

Review Article

Advance in Environmental Waste Management & Recycling

The Father of Scientific Forestry in India-Hugh Francis Clarke Cleghorn, The First Conservator of The Madras Presidency. His Contribution in Indian Forestry

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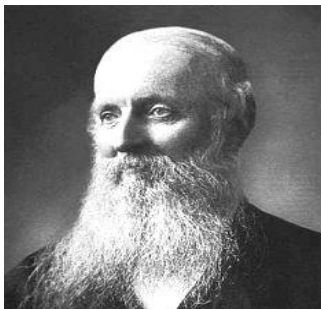
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Dr. Hugh Francis Clarke Cleghorn, the father of scientific forestry in India; was born in Madras on August 9, 1820, (9 August 1820-16 May 1895). He was, the first Conservator of the Madras Presidency and was the son of Peter (also known as Patrick) Cleghorn and



Isabella Cleghorn. His father Peter Cleghorn (1783-1863) served as Administrator General Registrar and Prothonotary in the Supreme Court of Madras. His mother Isabella Cleghorn passed away in Madras on June 1, 1824 when Hugh Cleghorn was just three and half year old. Following his Mother's death, Hugh and his

younger brother were sent back to Scotland in 1824 to be raised at the family estate of Stravithie near St Andrews by their paternal grandfather Sir Hugh Cleghorn (1752 -1837).

Sir Hugh Cleghorn was the first British Colonial Secretary of Ceylon and a professor of Civil History at University of St Andrews. After returning to Scotland, Hugh Cleghorn did his M.D. from the University of Edinburgh in 1841. During his university years, he became interested in plants. He returned to Madras as a member of the Indian Medical Service. He first served in the Madras General Hospital, and later in Shimoga (present Shivamogga) then Mysore Provenance. While at Shimoga, economically important plants fascinated him. In 1848-1851, he went back to Britain on sick leave. His association with John Forbes Royle – especially when Royle was busy cataloguing natural materials for the Great Exhibition in London in 1851 – made Cleghorn more interested in plants.

While in Britain, Cleghorn lectured at different forums on the reasons for the failure of Indian agriculture. He attributed tree loss in natural forests as the key reason. These observations stimulated

the then Government of India to think of introducing forest management and conservation practices to improve agriculture. After returning to India in 1851, the Govt of India found him most suitable person, to assign this task and was appointed as first Conservator of Forests of the Madras Presidency and subsequently, twice acted as Inspector General of Forest during British rule. A Scottish physician, botanist, and pioneer forester, Dr. Cleghorn was asked to organize the newly established **Madras Forest Department** in 1855, officially stepping into the role of Conservator of Forests on December 19, 1856. He is widely celebrated as the "father of scientific forestry in India" (alongside Dietrich Brandis). He was an Indian Forester and Scottish Laird (tradition title for an owner of a large long-established landed estate in Scotland) [1].

In 1834 he entered the arts faculty of the United College of St Salvatore and St Leonard of St Andrews University. While at estate in Stravithie, under the influence of his grandfather an improving laird, the young Hugh acquired an interest in estate management (including forestry) and botany. In 1837 he went to study medicine at Edinburgh, during which period he was apprenticed to the Surgeon James Syme and studied botany under Robert Graham. He graduated MD from the University of Edinburgh in 1841 and the following year was appointed to the East India Company as an Assistant Surgeon in the Madras Presidency. One of his first acts as Conservator was a brief trip to Burma in January 1857, when he met Dietrich Brandis, who was already working there on the teak forests. Having witnessed their denudation by private business interests, Cleghorn believed that the State had to take the main role in preserving forests. As Conservator, Cleghorn spent a great part of the year in travels surveying forest resources in the vast territory for which he was responsible, with three major tours each of more than six months in 1857, 1858 and 1860. Shorter tours were made to the Sal forests of Orissa in the spring of 1859, and a productive week in the Annamalai Hills in September 1859. On the latter, he

was accompanied by Richard Henry Beddome (who succeeded Cleghorn as Conservator Madras) and Major Douglas Hamilton a talented artist who recorded the expedition visually.

By this date it was already well known that forests have a major influence on climate, as were the negative effects of deforestation on rainfall and river flow. In his 1851 British Association report, Cleghorn had summarised existing literature and cited anecdotal information from other East India Company surgeons including Alexander Gibson and Edward Balfour. The importance placed by Gibson and Cleghorn on climate-modification (rather than purely economic concerns) as the motivation for their system of forest conservancy is one that had been much discussed by historians of forestry and ecology. Claims by authors, notably Richard Grove in his *Green Imperialism*, that it was the major motivation of the East India Company Surgeon-Conservators have recently been disputed. In 1860 Cleghorn's persistent campaigning with the Government resulted in the banning in the Madras Presidency of 'kumri', a form of shifting cultivation he considered particularly damaging.

Madras Forest Department-In 1855, on the advice of the Civil servant Walter Elliot, Cleghorn was asked by the Governor of Madras, Lord Harris, to organise a Forest Department for Madras and to start systematic forest conservancy, such has had earlier been established in Bombay under Alexander Gibson. On the suggestion of Frederick Cotton, a similar forest management scheme had been begun in the Annamalai hills under Colonel James Michel who worked from 1848 to 1856 on timber management. Cleghorn took over management of the area that was being worked and was appointed Conservator of Forests Madras, on December 19, 1856, which he held until October 10, 1867, most actively so until 1860.

Pressures on the forests of the Presidency, which included those of the southern part of the Western Ghats, and as far north as Orissa on the east coast, were great. This was the time of the early development of railways in India and Cleghorn estimated that a mile (1.6 km) of rail line needed 1760 wooden sleepers, which had a lifespan of only eight years. In addition to sleepers, wood was also required to run the steam engines of the railways and for steamships. By his estimate, there was no way to maintain the supply without destroying the forests unless active management was undertaken. He pointed out that in Britain requirement for wood was less, due to the country's substantial reserves of coal and the ability to import wood from other parts of its Empire.

On his third forest tour, Cleghorn again contracted fever and obtained a year's sick leave to Brittan in September 1861. During this leave he interacted with the India office which allowed a publication of a compilation of his forest reports as the Forest and Gardens of south India. Though his goal may have been to supply a manual to enable forest assistants to work more effectively for the benefit of State, the book is mainly a compilation of his reports documenting his activities in forest conservancy in the Madras Presidency during the four years that the department had by then been in operation. In Scotland, as on his previous leave,

Cleghorn read papers to the Botanical Society of Edinburgh, and his Annamalai one to the Royal Society of Edinburgh (to which he was elected on 1 December 1862) [2]. The most notable event of this leave, however, was Cleghorn's marriage at Penicuik, on August 8, 1861 to Marjorie Isabella Cowan, in family known as 'Mabel', daughter of Charles Cowan a notable philanthropist and paper-maker and formerly served as a Member of Parliament for Edinburgh [3].

On returning to India with Mabel in October 1861, Cleghorn was summoned to Calcutta by Lord Canning and appointed as Joint Commissioner of Forest Conservancy of India in 1862, along with another distinguished forester, one with German roots, Dietrich Brandis. He was given charge of surveying/exploring the natural forests of the North-western Himalaya and its neighbourhood. The forest conservancy methods he had launched in Madras Presidency during his leadership were of high value and relevance in all-India forest management. He continued this under Sir Robert Montgomery, Lt Governor of the Punjab, which led to Cleghorn's being based in Lahore, where he was involved in the 1864 Punjab Exhibition.

The same year he was involved in a Missionary Conference in Lahore, evangelical Christianity, especially with a medical bias, underpinning the whole of Cleghorn's life and work. His second book *The Forests of the Punjab* (1864) was a compilation of his reports from this period. In December 1862 Lord Elgin had summoned Brandis from Burma to reorganize the Forest Department and in January 1864 Brandis and Cleghorn were appointed joint Commissioners of Forests; three months later Brandis was given the Senior post of Inspector General. **The pair worked together on the Indian Forest Act, which came into effect on 1 May 1865.** This Act of 1865 was applicable to all the Territories under the immediate administration of the Govt. of British India, Govt of Bengal, the North -Western Provinces and the Punjab; it shall be lawful for the Governors in Council of Madras and Bombay by notification in official Gazette to extend this Act to the Territories under their respective Governments. Just after that Cleghorn was given a six-month leave to take his ailing wife home, and to attend to Stravithie following the death of his father. During two periods when Brandis was on leave in Europe, Cleghorn acted as Inspector General (July 1864 to January 1865, and May 1866 to March 1867). Following the second of these, Cleghorn returned to Madras, where he was given 20 months' leave in October 1867, though he was never return to India, and formally retired at the expiry of this period.

Retirement: After a career spent in India, Cleghorn returned to Scotland where he was involved in the first ever International Forestry Exhibition. On retirement in 1869, Cleghorn returned to Scotland and lived in Strathvie until his death in 1895. In November 1867 Cleghorn met up with Mabel in Malta, which resulted in a report on the agriculture and botany of Malta and Sicily the following year Back in Britain he acted as an adviser to the Secretary of State for India and assisted with the selection of candidates for the Indian Forest Service. A member of the

Edinburgh Botanical Society since 1838, he was elected its president in 1868–69 (succeeded by Walter Elliot).

In 1872 he was elected president of the Scottish Arborical Society for two years, and subsequently played an instrumental role in the establishment of a lectureship in Forestry at the University of Edinburgh [4]. To make it, he advised the India office on the training of Forest Officers, and contributed to establishment of lectureship in botany at the University of St Andrews and in forestry at the University of Edinburgh. Cleghorn also gave his opinions to the Select Committee of the House of Commons in 1885 on the topic of forestry education in Britain [5]. Cleghorn wrote the entries on 'Arboriculture' (1875) and Forests (1879) for the ninth edition of the *Encyclopaedia Britannica*. Cleghorn died at Stravithie, in the Mansion that he had largely rebuilt, on 16 May 1895.

The heir to the property was his nephew Alexander Sport (*later Sir Alexander, 1st Baronet*), son of Cleghorn's sister Rachel Jane, widow of Alexander Sprot of Gamkirk. In 1848 his friend Robert Wight dedicated the genus *Cleghornia* to him as a 'zealous cultivator of Botany, but more especially directing his attention to Medical Botany. Henry Noltie, no stranger to Indian botanists, presents the Cleghorn story in two volumes: the first on the life and work of Cleghorn in colonial Madras and elsewhere in India. The second refers to his botanical acumen and the details of plants he recorded as exquisite artworks, while serving in India. Noltie has done yeoman service recapturing the science history of Madras and India, as he chronicled the life and science of Cleghorn, who played a vital role in recognising the scientific merit and aesthetic and economic values of Indian forests. Although Brandis too played an equally vital role, Cleghorn's role in enabling forestry to evolve as a science in India, while spending most of active career life in southern India, is worthy of recognition. Cleghorn, assuming charge as the Conservator of Forests of Madras toured various locations of the Eastern Ghats, and thus scoped knowledge on timber trees and forests. Cleghorn's role as a forester cannot be gainsaid in the context of Indian forestry and forest management.

It is worth noting that Cleghorn was a multidimensional personality and considered as the Madras Polymath. Noltie speaks of the multidimensional personality of Cleghorn. Cleghorn was associated with the Madras Medical College (MMC). Cleghorn was the professor of botany and taught *Materia Medica*, necessitated learning about various medicinal plants. He, therefore, used accurately depicted illustrations of plants as a teaching tool. Noltie indicates that this tactic of using accurately drawn illustrations was a capability Cleghorn acquired from John Hutton Balfour of the Royal Botanic Garden of Edinburgh. At Cleghorn's initiative, a museum of vegetable productions and a botanic garden appear to have been established in MMC. Woefully, no trace of these exists today. Cleghorn also concurrently played a key role in the management of the Madras Horticultural Society Garden (MHSG) (later, the Madras Agri-Horticultural Society Garden), which was established by Robert Wight in 1835. As Secretary, he enumerated the plants occurring within the MHSG and titled this work *Hortus Madraspatensis*, getting it published through the Society in 1853. At

the Madras Exhibition of Raw Products, Arts, and Manufacturers of Southern India (1855), held during the governorship of George Harris, Cleghorn, further to playing a key role in the arrangement and management of the Exhibition, displayed 28 gums and resins obtained from the trees in the MHSG, 43 wood specimens he had collected while he was at Shimoga, and a range of botanical drawings.

The chapter on 'Gardens of South India' speaks of Cleghorn's role in the development of the Government Garden at Ootacamund (Ooty); then managed by William McIvor, and which bears significant relationships with the introduction of *Cinchona* into India, the Lal Bagh at Bangalore, a few private gardens both in Ooty and Madras, and the People's Park, Madras. An interesting story attributed to good work of conservancy by Cleghorn has been revealed from the notes of Noltie from study of representative illustrations from the Cleghorn plant collections (these are archived at the RBGE) made during his stay in Shimoga, Madras environs, and elsewhere in India. For example, a crisp commentary on *Tectona grandis* and population as noted by Francis Buchanan (known as Francis Buchanan-Hamilton in later days) during his survey of the Mysore region in 1800–1801. With the fall of the Mysore Tiger, Buchanan was requested to survey southern India in 1799; his survey resulted in *A Journey from Madras through the Countries of Mysore, Canara and Malabar*. Cleghorn visiting the site previously visited by Buchanan, 45 years later, recognised the declined numbers of *Tectona grandis*, which he attributed to the shifting cultivation (*kumari*) practised in the area. This observation made in 1845 got Cleghorn to intensify his interest in forest conservation and write a seminal report on the effects of deforestation for the British Association for the Advancement of Science.

Another contribution of Cleghorn was the 'Madras Nature Prints' It is surprise to many that such Madras Nature Prints did exist. Noltie explains that these prints were direct images made from plants, especially leaves, as a way of capturing intricate patterns, such as leaf venation. In practice, this effort did away with the reliance on an artist. Noltie indicated that Cleghorn accumulated close to 300 of such monochrome colour Madras Nature Prints, most of which are archived under the Cleghorn collections in Edinburgh [6]. Madras School of Arts started by another Scottish medical doctor in Madras, Alexander Hunter; today, the school functions as the Government College of Fine Arts in a different, but at a not-far-away location, in Madras. Cleghorn in 1851 found students trained at the school useful to him in creating artworks of plants and items of medical relevance e.g., human anatomy. Cleghorn especially used the services of one P. Mooroo gasen Moodaliar, a graduate of the school and later a teacher in it, who created artworks for Cleghorn. There is also mention of some of the artworks that were created at the school, especially those relating to plants.

In summary: Cleghorn did not focus on naming hundreds of new species from an isolated laboratory. Instead, his genius lay in field taxonomy and economic botany; bridging the gap between classical plant classification and its practical application in protecting and

identifying the vast forest wealth of British India.

When he died at Stravithie in 1895, his estate papers revealed just how interconnected his two lives were. He left behind a massive collection of over 3,000 exquisite, vibrant Indian botanical drawings (commissioned from brilliant local Indian artists like Govindoo), a massive herbarium, and rare forestry



texts dating back to 1582. To honour this unique dual legacy, the Royal Botanic Garden Edinburgh (which houses his collection) published a definitive two-volume historical biography of his life titled *Indian Forester*, Scottish Laird. He used his wealth and status as a Laird to advance modern science back home, successfully lobbying for the creation of the first formal Lectureship in Forestry at the University of Edinburgh and helping found the University Botanic Garden at St. Andrews.

Figure—Forest Department of British India Cleghorn (extreme right) with, from left to right, Johan Lindsey Stewart, Thomas Caverhill Jerdon and William Jameson taken at the Punjab Exhibition, Lahore, 1864.

Cleghorn Core Contributions to Indian Forestry: Cleghorn believed in preserving natural forests, since he was convinced that they encouraged better hydraulics and therefore better landscapes. He was conscious how private timber enterprises in Burma indiscriminately destroyed forests and the consequences of such destruction impacted negatively on the hydraulics and landscape of Burma.

Cleghorn justly laid great stress upon the necessity of acquiring a good knowledge of the principal trees and shrubs, as well as of the climate, soil, and forest growth in the different forest tracts; and in regard to the protection of the forests, he studied the chief sources of injury, indiscriminate cutting, fires, and Kumri cultivation. To meet this principal objective(s), Cleghorn immensely worked for the following:

(i). Stopping the Environmental Denudation Crisis—During his early service as an assistant surgeon in Shimoga (Mysore) and other parts of southern India, Cleghorn witnessed rapid environmental degradation. In 1851, he presented a landmark report to the British Association for the Advancement of Science detailing the ecological hazards of tropical deforestation. He argued that stripping forests destroyed natural landscapes, disrupted river hydraulics, and threatened regional agriculture.

(ii). Banning Shifting Cultivation (Kumri)—One of Cleghorn's most fierce and successful administrative crusades was against "kumri" (shifting or slash-and-burn cultivation). Kumri cultivation was practised on the slopes of Western Ghats of Peninsular India, about which Cleghorn has written in his *Forests and Gardens of South India*. He realized that uncontrolled burning and patch-

clearing destroyed pristine timber tracts faster than they could naturally regenerate. Thanks to his persistent lobbying, the British Government completely banned shifting cultivation in the Madras Presidency in 1860, shifting focus toward permanent, managed agricultural and forest tracts.

(iii). Mitigating the Railway Timber Crisis—When the expansion of the railways began in India during the 1850s, Cleghorn foresaw it as a major ecological threat. He mathematically estimated that a single mile (1.6 km) of railway track required roughly 1,760 wooden sleepers, which had to be completely replaced every eight years. He went on further that each sleeper would weigh between 75 and 100 kg, is admirable. He was equally concerned with the quantity of wood that would be burnt to run steam locomotives. Recognizing that local ecosystems would collapse under this demand, he implemented strict, systematic felling quotas and introduced regulated timber extraction to prevent the total depletion of valuable species like Teak and Sal.

(iv). Setting the Blueprint for Pan-Indian Forestry—Cleghorn's organizational structure in Madras was so phenomenally successful that the Government of India regularly utilized his expertise to scale operations nationally. He was sent to establish an efficient system of forest conservancy in the Punjab region. He worked side-by-side with Dietrich Brandis (who became the first Inspector-General of Forests to the Government of India in 1864) to systematically organize the forest departments of Bengal and other provinces.

(v). Botanical Documentation & Economic Botany—As a trained medical man and passionate botanist, Cleghorn believed that a forester must intimately understand taxonomy. He extensively catalogued the economic and therapeutic uses of indigenous plants. He compiled a massive collection of botanical drawings and created Madras Nature Prints—monochrome direct-leaf impressions—to visually document the native flora of the Western and Eastern Ghats.

The Government's Recognition: On January 10, 1865, the Government of India passed a public resolution formally acknowledging Dr. Cleghorn as the founder of forest conservancy in India, noting that his long, tireless administration from the inception of the Madras department greatly conduced to the public good. While Hugh Cleghorn is universally recognized as an administrative giant in pioneering scientific forestry, his contributions to plant taxonomy and systematic botany were foundational. As a trained surgeon under the eminent Scottish botanist Robert Graham, Cleghorn viewed taxonomy not as an abstract academic exercise, but as an indispensable baseline tool for economic development and environmental medicine. His taxonomic contributions can be mapped across several major areas:

a. Massive Field Herbaria & Collections: Cleghorn was a relentless field collector. Throughout his journeys across the Western Ghats, Odisha, the Eastern Ghats, and later the North-Western Himalayas (Punjab region), he meticulously collected, pressed, and identified thousands of plant specimens. The He

amassed a personal herbarium of several thousand Indian plants. Upon his retirement, he bequeathed this vast repository to the Royal Botanic Garden Edinburgh (RBGE), where it remains a highly valuable, historical reference collection for taxonomists studying South Asian flora.

b. Commissioning Over 3,000 Botanical Illustrations: Recognizing that field identification requires precise visual accuracy, Cleghorn acted as a major patron of local Indian artists. In the 1840s and 1850s, he commissioned over 3,000 scientific botanical drawings to document species with exact taxonomic detail. While stationed in Shimoga (Shivamogga, Karnataka), he famously employed an artist to paint a completely different local plant every single day from nature. In Madras, he hired Govindoo—the legendary artist who had previously worked with the great taxonomist Robert Wight. Govindoo precisely illustrated the complex floral morphologies of Western Ghats Forest trees, helping clearly delineate distinct timber species.

c. Authoring Hortus Madraspatensis (1853): While serving as the Secretary of the Madras Agri-Horticultural Society Garden, Cleghorn undertook the monumental task of identifying, classifying, and enumerating every plant species cultivated within the society's gardens. He compiled this into a systematic catalogue titled *Hortus Madraspatensis* in 1853, which provided a major taxonomic reference for introduced, exotic, and native economic plants in Southern India.

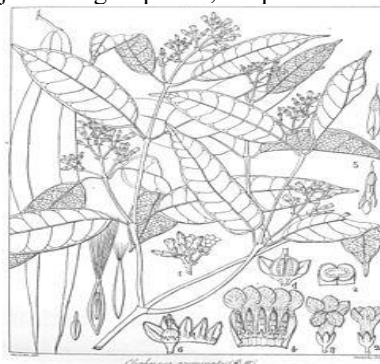
d. Taxonomic Integration of Economic Botany: Cleghorn's taxonomic eye was sharply focused on the structural characteristics of plants yielding raw materials. Gums, Resins, and Fibbers. At the Madras Exhibition of 1855, he categorized and displayed dozens of distinct wood specimens, gums, and resins, matching them exactly to their correct botanical genus and species. The Indian Gutta-Percha Tree- He authored detailed technical memorandums (such as his 1858 paper on the Pauchon tree or Indian Gutta tree, *Palaquium ellipticum*) identifying and isolating indigenous latex-producing trees of the western coast. This required distinguishing subtle taxonomic boundaries between similar species of the Sapotaceae family.

e. Establishing Academic Botany Infrastructure: Cleghorn understood that taxonomy could not grow without institutions. He served as the Professor of Botany at the Madras Medical College (MMC), where he established a designated museum of vegetable productions and an early botanical garden to train future medical and forest officers in systematic classification.

After returning to Scotland, he used his own resources to fund and establish formal lectureships in botany at the University of St Andrews and helped set up the University Botanic Garden in 1889 to ensure the continuation of systematic plant science. Dr. Hugh Cleghorn's monumental contribution to Indian botany was immortalized by fellow taxonomists who named both a distinct plant genus and a specific South Indian Forest species in his honour. Rather than just a single species, the prominent Scottish botanist Robert Wight dedicated an entire plant genus to Cleghorn in 1848

within the dogbane family (Apocynaceae). This genus contains two widely accepted species native to parts of Southern and South-eastern Asia. Abundantly found in wet zones of Sri Lanka.

A. The Genus *Cleghornia* (Family: Apocynaceae) Rather than just a single species, the prominent Scottish botanist Robert Wight



dedicated an entire plant genus to honour Cleghorn's emerging brilliance in South Asian botany in 1848 within the dogbane family (Apocynaceae). This genus contains two widely accepted species native to parts of Southern and South-eastern Asia - (a) *Cleghornia acuminata* Wight, a woody climber endemic to the

seasonally dry tropical forests of Sri Lanka and native to the wet zones of Sri Lanka. (b) *Cleghornia malaccensis* (Hook.f.) King & Gamble-distributed across regions including southern China (Yunnan, Guizhou), Laos, Thailand, Vietnam, and Peninsular Malaysia.

Figure- *Cleghornia Acuminata*, Wight (Handmade Sketch)

B. *Capparis Cleghornii* (Common Name: Cleghorn Caper)- Named by the botanist Stephen Troyte Dunn in 1915, *Capparis cleghornii* is a beautiful, sprawling liana (climbing shrub) belonging to the caper family (Capparaceae). This species is deeply tied to the areas Cleghorn loved and travelled. It is endemic to the Western Ghats of South India and is heavily distributed across the semi-evergreen forest margins of Karnataka especially around Shivamogga, Chikkamagaluru, Sakleshpur, and Hassan), Kerala, and Maharashtra. Habit- A large, scanning or climbing shrub reaching about 2 meters or more, densely armed with sharp, recurved thorns to help it climb forest edges. Leaves Alternate, elliptic, sub-leathery, and famously pinkish when tender, drying to a dull green. Flowers: Highly showy, large, and fragrant. They emerge with brilliant white petals and a massive, protruding bunch of 65 to 80 white stamens. As the flowers age over the day, they turn a deep pink or scarlet colour. Fruit: Ovoid or sub globose berries.

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