EASTERN MEDITERRANEAN BRYOPHYTES

by D. M. HENDERSON AND C. W. MUIRHEAD

This short list is based upon collections made by Dr. P. H. Davis principally in Lebanon during the winter of 1943, with a few from Syria and Palestine. To aid in tracking down localities Davis has published an account of his itineraries during this period (Davis, 1955).

Previous collections from this area have been enumerated in a number of papers. Of these the most important are the lists published by Hart (1891) in the Fauna and Flora of Sinai, Petra and Wadi Arabah and Schiffner's (1913) account of Handel-Mazzetti's collection from Mesopotamia, Kurdistan and Syria. Short lists have been published by Bizot (1945 and 1952) and Proskauer (1953). In the present paper bryophytes which have not been recorded in these accounts, twenty-three species in all, are distinguished by an asterisk. A number of species so distinguished are listed from Persia or Lydia by Schiffner (1897, 1901 and 1908): in these cases a note has been added.

In general, the bryophyte flora is of the typical dry Mediterranean type as described by Herzog (1926); it is common to North Africa and the northern shores of the Mediterranean. If there are well defined elements in the bryophyte flora of this area, published accounts and our present data are too fragmentary for their proper evaluation.

The nomenclature and arrangement of mosses is according to Monkemeyer (1927); Muller's system (1911) is followed for hepatics. The first set of the collections on which this account is based is deposited in the herbarium, Royal Botanic Garden, Edinburgh. Duplicates have been distributed to the Royal Botanic Gardens, Kew and the British Museum (Natural History).

We are indebted to Miss J. Taylor, Kew, for assistance and to Dr. Demaret for the identification of *Tortula papillosissima*.

MUSCI

Fissidens crassipes Wils.
LEBANON. Choueifat; wet rocks of the fountain under permanent dripping from overflow, 6 Jan. 1943, *Davis* 5211.

Fissidens pusillus Wils.*
LEBANON. Nahr el Kelb, on damp limestone rocks facing north, 20 Feb. 1943, *Davis* 5287B; Antelias, on shady sandstone rocks in Pinetum, 7 Feb. 1943, *Davis* 5232B.

Dicranella rubra (Huds.) Monkem. var. **tenuifolia** B. & S.
LEBANON. Choueifat: dominant on perpendicular bank of calcareous clay facing north at the south-west end of the village, 6 Feb. 1942, *Davis* 5210; Antelias, vertical bank of reddish sandstone soil, facing north, 7 Feb. 1943, *Davis* 5226, 5230, 5227B (with *Epipterygium tozeri*); Ein Anub, on damp sandstone, with *Anthoceros laevis*, *Davis* 5201C.

This variety seems to completely replace the typical form in this area.

Dicranella heteromalla (L.) Schpr.*
LEBANON. Antelias, on shady sandstone rocks in Pinetum, 7 Feb. 1943, *Davis* 5232C (with *Fossombronia pusilla*).

Encalypta rhabdocarpa Schwaegr.*
LEBANON. Hursh Imarra, between Baalbek and Talaat Musa, on shady rocks, 2,190 m., 22 June 1943, *Davis* 6613C (with *Brachythecium trachypodium*).

Gymnostomum calcareum Nees et Hornsch.
LEBANON. Antelias, on shady, hard limestone boulder, 7 Feb. 1943, *Davis* 5245B; near Ein Anub, on shady sandstone outcrops in Pinetum, 10 Feb. 1943, *Davis* 5265; Choueifat, on marshy bank facing north, 22 Feb. 1943, *Davis* 5281; Choueifat, on calcareous boulders, winter 1943, *Davis* s.n.; Hursh Imarra between Baalbek and Talaat Musa, 2,190 m., shady rocks, 22 June 1943, *Davis* 6615A.

Eucladium verticillatum (L.) B. & S.
PALESTINE. Mt. Gerazim, in caves of old limestone quarries in the rock, 23 Apr. 1942, *Davis* 4450.

Trichostomum crispulum Bruch *
LEBANON. Below Ein Anub, on shady sandstone rocks in Pinetum, 10 Feb. 1943, *Davis* 5257; Antelias, on damp hard limestone rocks at the source, 7 Feb. 1943, *Davis* 5236.

—— var. **elatum** Schpr.
LEBANON. Antelias, on hard limestone rocks at the source, 7 Feb. 1943, *Davis* 5244; Jezzin, sandstone rocks in Pinetum, 14 Mar. 1943, *Davis* 5433, 5434B.

Trichostomum viridulum Bruch *
LEBANON. Der Kubil (near Choueifat), on shady calcareous boulders in mixed Pinetum, 7 Mar. 1943, *Davis* 5385B (with *Brachythecium olympicum*).

Trichostomum mutabile Bruch *
LEBANON. Jezzin, on sandstone boulders in Pinetum Pineae, 14 Mar. 1943, *Davis* 5434C (with *Grimmia trichophylla* var. *meridionalis*), 5440; Antelias, on shady, sandstone rocks in Pinetum, 7 Feb. 1943, *Davis* 5234.

Hyophila ehrenbergii (Lorentz) Monkem.
LEBANON. Nahr el Kelb, hanging in great festoons, dark green, down the dripping walls of aqueduct, facing south, 20 Feb. 1943, *Davis* 5283, 5284B.

Tortella nitida (Bruch) Loeske
LEBANON. Antelias, on hard limestone rocks at the source, 7 Feb. 1943, *Davis* 5238D, 5243; near Choueifat on hard limestone boulder under trees with 5214 (*Brachythecium olympicum*), 6 Mar. 1943, *Davis* 5215; below Ein Anub, on shady sandstone rocks in Pinetum, 10 Feb. 1943, *Davis* 5258.

Timmiella barbuloides (Brid.) Monkem.
LEBANON. Near Ein Anub, on sandstone rocks in Pinetum, 10 Feb. 1943, *Davis* 5267; Der Kubil (near Choueifat), on shady walls, 7 Mar. 1943, *Davis* 5411; Choueifat, on marl walls and marly banks in shade, 25 Jan. 1943, *Davis* 5206, 5207; below Choueifat, on vertical clay bank facing west, 16 Feb. 1943, *Davis* 5270; Choueifat, marly walls, winter 1943, *Davis* s.n.

Barbula unguiculata Hedw.
LEBANON. Antelias, on vertical sandstone bank facing north, 7 Feb. 1943, *Davis* 5229.

Barbula gracilis (Schleich.) Schwaegr.
LEBANON. Arayeh (Nahr Beirut), winter 1943, *Davis*, s.n.; Ein Anub, on damp sandstone, *Davis* 5201C; Antelias, on hard limestone rocks at the source, 7 Feb. 1943, *Davis* 5244B.

Barbula vinealis Brid.
LEBANON. Antelias, on hard limestone rocks at the source, 7 Feb. 1943, *Davis* 5238B.

Barbula cylindrica (Tayl.) Schpr.
LEBANON. Jezzin, on damp calcareous rocks near the waterfall, 14 Mar. 1943, *Davis* 5425.

Barbula rigidula (Hedw.) Mitt.
LEBANON. Jezzin, damp calcareous rocks near the waterfall, 14 Mar. 1943, *Davis* 5426B; Hursh Imarra, between Baalbek and Talaat Musa on shady rocks in Pinetum excelsae, 2,190 m., 22 June 1943, *Davis* 6613B (with *Brachythecium trachypodium*).

Barbula lurida (Hornsch.) Lindb.
LEBANON. Antelias, vertical sandstone bank facing north, 7 Feb. 1943, *Davis* 5229; near Ein Anub, on shady sandstone outcrops in Pinetum, 10 Feb. 1943, *Davis* 5265B (with *Gymnostomum calcareum*), 5267 (with *Timmiella barbuloides*); Choueifat, on marshy bank facing north, 22 Feb. 1943, *Davis* 5281C (with *Gymnostomum calcareum*); Choueifat, on marly walls, winter 1943, *Davis* s.n. (with *Timmiella barbuloides*).

Tortula muralis (L.) Hedw.
LEBANON. Choueifat, calcareous walls of villages, growing in the mortar between the stones alone, 6 Feb. 1943, *Davis* 5213.

Tortula papillosissima (Coppey) Broth.
LEBANON. J. Akar (above Baynu), 1,200 m., 24 Apr. 1943, *Davis* 5939; Feesen (dist. Hermel), 900 m., shady rocks, 24 Apr. 1943, *Davis*, 5805.

This interesting and distinctive species (see Fig. 1) occurs rather infrequently in dry mountainous regions in Morocco, Sardinia, Greece, Syria and Palestine (see Bizot, 1954) and in similar situations in North America.

Crossidium squamigerum (Viv.) Jur.
LEBANON. Antelias, surface of calcareous rocks (like tufa) facing south, plant green-grey (with grey hairs), 7 Feb. 1943, *Davis* 5249; Baabda, on sloping rocks of hard limestone, facing south—the only species so far showing a decided preference for full sun, 28 Feb. 1943, *Davis* 5302.

Aloina ericifolia (Neck.) Kindb.*
LEBANON. Jezzin, on damp calcareous rocks near the waterfall, light glossy hummocks like *Sagina boydii*, 14 Sept. 1943, *Davis* 5426; Antelias, on vertical sandstone bank facing north, 7 Feb. 1943, *Davis* 5229.

Cinclidotus mucronatus (Brid.) Monkem.
LEBANON. Deir el Beidar, on rocks edging a torrent, in spray, 1,410 m., *Davis* 6056A.

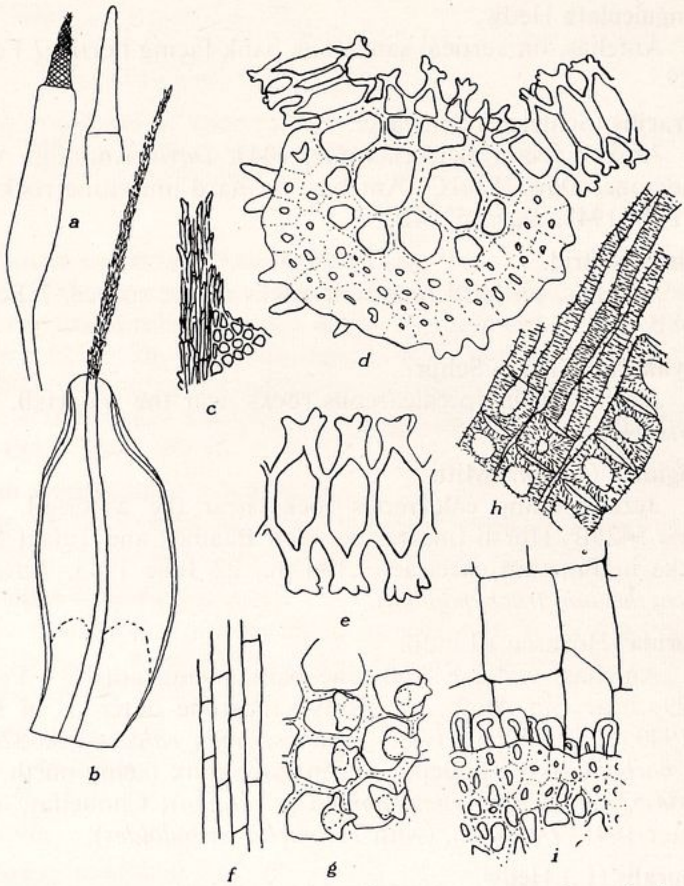

FIG. 1. *Tortula papillosissima* (Coppey) Broth. a, capsule and calyptra, × 10. b, leaf, × 10. c, leaf apex, × 40. d, T.S. Midrib, × 400. e, T.S. lamina, ×460. f, basal cells, ×460. g, laminar cells, ×460. h, peristome, × 200. i, base of peristome, × 200.

Grimmia campestris Burch.
LEBANON. Jezzin, sandstone boulders in Pinetum Pineae, 14 Mar. 1943, *Davis* 5435A, 5434D.

Grimmia pulvinata (L.) Smith
LEBANON. Jezzin, on sandstone boulders in Pinetum Pineae, 14 Mar. 1943, *Davis* 5435D (with *G. campestris*).

Grimmia orbicularis Bruch
LEBANON. Jezzin, on sandstone boulders in Pinetum Pineae, 14 Mar. 1943, *Davis* 5435C.
L. EGYPT. S. Galala: Um Zenatir plateau in upper Wadi Fin, 1,230 m., shady rocks in *Varthemia—Noea* association, 7 Dec. 1944, *Davis* 8054.

Grimmia trichophylla Grev.
LEBANON. Nahr Beirut, below Areiya, on sandstone boulders in Pinetum, facing north, 28 Feb. 1943, *Davis* 5315.

Grimmia trichophylla Grev. var. **meridionalis** Schpr.
LEBANON. Jezzin, on sandstone boulders in Pinetum, 14 Mar. 1943, *Davis* 5434; Antelias, on sandy sandstone rocks in Pinetum, 7 Feb. 1943, *Davis* 5234.

Funaria attenuata (Dicks.) Lindb.
LEBANON. Jezzin, on damp calcareous rocks near the waterfall, 14 Mar. 1943, *Davis* 5426C (with *Aloina ericifolia*).

Funaria curviseta (Schpr.) Lindb.*
LEBANON. Antelias, on damp hard limestone rocks at the source, scarce, 7 Feb. 1943, *Davis* 5235.
Hitherto recorded only from the central and western Mediterranean.

Funaria dentata Croome *
LEBANON. Antelias, on damp hard limestone rocks at the source, 7 Feb. 1943, *Davis* 5242.

Funaria hygrometrica (L.) Sibth.
LEBANON. Ras Beirut, on shady sandstone wall, 20 Feb. 1943, *Davis* 5299, 5313; Aley, in ditch, 24 Jan. 1943, *Davis* 5200; Nahr Beirut, below Areiya, in disused lime kiln, 28 Feb. 1943, *Davis* 5308.
SYRIA. Bludan, edge of streams, 20 Apr. 1943, *Davis* 5930.

Leptobryum pyriforme (L.) Schpr.*
LEBANON. Hursh Imarra, between Baalbek and Talaat Musa, 2,190 m., on shady rocks, 22 June 1943, *Davis* 6614A.
Recorded from Persia (Schiffner, 1908).

Epipterygium tozeri (Grev.) Lindb.*
LEBANON. Antelias, vertical bank of reddish sandstone soil co-dominant with *Davis* 5226 (*Dicranella rubra* var. *tenuifolia*), 7 Feb. 1943, *Davis* 5227.
Recorded from the Caucasus but not otherwise from the eastern Mediterranean.

Bryum pallens Sw.
LEBANON. Hursh Imarra, between Baalbek and Talaat Musa, 2,190 m., on shady rocks, 22 June 1943, *Davis* 6614A.

Bryum obconicum Hornsch.*
LEBANON. Antelias, on hard limestone rocks at the source, 7 Feb. 1943, *Davis* 5240.

Bryum muehlenbeckii B. & S.*
LEBANON. Jezzin, damp calcareous rocks near waterfall, 14 Mar. 1943, *Davis* 5430.

Bryum donianum Grev.
LEBANON. Jezzin, damp calcareous rocks near the waterfall, 14 Mar. 1943, *Davis* 5424.

Bryum capillare L.
LEBANON. Antelias, damp hard limestone rocks at the source, scarce, 7 Feb. 1943, *Davis* 5239; near Ein Anub, damp sandstone rocks by a shady stream, 10 Feb. 1943, *Davis* 5260; below Choueifat, vertical clay banks, 16 Feb. 1943, *Davis* 5269.

Mnium undulatum Weis.
N. LEBANON. Above Sîr, on bank of rivulet, 17 June 1943, *Davis* 6407A.

Mnium rostratum Schrad.
LEBANON. Qadisha gorge below Mar Lisa (near Bcharre) on a wet bank, 19 Aug. 1945, *Davis* 10142.

Bartramia stricta Brid.
LEBANON. Antelias, on shady sandstone rocks in Pinetum (with *Selaginella denticulata*), 7 Feb. 1943, *Davis* 5231.

Philonotis rigida Brid.*
LEBANON. Nahr el Kelb, aqueduct, vertical banks facing south, permanently wet, 20 Feb. 1943, *Davis* 5282.

Philonotis calcarea Schpr.
LEBANON. Nahr el Kelb, on damp walls of aqueduct facing south, perhaps the same as *Davis* 5282 (*P. rigida*), 20 Feb. 1943, *Davis* 5284; above Sîr, 1,050 m., on banks of rivulet, 17 June 1943, *Davis* 6408A.

Cratoneurum commutatum (Hedw.) Monkem.
N. LEBANON. Above Sîr, 1,050 m., on bank of rivulet, 17 June 1943, *Davis* 6406B (with *Pellia fabbroniana*).

Hygramblystegium irriguum (Wils.) Loeske *
LEBANON. Jezzin, shady calcareous rocks, 14 Mar. 1943, *Davis* 5423.
SYRIA. Bludan, by the edge of streams, 20 Apr. 1943, *Davis* 5929.

Calliergon cuspidatum Kindb.*
LEBANON. Akar, 25 June 1943, *Davis* 5977; above Sîr, 1,050 m., banks of rivulet, 17 June 1943, *Davis* 6408B (with *Philonotis calcarea*).

Recorded from Persia (Schiffner, 1897).

Camptothecium sericeum (L.) Kindb.
LEBANON. Jezzin, 900 m., on sandstone banks in Pinetum Pineae, 14 Mar. 1943, *Davis* 5439, 6439, 5437.
PALESTINE. J. Jermak, above Meirun, on vertical rocks in complete shade, *Quercus calliprinos* dominant, 8 Jan. 1943, *Davis* 5128.
CYPRUS. Above Larnaca-tis-Lapithou, 600 m., 3 Jan. 1941, *Davis* 2091A.

Camptothecium aureum (Lagasca) B. & S.*
LEBANON. Jezzin, 900 m., on sandstone banks in Pinetum pineae, 14 Mar. 1943, *Davis* 5438; Aley, on damp sandstone rocks, 24 Jan. 1943, *Davis* 5198; Feesen (district Hermel), 900 m., on shady rocks, 24 Apr. 1943, *Davis* 5804.

Recorded from Lydia (Schiffner, 1908).

Camptothecium lutescens (Huds.) B. & S.*
LEBANON. Jezzin, on shady banks (calcareous), 14 Mar. 1943, *Davis* 5402.
Recorded from Persia (Schiffner, 1908).

Brachythecium salebrosum (Hoffm.) B. & S.*
LEBANON. Der Kubil (near Choueifat), at base of hole in oak tree in *Pinus brutia—Quercus calliprinos* association, facing north, 7 Mar. 1943, *Davis* 5386A.

Brachythecium rutabulum (L.) B. & S.
LEBANON. Der Kubil, near Choueifat, on shady walls, 7 Mar. 1943, *Davis* 5382, 5412.

Brachythecium rivulare (Bruch) B. & S.
LEBANON. Jezzin, 840 m., on calcareous banks and walls facing north, 14 Mar. 1943, *Davis* 5427, 5428, 5429 (with *Pellia fabbroniana*).

Brachythecium olympicum Jur.
LEBANON. Der Kubil (near Choueifat), on shady calcareous boulders in mixed Pinetum, 7 Mar. 1943, *Davis* 5385; near Choueifat, on hard limestone boulders under trees, complete shade, co-dominant with *Tortella nitida* (*Davis* 5215), 6 Mar. 1943, *Davis* 5214.

Brachythecium trachypodium (Funck) B. & S.
LEBANON. Hursh Imarra, between Baalbek and Talaat Musa, 2,190 m., on shady rocks, 22 June 1943, *Davis* 6613A.

Scleropodium illecebrum (Schwaegr.) B. & S.
LEBANON. Nahr Beirut, below Areiya, on shady, sandstone slopes in Pinetum, 28 Feb. 1943, *Davis* 5311, 5319; Jezzin, in Pinetum pineae, winter 1943, *Davis* s.n. (with *Camptothecium aureum*).

Eurhynchium circinatum (Brid.) B. & S.
LEBANON. Antelias, on damp hard limestone rocks at the source, Feb. 1943, *Davis* 5239.

Eurhynchium deflexifolium (Solms-Laub.) Roth *
LEBANON. Near Ein Anub, on damp sandstone rocks by the stream, 10 Feb. 1943, *Davis* 5259, 5261 (with *Lunularia cruciata*).
This species has apparently been recorded only from the western Mediterranean—S. France, Pyrenees, Algiers and Tunis.

Eurhynchium swartzii (Turn.) Hobk.*
LEBANON. Nahr el Kelb, on wet banks of the aqueduct facing north, 20 Feb. 1943, *Davis* 5286.
Recorded from Persia (Schiffner, 1908).

Eurhynchium rusciforme (Neck.) Milde
LEBANON. Nahr Beirut below Areiya, on shady sandstone slopes in Pinetum, 28 Feb. 1943, *Davis* 5310; above Sîr, on banks of rivulet, 17 June 1943, *Davis* 6409A.

Hypnum cupressiforme L. var. **tectorum** Brid.
LEBANON. Nahr Beirut, below Areiya, on shady sandstone slopes in Pinetum, 28 Feb. 1943, *Davis* 5314.

HEPATICAE

Targionia hypophylla Linn.
LEBANON. Ein Anub–-Choueifat, on damp sandstone walls, 24 Jan. 1943, *Davis* 5204; Jezzin, on shady calcareous rocks, 14 Mar. 1943, *Davis* 5421B (with *Reboulia hemisphaerica*).

Reboulia hemisphaerica (L.) Raddi
LEBANON. Nahr el Kelb, on damp limestone rocks facing north, 20 Feb. 1943, *Davis* 5287; Der Kubil, near Choueifat, on shady walls, 7 Mar. 1943, *Davis* 5382B (with *Brachythecium rutabulum*); Jezzin, shady calcareous rocks, 14 Mar. 1943, *Davis* 5421.
PALESTINE. J. Jermak, on shady rocks 100 ft. below summit, facing N.E., growing on humid vertical faces with *Camptothecium sericeum* (D. 5128), 8 Jan. 1945, *Davis* 5140; J. Jermak, above Meirun on vertical rocks in complete shade, in *Quercus calliprinos* association, 8 Jan. 1943, *Davis* 5127B (with *Lunularia cruciata*).

Grimaldia dichotoma Raddi

LEBANON. Antelias, in holes on hard limestone boulder, 7 Feb. 1943, *Davis* 5247.

Lunularia cruciata Linn.

LEBANON. Der Kubil (near Choueifat), on vertical clayish bank under overhanging trees facing north, 7 Mar. 1943, *Davis* 5384; Aley, on damp, sandstone rocks in ditch facing north, 24 Jan. 1943, *Davis* 5199; near Ein Anub, on sandy sandstone rocks by a stream, 10 Feb. 1943, *Davis* 5261.

PALESTINE. J. Jermak, above Meirun, on vertical rocks in complete shade in *Quercus calliprinos* association, 8 Jan. 1943, *Davis* 5127; J. Jermak, on shady rocks 30 m. below summit, facing N.E., growing on humid vertical faces with *Camptothecium sericeum* (D. 5128), 8 Jan. 1943, *Davis* 5140B (with *Reboulia hemisphaerica*).

Pellia fabbroniana Raddi

LEBANON. Nahr el Kelb, on dripping wet walls of aqueduct facing south, 20 Feb. 1943, *Davis* 5285; Jezzin, on damp rocks beside the waterfall, 14 Mar. 1943, *Davis* 5429; above Sîr, 1,050 m., on bank of rivulet, 17 June 1943, *Davis* 6406A.

Fossombronia pusilla (L.) Dum.*

LEBANON. Near Ein Anub, on shady sandstone rocks, 10 Feb. 1943, *Davis* 5263; Ein Anub, on damp sandstone, *Davis* 5201B; Antelias, on shady hard limestone boulder, 7 Feb. 1943, *Davis* 5245; Antelias, on shady sandstone rocks in Pinetum, 7 Feb. 1943, *Davis* 5232.

Gongylanthus ericetorum (Raddi) Nees *

LEBANON. Nahr Beirut, below Areiya on vertical sandstone bank facing north at the foot of a gulley (in *Pinus halepensis-Quercus coccifera* forest), 28 Feb. 1943, *Davis* 5318.

Anthoceros levis Linn.

LEBANON. Antelias, on vertical bank (sandstone) of deep reddish soil in complete shade, in *Dicranella rubra* var. *tenuifolia-Epipterygium tozeri* (D. 5226–5227) association, 7 Feb. 1943, *Davis* 5228; Nahr Beirut, below Areiya, on damp sandstone rocks by stream, facing north, 28 Feb. 1943, *Davis* 5317; Ein Anub, on damp sandstone, 24 Jan. 1943, *Davis* 5202, 5201A.

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POSTSCRIPT. Since this paper went to press a further contribution to the flora of the area has been published :—

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