolla iron seen to fall. This is largely due to the help given by the Government of India and the generosity of the Director of the Geological Survey of India, with important contributions also from the Trustees of the Indian Museum of Calcutta and the Asiatic Society of Bengal. A stone of the Benares shower of 1798 was presented to the Collection by Sir Joseph Banks in 1802.

—L. J. S.

² Sir W. W. Hunter, *The Imperial Gazetteer of India*. 26 vols. New edit., Oxford, 1907–1909. New (revised) edit. of vol. 26 (Atlas), 1931.

The list includes the meteorites representing 106 distinct falls. An unusually large number of these are stones, namely 100, there being only four irons (Garhi Yasin, Kodaikanal, Nedagolla, and Samelia) and two stony-irons (Lodran and Singhur). Three of the four irons were seen to fall, there being only one found iron. This striking difference as compared with other countries, such as the United States or Australia, is doubtless accounted for by the fact that a large part of India has been thickly inhabited and cultivated for a very long period, with the consequence that most of the irons have been found long ago and used as metal.

Indian meteorites are also exceptional in that nearly all of them, namely 101, have been actually observed to fall. Of the falls (83) for which the time of day is recorded 68 (81.9%) fell during the 12 hours of daylight (6.0 a.m. to 6.0 p.m.) and only 15 (18.1%) during those of night. O. C. Farrington ('Meteorites', 1915, p. 41) gives 194 (73.2%) and 71 (26.8%) as the corresponding distribution of the 265 falls for the whole world. The monthly distribution of the 97 falls for which the date has been recorded is as follows (one was recorded as in August or September, i.e. in the Hindu month Bhadon):

Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
12	8	4	12	10	9	3	8.5	8.5	5	9	8

In fig. 1 these numbers, reduced to percentages, are compared with those of O. C. Farrington and of P. N. Chirvinsky. Though differing to some extent there is general agreement, especially in the position of the minima, the chief difference being as regards December and January. The more violent fluctuations of the Indian curve are doubtless due to the smaller total number concerned.

As some guide to the real frequency of falls the following may be of interest. In the United Provinces of the 24 falls which occurred during the century 1831-1930, 12 occurred during the first and the same number during the second half, indicating an intrinsic probability of regular recording. Of the total area of the Province, 107,000 square miles, 11,000 should be deducted for the sparsely populated tracts in the Himalaya and south Mirzapur from which no falls have been recorded. This gives an average of one fall per 4,000 square miles per century, as compared with 94 recorded falls for all India and Burma (1,800,000 square miles) during the same period, or one fall per 19,200 square miles per century. It appears probable,

therefore, that at least 450 falls have not been recorded. If, however, it be assumed that falls are equally likely to occur at night as by day, and that the difference is merely due to non-record of many of the former, a further addition must be made. Taking 25% as a round figure lying between the percentage of Indian night falls (18.1) and that deduced from Farrington's figures (26.8), this addition would amount to 50%; so that, assuming all daylight falls to have been recorded in the United Provinces, the number for all India for the century would be 675, indicating that only about 14% of falls have been recorded.

The United Provinces have been selected as a basis for this estimate as being a compact block of territory, and, with the exception of the omitted area, a level, highly cultivated, and thickly populated (438 per square mile) tract, no part of which is, like much of Bengal, liable to periodic flooding, and which has been under fairly uniform administration throughout the period concerned, where reporting is likely to have been at least as full as anywhere in the world.

ASSAM

1. **Assam.** Stone (brecciated grey chondrite), three pieces, total weight about 2.7 kg., found in Calcutta, 1846, supposed to have come from Assam.

2. **Goalpara.** Stone (ureilite), about 2.7 kg., found 1868, supposed to have fallen at Goalpara, 26° 3' N., 90° 40' E.

BENGAL

1. **Dokachi.** Shower of over a hundred stones (spherical chondrite), twenty-four (total weight 3.838 kg.) recovered, fell 22. 10. 1903, 7 p.m., some at Dokachi, 23° 30' N., 90° 20' E., 17 miles SW. of Dacca, police station Srinagar, subdivision Munshiganj, district Dacca; and some at Kolapara, Dakhin Paiksha, Hariya, Munshiya, Kukutiya, Bibandi, Bangaon, and Rana, villages from 1 mile WSW. to 6 miles ENE. of Dokachi.

2. **Gopalpur.** Stone (spherical bronzite-chondrite), about 1.6 kg., fell 23. 5. 1865, 6 p.m., at Gopalpur, 22° 40' N., 89° 50' E., near police station Bagirhat, pargana Salimabad, district Khulna.

3. **Muraid.** Three stones (white chondrite), two recovered, 4.703 kg., fell 7. 8. 1924, 2.30 p.m., one at Muraid, 24° 30' N., 90° 13' E., 24 miles SSW. of Mymensingh, police station Ghatail, subdivision

Tangail, district Mymensingh; the other at Mantala, 1 mile SW. of Muraid.

4. **Pirgunje.** Stone (veined white chondrite), 0.842 kg., fell 29. 8. 1882, at Pirganj, $25^{\circ} 48' N.$, $88^{\circ} 27' E.$, 22 miles NW. of Dinajpur, subdivision Thakurgaon, district Dinajpur.

5. **Rampurhat.** Stone (chondrite), 0.1 kg., fell 21. 11. 1916, 9.30 a.m., at Buripara in Rampurhat town, $24^{\circ} 10' N.$, $87^{\circ} 46' E.$, police station and subdivision Rampurhat, district Birbhum.

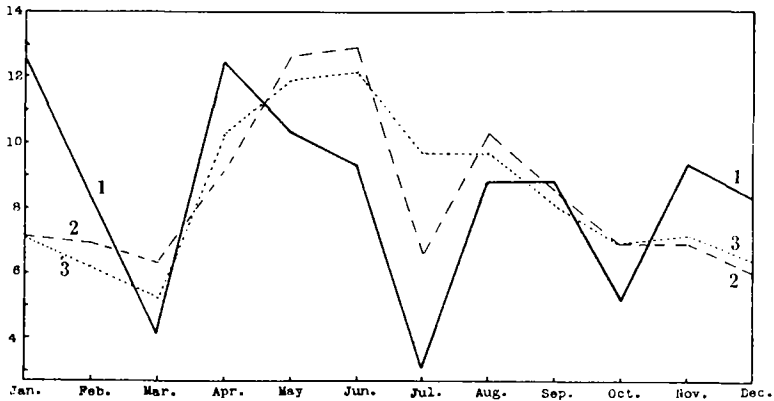


FIG. 1. Percentage curves of monthly falls of meteorites.

(1) 97 Indian falls since 1795.

(2) 350 falls for the whole world tabulated by O. C. Farrington, *Times of the fall of meteorites*. *Amer. Journ. Sci.*, 1910, ser. 4, vol. 29, p. 211; and '*Meteorites*', Chicago, 1915, p. 39.

(3) 422 falls tabulated by P. N. Chirvinsky, *Monatstatistik der Meteoritenfälle*. *Centr. Min.*, Abt. A, 1926, p. 239.

6. **Shalka.** 'An immense stone, said to have measured 3 feet across', but only 3.5 kg. preserved, fell 30. 11. 1850, 4.30 p.m. 'Shalka' is probably Saluka, $23^{\circ} 6' N.$, $87^{\circ} 18' E.$, near Bhora-Dharpur, about 10 miles SE. of Bankura, district Bankura.

7. **Shtyal.** Stone (brecciated intermediate hypersthene-chondrite), fell 11. 8. 1863, noon. Shtyal is said to be in 'the Madhupur jungle, Mymensingh district, 40 miles north of Dacca', i.e. about $24^{\circ} 21' N.$, $90^{\circ} 30' E.$ The District Magistrate of Mymensingh writes (letter dated 4. 7. 32) 'there is no such place in the Madhupur jungle within my knowledge'.

8. **Vishnupur.** Two stones (brecciated intermediate chondrite), fell 15. 12. 1906, 9.30 a.m.: one, 670 g., at Kherai Bani, $23^{\circ} 6' N.$,

87° 26' E., the other, 1.767 kg., at Mathura, 6 miles WSW., near Ramsagar, 16 miles SE. of Bankura, subdivision Vishnupur, district Bankura.

BIHAR and ORISSA

1. **Andhara.** A stone, weight about 2.7 kg., fell 2. 12. 1880, 4 p.m., at Andhara or Ujyan, 26° 35' N., 85° 34' E., 4 miles NW. of Sitamarhi (police station and subdivision), district Muzzaffarpur. The stone has become an object of worship, so no more is known of it.

2. **Butsura.** Five stones (intermediate chondrite), total weight 27.5 kg., fell 12. 5. 1861, noon, in a tract about 5 miles SW. of Bagaha, 27° 5' N., 84° 5' E. (Bengal North-Western Railway), subdivision Bettia, district Champaran. The falls occurred at Piprasi 5 kg., Ballua 140 and 200 g., Chiriya 4 kg., and Jataha Bazar 13 kg., all now in the Gorakhpur district (United Provinces) except Piprasi. Qutahā Bazār in the accounts of this fall is a mistransliteration of Jatahā Bazār, قتها بازار being misread as قتها بازار.

3. **Manbhoom.** A shower of stones (amphoterite), fell 22. 12. 1863, 9 a.m.; the largest, 1.5 kg., at Govindpur, 23° 3' N., 86° 42' E., 2 miles S. of Manbazar and 20 miles SE. of Purulia, district Manbhum, and other portions at the neighbouring villages Pandra and Kashipur.

4. **Nawapali.** Three stones (carbonaceous chondrite), of which only 60 g. recovered, fell 6. 6. 1890, at Nawapali, 21° 15' N., 83° 40' E. The Deputy Commissioner of Sambalpur writes (25. 9. 1932) that the village Nawapali is in tahsil Bargarh and is 34 miles SW. of the town Sambalpur, district Sambalpur.

5. **Ranchapur.** A stone, of which four pieces, 366.3 g., recovered, fell 20. 2. 1917, 8.30 a.m., at Ranchapur, 23° 59' N., 87° 5' E., 12 miles E. of Jamtara, police station Kundahit, subdivision Jamtara, district Santal Parganas.

6. **Segowlie.** About thirty stones (crystalline chondrite), weights 0.5–13 kg., fell 6. 3. 1853, noon, at Sagauli (Bengal North-Western Railway), 26° 45' N., 84° 47' E., 13 miles WNW. of Motihari, district Champaran.

7. **Sherghotty.** A stone (sherghottite), 5 kg., fell 25. 8. 1865, 9 a.m., at police station Sherghati, 24° 33' N., 84° 50' E., 20 miles SW. of Gaya, district Gaya.

8. **Shikarpur.** Stone (veined white chondrite), 3.68 kg., fell 9. 8. 1921, 9 a.m., at Diari Shikarpur, 25° 51' N., 87° 35' E., 8 miles NW. of Purnea, police station Kasba, district Purnea.

BOMBAY

1. **Bhagur.** Stone (veined white chondrite), fell 27. 11. 1877, 6 p.m., at Bhagur, near Dhulia, $20^{\circ} 53' N.$, $74^{\circ} 50' E.$, district West Khandesh.

2. **Dharwar.** Stone (? intermediate chondrite), 1.8 kg., fell 15. 2. 1848, 1 p.m., at Naglur, $14^{\circ} 53' N.$, $75^{\circ} 36' E.$, 20 miles N. of Ranibennur, taluq Ranibennur, district Dharwar.

3. **Jamkheir.** Two stones (brecciated spherical chondrite), about 4 inches across, but only small fragments recovered, fell 5. 10. 1866, noon, at Jamkhed, $18^{\circ} 45' N.$, $75^{\circ} 20' E.$, taluq Jamkhed, district Ahmadnagar.

4. **Kalumbi** (or Kalambi). Stone (veined white chondrite), about 4.5 kg., fell 4. 11. 1879, at (probably) Kalambha, $17^{\circ} 50' N.$, $73^{\circ} 59' E.$, 16 miles NNW. of Satara, taluq Wai, district Satara.

5. **Manegaon.** Stone (diogenite; hypersthene-achondrite), about 15×5 inches, but only a few ounces recovered, fell 29. 6. 1843, 3.30 p.m. at Manegaon, $20^{\circ} 58' N.$, $76^{\circ} 6' E.$, 20 miles E. of Bhusawal (Great Indian Peninsular Railway), taluq Bhusawal, district East Khandesh.

6. **Singhur.** Stony-iron (? pallasite), 14.2 kg., found 1847 at Sinhgarh, $18^{\circ} 19' N.$, $73^{\circ} 55' E.$, 14 miles SSW. of Poona, district Poona.

BURMA

1. **Quenggouk.** Three stones (spherical chondrite), total weight 6.045 kg., fell 27. 12. 1857, 2.30 a.m., at Kwingauk, $17^{\circ} 46' N.$, $95^{\circ} 11' E.$, township Ngathaingyaung, district Bassein, Lower Burma.

CENTRAL PROVINCES

1. **Bori.** Stone (veined intermediate chondrite), weight 8.6 kg., fell 9. 5. 1894, 4 p.m., at Bori, $21^{\circ} 57' N.$, $78^{\circ} 2' E.$, 12 miles NE. of Badnur, district Betul.

2. **Chandakapur.** Three stones (brecciated intermediate hypersthene-chondrite), 8.9 kg., fell 6. 6. 1838, noon, at Chandakapur or Burgaon-Dewalgaon, (probably) $20^{\circ} 16' N.$, $76^{\circ} 1' E.$, 16 miles SW. of Chikhli, tahsil Chikhli, district Bludana.

3. **Donga Kohrod.** Stone (intermediate chondrite), about 0.45 kg., fell 23. 9. 1899, 3 p.m., at Donga Karaod, $21^{\circ} 52' N.$, $82^{\circ} 27' E.$, 24 miles SE. of Bilaspur, tahsil Janjgir, district Bilaspur. (Letter of Deputy Commissioner, Bilaspur, of 6. 6. 1932.)

4. **Sitathali.** Two stones (grey bronzite-chondrite), 1.6 kg., fell 4. 3. 1875, 11 a.m., at Sitathali, $20^{\circ} 55' N.$, $82^{\circ} 35' E.$, 2 miles from police station Narra, and 62 miles E. of Raipur, tahsil Mahasamund, district Raipur.

MADRAS

1. **Gurram Konda.** Stone (white chondrite), 8 g. recovered, fell 1814, at Gurram Konda, $13^{\circ} 47' N.$, $78^{\circ} 36' E.$, 50 miles NW. of Chittoor, taluq Vayalpad, district Chittoor.

2. **Kakangari.** Two stones (spherical chondrite), 0.34 kg. recovered, fell 4. 6. 1890, 8 a.m., at Kangankarai (Madras Railway), $12^{\circ} 23' N.$, $78^{\circ} 31' E.$, taluq Tirupatur, district Salem.

3. **Kodaikanal.** Iron (fine octahedrite, brecciated), 16 kg., found, 1898, at Kodaikanal, $10^{\circ} 16' N.$, $77^{\circ} 24' E.$, district Madura.

4. **Kuttippuram.** Shower of stones (veined white chondrite), total weight 46 kg., largest 32 kg., fell 6. 4. 1914, 7 a.m., at Kuttippuram (Madras Railway), $10^{\circ} 50' N.$, $76^{\circ} 2' E.$, 34 miles SE. of Calicut, district Malabar. Portions fell from Kuttippuram to the coast at Kutteyi 32 miles SSE. of Calicut.

5. **Nammianthal.** Stone (veined spherical chondrite), 4.5 kg., fell 27. 1. 1886, at Durginammiyandal, $12^{\circ} 17' N.$, $79^{\circ} 12' E.$, 6 miles NE. of Tiruvannamalai, district North Arcot.

6. **Nedagolla.** Iron (nickel-poor ataxite), 4.5 kg., fell 23. 1. 1870, 7 p.m., at Nidigullam, $18^{\circ} 41' N.$, $83^{\circ} 29' E.$, 7 miles S. of Parvati-puram, district Vizagapatam.

7. **Parnallee.** Two stones (veined grey hypersthene-chondrite), 77.7 kg., fell 28. 2. 1857, noon. Parnallee is said to be 16 miles S. of Madura, but the Collector of Ramnad, in which district such a point would now be, writes (letter of 30. 6. 32) 'there is no village Parnalle or any place whose name could be so perverted in my district'. Possibly Perunali, $9^{\circ} 14' N.$, $78^{\circ} 21' E.$, a police station, in the Ramnad district, 52 miles SSE. of Madura is meant, a surmise confirmed by the Geological Survey of India (letter of 15. 9. 32.)

8. **Udipi.** Stone (veined grey chondrite), 3.63 kg., fell April 1866, 10 a.m., at Yedabettur, $13^{\circ} 29' N.$, $74^{\circ} 47' E.$, taluq Udipi, district South Kanara.

9. **Yatoor.** Stone (spherical chondrite), 13.6 kg., fell 23. 1. 1852, 4.30 p.m., at Yetur, $14^{\circ} 18' N.$, $79^{\circ} 46' E.$, 23 miles SW. of Nellore, taluq Rapur, district Nellore. (Letter of 31. 5. 32 from the Collector of Nellore.)

PUNJAB and DELHI

1. **Adhi Kot.** Stone (black chondrite), 4.239 kg., fell 1. 5. 1919, noon, at Adhi Kot, $32^{\circ} 16' N.$, $71^{\circ} 49' E.$, 15 miles N. of police station Nurpur, district Shahpur.

2. **Charwallas.** Stone (intermediate chondrite), 12 kg., fell 12. 6. 1834, 8 a.m., at Chaharwala, $29^{\circ} 29' N.$, $75^{\circ} 30' E.$, 30 miles WNW. of Hissar, tahsil Fatehabad, district Hissar.

3. **Delhi.** Two stones (white chondrite), about 1 kg., fell 18. 10. 1897, 7.30 p.m., near the Kutb Minar, $28^{\circ} 34' N.$, $77^{\circ} 15' E.$, 5 miles SSW. of Delhi.

4. **Dhurmsala** (or Dharmsala). Several stones (intermediate hypersthene-chondrite), largest 150 kg., fell 14. 7. 1860, 2.15 p.m., in Dharmsala, $32^{\circ} 14' N.$, $76^{\circ} 28' E.$, district Kangra.

5. **Jhung** (or Jhang). A shower of stones (spherical chondrite), fell June 1873, 3 p.m., 6 kg. recovered, at Kot diwan 15 miles, Dhuin Muhammad 13 miles, and Dhiraj 11 miles SW. of Jhang, and Talwara 10 miles NW. of Jhang, $31^{\circ} 18' N.$, $72^{\circ} 23' E.$, district Jhang.

6. **Kangra Valley.** Stone (spherical chondrite), 395 g., fell about 1897 in the Kangra valley, about $32^{\circ} N.$, $76^{\circ} 20' E.$, district Kangra.

7. **Lodran** (or Lodhran). Stony-iron (lodranite), 1 kg., fell 1. 10. 1868, 2 p.m., 12 miles E. of Lodhran, $29^{\circ} 32' N.$, $71^{\circ} 48' E.$, tahsil Lodhran, district Multan.

8. **Pirthalla.** Stone (brecciated spherical chondrite), 1.36 kg., fell 9. 2. 1884, 2.30 p.m., at (probably) Pirthalla-Lalanda, $29^{\circ} 35' N.$, $76^{\circ} 0' E.$, 38 miles N. by E. of Hissar, police station Tohana, tahsil Barwala, district Hissar.

SIND

1. **Garhi Yasin.** Iron (medium to coarse octahedrite), 380 g., fell Jan. 1917, in night, at Garhi Yasin, $27^{\circ} 53' N.$, $68^{\circ} 32' E.$, 23 miles WNW. of Sukkur, taluq Shikarpur, district Sukkur.

2. **Sindhri.** Stone (spherical chondrite), about 2 kg. seen to fall 10. 6. 1901, 11 p.m., and another stone of 7 kg. dug up a week later, at 'Sindhri, near Samo-junejo'. This is probably Sumo-juneja of the half-inch map, $26^{\circ} 13' N.$, $69^{\circ} 33' E.$, 30 miles NNE. of Khipro, taluq Khipro, district Thar and Parkar.

3. **Visuni.** Stone (crystalline spherical chondrite), 594 g. recovered, fell 19. 1. 1915, noon, at Visuni or Bisoi-jo-thar, $25^{\circ} 27' N.$, $70^{\circ} 0' E.$, 15 miles ENE. of Umarmot, taluq Umarmot, district Thar and Parkar.

UNITED PROVINCES

1. **Akbarpur.** Stone (brecciated grey chondrite), 2 kg., fell 18. 4. 1838, 8 a.m., at Akbarpur, $29^{\circ} 43' N.$, $77^{\circ} 57' E.$, 6 miles S. of Roorkee, tahsil Roorkee, district Saharanpur.

2. **Ambapur Nagla.** Stone (crystalline spherical chondrite), 6.4 kg., fell 27. 5. 1895, 1 a.m., at Ambapur Nagla, tahsil Sikandra Rao, district Aligarh. The Collector of Aligarh writes (letter of 7. 6. 32), 'There is no village in tahsil Sikandra Rao named Ambapur Nagla. The only village with a name resembling it is Amba Madapur, 4 miles north of Sikandra Rao.' This would be at $27^{\circ} 40' N.$, $78^{\circ} 15' E.$

3. **Atarra.** Three stones (black chondrite), 1.28 kg., fell 23. 12. 1920, 5.35 p.m., at Turra, $25^{\circ} 15' N.$, $80^{\circ} 38' E.$, 4 miles SE. of Atarra (Great Indian Peninsular Railway), tahsil Badausa, district Banda.

4. **Banswal.** Stone (grey chondrite), 14 g. recovered, fell 12. 1. 1913, 6 p.m., at Banswal, a hamlet of Chamarsari village, $30^{\circ} 24' N.$, $78^{\circ} 12' E.$, 10 miles SE. of Mussoorie, district Dehra Dun.

5. **Benares** (or Krakhut). Shower of stones (spherical chondrite), largest recovered 1 kg., fell 19. 12. 1798, 8 p.m., at Krakhaut, $25^{\circ} 22' N.$, $82^{\circ} 55' E.$, 14 miles from Benares, district Benares. [Compare Bishunpur under Indian States.]

6. **Bustee** (or Basti). Stone (aubrite; enstatite-achondrite), 1.7 kg., fell 2. 12. 1852, 10 a.m., at Basti, $26^{\circ} 47' N.$, $82^{\circ} 50' E.$, district Basti.

7. **Chail.** Shower of nineteen stones (brecciated chondrite), some said to be up to 14 kg., but only 0.5 g. recovered, fell 5. 11. 1814, 4.30 p.m., at and near Chail, $25^{\circ} 22' N.$, $81^{\circ} 40' E.$, 14 miles W. of Allahabad, district Allahabad.

8. **Chainpur.** Shower of stones (spherical chondrite), 8 kg. recovered, fell 9. 5. 1907, 1.30 p.m., at and near Chainpur, $25^{\circ} 51' N.$, $83^{\circ} 29' E.$, 20 miles SE. of Azamgarh, tahsil Deogaon, district Azamgarh. Some pieces at Bhikampur and Jalalabad, 3 miles SE. and 3 miles SW. of Chainpur respectively,

9. **Chandpur.** Stone (veined white chondrite), 1.14 kg., fell 6. 4. 1885, at Chandpur, $27^{\circ} 17' N.$, $79^{\circ} 3' E.$, 5 miles N. by W. of Mainpuri, district Mainpuri.

10. **Dandapur.** Two stones (veined intermediate hypersthene-chondrite), 5.6 kg., fell 5. 9. 1878, 5 p.m., at Dandapur, $26^{\circ} 55' N.$, $83^{\circ} 58' E.$, 38 miles ENE. of Gorakhpur, tahsil Padrauna, district Gorakhpur.

11. **Dyalpur.** Stone (ureilite), 280 g., fell 8. 5. 1872, at Dyalpur, district Sultanpur, approximately $26^{\circ} 14' N.$, $82^{\circ} 12' E.$ No further detail is available. The Deputy Commissioner of Sultanpur reports (letter dated 22. 8. 1932) that no such place is traceable in the district, but that there are hamlets such as Pura Dayal, Pura Dayal Singh, and Purwa Dayalapur in various tahsils.

12. **Ekh Khera.** Stone (veined intermediate chondrite), 840 g., fell 5. 4. 1916, 2.30 a.m., at Ekh Khera, $28^{\circ} 16' N.$, $78^{\circ} 47' E.$, 30 miles N. of Budaun, tahsil Bisauli, district Budaun.

13. **Futtehpur.** Shower of stones (veined white chondrite), weights 0.5–2 kg., fell 30. 11. 1822, 6 p.m., over a stretch of country from Fatehpur to Bithur, 5 miles WNW. of Cawnpore, some 70 miles, in districts Fatehpur and Cawnpore; $25^{\circ} 52' N.$, $80^{\circ} 50' E.$, to $26^{\circ} 25' N.$, $80^{\circ} 20' E.$

14. **Haraiya.** Stone (white to grey chondrite), 1 kg., fell Aug. or Sept. 1878, afternoon, at Haraiya, $26^{\circ} 48' N.$, $82^{\circ} 32' E.$, 14 miles W. of Basti, district Basti.

15. **Kadonah.** 'Large' stone (veined grey chondrite), weight not recorded, fell 7. 8. 1822, in the night, 'at Kadonah in the Agra district'. The Collector of Agra (letter dated 18. 6. 32) writes, 'There is no village named Kadonah in the Agra district. Karondhna is, however, a village in tahsil Fatehabad, district Agra, about 2 miles west of Tharai flag station on the Agra-Bah branch of the Great Indian Peninsular Railway.' This would place the fall at about $27^{\circ} 5' N.$, $78^{\circ} 20' E.$

16. **Kace.** Stone (spherical chondrite), about 240 g., fell 29. 1. 1838, at (probably) Kaikhai, $27^{\circ} 15' N.$, $79^{\circ} 58' E.$, 3 miles W. of Sandi, pargana Sandi, tahsil Bilgram, district Hardoi.

17. **Kheragur.** Stone (spherical chondrite), about 500 g., fell 28. 3. 1860, at (probably) Khairagarh, $26^{\circ} 57' N.$, $77^{\circ} 53' E.$, 20 miles SW. of Agra, district Agra.

18. **Khohar.** Stone or ? stones (22 pieces recovered, total weight 9.7 kg.), fell 19. 9. 1910, 1 p.m., at Khohar, $25^{\circ} 6' N.$, $81^{\circ} 32' E.$, 5 miles SSE. of Bargarh (Great Indian Peninsular Railway), tahsil Mau, district Banda.

19. **Kusiali.** Stone (white chondrite), fell 16. 6. 1860, 5 a.m., at Kasiali, 'a village 38–40 miles SW. of Pauri, patti Walla-Udaipur, tahsil Lansdowne, district Garhwal' (letter of Deputy Commissioner, Garhwal, of 14. 6. 32); this would be about $29^{\circ} 41' N.$, $78^{\circ} 23' E.$

20. **Lalitpur.** Stone (veined intermediate chondrite), 372 g. collected, fell 7. 4. 1887, 10.30 a.m., between Jharaota and Nayagaon, $24^{\circ} 27' N.$, $78^{\circ} 34' E.$, 20 miles SE. of Lalitpur, tahsil Mahroni, sub-division Lalitpur, district Jhansi.

21. **Meerut.** Stone (intermediate chondrite), 22 g. preserved, fell 1860–1862, at Meerut, $29^{\circ} 1' N.$, $77^{\circ} 48' E.$, district Meerut.

22. **Merua.** Shower of stones (grey bronzite-chondrite), total collected 71.4 kg., fell 30. 8. 1920, 11.15 a.m., at and near Merua, $25^{\circ} 29' N.$, $81^{\circ} 59' E.$, 9 miles ENE. of Allahabad, district Allahabad. Portions at the neighbouring villages Chukri, Manpur or Baghai kalan, Mustafabad, and Umri.

23. **Mhow.** Shower of stones (intermediate chondrite), fell 16. 2. 1827, 3 p.m., largest 1.4 kg., at Mau, $25^{\circ} 54' N.$, $83^{\circ} 37' E.$, 30 miles SE. of Azamgarh, tahsil Mau, district Azamgarh.

24. **Mirzapur.** Stone (veined and brecciated intermediate chondrite), fell 7. 1. 1910, 11.30 a.m., 8.5 kg. recovered, at village Mirzapur, $25^{\circ} 41' N.$, $83^{\circ} 15' E.$, 27 miles WNW. of Ghazipur, tahsil Saidpur, district Ghazipur.

25. **Moradabad.** Stone (white chondrite), 70 g. preserved, fell 1808 in Moradabad district. (Moradabad town is at $28^{\circ} 47' N.$, $78^{\circ} 50' E.$)

26. **Nagaria.** Stone (eucrite), 12 kg., fell 24. 4. 1875, 7.30 a.m., at Nagaria, $26^{\circ} 59' N.$, $78^{\circ} 13' E.$, 19 miles SSE. of Agra, tahsil Fatehabad, district Agra.

27. **Pokhra.** Stone (crystalline bronzite-chondrite), 340 g., fell 27. 5. 1866, 8.30 p.m., at Pokhra, $26^{\circ} 43' N.$, $82^{\circ} 40' E.$, 6 miles ESE. of Basti, tahsil and district Basti.

28. **Sabetmahet.** Stone (crystalline spherical chondrite), 1.25 kg., fell 16. 8. 1885, evening, at Sahet-mahet, $27^{\circ} 26' N.$, $82^{\circ} 5' E.$, 12 miles NW. of Balrampur (Bengal North-Western Railway), tahsil Utraula, district Gonda. Has become an object of worship.

29. **Sultanpur.** Shower of stones (black chondrite), 1.71 kg. collected, fell 10. 7. 1916, 11 a.m., at Sultanpur, $25^{\circ} 56' N.$, $84^{\circ} 17' E.$, 4 miles N. of Bansdih, tahsil Bansdih, district Ballia; portions at near villages Mandiari and Kharauni, 2 miles W. and 3 miles SSE. respectively of Sultanpur.

30. **Supuhee.** Six stones (brecciated grey chondrite), 7.285 kg., fell 19. 1. 1865, noon, at and near Sapahi, $26^{\circ} 43' N.$, $84^{\circ} 13' E.$, 14 miles SSE. of Padrauna, tahsil Padrauna, district Gorakhpur; portions fell near villages Khuria and Babnauli.

INDIAN STATES

1. **Baroti.** Stone (white hypersthene-chondrite), 4.5 kg., fell 15. 9. 1910, 10 a.m., at Baroti, 31° 37' N., 76° 48' E., 20 miles N. of Bilaspur, Bilaspur State, Simla Hills.

2. **Bherai.** Stone (veined white hypersthene-chondrite), 100 g., fell 28. 4. 1893, 8 a.m., on coast between Bherai and Jafarabad, 20° 50' N., 71° 28' E., Junagarh State, Kathiawar.

3. **Bholghati.** Two stones (howardite), 2.5 kg., fell 29. 10. 1905, 8.30 a.m., at Bholghati, 22° 5' N., 86° 54' E., 35 miles N. of Balasore, pargana Deoli, Mayurbhanj State, Orissa.

4. **Bishunpur.** Four stones (black chondrite), 1.039 kg. recovered, fell 26. 4. 1895, 3 p.m., at Bishunpur, 25° 23' N., 82° 36' E., 2½ miles SSE. of Bhadohi (East Indian Railway), Benares State, and at Parjapatpur, 1 mile NW. of Bishunpur. In 1895 this locality was in district Mirzapur, North-Western Provinces (since 1902 United Provinces), the Benares State not being constituted until 1911. (Letter of 26. 7. 32 from the Collector of Mirzapur, United Provinces.) [The Benares fall of 1798 was near the city of Benares, district Benares, United Provinces.]

5. **Cranganore** (or Changanorein). Stone (grey chondrite), 1.46 kg., fell 3. 7. 1917, 12.45 p.m., at Kranganur (or Kodungalur), 10° 12' N., 76° 16' E., 14 miles N. of Cochin, Cochin State.

6. **Durala.** Stone (veined intermediate hypersthene-chondrite), 13 kg., fell 18. 2. 1815, noon. It is said to have fallen at Durala, 30° 20' N., 76° 41' E., 17 miles from Ambala in Patiala State. The one-inch map shows no such village, but there are two villages Surala kalan and Surala khurd, at 30° 18' N., 76° 38' E., 13 miles S. by E. of Rajpura (North-Western Railway). Durālā is probably a mis-transliteration of Surālā, سُورَالَا for سُورَالَا.

7. **Gambat.** Stone (veined intermediate chondrite), 6.5 kg., fell 15. 9. 1897, at Gambat, 27° 21' N., 68° 32' E. (36 miles SW. of Sukkur), Khairpur State.

8. **Haripura.** Shower of stones (carbonaceous chondrite), two recovered, one weighed 315 g., fell 17. 1. 1921, 9 p.m., at Haripura, near police station Pilod, 28° 23' N., 75° 47' E., nizamat Jhunjhunu, Shekhawati, Jaipur State, Rajputana.

9. **Jajh deh Kot Lahu.** Stone (veined crystalline chondrite), 973 g., fell 2. 5. 1926, between 5 and 6 p.m., at Jajhdeh-kot-lahu, 26° 45' N.,

68° 25' E. (22 miles SSE. of Naushahro), taluq Faizganj, Khairpur State.

10. **Judesegeri.** Stone (spherical chondrite), 680 g. recovered, fell 16. 2. 1876, evening, at Judesegeri, 12° 51' N., 76° 48' E., 37 miles SW. of Tumkur, taluq Kadaba, district Tumkur, Mysore State.

11. **Kamsagar.** Stone (intermediate chondrite) 1.293 kg., fell 12. 11. 1902, 1 p.m., at Kamsagar, 14° 11' N., 75° 48' E., 35 miles NE. of Shimoga, taluq Channagiri, district Shimoga, Mysore State.

12. **Karkh.** Several stones (grey chondrite), 22 kg. recovered, fell 27. 4. 1905, 1 p.m., in the neighbourhood of Karkh, 27° 48' N., 67° 10' E. (65 miles W. of Larkhana), Jhalawan State, Baluchistan. Portions fell below the Sumbhaji hills, and at Michara, 4 and 5 miles respectively WNW. of Karkh, and near Nar on the Mula pass.

13. **Khairpur.** Shower of stones (crystalline enstatite-chondrite), total weight recovered 13.6 kg., fell 23. 9. 1873, 5 a.m., over area 16 × 3 miles near Khairpur, 29° 32' N., 72° 18' E., 30 miles ENE. of Bahawalpur, Bahawalpur State. Portions also fell at Mailsi, tahsil Mailsi, district Multan, Punjab.

14. **Khetri.** Shower of about forty stones (brecciated grey bronze-chondrite), 8 kg. found, but very little preserved, fell 19. 1. 1867, 9 a.m., mostly at Saonlod, 28° 1' N., 75° 49' E., 3 miles N. of Khetri, Shekhawati, Jaipur State, Rajputana.

15. **Lakangaon.** Stone (eucrite), 212 g., fell 24. 11. 1910, 6 p.m., at Lakangaon, probably 21° 52' N., 76° 2' E., pargana Bhikangaon, district Nimar, Indore State, Central India; 25 miles W. by N. of Khandwa (Great Indian Peninsular Railway).

16. **Lua** (or Dabra). Shower of stones (grey chondrite), 9.241 kg. recovered, fell 26. 6. 1926, 4.30 p.m., at Dabra, 24° 55' N., 75° 8' E. (34 miles NNE. of Nimach), pargana Nandwas, Indore State, Central India, and at Lua and Dongria, pargana Begu, Udaipur State, villages a mile or two distant from Dabra. [Min. Abstr., 4-118.]

17. **Moti-ka-nagla.** Shower of stones (crystalline chondrite), 3 kg. recovered, fell 22. 12. 1868, 5 p.m., at Moti-ka-nagla, a hamlet of Gurdha Dang, 26° 50' N., 77° 20' E., 36 miles S. of Bharatpur, tahsil Biana, Bharatpur State, Rajputana.

18. **Muddoor** (or Maddur). Two stones (spherical hypersthene-chondrite), 2 kg. recovered, fell 21. 9. 1865, 7 a.m., at Anedoddi, 12° 38' N., 77° 1' E., 5 miles N. of Maddur, district Mysore, Mysore State.

19. **Myhee Caunta.** Shower of stones (intermediate chondrite), one fragment recovered, fell 30. 11. 1842, 4 p.m., 'between the villages of Jeetala and Mor Monree, in the Myhee Caunta, to the north-east of the city of Ahmedabad'. Ahmedabad ($23^{\circ} 3' N.$, $72^{\circ} 38' E.$) is in Bombay, but I have been unable to identify the villages in Mahi Kantha State on the one-inch map.

20. **Naoki.** Four stones (grey chondrite), 6.683 g. recovered, fell 29. 9. 1928, 5 p.m., at and near Naoki, $19^{\circ} 15' N.$, $77^{\circ} 0' E.$, 4 miles NNW. of Purna River railway station (Hyderabad-Godavari Railway), district Parbhani, Hyderabad State; portions also at Malegaon 1 mile SE., and Kawagaon 1 mile SW. of Naoki. [Min. Abstr., 4-421.]

21. **Pulsora.** Three stones (brecciated intermediate chondrite), one weighed about 680 g., fell 16. 3. 1863, afternoon, at Pulsora, $23^{\circ} 22' N.$, $75^{\circ} 11' E.$, 6 miles NE. of Ratlam, Ratlam State.

22. **Samelia.** Three irons (coarse octahedrite), 2.461 kg., fell 20. 5. 1921, 5.30 p.m., at and near Shahpura, $25^{\circ} 40' N.$, $74^{\circ} 52' E.$, Shahpura State; portions also at Beshi 1 mile SE., and Beshkali 4 miles WSW. of Samelia, in Banera, Udaipur State, Rajputana. [M.A. 5-10.]

23. **Shupiyun.** Two stones (brecciated grey chondrite), 5 kg., fell April 1912, at Shapiyun, $33^{\circ} 43' N.$, $74^{\circ} 50' E.$, 24 miles S. of Srinagar, Kashmir State.

24. **Tonk.** Shower of small stones (carbonaceous chondrite), 7.7 g. collected, fell 22. 1. 1911, 3.55 p.m., at Chhabra, $24^{\circ} 39' N.$, $76^{\circ} 52' E.$, Tonk State; near Gugor or Chhabra railway station, Great Indian Peninsular Railway, 28 miles W. of Guna, Central India.

25. **Umbala.** Stone (veined grey chondrite), 100 g., fell in 1822 or 1823, 'about 40 miles to the west of Umbala, between the Jumna and Punjab'. No further information is available, but 40 miles W. of Ambala is now in Patiala State, at about $30^{\circ} 20' N.$, $76^{\circ} 20' E.$

UNCLASSSED

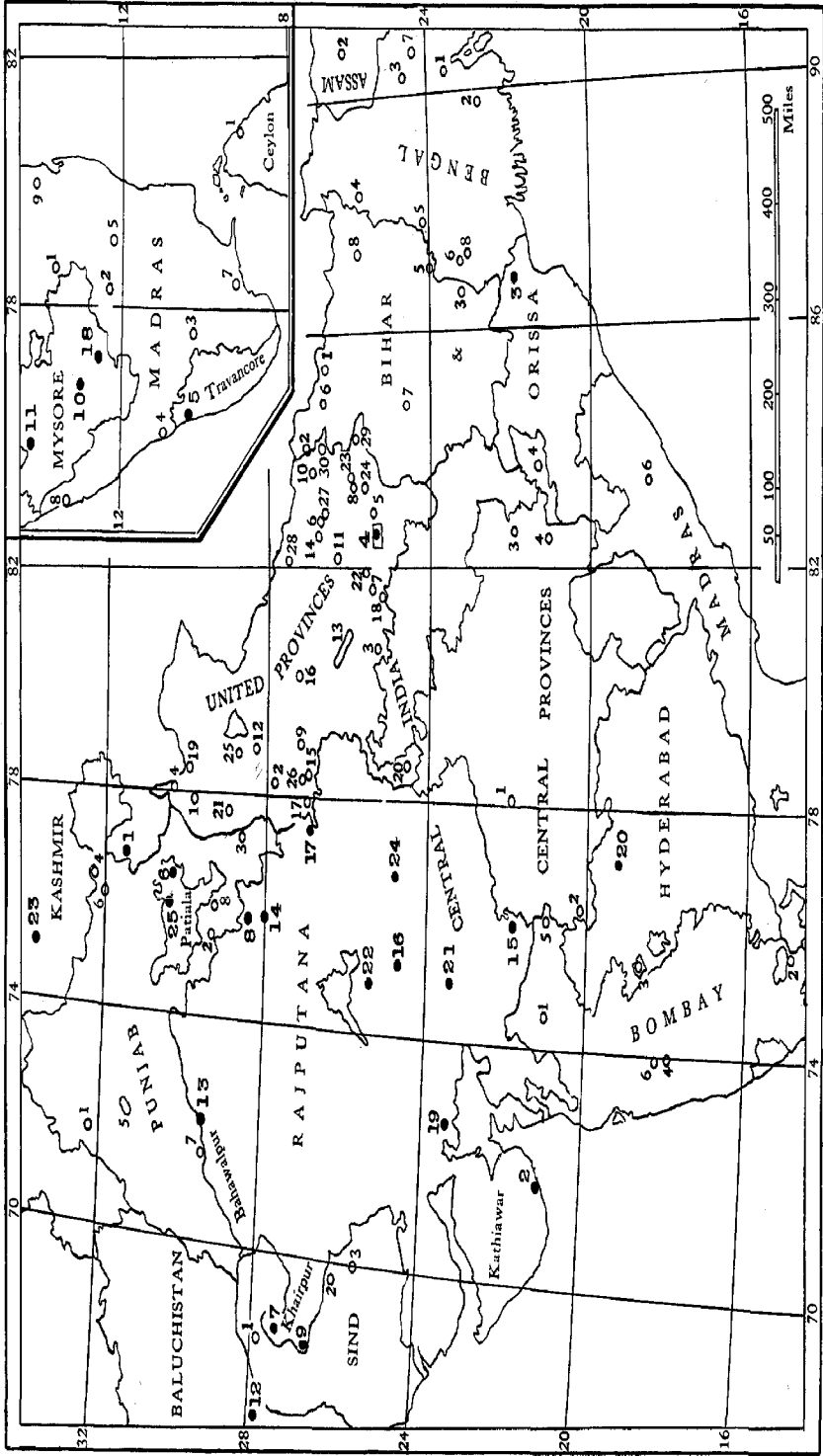
1. **Jemlapur.** Stone (intermediate chondrite), 468 g., found in a curio shop at Beckenham, Kent, in 1913, with slip attached inscribed: 'Meteorite, Jemlapur, Muddera [or Muddesa] Tk [or Ik or Gk], (fell Feb./01).' All efforts to obtain further information at the time (letter and photograph in 'Nature', 1916, vol. 97, p. 241), and letters recently published in the five chief Indian newspapers, have failed to do so.

CEYLON

1. **Mulletivu.** Shower of stones (spherical chondrite), fell 13. 4. 1795, 8 a.m., at Mullaitivu, $9^{\circ} 20' N.$, $80^{\circ} 50' E.$, on coast 60 miles NW. of Trincomali.

EXPLANATION OF PLATE XII.

Sketch-map showing the distribution of Indian meteorites. The rings are marked from no. 1 in each Province, e.g. nos. 1-30 in the case of the United Provinces. The black dots with larger numbers 1-25 refer to the Indian States.



C. A. SILBERRAD: SKETCH-MAP SHOWING DISTRIBUTION OF INDIAN METEORITES.