

The South African Species of *Kniphofia* (Liliaceae)

by

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FIG. 1.—Johannes Hieronymus Kniphof, 1704–63, Professor of Medicine at Erfurt University, after whom the genus *Kniphofia* Moench is named.

THE SOUTH AFRICAN SPECIES OF KNIPHOFIA (LILIACEAE)

ABSTRACT

A revision of the South African species of *Kniphofia* (Liliaceae) is presented in which a key is provided to the 45 species and 4 subspecies recognized. The new species, subspecies and combinations are: *K. ensifolia* Bak. subsp. **autumnalis**, *K. praecox* Bak. subsp. **bruceae**, *K. triangularis* Kunth subsp. **obtusiloba** (Diels ex Berger) (*K. obtusiloba* Diels ex Berger), *K. littoralis*, *K. elegans*, *K. latifolia*, *K. tysonii* Bak. subsp. **lebomboensis**. Freely illustrated, with 27 species depicted life-size in colour.

INTRODUCTION

The genus *Kniphofia* Moench, which includes the plants commonly known as Redhot Pokers, was named in honour of Johannes Hieronymus Kniphof, 1704–63 (Fig. 1), who was Professor of Medicine at Erfurt University, Germany. He was interested in botany and one of his best known works was entitled *Botanica in Originali* or *Herbarium Vivum*. It comprised 1,200 botanical illustrations which were produced by a somewhat unique process, whereby dried plant specimens were coated with printer's ink and pressed on paper, resulting in a silhouette effect. According to Kew Bulletin 1895: 157 (1895): "It is interesting historically both on account of its being a record of plants cultivated at that date in Germany and also on account of its being one of the earliest, if not actually the first, work of considerable extent, in which the process of nature-printing was employed to illustrate plants". This was an adaptation from an earlier method in which the plant specimens were blackened by holding them over the smoke of a candle or oil lamp; by placing these between sheets of paper and rubbing them down with a smoothing bone, the lamp-black was transferred to the paper (see Blunt, "The art of botanical illustration", Collins, London, 1950, pp. 138–9; and Nissen, "Die botanische Buchillustration", Hiersemann, Stuttgart, 1951, pp. 246–7).

The 1,200 illustrations were published in twelve folio volumes of 100 plates each, and each centurion is preceded by a title page. One of the illustrations depicts the species then known as *Aloe uvaria* L. which later became the type species of the genus *Kniphofia* Moench. The dates on which the various illustrations were published cannot be determined with certainty. In the copy at the British Museum (Natural History), the plate of *Aloe uvaria* is No. 805 in centurion IX, of which the title page, dated 1762, is reproduced in Fig. 2. This date may be accepted as authentic, although, in *Index Londinensis*, which is based on the Kew copy, the plate of *Aloe uvaria* is cited as *Herb. Viv. 1: t.46* (1758). As will be seen from Fig. 2, reproduced from the British Museum copy, the characters of the plants are depicted with remarkable fidelity.



FIG. 2.—Title page of Centurion IX (1762) of Kniphof's publication *Herbarium Vivum*.

It may be noted that *Kniphofia* Moench (1794) was antedated by *Kniphofia* Scop. (1777). The latter is generally regarded as being a synonym of *Terminalia* L. (Combrretaceae) and has never been taken up. In order to preserve the name for the Redhot Pokers, the recommendation to conserve *Kniphofia* Moench, in accordance with the provisions of the International Code of Botanical Nomenclature, was approved (Taxon 8: 140, 1959).

Linnaeus described the only species of the genus then known to him as *Aloe uvaria* in his *Species Plantarum* (1753). In 1771 he transferred it to the genus *Aletris* while Willdenow, in 1799, placed it in *Veltheimia*, but it clearly does not belong to either of these genera. In 1794 Moench created the genus *Kniphofia* to accommodate the species, but took the unnecessary step of changing the epithet to *K. aloïdes*. The generic name *Kniphofia* was not taken up until 1843, when Kunth reviewed the species then known to him. In the meantime Ker Gawler described the genus *Tritoma* in 1804 and made the combination *Tritoma uvaria* (L.) Ker Gawl. The generic name *Tritoma* became widely used in Britain and America for the Redhot Pokers and still persists in nursery catalogues to this day, even though the name *Kniphofia* has been in general use in scientific literature for the last 100 years. Subsequently Link, in 1821, proposed the generic name *Tritomanthe* Link in place of *Tritoma*, pointing out that the latter name had previously been used for a genus of insects and, in 1829, used the name *Tritomium* Link, without giving reasons for the change. In 1866 a further change to *Triclissa* Salisb. was published, attention again being drawn to the prior use of the name *Tritoma* for a genus of insects. Further notes on the history of the genus will be found on pp. 376-88).

The genus is almost entirely confined to the continent of Africa, with only one species in Madagascar and one in southern Arabia. In Vol. 6 of *Flora Capensis* (1896), Baker recognized 32 species in South Africa and, in Vol. 7 of *Flora of Tropical Africa* (1898), he dealt with 13 tropical species. Since then the genus was monographed as a whole by Berger (1908), who deals with 67 species, 44 of which are recorded from South Africa. The genus *Notosceptrum*, separated by Bentham in 1883, was upheld by both Baker and Berger (3 species in South Africa and 2 species in Angola). In the present revision, *Notosceptrum* is included in synonymy under *Kniphofia* (see pp. 392, 394, in which genus 45 South African species are maintained).

THE *K. UVARIA* AND *K. PRAECOX* COMPLEXES

Before proceeding to a historical outline of the genus, it is appropriate to comment on members of the *K. uvaria* and *K. praecox* complexes which have contributed largely to the commonly cultivated Redhot Pokers. Much of the early history of the genus is concerned with the application and misinterpretation of species names within these groups, thus illustrating some of the difficulties encountered in studying a genus favoured for horticultural purposes.

Fortunately, until about 1800, apparently only one member from these two groups of species was known to botanists in Europe, namely *K. uvaria* (L.) Hook., the typification of which is not in doubt. This is the species which occurs in the south-western Cape Province and was readily available to early visitors to the Cape. However, as botanical exploration spread further to the east, certain more robust *Kniphofia* plants, with larger inflorescences, found their way to European gardens. These were not immediately recognized as distinct and were grown and illustrated under the epithet "uvaria" or its synonym, "aloïdes".

Early examples which may be quoted are the plants illustrated on Plate 4 of Jacquin's *Fragmenta* (1800 or 1801) under the name *Veltheimia uvaria* (reproduced here as Fig. 9), and Plate 291 of Redouté's *Liliacées* (1810 or 1811) under the name *Tritoma uvaria* (see Fig. 11). Not only can these two be distinguished from true *K. uvaria*, but they are clearly distinct from one another. Yet 70 years or more elapsed before the species represented in these illustrations received names of their own.

K. praecox *Bak.* The identity of the Jacquin illustration (see Fig. 9), which has an elongate inflorescence, perianth tube constricted above the ovary and well-exserted stamens, provided a puzzle for some time. Only recently has it been satisfactorily matched with naturally occurring plants which are restricted to a few localities in the Knysna and Komga areas. Another characteristic then became apparent, namely that it possesses narrow, long-acuminate bracts which are very different from the ovate-oblong, obtuse to rounded bracts of the *K. uvaria* complex.

The bracts are of particular importance in the diagnosis of this group in the herbarium with the result that it is now possible for the first time to account satisfactorily for certain old herbarium specimens in various European herbaria (discussed in some detail on p. 448). These specimens, which were confused under various names, have narrow, long-acuminate bracts, and are thus obviously allied to the plant illustrated by Jacquin. They were widely grown in Europe in the early 1800's and superficially resemble certain members of the *uvaria* complex, but can readily be identified by their characteristic bracts. Derivatives of these plants are grown in gardens to this day and, over the years, some of the floral characters have become modified in cultivation, as may be expected.

In 1870 Baker somewhat diffidently described *K. praecox* in Saunders' *Ref. Bot.* t.169, stating that it differed from "*uvaria*" mainly in its earlier flowering time. In subsequent revisions Baker himself and, later, Berger (1908) included the species in their concept of *K. uvaria*. The illustration (see Fig. 46, p. 446) cannot readily be distinguished from the *uvaria* complex, but fortunately a specimen is preserved in Kew Herbarium and it may be seen at a glance that the bracts are narrow and long-acuminate. The type of *K. praecox* is, therefore, clearly allied to the plant illustrated by Jacquin. It is not a perfect match of the known wild plants now associated with the Jacquin plate (flowers of the type plant are longer and not distinctly constricted above the ovary, with the stamens only slightly exerted), but the wild plants may be included in a broad concept of *K. praecox*. It may be mentioned that another cultivated member of this complex with pale yellow flowers was later illustrated in the *Bot. Mag.* t.7623 (1898) where it was erroneously called *K. longicollis* *Bak.*

Unless, therefore, adequate botanical details are shown (or described), the identity of an illustration (especially in the *K. uvaria* or *K. praecox* complexes) cannot be satisfactorily established unless a corresponding herbarium specimen is preserved. For this reason one may conveniently ignore many semi-horticultural names, such as *T. saundersii* *Carr.* (1882) and *T. nobilis* *Guill.* (1882), of which no authentic type specimens have been traced.

The *K. uvaria* Complex. This complex is widespread and variable, extending from the western Cape Province, through eastern Cape Province, eastern Free State, Natal, Swaziland and eastern Transvaal to eastern Rhodesia. The copious modern material now available appears to fall into five main groups according mainly to the shape of the inflorescence, which varies from globose (large, medium or small) to cylindrical, and the perianth length, which varies from 20 mm to 45 mm. The groups vary in size and degree of variability, and are by no means clear-cut, being linked by intermediates. However, each group has a fairly well-defined geographical distribution, as indicated in Maps 13 and 14.

Opinions may differ as to the rank which should be accorded to each of these groups. From what has been said above it may seem logical to designate each group as a subspecies of *K. uvaria*. Apart from the cumbersome names that would result from such a treatment, it is preferred, at the present state of our knowledge, to give each group the rank of species because more field work is required than has been possible during the present study to assess the status of the so-called intermediate specimens. Some are undoubtedly true intermediates in genetic composition, while others, as already suspected, will prove to be abnormal variants, either depauperate or unusually large specimens of recognized groups, resulting from local or seasonal abnormalities, cultivation, etc.

Partly for these reasons, it is impossible to construct a key which will necessarily lead to the correct identification of every specimen, regardless of its condition. The key provided on pp. 397-400 is based on average specimens and is, therefore, intended mainly as a guide. The position is further complicated by the fact that Kniphofias, like so many other Monocotyledons, are difficult to transform into good herbarium specimens. When identifying a member of the *K. uvaria* complex, it is suggested that the key should be used in conjunction with distribution maps Nos. 13 and 14 (p. 497) and in consultation with the group characters summarised briefly below.

In determining the correct epithet at species level for each group, it is necessary to review 11 epithets which, in chronological order of priority, are as follows: *K. uvaria* (L.) Hook. (1753), *K. burchellii* (Herb.) Kunth (1836), *K. rooperi* (Moore) Lem. (1852), *K. tysonii* (Bak. (1889), *K. longicollis* Bak. (1893), *K. citrina* Bak. (1893), *K. linearifolia* Bak. (1896), *K. longiflora* Bak. (1901), *K. bachmannii* Bak. (1901), *K. occidentalis* Berger (1908) and *K. rhodesiana* Rendle (1911). These are allocated to the five groups as shown below. Full descriptions and discussion of synonymy will be found in the taxonomic section, as indicated by the page numbers quoted.

1. ***K. uvaria* (L.) Hook.** Plants of small to medium stature, with medium-sized oblong to globose inflorescences, perianth tube 28-38 mm long, usually conspicuous pedicels (2-)3-5 mm long and slightly exerted stamens. Distributed from south-western Cape Province northwards to Khamiesberg in Namaqualand, eastwards to King William's Town District, and from there inland to Murraysburg, Steynsburg and Xalanga Districts. In Humansdorp and Albany Districts it grades into Group 4, while in the north-eastern Cape Province it may be difficult to distinguish satisfactorily from Group 5. Synonyms: *K. burchellii* (Herb.) Kunth, *K. bachmannii* Bak. and *K. occidentalis* Berger (see p. 492).

2. ***K. rooperi* (Moore) Lem.** Relatively robust plants (but varying according to soil conditions) with broad, somewhat arcuate leaves, large globose inflorescences, perianth tube 32-44 mm long, short pedicels and slightly exerted stamens. Described in 1852 from a cultivated plant originally from "Kaffraria", and is distributed near the coast from King William's Town to Port Shepstone Districts. Synonym: *K. longicollis* Bak. (see p. 488).

3. ***K. tysonii* Bak.** Robust plants with erect leaves, oblong to cylindrical inflorescences, perianth tube 22-30 mm, short pedicels and well-exserted stamens. Based on a wild plant collected by *Tyson* in East Griqualand and distributed from there to the Natal Midlands, with a subspecies extending to the Lebombo Mts. in Swaziland (see p. 504).

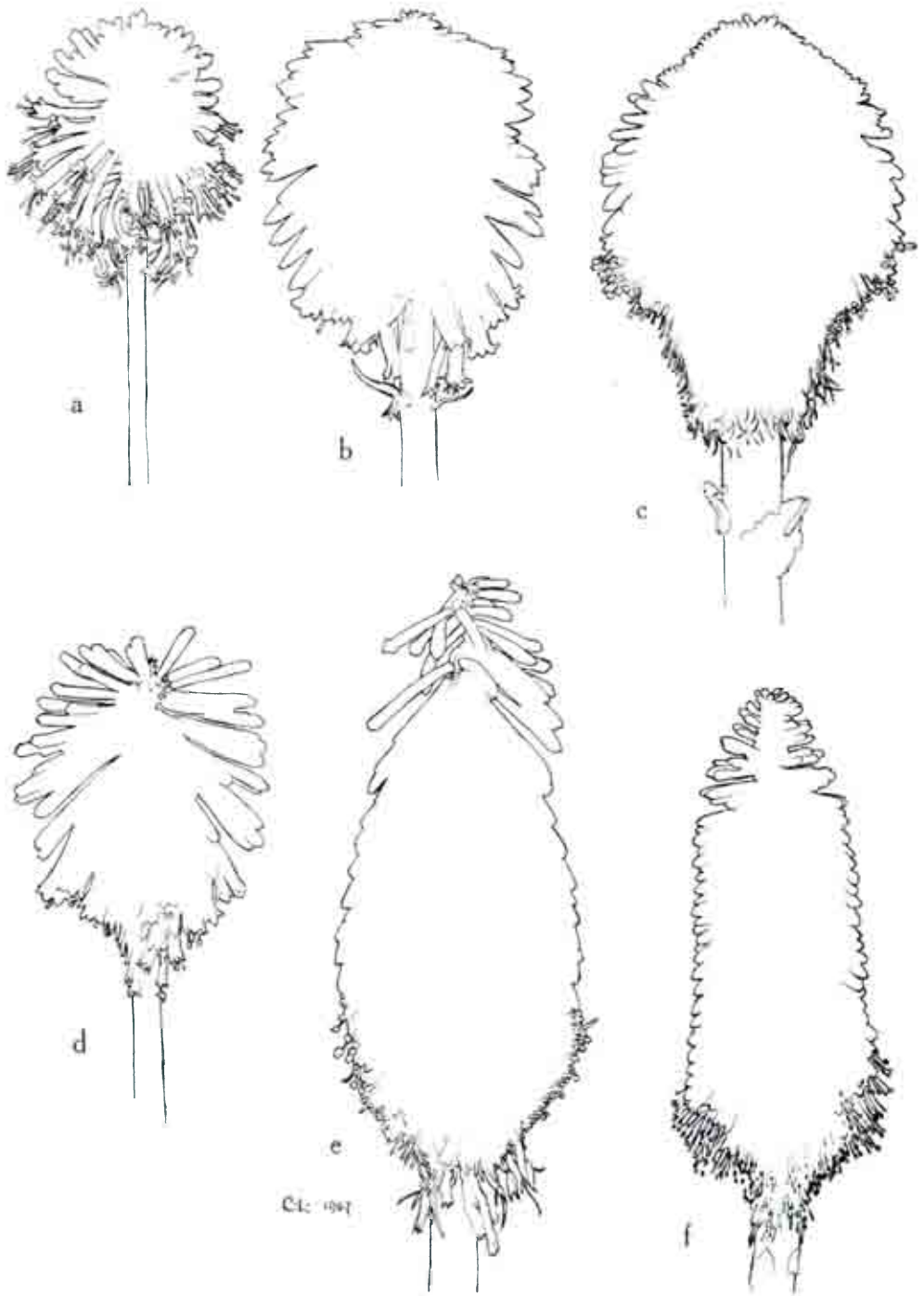


FIG. 3.—Outlines of inflorescence shapes illustrating the five species recognized in the *K. uvaria* complex: a, *K. citrina*; b and d, *K. uvaria*; c, *K. rooperi*; e, *K. linearifolia*; f, *K. tysonii*. All $\times \frac{1}{2}$.

4. *K. citrina* Bak. Plants of small stature with narrow, mainly arcuate-spreading leaves, small globose inflorescences, perianth tube 20–28 mm long, short pedicels and well-exserted stamens. The type is a cultivated plant said to have its origin in the Albany District and it is in this and neighbouring districts that matching plants are found (see p. 497).

5. *K. linearifolia* Bak. Robust to medium-robust plants with medium to large rhomboid to elongate inflorescences, perianth tube 28–40 mm long (sometimes shorter in cultivation), short pedicels and slightly exerted stamens. This is the most widespread group of the *K. uvaria* complex and, probably, in the whole genus. Its main area of distribution is from about Somerset East in the Cape, through eastern Cape, eastern Free State, Natal, Swaziland and eastern Transvaal to eastern Rhodesia. It may come as a surprise, therefore, that it was the last group in the complex to receive a species name. The reason is, of course, that the plants of this group were grown in Europe under the name “*uvaria*” or “*alooides*”. Examples which are well known are the plants illustrated in Redouté’s Plate 291 (see Fig. 11, p. 383) and Bot. Mag. t.4816, 1854 (see Fig. 12, p. 385). The type of *K. linearifolia* was a Bachmann specimen in Berlin which was destroyed during World War II. It was collected in Pondoland, not far from Lusikisiki, and a study of *Kniphofias* in this area indicated that the present concept answers to the description. The name *K. linearifolia* is, therefore, interpreted in the sense of the specimens cited on p. 499, and a neotype has been designated. There are two synonyms at species level, *K. longiflora* Bak. and *K. rhodesiana* Rendle.

PRE-LINNAEAN HISTORY

The first known reference to the plant now called *Kniphofia uvaria* appeared in 1644 under the name *Iris uvaria promont. bonae spei* (“*uvaria*” indicates a resemblance to a bunch of grapes) in the edition of *Theophrasti Eresii de Historia Plantarum* by Johannes Bodaeus a Stapel (or Van Stapel, latinized as Stapelius), published in Amsterdam. In this work five Cape plants are illustrated and shortly described in Latin including, on p. 335, the drawing reproduced here (Fig. 4). It is probable that the drawings and descriptions were done by Justus Heurnius, a missionary from Leiden, Holland, when he called at the Cape in the year 1624. The description of the plant may be roughly translated as follows: “Flowers purple-red, inflorescence wedge-shaped, stem about 40 inches tall, round, brown, leaves long, $\frac{3}{4}$ inch broad, both sides acute glandular (i.e. serrulate?), flowers foetid, grows in wet places”. Actually the flowers of this plant have no odour at all and it may be concluded that the reference to foetid flowers became transferred from the description of *Stapelia variegata*, which is illustrated on the same page.

Another illustration of *K. uvaria* of considerable historical interest is in a collection of early paintings of Cape plants acquired by the Africana Museum, Johannesburg. The paintings are attributed to Hendrik Claudius, a German apothecary, who was sent to the Cape from Batavia in 1682 to collect and draw botanical specimens. They are reproduced (much reduced and not in colour) in a “Catalogue of Pictures in the Africana Museum” compiled by the former Director of the Museum, R. F. Kennedy, and *K. uvaria* appears as illustration C 314 in Vol. 2 (1967) of the Catalogue.

It was customary, up to the time of Linnaeus, to designate plants by means of a descriptive phrase. The various phrase names used for the species are summarised below, followed in each case by authors who used them.

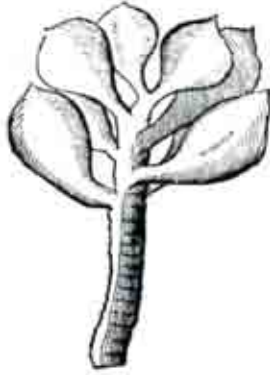
Aloe africana folio triangulo longissimo etc.: Paul Herman, Hort. Acad. Lugd.-Bat, p. 18 (1687); Commelin, Hort. Amst. 2, p. 29, t.15 (1701); Boerhaave, Index, 2, p. 131. No. 43 (1727).

HISTOR. PLANT. LIB. IV.

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Planta sine nomine. Hanc placet *verbenam lanuginosam Indicam* vocare, quæ his verbis ab Heurnio describitur. Folia habet oblonga, ambitu incisa, in extremo obrute mucronata, lanuginosa, inodora, prope radicem crebriora; caulem rotundum, femicubitalem; cauli orbiculatim affurgunt flosculi parvuli, coloris obscure phœnicei, quinque foliorum, racematim ex caliculis sublateis protrusi, inodori; radix fibrosa. Floret April, id est, autumn in illis regionibus initio.

Sedum arborefcens promontorii bonæ spei:



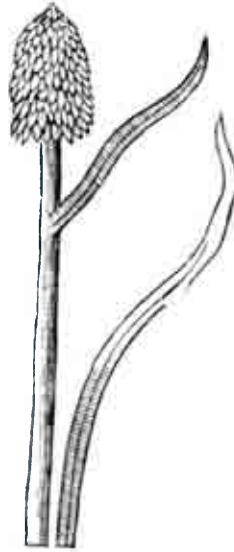
Sedum arborefcens promontorii bonæ spei. *Sedum arborefcens* folia digitum fere crassa, ex viridi albicantia habet, volæ manus ferme magnitudine.

Frustrillaria crassa promontorii bonæ spei.



Frustrillaria crassa (dentillariz species videtur) promontorii bonæ spei vel Saldanica a loco, foliorum loco excrefcens habet digitum longitudine & crassitie succulenta, angulis rupium instar præruptis, circumquaque eminentibus, & in aculeum delincentibus. Folia hæc in summo ad livorem purpureum vergunt, inferius viridia; quibus flos adnascitur quinque, constans foliis tenacibus, in extremitatibus acuminatis; quæ corollam in medio positam cingunt, quaque illum attingunt lata sunt, & orbiculato margine in acumen vergunt. Corolla protuberat, intusque concavum habet, cui alter quasi flosculus intidet, constans quinque mucronatis foliolis in extremitatibus fuscis, cætera luteis, filamentibus aliquot in centro phœniceis. Color floris exterius sordidus, purpureus est; intus fundus luteus maculis fuscis undique confpergitur, tam in foliis quam in corolla. Caulis quoque flos foliis neditur, strobilus purpureus distinguitur, vix semidigiti longitudinem habens, folia parva appendice radice tuberosa, candida coherent. Planta plane molliora est, nascitur locis montanis arenosis.

Iris uaria promont. bonæ spei.



Iris uaria. Florem habet coloris phœnicei, qui uvulis deorsum propendentibus, capite vel cunei formam habet. caulis bicubitalis, rotundus fuscæ coloris; folia digitum fere crassa, proque latere acuta glandioli forma; flos brevis, coloris est, nascitur locis paludosis.

FIG. 4.—The first known illustration of a *Kniphofia* (here entitled "Iris uaria") in Van Stapel's *Theophrastii Eresii de Historia Plantarum*, Amsterdam, 1644.



FIG. 5.—An illustration of *Kniphofia uvaria* in Mentzel's *Index Nominum Plantarum Multilinguis*, t.13, fig. 5, Berlin, 1696.

Iris uvaria flore luteo etc.: Jacob Breyne, Prodr. Fasc. Rar. Pl. ed. 1, p. 74 (1688).

Aloe africana foetida, folio triangulari longissimo et angustissimo, radice lutea: Kiggelaar, Horti Beaumontiani, p. 5 (1690).

Aloe foliis linearibus triangularis etc.: Linnaeus, Hort. Cliff. p. 133 (1737).

Aloe africana foetida folio triangulari etc.: J. Burman, Cat. Plant. Afric. p. 2 (1737).

Aloe uvaria: Weinmann, Phyt. Icon. t.45 (1737).

POST-LINNAEAN HISTORY

1753. *Aloe uvaria* L., Sp. Pl. 1: 323 (1753). This name was also used by Linnaeus in his Flora Capensis p. 4 (1759) and by other authors, such as Kniphof, Herb. Viv. 9: t.805 (1762); N. L. Burman, Prodr. Fl. Cap. p. 10 (1768); P. Miller, Dict. n.23 (1768); John Hill, Hort. Kew. p. 333, No. 11 (1769) etc. For a full bibliography, see p. 493.

1771. Linnaeus transferred the species to the genus *Aletris* in his Mantissa Plantarum pp. 367–368 (1771).

1783. Lamarck, Encycl. Meth. Bot. 1: 90 (1783), described the same species under the name *Aloe longifolia* Lam.

1789. William Aiton, Hortus Kewensis 1: 464 (1789), listed *Aletris uvaria* and described a second species, *A. pumila* Ait. This is a distinctive species with short, funnel-shaped flowers, credited by Aiton as having been introduced to England from the Cape by Francis Masson in 1774. However as pointed out in J. S. Afr. Bot. 29: 145 (1963), *K. pumila* is an Abyssinian species, and its long association with the South African flora is based on an error. There is a specimen in the Herbarium of the British Museum (Natural History) annotated “Hort. Kew 1781, *Aletris pumila*” (in Dryander’s handwriting), which may be accepted as the type of *K. pumila*. It is not matched by any material known to occur in South Africa, but is conspecific with *Schimper* specimens collected in Ethiopia and described as *K. comosa* Hochst. (1844).

Francis Masson did, in fact, figure in the early history of the genus in South Africa because there is another specimen in BM labelled “*Aletris uvaria?* Hort. Kew 1786 (e Cap b. Spei per Masson 1780)”. Although not recognized as such at the time, this specimen represented a distinct species, the second to be found in South Africa. The flowers are considerably shorter than in *K. uvaria*, but are longer than those of *K. pumila*. The 1786 specimen clearly belongs to the species described many years later as *K. ensifolia* Bak. (1885), and again as *K. tuckii* Bak. (1893) and *K. rivularis* Berger (1908).

Masson apparently did not himself reach the areas where this species is known to occur. One can only speculate how it came into his possession. Possibly the well-known explorer and friend of Masson, Colonel Gordon, found the species during his travels to the Orange River.

1794. Thunberg, who accompanied Masson on some of his travels, records collecting only one species, *Aletris uvaria*, in his Prodr. Cap 1: 60 (1794). It is evident, however, that he and Masson penetrated eastwards into regions where other species are found. Thus it was left to later collectors, probably before and about the turn of the century, to introduce the more robust plants into Europe which came to alter the concept of *K. uvaria*. One of these collectors was Scholl, who collected extensively as far east as the Great Fish River, and who sent quantities of plants back to the Royal Garden at Schoenbrunn, Vienna, towards the end of the eighteenth century.

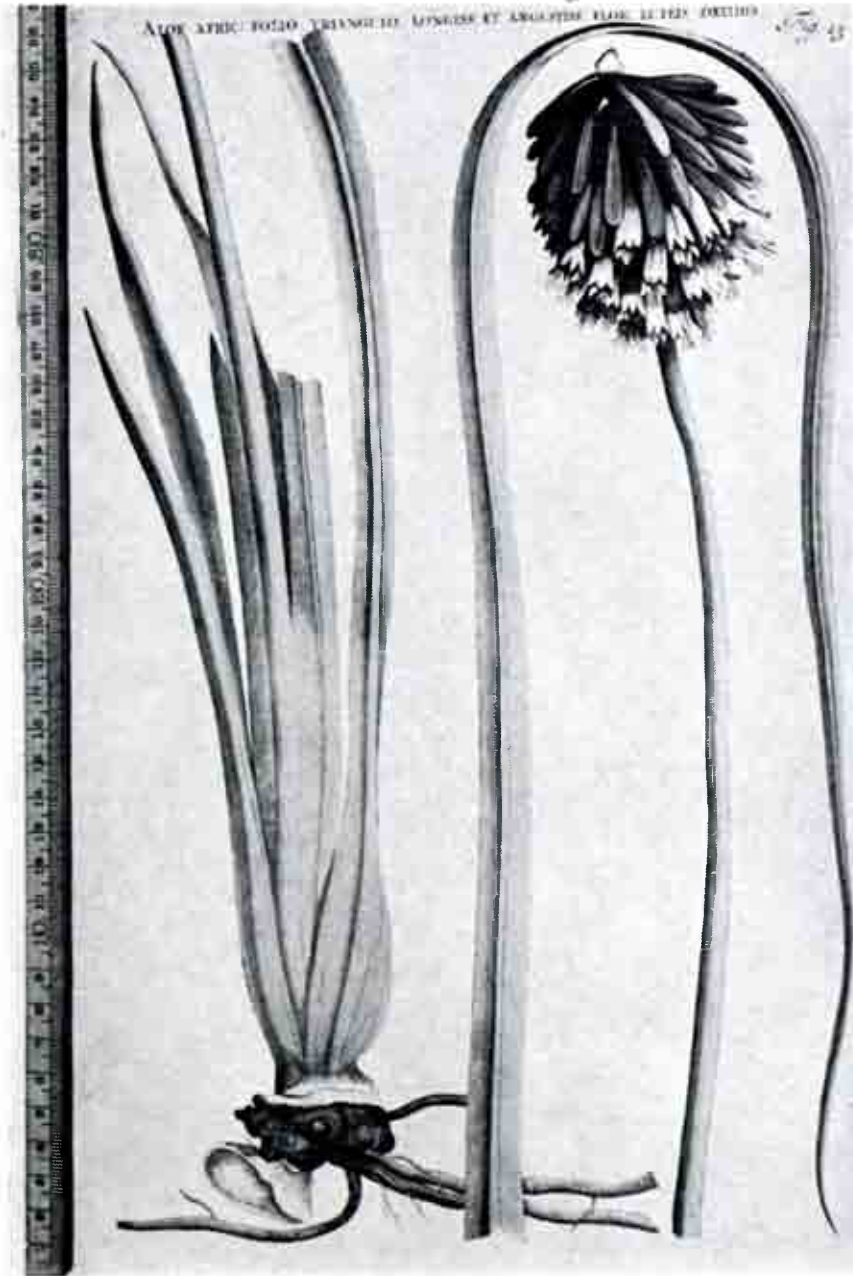


FIG 6 *Kniphofia uvaria* illustrated by Commelin in *Horti Medici Amstelaedamensis*, Vol. 2, t.15 (1701).

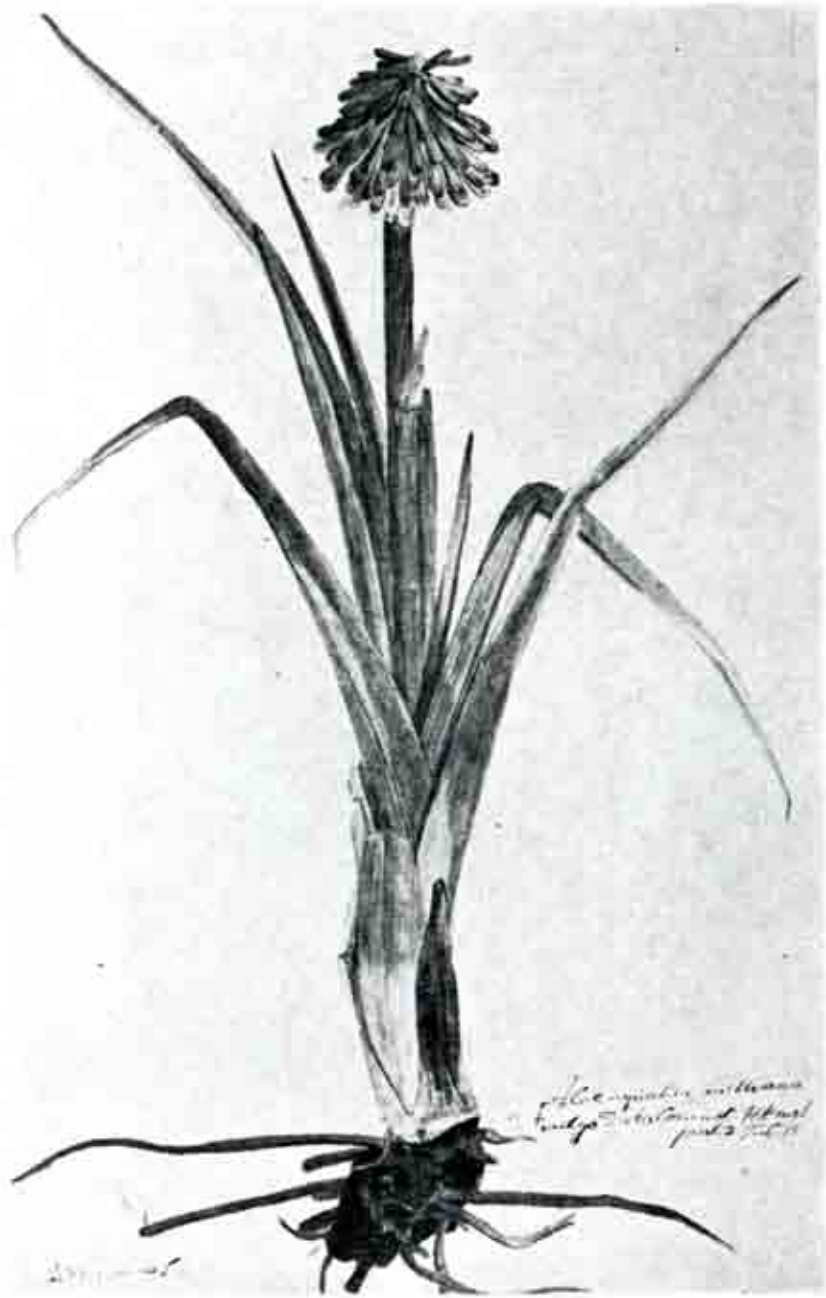


FIG. 7.—*Kniphofia uvaria*, from a folio of early eighteenth-century water-colour illustrations in the library of the Botanical Research Institute, Pretoria. The artist is not known, but the illustrations are annotated by Johannes Burman, 1706–79 (see Fig. 8).

1794. The genus *Kniphofia* Moench, Meth. 631 (1794), was created to accommodate *Aloe uvaria* L. Unfortunately, Moench renamed the species *Kniphofia aloöides* Moench, a procedure not unusual at the time, but not acceptable according to the present International Code of Botanical Nomenclature. This was the first generic name to be created specially for the Redhot Pokers.

1797. The third species to be described was illustrated in 1797 on Plate 54 of Andrews' Botanical Repository under the name *Aletris sarmentosa* Andr. The figured plant was cultivated in Lee's Nursery at Hammersmith and was recorded as being "introduced . . . from the Cape of Good Hope about 1789". We now know that the species occurs mainly in the Roggeveld, an area visited by Masson, although his name is not linked with the introduction. The younger Aiton in Hort. Kew ed. 2, 2: 290 (1811) says it was "introduced about 1789 by Mr. Richard Williams". The species is distinct from *K. uvaria* and was never confused with it.

1799. Willdenow, Sp. Pl. 2: 182 (1799), evidently unaware of the creation of *Kniphofia* Moench, transferred two of the three known species to the genus *Veltheimia*, making the combinations *V. uvaria* (L.) Willd. and *V. pumila* (Ait.) Willd.

1800 or 1801. The first illustration which calls for close scrutiny with regard to its identity was published by Jacquin as Plate 4 of his *Fragmenta*, a series which appeared in six fascicles from about 1801 to 1809. Plate 4, which was entitled *Veltheimia uvaria* Willd., probably appeared in 1801 (see König and Sims in Ann. Bot. 1: 64, 1806). Although its identity was not questioned by subsequent workers, it has several clear-cut characters which distinguish it from true *K. uvaria*. A glance at the illustration (see Fig. 9) immediately reveals its distinguishing features, namely: the cylindrical inflorescence; relatively short perianth tube, constricted above the ovary and expanding

Afbeeldingen van eenige
Cappische gewassen,
degh meest bloem bollen,
waar by in de Latijnsche namen
geschreven heb
Johannes Burmanus?
3 Augusti 1755

FIG. 8.—Annotation in 1755 by Johannes Burman to the folio of early eighteenth-century drawings in the library of the Botanical Research Institute, Pretoria (see Fig. 7).

rather abruptly, with long-exserted anthers; and the lanceolate, acuminate bracts. The identity of the figured plant remained uncertain until recently, when it was matched with a few gatherings from the Uniondale–Knysna Districts and specimens collected first by Flanagan and later by Miss Bruce in the Komga District (see Figs. 49 and 50). The species is evidently comparatively rare at a few scattered localities. Specimens corresponding to Jacquin's plate are not present in the Herbarium of the Natural History Museum, Vienna, but it was interesting to find matching specimens in the herbaria of the British Museum (Natural History) and Geneva, made from specimens cultivated in Europe during the early part of the Nineteenth Century (see p. 448). They may immediately be recognized by the long, narrow, acuminate bracts, a characteristic shown by *K. praecox* Bak. (1870), in which species the Jacquin plate is now included. Jacquin does not explain the origin of his plants, but the most probable explanation is that they were sent by the collector Scholl.

1804. Ker Gawler, editor of Curtis's Botanical Magazine, no doubt also unaware of the publication of *Kniphofia* Moench, described the genus *Tritoma* Ker Gawl., illustrating it with plates of the three species known to him: *T. media* Ker Gawl., which name he introduced as being more appropriate than "sarmentosa", in Bot. Mag. t.744 (1804); *T. uvaria* (L.) Ker Gawl., l.c., t.758; and *T. pumila* Ker Gawl., l.c., t.764.

1810 or 1811. Redouté published a plate in his Liliacées 5: t.291 (about 1810) under the name *Tritoma uvaria*. The illustration does not, however, depict typical *K. uvaria*, but rather one of the more robust plants from the eastern Cape Province. Support for this view may be found in the more robust inflorescence with densely overlapping buds and flowers (see Fig. 11). However, subsequent authors did not question its identity and it is clear that, from about this time, the concept of *K. uvaria* became altered to apply to one or more of the more robust species (see, for example, Fig. 12 on page 385, showing the illustration which appeared under the name *K. uvaria* (L.) Hook. in Bot. Mag. t.4816, 1854). It is thus an interesting exercise to examine the numerous literature references that have appeared under the specific epithets *uvaria* and *alooides* in order to sort out the concepts involved. These two illustrations are now included in *K. linearifolia* Bak., which was described only in 1896 (see pp. 498–504).

1811. William Townsend Aiton, in the second edition of Hortus Kewensis 2: 29 (1811), listed the three species *Tritoma uvaria*, *T. media* and *T. pumila*.

1821. A. G. Roth described *Veltheimia speciosa* in his Nov. Pl. Sp. 190 (1821), a publication dealing with plants collected by Dr. Benj. Heyne in India. He relates it to *V. uvaria* and the description could apply to one of the large, showy Redhot Pokers of the eastern Cape Province, for example, *K. praecox* Bak., *K. linearifolia* Bak. or even *K. rooperi* (Moore) Lem. No type specimen has been traced and thus the possibility cannot be excluded that the plant is not a *Kniphofia* at all. Heyne is not known to have collected in South Africa. Therefore, although the name "speciosa" would be an appropriate one for the robust species, and subsequent authors have treated it as a synonym of "uvaria", it is considered advisable to treat it as a name of doubtful application.

1821. H. F. Link in Enum. Pl. Hort. Reg. Bot. Berol. 1: 333 (1821) proposed the name *Tritomanthe* Link in place of *Tritoma* Ker Gawl., pointing out that the name *Tritoma* had previously been used for a genus of insects. He published the combinations *Tritomanthe uvaria* (L.) Link, *T. media* (Ker Gawl.) Link and *T. pumila* (Ait.) Link.

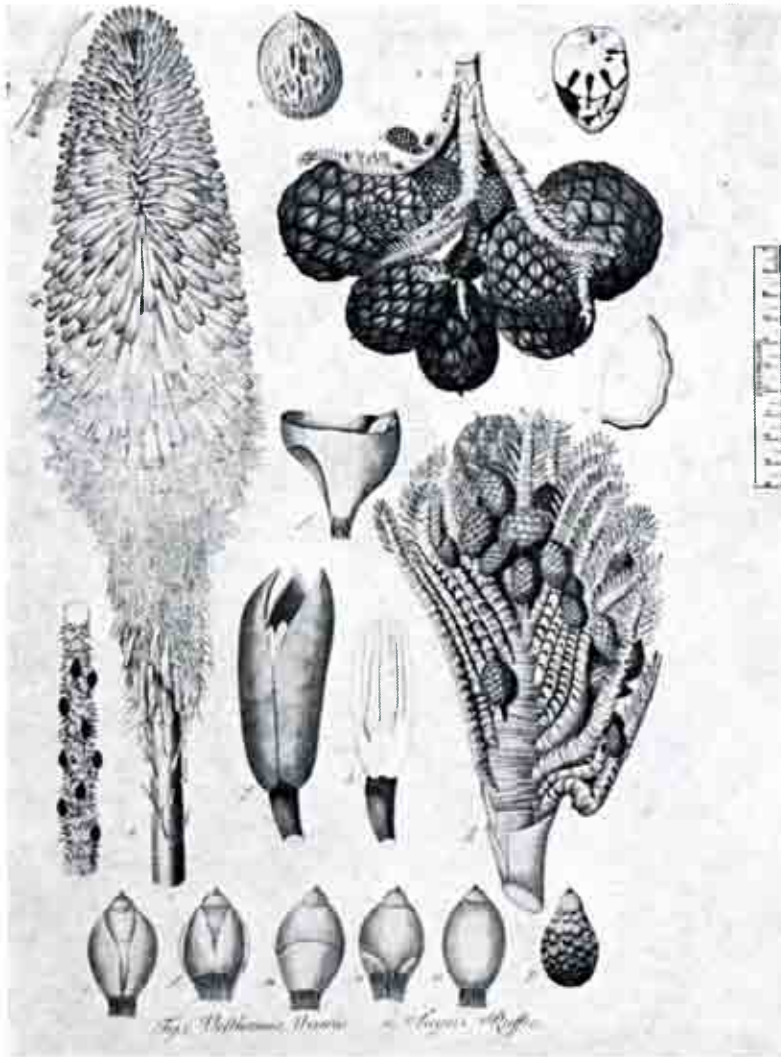


FIG. 9.—A robust *Kniphofia* illustrated by Jacquin in his *Fragmenta*, t.4 (1800 or 1801). Although named “*Veltheimia uvaria*”, it is not that species, but represents *K. praecox* subsp. *bruceae* Codd (see p. 450, fig. 48).

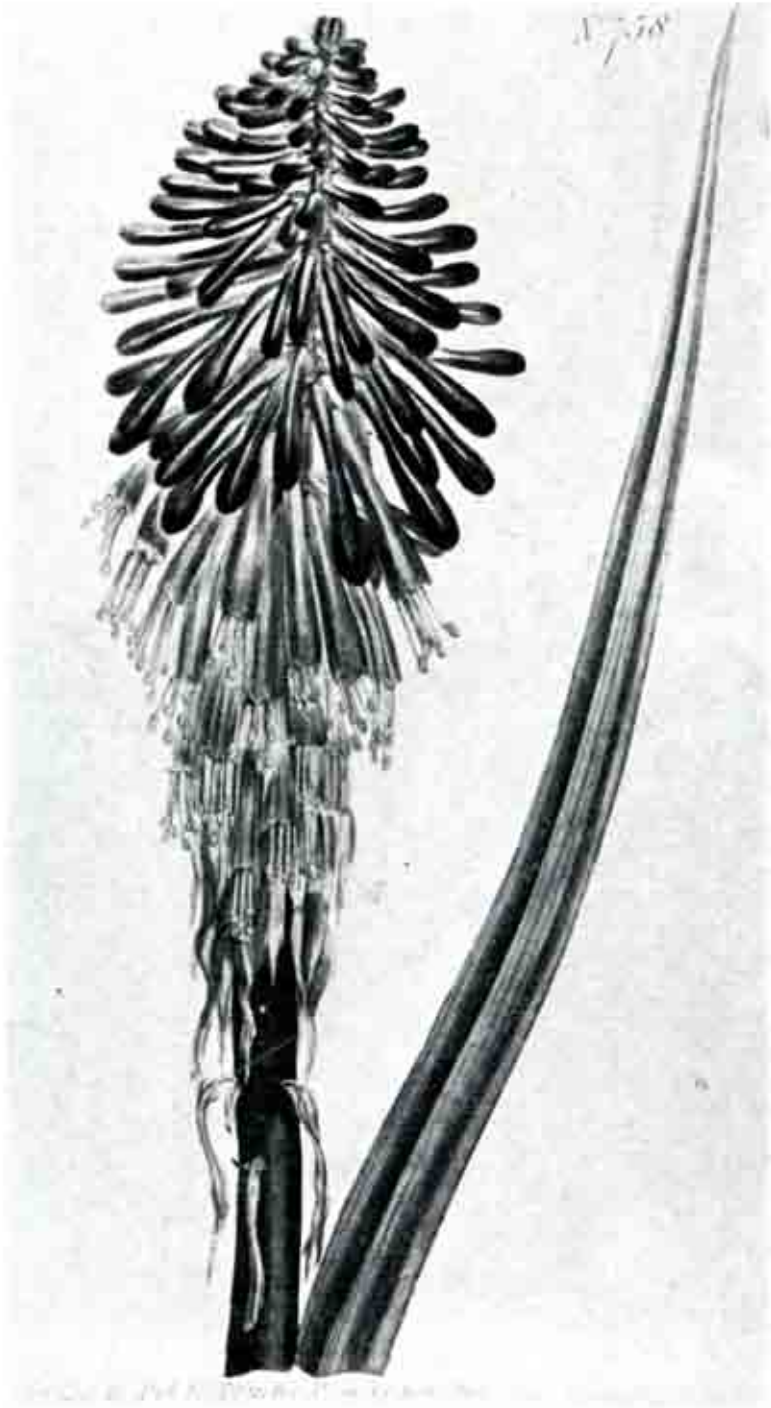


FIG. 10.—The illustration in *Botanical Magazine* t.758 (1804) accompanying the description of the genus *Tritoma* Ker Gawl. Although reputed to be "*Tritoma uvaria*", it looks somewhat like Jacquin's plant (see Fig. 9).



FIG. 11.—Although referred to as "*Tritoma uaria*" in Redouté's *Liliacées* t.291 (1810 or 1811), this is probably the first illustration of the more robust plants now included in *K. linearifolia* (see p. 498).

1823. Thunberg's *Flora Capensis* edited by Schultes appeared in this year. Only the one species *Veltheimia uvaria* is listed, with a more extensive description than is given in his *Prodröm*s (1794).

1829. Link, *Handbuch* 1: 170 (1829), published the generic name *Tritomium* and made the combination *Tritomium uvaria* (L.) Link. No reasons are given for the change.

1829. Schultes in *Roem. & Schult., Syst. Veg.* 7: 629–631 (1829) follows Link (1821) and lists the three species as *Tritomanthe*. He gives an extensive bibliography under each species, but the descriptions are compilations from earlier authors. Under *T. uvaria* he includes, amongst others, the Jacquin illustration (1800/01), Redouté's plate (1810/11) and *V. speciosa* Roth (1821), all of which are now excluded from *K. uvaria* proper, though admittedly he expresses doubt about the identity of the Redouté plate.

1836. It is evident that by this time the epithet "uvaria" was generally applied to the more robust plants commonly cultivated in gardens, and which probably originated in the eastern Cape Province. Hybridization and selection had also no doubt played a part in modifying and improving the cultivated stock. Thus when true *K. uvaria* was again introduced into England by Burchell, it was looked upon as a distinct species, and was illustrated and described as *Tritoma burchellii* Herb. ex Lindl. in *Bot. Reg.* t.1745 (1836). The error was perpetuated, even by monographers of the genus, so that members of the large eastern species became consistently known as "uvaria" or "alooides", while the epithet "burchellii" came to be accepted as the correct name for the true *K. uvaria* of the south-western Cape Province. See, for example, Hooker (1854) and Baker (1870) below.

1841. Steudel, *Nom. Bot.* ed. 2: 718 (1841), repeats the three species listed by Link (1821) and adds *Tritomanthe burchellii* (Herb. ex Lindl.) Steud. and *T. odorata* Steud., a *nomen nudum*.

1843. The generic name *Kniphofia* Moench was taken up by Kunth, *Enum.* 4: 550–553 (1843) and the genus was reviewed. In addition to listing *K. alooides* Moench, he made the combinations *K. burchellii* (Herb. ex Lindl.) Kunth, *K. pumila* (Ait.) Kunth and *K. sarmentosa* (Andr.) Kunth, thus correctly restoring Andrews' epithet. He had before him the extensive collections made by Drege, from which he described three new species, *K. laxiflora*, *K. parviflora* and *K. triangularis*.

1852. *Tritoma rooperi* Moore was described and figured in *Gard. Comp.* 1: 116 (1852). It is a robust plant with a large, globose inflorescence, obviously a component of the *K. uvaria* complex, but relatively uniform throughout its distribution range from about East London, along the coast to just north of Port Shepstone. The original plant was cultivated in England from a plant sent by Capt. Edward Rooper, who was stationed in East London from time to time between 1848 and 1850. In the library of the Botanical Research Institute, Pretoria, is a collection of original water-colour paintings by Capt. Rooper, among which Plate 99 is an illustration which is a good match of the figure in the *Gardener's Companion* (1852). The illustration is annotated by the artist: "Common in Albany and Kaffirland. Flowers nearly all year. March '49".

1854. In the *Bot. Mag.* t.4816 (1854), the combination *Kniphofia uvaria* (L.) Hook. was published. This is the correct name for the species from the S.W. Cape, but the illustration published by Hooker (see Fig. 12) shows the robust eastern species which was, by that time, commonly known as "uvaria". In fact, Hooker refers to the earlier *Bot. Mag.* Plate 758 (1804) in the following terms: "The figure of Mr. Gawler is so indifferent that we can well excuse its not being easily recognised and have no hesitation in offering a better one".



FIG. 12.—Probably a specimen of the robust species now known as *K. linearifolia*, figured by Hooker in *Bot. Mag.* t.4816 (1854), when he effected the combination *K. uvaria* (L.) Hook.

1866. In R. A. Salisbury's Gen. Pl. (p. 75), published nearly 40 years after his death, the generic name *Triclissa* Salisb. is proposed in place of *Tritoma* Ker Gawl., mention again being made of the prior use of the name *Tritoma* for a genus of insects.

1870. J. G. Baker, subsequently Keeper of the Herbarium, Kew, described *K. praecox* Bak. with an accompanying illustration (see Fig. 46) in Saunders' Ref. Bot. 3: t.169 (1870). Baker advanced the name with some diffidence, stating that it differed from "*K. aloöides*" only in its earlier flowering time. Later he reduced it to a synonym of "*K. aloöides*". It appears to be the first valid specific name for the robust eastern species illustrated by Jacquin (see Fig. 9, p. 381). Some years before this, plants had been introduced into horticulture under such names as *T. recurva* and *T. recurvata* (1863), and *T. grandis* (1865). Although some of these are accompanied by illustrations and resemble *K. praecox* or the species described later as *K. linearifolia*, their origin is uncertain and they may even be garden hybrids. No corresponding herbarium specimens have been traced and these horticultural names are best disregarded as being of uncertain application.

K. praecox is based on a plant cultivated in England and said to have been received from Thomas Cooper (see also p. 445), who came to South Africa to collect plants for Mr. W. W. Saunders of Reigate. Although the original locality is not known, there is a specimen in the Herbarium of the Royal Botanic Gardens, Kew, which may be regarded as the type. Cooper spent from 1859 to 1862 in South Africa and proceeded from Port Elizabeth to the north-eastern Cape Province and thence through the eastern Orange Free State to the Basutoland border. Continuing round the northern boundary of Basutoland, he crossed the Drakensberg and eventually returned via Port Natal. Unfortunately his localities are usually vague. Two further species were based on his gatherings, namely *K. breviflora* Harv. ex Bak. (1871) and *K. porphyrantha* Bak. (1874), from the Orange Free State.

1871. Baker published a review of the genus in J. Linn. Soc. 11: 360 (1871) in which he recognized 14 species, nine of which were recorded as originating in South Africa.

1883. Bentham & Hook. f., Genera Plantarum 3: 775 (1883), considered that there were 16 species of *Kniphofia*. In this work the segregate genus *Notosceptrum* was described, based on two species from Angola.

1885. A synopsis of the South African species, including the first key, was published by Baker in J. Bot. Lond. 23: 275 (1885). Eighteen species and three varieties were upheld, several of which were newly described.

1888. Engler reviewed the genus briefly in Pflanzenfamilien 2: 5 (1888) but made no useful contribution to our knowledge of the group. Only 16 species were recognized.

1896. Baker, in Flora Capensis 6: 275 (1896) and 6: 533 (1897), revised the South African species. A further six species were described in this work, bringing the total to 35 for South Africa. Two South African species of *Notosceptrum* were upheld.

About this time, Max Leichtlin, a nurseryman in Baden Baden, Germany, began to take a particular interest in the genus *Kniphofia* and went to considerable trouble to import seeds and plants from South Africa. One of his most active helpers was Medley Wood in Durban. He regularly supplied specimens to Kew, on which Baker based several new species, including *K. leichtlinii* (from tropical Africa), *K. citrina*, *K. longicollis*, *K. rufa* and *K. tuckii*. Unfortunately, precise information regarding original localities of these introductions is usually lacking and they cannot always be matched exactly with naturally occurring plants. This applies particularly to the type specimens of *K. longicollis* and *K. rufa*.

1898. The species of tropical Africa were dealt with by Baker in *Fl. Trop. Afr.* 7: 450 (1898), in which 13 species of *Kniphofia* and 2 species of *Notosceptrum* were dealt with.

1908. The genera *Kniphofia* and *Notosceptrum* were monographed in their entirety by Alwin Berger, the German horticulturalist and botanist, in his monumental work on the Aloineae published in *Pflanzenreich* 4, 38: 31–72 (1908). Berger was Curator of the famous La Mortola Gardens in Italy from 1899 to 1918 and was particularly interested in succulent plants. Of 67 species and 13 varieties of *Kniphofia* recognized, 44 species and 13 varieties were recorded from South Africa, including three newly described species. Five species of *Notosceptrum* were upheld, of which three were South African.

Berger's work served an important purpose in bringing together the greater part of the information available at the time, including a comprehensive list of hybrids and garden cultivars. It is evident that he consulted the types represented in Berlin and Kew, covering most species, several of which he illustrated by means of black-and-white drawings. The descriptions of the species are carefully prepared and the full transcriptions of notes appearing on collectors' labels are often helpful. In those cases where no type material remains after the extensive damage to the Berlin Herbarium during World War II (e.g. *K. bachmannii*, *K. linearifolia* and *K. decaphebia*), the information in Berger's monograph is of particular value in interpreting the species.

Unfortunately, Berger's work suffers from two main weaknesses. Firstly, his nomenclature is, in several cases, not acceptable according to our present International Code. Examples may be seen in discussions under *K. buehneri* (p. 416), *K. breviflora* (p. 416), *K. parviflora* (p. 405) and *K. gracilis* (p. 427).

Secondly, he had no opportunity to study the plants in the field, while very scanty material apart from the type specimens was available to him, which makes his treatment unrealistic in several respects. Thus he shows no grasp of geographical distribution of species and little concept of the variation which occurs within a taxonomic group, resulting in too many "species" (among those known to him) being upheld on unreliable "differences". In practice, therefore, it is often difficult to name specimens according to Berger's treatment and it would seem as if his monograph had a stultifying effect on the progress of our knowledge of the genus. Since 1908, a considerable quantity of herbarium material has accumulated in South African herbaria, but little constructive taxonomic work was undertaken until after World War II.

From 1947 to 1952, Miss Eileen A. Bruce (see Fig. 51, p. 452), previously of the Herbarium of the Royal Botanic Gardens, Kew, was employed at the National Herbarium, Pretoria, and started a revision of the South African *Kniphofia* species. She came to South Africa with a sound background of taxonomic research and set about her studies with typical enthusiasm and energy, being determined to see as many species as possible in their natural habitats. After her return to Kew in 1952, she found it necessary to relegate her *Kniphofia* studies to periods of spare time between work on other groups for the Flora of East Tropical Africa and, unfortunately, her career was cut short by her untimely death in 1955. Three species which she recognized as new, and for which she had drawn up descriptions, were published posthumously in *Flowering Plants of Africa*, Vol. 30 (1955). They are: *K. splendida* E. A. Bruce, *K. coralligemma* E. A. Bruce and *K. rigidifolia* E. A. Bruce.

As I had been associated with Miss Bruce in many of her field excursions in my capacity as Officer in Charge of the Botanical Survey Section and had continued to co-operate in her *Kniphofia* studies after her return to Kew, it was fitting that I should continue with the revision of the genus. Several additional species have been illustrated in *Flowering Plants of Africa* since 1955, including some new to science, while a review

of the Transvaal species appeared in Wild Flowers of the Transvaal by Cythna Letty (1962). After the criticisms directed at Berger, it must be confessed that, in the last-mentioned publication, the plant with the robust inflorescence illustrated under the name *K. praecox* Bak. should, in fact, be called *K. linearifolia* Bak.

While it is felt that the identity of *K. praecox* has been established (p. 370), it should be realised that there are still many problems which have not been satisfactorily dealt with, and for which much more field work is necessary than could be allocated during the present revision. The eastern Cape Province, in particular, is of interest because here a complicated interaction is found between complexes of *K. uvaria*, *K. rooperi*, *K. linearifolia* and their allies. Intensive studies are required of variation within populations and between neighbouring populations of this group of species before a satisfactory classification can be achieved. Also, more extensive and thorough collecting is required in order to ensure that a good representation of the distribution of each species is obtained. Similarly, in Natal, an attempt should be made to analyse the variation now included within *K. gracilis*, while closer study is required of the interactions within the *K. rufa*—*K. ichopensis* and *K. linearifolia*—*K. tysonii* complexes. The present revision should, therefore, be regarded essentially as a framework for further study.

TAXONOMIC VALUE OF CHARACTERS

Root System. The subterranean part of the plant consists of a thick rhizome from which arise numerous somewhat fleshy roots. In most species the rhizome divides, forming groups of stems, while in others the stems are more or less solitary. In *K. sarmentosa*, slender rhizomes 4–10 cm long arise from the main, thick rhizome, so that new shoots may arise at a short distance from the parent plant.

Stem. The great majority of species do not produce an aerial stem, but exceptions occur and stems are usually to be seen on old plants of *K. caulescens* and *K. northiae*, reaching to a height of 30 cm in the former and 60 cm or more in the latter.

Leaves. All species of *Kniphofia* have non-succulent leaves and this is a useful character for separating them from the closely related genus *Aloe*. Leaf characters are also useful in recognising species, and variation may be seen in (a) arrangement of leaves and whether erect or spreading; (b) shape, e.g. length, breadth, cross section; (c) texture and colour; and (d) character of leaf margin. These characters are elaborated below.

(a) *Arrangement.* The leaves may or may not be arranged in distinct ranks. A distichous arrangement is to be seen in *K. typhoides*, *K. brachystachya* and *K. ichopensis* but, when distinct ranks are visible in the broader-leaved species, there are usually 4 or 5, as in *K. rooperi* and allied species, and in *K. multiflora*. In some species the leaves are spreading arcuate or recurved, e.g. *K. drepanophylla* and *K. citrina*, but in the great majority of species the leaves are erect at first, later sharply bent (kneed) at or below the middle due to their relatively flaccid texture. In *K. stricta* the leaves remain rigidly erect.

(b) *Shape.* Length and breadth (especially the latter) are useful diagnostic characters, but are liable to be affected by habitat factors, for example cultivation, and so allowance must be made for this when dealing with cultivated plants. The leaves die down annually (except in species such as *K. northiae*) and are produced again in spring in clusters at the end of each growing point, from 6 to 16 leaves, appearing in such a cluster. The extreme outermost of these leaves are often broad scale-like structures and may be ignored; measurements should be taken from those outer leaves (of which there may be 3 to 8) which develop more or less to their maximum

length. In the centre of the cluster, the leaves become shorter and narrower to more or less filiform, and these should also be ignored for diagnostic purposes. The peduncle arises in the centre of the leaf-cluster and, in early-flowering varieties, usually rapidly overtops the leaves. The cross section of the leaf may also be diagnostic. In most species the leaves have a distinct keel to the leaf, in which cases the keel forms the base of a broad or shallow V in cross section. Exceptions are *K. stricta* (U-shaped) and *K. northiae* (broadly U-shaped to almost flat). The depth to which the leaf is channelled on the upper surface also varies in different species. In some with very narrow leaves there may be practically no channel above, so that the cross section is an inverted triangle.

(c) *Texture and colour.* These characters are not easy to define and are usually omitted from collectors' notes. Texture varies from the soft, flaccid leaves of *K. sarmentosa* and *K. porphyrantha* to the fibrous, rigid leaves of *K. stricta* and *K. uvaria*. When the leaves die down annually, the bases of the leaves may break into separate fibres which persist at the base of the plant in several species. Leaf colour varies from yellow-green to milky-glaucous. Texture can usually be recognized in the Herbarium but colour, although conspicuous in living plants, is not easily detected in dried specimens.

(d) *Leaf Margin.* The leaf margin, and often the keel also, may bear minute teeth (serrulations), which are characteristic for certain species. Other species have consistently smooth-margined leaves. There are also several species in which the character is not constant, especially when the teeth are few and scattered (sometimes only towards the apex of the leaf, or present on some leaves and absent on others). The leaf surface is glabrous in all except one species, namely, *K. hirsuta*, although *K. stricta* may occasionally have small papilla-like outgrowths on the main nerves as well as on the margin.

Peduncle. Length and stoutness of peduncle are reasonably characteristic for particular species but have little diagnostic value except, possibly, in the case of *K. multiflora*, which has a long scape 1.5–2 m in length and a markedly elongate inflorescence, making it the tallest member of the genus in South Africa (2–3 m tall). The shortest species is probably *K. brachystachya* with a peduncle about 30 cm long. The peduncle projects above the leaves in the great majority of species (in many of which the leaves are equally long, but are bent downwards), one of the exceptions being *K. latifolia*. In this species the broad, erect leaves overtop the inflorescence at the flowering stage, but the peduncle elongates exceeding the leaves at the fruiting stage. The peduncle is normally simple but branched peduncles are occasionally found in *K. tabularis*.

Inflorescence. (a) *Shape and density.* The shape of the inflorescence is a useful species characteristic, best observed in living plants, where an impression of average shape can be obtained. In the herbarium this is not always easy, and odd or abnormal inflorescences, collected deliberately or through being the only one available, may cause difficulty. The inflorescence varies from narrowly cylindrical (markedly elongate in *K. multiflora*) through narrowly ovoid and ovoid to globose or even subcapitate (for example in some specimens of *K. drepanophylla*). As flowering progresses, an inflorescence may change in shape from ovoid (conical at the apex), through rhomboid to obovoid. In the descriptions of each species the shape is indicated at approximately the mid-flowering stage, when about half the flowers in the inflorescence have opened. Length and diameter (in herbarium specimens this is measured as width) should be measured at this stage. The reliability of these figures obviously depends on the material available and the efficiency with which the specimens have been prepared. While in most species the flowers are densely placed, often densely overlapping so that the rachis is not visible, in other species the flowers are fewer per unit length and may be

widely spaced (as in *K. pauciflora*, *K. rufa* and *K. tabularis*). Variation in density may be found within certain species, such as *K. gracilis*, *K. laxiflora* and *K. ichopensis*. Normally the buds are more densely placed than the open flowers, due to the elongation of the rhachis as flowering progresses but, in certain species, the apex of the inflorescence may be more lax than the central or lower portion.

(b) *Colour*. In general the buds and unopened flowers tend to be more intensely pigmented than the open flowers. This is to be seen in the commonly cultivated Redhot Pokers in which the apex of the inflorescence (buds and young flowers) is brilliant scarlet in colour, grading down to the yellow or orange-yellow flowers towards the base of the inflorescence. This pattern may be observed in many species, although the red pigment may vary in intensity and colour, or be lacking, while the flowers may be yellowish to yellow-green. In several species, on the other hand, the inflorescence may be more or less concolorous. In one group of species, consisting of *K. evansii*, *K. triangularis* (together with its subspecies) and a colour form of *K. rufa*, the inflorescence is more or less uniformly coral-red in colour, a fact which may be used in separating these from closely allied plants. Some species have white or yellow flowers, which are slightly more pigmented or sometimes tinged with red at the apex of the inflorescence. Among these may be listed *K. albescens*, *K. buchananii*, *K. fibrosa* and *K. crassifolia* (always white); *K. brevifolia*, *K. ensifolia*, *K. gracilis* and *K. multiflora* (white or yellow-flowered forms); *K. acraea*, *K. brachystachya* and *K. pauciflora* (pale yellow); *K. parviflora* (greenish brown); while in two species the flowers are chocolate-brown, namely *K. typhoides* and *K. umbrina*.

(c) *Scent*. Although in the description of *K. uvaria*, the first species known in Europe, Linnaeus repeats references by earlier authors to the "foetid" flowers of this species, it must be accepted (see p. 373) that this reference became accidentally transferred from another plant (*Stapelia variegata*) to the *Kniphofia*. The great majority of *Kniphofia* species, including *K. uvaria*, may be described as having scentless flowers. However, a faintly sweet scent is found in certain species, all of which have short, yellow or brownish flowers, and which form a closely related group, namely *K. brachystachya*, *K. parviflora*, *K. typhoides* and *K. umbrina*.

(d) *Flowering sequence*. In all South African species, flowering progresses from the base of the inflorescence upwards (acropetal), with the exception of an occasional freak inflorescence which may start at the apex (basipetal). N. E. Brown, in Gardener's Chronicle of January 25th (1910), p. 35, records an inflorescence of this kind. However, in Ethiopia, at least two species, namely *K. pumila* (Ait.) Kunth (= *K. comosa* Hochst.) and the closely related *K. isoetifolia* Engl., may flower in either basipetal or acropetal sequence. An investigation of the underlying causes for this should make an interesting study.

(e) *Flowering Time*. Each species has a relatively constant flowering season. Abnormal weather conditions may cause occasional flowers to appear at unusual times but, in general, flowering of a particular species may be predicted to within a few weeks. Exceptions are *K. rooperi*, which is one of the few winter-flowering species but which has an extended flowering period from about May to November, and *K. uvaria*, which may flower at almost any time of the year depending on veld fires. Cultivated plants, especially during the first year they are brought into cultivation, may deviate from their normal flowering times but, once established, they usually settle down to a regular cycle corresponding approximately to the species in the wild state. In Table I the main flowering times are indicated for each species (x = main flowering season; o = occasional flowers recorded). If used in conjunction with the key based on morphological characters, this table may assist with the identification of specimens collected in the wild state. As nearly all species are dormant in winter, the months are listed from July to June.

TABLE 1.—Flowering times of *Kniphofia* species

Month	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.
<i>K. multiflora</i>								x	x	x		
<i>K. parviflora</i>		o	o	o	o	o	x	x	x	o		
<i>K. acraea</i>							x	x	x			
<i>K. umbrina</i>								x	x			
<i>K. typhoides</i>								x	x	x		
<i>K. brachystachya</i>					x	x						
<i>K. buchananii</i>				o	o	o	o	x	x	o		
<i>K. breviflora</i>				o	o	o	x	x	x			
<i>K. albescens</i>							x	x	x			
<i>K. flammula</i>					x	x	x					
<i>K. evansii</i>							x	x				
<i>K. fibrosa</i>								x	x			
<i>K. gracilis</i>							x	x	x	x		
<i>K. laxiflora</i>								x	x	x	x	
<i>K. ichopensis</i>					x	x	x	x				
<i>K. rufa</i>					x	x	x	x				
<i>K. pauciflora</i>			o	x	x							
<i>K. tabularis</i>						x	x					
<i>K. ensifolia</i>												
subsp. <i>ensifolia</i>				x	x	x						
subsp. <i>autumnalis</i>							x	x				
<i>K. splendida</i>							x	x				
<i>K. praecox</i>												
subsp. <i>praecox</i>					x	x						
subsp. <i>bruceae</i>										x	x	
<i>K. coralligemma</i>								x	x	x		
<i>K. caulescens</i>					o	o	x	x	x	x		
<i>K. ritualis</i>							o	x	x			
<i>K. hirsuta</i>							x	x				
<i>K. stricta</i>							x	x	x			
<i>K. northiae</i>			o	o	o	x	x	x				
<i>K. triangularis</i>												
subsp. <i>triangularis</i>							x	x	x	x		
subsp. <i>obtusiloba</i>							x	x	x	x		
<i>K. thodei</i>					o	x	x	o	o			
<i>K. galpinii</i>							o	x	x			
<i>K. porphyrantha</i>				x	x	x	x	x				
<i>K. fluviatilis</i>					x	x	o	o				
<i>K. littoralis</i>		x	x	x								
<i>K. elegans</i>	x	x	x	x								
<i>K. drepanophylla</i>		x	x	x								
<i>K. baurii</i>			x	x	x							
do. (late flowering form).....						x	x	x				
<i>K. latifolia</i>				x	x							
<i>K. rigidifolia</i>			x	x								
<i>K. rooperi</i>	x	x	x	x	o			o	o	o	o	x
<i>K. citrina</i>								x	x	x	o	o
<i>K. uvaria</i>				x	x	x	o	o	o	x	x	o
<i>K. linearifolia</i>						o	x	x	x	o		
<i>K. tysonii</i>												
subsp. <i>tysonii</i>							x	x	x			
subsp. <i>lebomboensis</i> ..							o	x	x	o		

Bracts. *Sterile bracts* are often found as a small coma at the apex of the inflorescence. Also, below the inflorescence, occasional sterile bracts are produced which may be broadly deltoid to long-caudate, almost leaf-like structures. Although accorded some importance by certain authors, sterile bracts do not appear to have much taxonomic significance.

Fertile bracts, each of which subtends a flower in the inflorescence are, on the other hand, useful diagnostic characters in many cases. Although small and requiring a lens for adequate study, they show characteristics of shape which are relatively constant for a particular species. They are thin-textured, chartaceous structures, somewhat concave on the upper surface, varying in colour from white to brownish. The brown coloration occurs mainly at the apex and along the median nerve. Usually only one nerve is present but, in a few species (chiefly in the *K. uvaria* complex), the bracts towards the base of the inflorescence may have 3 or 5 nerves. In shape, the bracts vary from subrotund or ovate to linear-lanceolate, with the apex varying from rounded to long-acuminate. Cultivation may result in an increase in the length of the bracts, but the shape (and particularly the shape of the apex) remains fairly constant. As in the leaf margin, the margins of the bracts vary from entire to serrulate or irregularly toothed (eroso-denticulate).

Pedicels. Pedicel length, which should be measured at anthesis, does not vary a great deal, but can be useful in separating species such as *K. uvaria* (L.) Hook. (pedicels 3-6 mm) and *K. linearifolia* Bak. (pedicels 0.5-3 mm). The longest pedicels are found in *K. praecox* Bak. (up to 10 mm). The bracts and pedicels are persistent. If the ovary is not fertilized, the ovary and perianth are soon shed, in which case the pedicel does not elongate. If the ovary develops into a fruit, the pedicel elongates slightly and carries the fruit in a horizontal or ascending position.

Perianth. *Length.* The perianth consists of a tubular portion which varies in length from about 1.5 to 50 mm, with six equal lobes which vary scarcely at all (1.5-3 mm in length) between species. The width of the tube at the base is also fairly constant (1.5-3 mm). Perianth length can often be used as a diagnostic character though, in cultivated plants, it is less reliable than in naturally occurring plants.

(a) *Shape.* In the majority of species the perianth tube is subcylindrical. Exceptions are to be found in those species (a) with very short perianths (1.5-3 mm long and 1.5-2.5 mm in diameter) in which the tube may be described as sub-campanulate; and (b) in which the tube expands noticeably from about the middle, resulting in a relatively funnel-shaped tube.

(b) *Lobes.* The perianth lobes are relatively constant in size throughout the genus, rarely exceeding 3 mm in length so that, in species with very short perianth tubes, the lobes may be as long as the perianth tube, or even exceed it. It was on such species that the genus *Notosceptrum* Benth. was based, but there is a complete gradation from long to extremely short perianth tubes so, in the present revision, *Notosceptrum* is not upheld as a distinct genus. The lobes tend to spread more in some species than in others and this led Berger (1908) to create a section *Obtusilobae* to accommodate a group of species (see *K. triangularis*, p. 468) with this characteristic.

Fruit. The 3-locular, capsular fruit is a generic characteristic which varies a little in size and, in outline, from subglobose to 3-angled (triquetrous). In general, the fruit has little diagnostic value and, in fact, is rarely available to the herbarium worker. *K. littoralis* Codd (p. 478) has relatively large, acute capsules up to 10 mm long, which assist in separating this species from its allies, *K. baurii* Bak. (p. 482) and *K. elegans* Codd (p. 480). Seeds have not been thoroughly studied and are seldom available in the herbarium. Those that have been examined have not shown distinctive characteristics of taxonomic value.

NATURAL AND GARDEN HYBRIDS

All species investigated have $2n = 12$ chromosomes and it is evident that hybrids are readily formed when two or more species flower together in a garden. N. E. Brown makes a timely reference to this in the *Gardeners' Chronicle* 56: 410 (1914)

when he says: "Indeed, from the investigations I have made, I am of the opinion that in a very great majority of cases plants of this genus raised from seed produced in any garden where more than one kind is grown, whether that garden be in South Africa or Europe, will not be true to name, but will be more or less affected by hybridization, unless precaution has been taken to fertilize the plant with pollen of the same species and to exclude all insect visitors".

Unfortunately, species were frequently described in Europe from cultivated plants and there is evidence that the types of the following species are of hybrid origin: *K. longicollis* Bak., *K. primulina* Bak. and *K. rufa* Bak. Many new cultivars have been produced by horticulturalists, and Berger (1908) provides an extensive list of those found in European gardens, with an indication of their parentage, when known.

Two hybrid Redhot Pokers are commonly found in South African gardens. One of these flowers in summer and has relatively narrow, dull-green, erect leaves. It is near to *K. praecox* and is illustrated on p. 447. The other flowers in winter and has broad, yellow-green, flaccid leaves. It is possibly the var. *serotina* listed by Baker in Flora Capensis under "*K. aloïdes*" but, as no type specimen has been traced, its identity is uncertain.

In nature, where it is found that one species grades into another, it may be assumed that hybridization has contributed to the presence of intermediates and will continue to do so while neighbouring populations flower at approximately the same time. Hybrids between widely different species are rare, probably because when more than one species occurs in an area they either do not flower together or are separated by different habitat requirements. The following few specimens may be regarded with a fair degree of certainty as being hybrids between the species indicated, the supposed parents being listed in alphabetical sequence.

E. evansii × *K. porphyrantha*: Trauseld 741 from Giants Castle Game Reserve, Estcourt District, Natal.

K. ensifolia subsp. *autumnalis* × *K. linearifolia*: Jacobsz s.n. from Rensburgskop and Codd 10529 from Kerkenberg, both localities being in Harrismith District, O.F.S.

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- National Botanic Gardens, Kirstenbosch.
- Natal Herbarium, Durban.
- State Herbarium, Stellenbosch.
- Natural History Museum, Stockholm.
- Instituut für Systematische Botanik, Zurich.

The internationally accepted abbreviations for herbaria (Index Herbariorum) are given after all type specimens which have been seen but, in citing specimens in the text, a herbarium abbreviation is added only in those cases where the gathering is not represented in the National Herbarium, Pretoria.

I am particularly grateful to Miss M. D. Gunn, Librarian of the Institute, for much historical information regarding early botanical collectors and literature.

KNIPHOFIA

Kniphofia Moench, Meth. 631 (1794); Kunth, Enum. 4: 551 (1843); Hook. in Bot. Mag. t.4816 (1854); Bak. in J. Linn. Soc. 11: 360 (1871); Benth. & Hook. f., Gen. Pl. 3: 775 (1883); Bak. in J. Bot. Lond. 23: 275 (1885); Engl., Pflanzenfam. 2: 5 (1888); Dur. & Schinz, Consp. Fl. Afr. 5: 291 (1895); Bak. in Fl. Cap. 6: 275 (1896); Fl. Trop. Afr. 7: 450 (1898); Berger in Pflanzenr. 4, 38: 31 (1908); Marloth, Fl. S. Afr. 4: 102 (1915); Krause in Pflanzenfam. 15a: 299 (1930); Phillips, Gen. S. Afr. Flow. Pl. ed. 2: 185 (1951); Letty, Wild Flows. Tvaal. 32 (1962). Type species: *K. uvaria* (L.) Hook.

Aloe L., Sp. Pl. 1: 323 (1753), partly; Mill., Dict. ed. 8: n.23 (1768), partly.

Aletris L., Mant. Pl. 367 (1771), partly; Ait., Hort. Kew. 1: 464 (1789), partly.

Veltheimia sensu Willd., Sp. Pl. 2: 182 (1799), partly; Thunb., Fl. Cap. ed. Schult. 309 (1823).

Tritoma Ker Gawl. in Bot. Mag. t.758 (1804); Ait.f., Hort. Kew. ed. 2, 2: 290 (1811).

Tritomanthe Link., Enum. Pl. 1: 333 (1821); Schult. in Roem. & Schult., Syst. Veg. 7: 631 (1829).

Tritomium Link, Handb. 1: 170 (1829).

Rudolphoroemeria Steud. ex Hochst. in Flora 27: 30 (1844).

Triclissa Salisb., Gen. Pl. 75 (1866).

Notosceptrum Benth. in Benth. & Hook.f., Gen. Pl. 3: 775 (1883); Engl. in Pflanzenfam. 2: 5 (1888); Dur. & Schinz, Consp. Fl. Afr. 5: 291 (1895); Bak. in Fl. Cap. 6: 285 (1896); Fl. Trop. Afr. 7: 454 (1898); Berger in Pflanzenr. 4, 38: 69 (1908); Krause in Pflanzenfam. 15a: 300 (1930); Phillips, Gen. S. Afr. Flow. Pl. ed. 2: 185 (1951).

Plants perennial, herbaceous, caespitose or solitary from a thick rhizome, rarely with a well-developed stem; rhizome simple or branched. *Leaves* rosulate, usually in 4 or 5 ranks, rarely distichous, linear, tapering gradually to the apex, usually keeled; margin smooth to minutely serrulate. *Peduncle* terminal, stout, erect, subequal to the leaves, simple or very rarely branched, naked except for occasional sterile bracts below the inflorescence. *Inflorescence* a subspicate raceme of, usually, numerous flowers, dense or somewhat lax; bracts scarious, persistent, longer than the pedicels; pedicels short to almost obsolete, articulated at the apex; flowers spreading or pendulous, white, yellow, brownish or various shades of red, the red pigment often more conspicuous at the apex producing a bicolorous appearance. *Perianth-tube* campanulate to cylindrical or somewhat funnel-shaped, varying in length from 1.5–45 mm, lobed; lobes short, subequal, 1.5–5 mm. *Stamens* 6, hypogynous, usually as long as or longer than the perianth at anthesis, the 3 stamens opposite the inner segments longer than the others; anthers dorsifixed, versatile, dehiscent introrsely. *Ovary* sessile, ovoid, 3-chambered, with many ovules in each chamber; style filiform, subequal to the stamens at anthesis, usually finally exerted; stigma minute, capitate. *Fruit* globose to ovoid, often triquetrous with loculicidal dehiscence. *Seed* somewhat flattened, acutely 3-angled or winged; endosperm fleshy.

A genus of about 70 species distributed essentially in eastern and southern Africa, with one species in Madagascar and one in southern Arabia. In South Africa, 45 species are recognized (four of which are subdivided into subspecies), and are found mainly along the mountain ranges and in moist places. No species have been recorded from South West Africa or Botswana.

The status of the genus *Notosceptrum* Benth. was discussed in Bot. Notiser 120: 53 (1967), and it was concluded that insufficient grounds existed for maintaining it as distinct from *Kniphofia* L. The South African species *K. multiflora* (see p. 402) provides some basis for this conclusion. Although it has a markedly elongate inflorescence with ascending flowers, as in typical *Notosceptrum* species, the perianth is cylindrical, 7–12 mm long (as in *Kniphofia*), not campanulate nor deeply lobed as in *Notosceptrum*. Some grounds may be adduced for upholding *Notosceptrum* as a subgenus based on its distinctive facies, in which case *K. multiflora* would be accom-

modated in this subgenus. However, no worthwhile objective can be seen in such a step. Nor can any great advantage be seen in separating *Kniphofia* into sections as was done by Berger in his monograph (l.c.). Many of the affinities between species as indicated by Berger appear to be sound, though a good deal of recasting of sections would be necessary in order to produce reasonably satisfactory subdivisions.

In the outline given below, the South African species are grouped into sections according to their probable affinities which provide the basis for the sequence of species in the present revision.

Sect. 1. Plants of robust stature; leaves broad; *inflorescence markedly elongate*; flowers very numerous, short, *ascending*. (Sect. *Multiflorae* Berger, l.c. p. 44).

1. *K. multiflora* Wood & Evans, p. 400.

Sect. 2. Plants of small to medium stature; inflorescence very dense to medium-lax, *greenish-yellow to dark brown*; *flowers very short, often scented*. (Sect. *Parviflorae* Berger, l.c. p. 38, partly, and genus *Notosceptrum* sensu Berger, l.c. p. 69, partly).

2. *K. parviflora* Kunth, p. 403.
3. *K. acraea* Codd, p. 405.
4. *K. umbrina* Codd, p. 406.
5. *K. typhoides* Codd, p. 407.
6. *K. brachystachya* (A. Zahlbr.) Codd, p. 410.

Sect. 3. Plants of fairly small stature with *narrow, grass-like leaves*; inflorescence *small, dense, white to yellow* (red at the apex in *K. flammula*); *flowers very short to medium*. (Sect. *Parviflorae* Berger, l.c. p. 38, partly, and Sect. *Pauciflorae* Berger, l.c. p. 41, partly).

7. *K. buechananii* Bak., p. 411.
8. *K. breviflora* Harv. ex Bak., p. 414.
9. *K. albescens* Codd, p. 417.
10. *K. flammula* Codd, p. 418.
12. *K. fibrosa* Bak., p. 422.
13. *K. crassifolia* Bak., p. 424.

Sect. 4. Plants of small to medium stature; leaves fairly narrow; *inflorescence lax*; flowers medium length to longish. (Sect. *Pauciflorae* Berger, l.c. p. 41, partly; Sect. *Modestae* Berger, l.c. p. 42; and Sect. *Laxiflorae* Berger, l.c. p. 50).

14. *K. gracilis* Harv. ex Bak., p. 424.
15. *K. laxiflora* Kunth, p. 428.
16. *K. ichopensis* Bak. ex Schinz, p. 433.
17. *K. rufa* Bak., p. 434.
18. *K. pauciflora* Bak., p. 438.
19. *K. tabularis* Marl., p. 438.

Sect. 5. Plants of medium to robust stature; leaves medium to broad; inflorescence very dense, often large, oblong; *bracts lanceolate, acuminate*; flowers medium-length to long, anthers conspicuously exerted in some species. (Sect. *Comosae* Berger, l.c. p. 44; Sect. *Densiflorae* Berger, l.c. p. 55, partly; Sect. *Uvaria* Berger, partly; and Sect. *Caulescentes* Berger, l.c. p. 65).

20. *K. ensifolia* Bak., p. 440.
21. *K. splendida* E. A. Bruce, p. 442.

- 22. *K. praecox* Bak., p. 444.
- 23. *K. sarmentosa* (Andr.) Kunth., p. 453.
- 24. *K. coralligenma* E. A. Bruce, p. 453.
- 25. *K. caulescens* Bak., p. 455.
- 26. *K. ritualis* Codd, p. 458.
- 27. *K. hirsuta* Codd, p. 460.

Sect. 6. Plants of medium to robust stature; leaves medium to very broad, *not distinctly keeled*; inflorescence very dense; bracts oblong to ovate-lanceolate; flowers fairly long. (Sect. *Aloifoliae* Berger, l.c. p. 65).

- 28. *K. stricta* Codd, p. 461.
- 29. *K. northiae* Bak., p. 464.

Sect. 7. Plants of small to medium stature with *narrow-leaves*; inflorescence dense, small, *concolorous, orange-red in colour*; bracts lanceolate, *acuminate*; flowers medium to longish; *perianth lobes spreading*. (Sect. *Pauciflorae* Berger, l.c. p. 41, partly, and Sect. *Obtusilobae* Berger, l.c. p. 53).

- 11. *K. evansii* Bak., p. 419.
- 31. *K. triangularis* Kunth, p. 468.

Sect. 8. Plants of medium to smallish stature with *narrow-leaves*; inflorescence dense, small, *bicolorous*; bracts lanceolate, *acuminate*; flowers long; perianth lobes not spreading. (Sect. *Uvaria* Berger, l.c. p. 56, partly).

- 30. *K. galpinii* Bak., p. 466.
- 32. *K. thodei* Bak., p. 472.
- 33. *K. porphyrantha* Bak., p. 473.
- 34. *K. fluviatilis* Codd, p. 476.

Sect. 9. Plants of medium to smallish stature; leaves of medium breadth; inflorescence dense, subglobose, *mainly spring-flowering*; bracts ovate, *obtuse*; flowers long. (Sect. *Isoetifolia* Berger, l.c. p. 46).

- 35. *K. littoralis* Codd, p. 478.
- 36. *K. elegans* Codd, p. 480.
- 37. *K. drepanophylla* Bak., p. 481.
- 38. *K. baurii* Bak., p. 482.

Sect. 10. Plants of medium to robust stature; *leaves medium to broad*; inflorescence dense, often large, globose to oblong-cylindrical, spring or *autumn-flowering*; bracts *ovate to ovate-oblong, obtuse*; flowers medium to long. (Sect. *Densiflorae* Berger, l.c. p. 55, partly, and Sect. *Uvaria* Berger, l.c. p. 56, partly).

- 39. *K. latifolia* Codd, p. 484.
- 40. *K. rigidifolia* E. A. Bruce, p. 487.
- 41. *K. rooperi* (Moore) Lem., p. 488.
- 42. *K. uvaria* (L.) Hook, p. 492.
- 43. *K. citrina* Bak., p. 497.
- 44. *K. linearifolia* Bak., p. 498.
- 45. *K. tysonii* Bak., p. 504.

KEY TO SPECIES

*Perianth less than 2 cm long:

Inflorescence elongate, 30–80 cm long; flowers 7–12 mm long, ascending.... 1. *K. multiflora*

Inflorescence less than 30 cm long; flowers spreading or pendulous:

Perianth 4–10 mm long:

Inflorescence secund..... 2. *K. parviflora*

Inflorescence not secund:

Flowers yellow-brown to fuscous, drying dark purplish-brown:

Bracts linear-lanceolate, acuminate; perianth 8–9 mm long..... 4. *K. umbrina*

Bracts ovate-deltoid to subrotund; perianth 4–6.5 mm long:

Inflorescence 15–30 cm long; leaves 35–65 cm long..... 5. *K. typhoides*

Inflorescence 4–9 cm long; leaves 15–28 cm long..... 6. *K. brachystachya*

Flowers yellow, cream or white, not drying dark purplish-brown:

Bracts broadly ovate, obtuse; leaves 10–15 mm broad, margin minutely denticulate
3. *K. acraea*

Bracts ovate-lanceolate, acute; leaves 2.5–6 mm broad, margin smooth:

Perianth 4–5.5 mm long..... 7. *K. buchananii*

Perianth 7–11 mm long..... 8. *K. breviflora*

Perianth 11–19 mm long:

†Inflorescence dense (occasionally medium-dense in *K. breviflora*):

Inflorescence white, cream or yellow (buds may be tinged with red):

Perianth not exceeding 15 mm in length:

Bracts ovate-lanceolate to linear-lanceolate, acute to acuminate:

Leaves 3–6 mm broad:

Perianth 7–11 mm long..... 8. *K. breviflora*

Perianth more than 11 mm long:

Leaf margin scaberulous to finely denticulate, often smooth towards the base;

perianth 12–15 mm long..... 12. *K. fibrosa*

Leaf margin conspicuously serrulate; perianth 15–18 mm long 13. *K. crassifolia*

Leaves 6–12 mm broad; perianth 11–15 mm long..... 9. *K. albescens*

Bracts ovate to ovate-oblong, obtuse to rounded..... 14. *K. gracilis*

Perianth exceeding 15 mm in length:

Bracts lanceolate to linear-lanceolate, acute to acuminate:

Leaves narrow, grasslike, 3–6 mm broad; plants of small stature with inflorescences 5–8 cm long..... 13. *K. crassifolia*

Leaves 10–35 mm broad; robust plants with inflorescences 10–30 cm long
20. *K. ensifolia*

Bracts ovate to ovate-oblong, obtuse to rounded:

Inflorescence oblong to elongate, 2.8–3.8 cm in diam..... 14. *K. gracilis*

Inflorescence globose to subglobose, 5–5.5 cm in diam..... 43. *K. citrina*

Inflorescence orange, red or scarlet (buds distinctly suffused with red):

Inflorescence 3–7 cm long (rarely to 10 cm and then concolorous, coral red); plants of small stature with narrow leaves 2–10 mm broad:

Stamens reaching the throat of the perianth tube at anthesis or slightly exerted;

inflorescence flame-red at the apex grading to yellow at the base.... 10. *K. flammula*

Stamens not exceeding half the length of the perianth tube at anthesis; inflorescence

concolorous, coral-red..... 11. *K. evansii*

Inflorescence elongate, 8–30 cm long; leaves 8–35 mm broad:

Leaves relatively rigid, usually exceeding 60 cm in length; leaf margin usually finely serrulate; bracts 6–10 mm long:

Inflorescence white (flowers rarely pale yellow), often suffused with red at the apex;

perianth 15–20 mm long..... 20. *K. ensifolia*

Inflorescence yellow to orange-red, deeper red at the apex; perianth 19–25 mm

long..... 21. *K. splendida*

Leaves milky-glaucous, flaccid, 30–65 cm long; leaf margin smooth; bracts 11–15 mm

long..... 23. *K. sarmentosa*

††Inflorescence lax:

- Bracts ovate to oblong, obtuse to rounded..... 14. *K. gracilis*
 Bracts lanceolate to linear-lanceolate, acute to acuminate:
 Inflorescence 10–30 cm long; perianth 19–30 mm long, in various colours (including yellow), not markedly expanded about the middle..... 17. *K. rufa*
 Inflorescence 3–10 cm long; perianth 14–18 mm long, yellow, distinctly expanded from about the middle to the throat..... 18. *K. pauciflora*

**Perianth exceeding 2 cm long:

Inflorescence lax, particularly in the lower part:

- Bracts ovate to ovate-oblong, obtuse:
 Perianth up to 21 mm long..... 14. *K. gracilis*
 Perianth 25–35 mm long..... 15. *K. laxiflora*
 Bracts ovate-lanceolate to linear-lanceolate, acute to acuminate:
 Perianth exceeding 30 mm in length..... 16. *K. ichopensis*
 Perianth up to 30 mm long:
 Leaves 2–5 (rarely –8) mm broad (Natal)..... 17. *K. rufa*
 Leaves 8–30 mm broad (S.W. Cape):
 Leaves 60–150 cm long, pendulous from cliff faces; pedicels 5–7 mm long 19. *K. tabularis*
 Leaves 30–60 cm long, erect; pedicels 1–3 mm long..... 23. *K. sarmentosa*

Inflorescence dense, especially in the lower part (sometimes ± lax towards the apex):

Leaves not keeled or V-shaped in cross-section:

- Leaves rigid, erect, U-shaped in cross-section, markedly ribbed, 0.8–1.4 cm broad 28. *K. stricta*
 Leaves spreading-arcuate, broad and relatively flat, 3–12 cm broad; plants often caulescent..... 29. *K. northiae*

Leaves keeled or V-shaped in cross-section:

‡Bracts lanceolate to linear-oblong, acute to gradually acuminate at the apex:

Stamens well exerted at anthesis and remaining exerted:

- Plants usually caulescent; leaves and bracts usually drying with a purplish tinge; inhabiting high mountain areas at 6,000 to 10,000 ft..... 25. *K. caulescens*
 Plants acaulescent; leaves not drying with a purplish tinge; at low to medium elevation, usually below 6,000 ft:

Pedicels 1–3 (rarely –4) mm long; perianth up to 24 (rarely –25) mm long:

- Plants spring-flowering; flowers whitish when open, often red in the bud stage
 20a. *K. ensifolia* subsp. *ensifolia*

Plants autumn-flowering; flowers whitish to yellow when open, often red in the bud stage:

- Leaves semi-glaucous, 2–3.5 cm broad; flowers whitish to lemon-yellow when open (eastern O.F.S.)..... 20b. *K. ensifolia* subsp. *autumnalis*

Leaves mid-green, 1–2 cm broad; flowers greenish-yellow to orange-yellow when open (eastern Transvaal and Swaziland)..... 21. *K. splendida*

Pedicels 4–10 mm long; perianth 24–30 mm long (Cape: Uniondale to Komga; hybrid derivatives often cultivated)..... 22. *K. praecox*

Stamens included or shortly exerted at anthesis, usually withdrawn later:

- Plants with peduncles 1–2 m tall..... 22. *K. praecox*

Plants of small to medium stature rarely exceeding 80 cm tall:

Leaves with margins serrulate for entire length:

Leaves less than 2.5 cm broad:

- Leaves 8–20 mm broad; inflorescence dull red at the apex, flowers usually greenish-yellow:

- Leaves glabrous..... 26. *K. ritualis*

- Leaves pubescent..... 27. *K. hirsuta*

- Leaves up to 6 mm broad; inflorescence concolorous, coral-red 31a. *K. triangularis* subsp. *triangularis*

- Leaves more than 2.5 cm broad..... 29. *K. northiae*

Leaves with margins completely smooth or with a few scattered teeth:

Perianth 20–25 mm long; inflorescence not concolorous coral-red in colour:

- Leaves 30–60 cm long and 8–30 mm broad; peduncle 25–45 cm long; inflorescence lax to medium-dense (western Cape)..... 23. *K. sarmentosa*

- Leaves 50–90 cm long, rarely exceeding 10 mm broad; peduncle 50–90 cm long; inflorescence dense (Transvaal)..... 24. *K. coralligemma*
- Perianth 26–50 mm long or, if shorter, then inflorescence concolorous coral-red:
- Leaves 2–6 mm broad:
- Leaves grass-like, fibrous in texture:
- Inflorescence concolorous coral-red in colour.... 31a. *K. triangularis* subsp. *triangularis*
- Inflorescence mainly scarlet, often yellowish at the base..... 30. *K. galpinii*
- Leaves soft-textured:
- Buds brownish-red at the apex, flowers white..... 32. *K. thodei*
- Buds red at the apex, flowers lemon-yellow; leaf margins completely smooth..... 33. *K. porphyrantha*
- Leaves 7–25 mm broad:
- Leaves soft-textured, rarely less than 8 mm broad:
- Perianth 28–40 (rarely –42) mm long:
- Inflorescence concolorous, coral-red.. 31b. *K. triangularis* subsp. *obtusiloba*
- Inflorescence bicolorous with a few red buds at apex, remainder of inflorescence lemon-yellow..... 33. *K. porphyrantha*
- Perianth 42–50 mm long..... 34. *K. fluviatilis*
- Leaves fibrous in texture, up to 8 mm broad; inflorescence scarlet in the upper half, yellow below..... 30. *K. galpinii*
- ††Bracts ovate to oblong or, rarely, lanceolate; apex rounded to acute:
- Flowering during the period July to November:
- Pedicels 2·5–6 mm long:
- Leaves more than 3 cm broad..... 29. *K. northiae*
- Leaves usually less than 3 cm broad:
- Leaves 1·5–3 cm broad, yellow-green, usually recurved-falcate with serrulate margins; inflorescence short, subglobose-capitate (Pondoland) 37. *K. drepanophylla*
- Leaves 0·6–1·5 cm broad, erect, dull to glaucous-green, erect with margins smooth or nearly so; inflorescence subglobose to oblong (W. Cape).... 42. *K. uvaria*
- Pedicels 1–2 mm long:
- Leaf margins smooth or with a few scattered teeth:
- Inflorescence more than 6 cm in diameter, globose; plants usually robust with peduncles 60–140 cm long, leaves 50–120 cm long and 15–40 mm broad (depauperate plants apt to be confused with *K. littoralis*, but then bracts not white and fruits small, subglobose)..... 41. *K. rooperi*
- Inflorescence 4–6 cm in diameter, globose to oblong; plants of small to medium stature with peduncles 25–65 cm long, leaves 15–70 cm long and 8–25 mm broad:
- Buds flame-red, flowers yellow; inflorescence globose; leaves relatively narrow, erect..... 36. *K. elegans*
- Buds dull red, flowers greenish-yellow; inflorescence subglobose to oblong; leaves medium-broad, erect or falcate:
- Bracts entire, white; leaves dark green, not glaucous; fruits large, ovoid, 8–10 mm long..... 35. *K. littoralis*
- Bracts eroso-denticulate; leaves glaucous to semi-glaucous; fruits subglobose, 5–8 mm long..... 38. *K. baurii*
- Leaf margins distinctly serrulate:
- Leaves erect:
- Leaves glaucous to dull green (eastern Cape and Natal):
- Leaves up to 2·5 cm broad..... 38. *K. baurii*
- Leaves usually more than 2·5 cm broad..... 39. *K. latifolia*
- Leaves yellow-green (mainly eastern Transvaal)..... 40. *K. rigidifolia*
- Leaves arcuate-spreading to falcate:
- Inflorescence usually less than 6 cm in diameter, globose to oblong; plants of small to medium stature with peduncles up to 60 cm long and leaves up to 50 cm long..... 38. *K. baurii*

- Inflorescence usually more than 6 cm in diameter, globose; plants usually robust with peduncles 60–140 cm long and leaves 50–120 cm long 41. *K. rooperi*
- Flowering during the period December to June:
- Pedicels 3–6 mm long:
- Leaves more than 2.5 cm broad..... 29. *K. northiae*
- Leaves less than 2.5 cm broad..... 42. *K. uvaria*
- Pedicels less than 3 mm long:
- Inflorescence globose or subglobose:
- Perianth 19–28 mm long; plants of small stature with small, globose inflorescences and well-exserted stamens..... 43. *K. citrina*
- Perianth exceeding 28 mm; plants of medium to robust stature with stamens scarcely exerted:
- Leaves distinctly tough and fibrous, usually glaucous, 6–15 (rarely –20) mm broad; eastern Cape, inland, usually rocky situations:
- Leaf margin distinctly serrulate..... 38. *K. baurii*
- Leaf margin smooth or with a few teeth towards the apex..... 42. *K. uvaria*
- Leaves not markedly tough, usually not distinctly glaucous, 15–40 mm broad:
- Leaves arcuate-spreading; mainly coastal, eastern Cape to southern Natal, usually in marshy situations..... 41. *K. rooperi*
- Leaves erect; inland, eastern Cape to Transvaal..... 44. *K. linearifolia*
- Inflorescence oblong, rhomboid or subcylindrical:
- Leaves usually arcuate-spreading, tough and fibrous, glaucous; plants of medium stature not exceeding 80 cm tall; inflorescence shortly oblong to subglobose:
- Leaf margin distinctly serrulate..... 38. *K. baurii*
- Leaf margin smooth or with a few teeth towards the apex..... 42. *K. uvaria*
- Leaves at first erect, later reflexed (kneed) about the middle, not arcuate, more or less flaccid; plants of robust stature often exceeding 90 cm tall:
- Perianth exceeding 28 mm in length (rarely less); stamens scarcely exerted; inflorescence large, oblong to rhomboid..... 44. *K. linearifolia*
- Perianth 20–28 (rarely –30) mm long; stamens usually markedly exerted; inflorescence oblong to subcylindrical..... 45. *K. tysonii*

1. *Kniphofia multiflora* Wood & Evans in J. Bot. Lond. 35: 353 (1897); Wood in Gard. Chron. 29: 56 (1901); Natal Pl. 3: t.206 (1900); Hook. f. in Bot. Mag. t.7832 (1902); Berger in Pflanzenr. 4, 38: 44, fig. 154 H–J (1908); Codd in Flow. Pl. Afr. 37: t.1445 (1965). Type: Natal, between Van Reenen and Nelson's Kop, Medley Wood 5972 (NH!, holo.; K!).

Plants robust, usually in groups. *Leaves* broad, linear, more or less in four ranks, 8–12 per peduncle, at first ascending, later reflexed, mid-green, 80–180 cm long and 2–4 cm broad, channelled above and deeply keeled; margin and keel serrulate with minute forward-pointing teeth. *Peduncle* over-topping the reflexed leaves, 80–160 cm long (excluding the inflorescence), usually with a few sterile deltoid bracts below the inflorescence. *Inflorescence* narrowly cylindrical, elongate, tapering gradually towards the apex, lax to medium-dense at the base, denser towards the apex, 30–80 cm long and 2.5–4.0 cm in diameter; buds and flowers ascending; buds greenish-white to orange-yellow tipped with red, becoming whitish to yellow as the flowers open. *Bracts* oblong-spathulate, 3.5–5.5 mm long, 1.5–2 mm broad near the base, acute to rounded at the apex, scariose with a median brown nerve, overlapping the buds when young, soon withering; margin minutely eroso-denticulate. *Pedicels* 1.5–4 mm long at flowering stage, elongating to 4–5 mm in fruit. *Perianth* shortly subcylindrical, slightly constricted above the ovary, 7–12 mm long and 2.5 mm wide at the base, increasing gradually to 3 mm wide near the apex; lobes ovate, 1.5 mm long, rounded, not spreading. *Stamens* 6, of different lengths, exerted at anthesis by 4–8 mm; anthers broadly oblong, 1.5 mm long. *Style* subequal to the anthers at anthesis, finally exerted by 10–12 mm. *Fruit* ovoid-triquetrous, 5–6 mm long. FIGS. 13, 14. PLATE I. MAP 1.

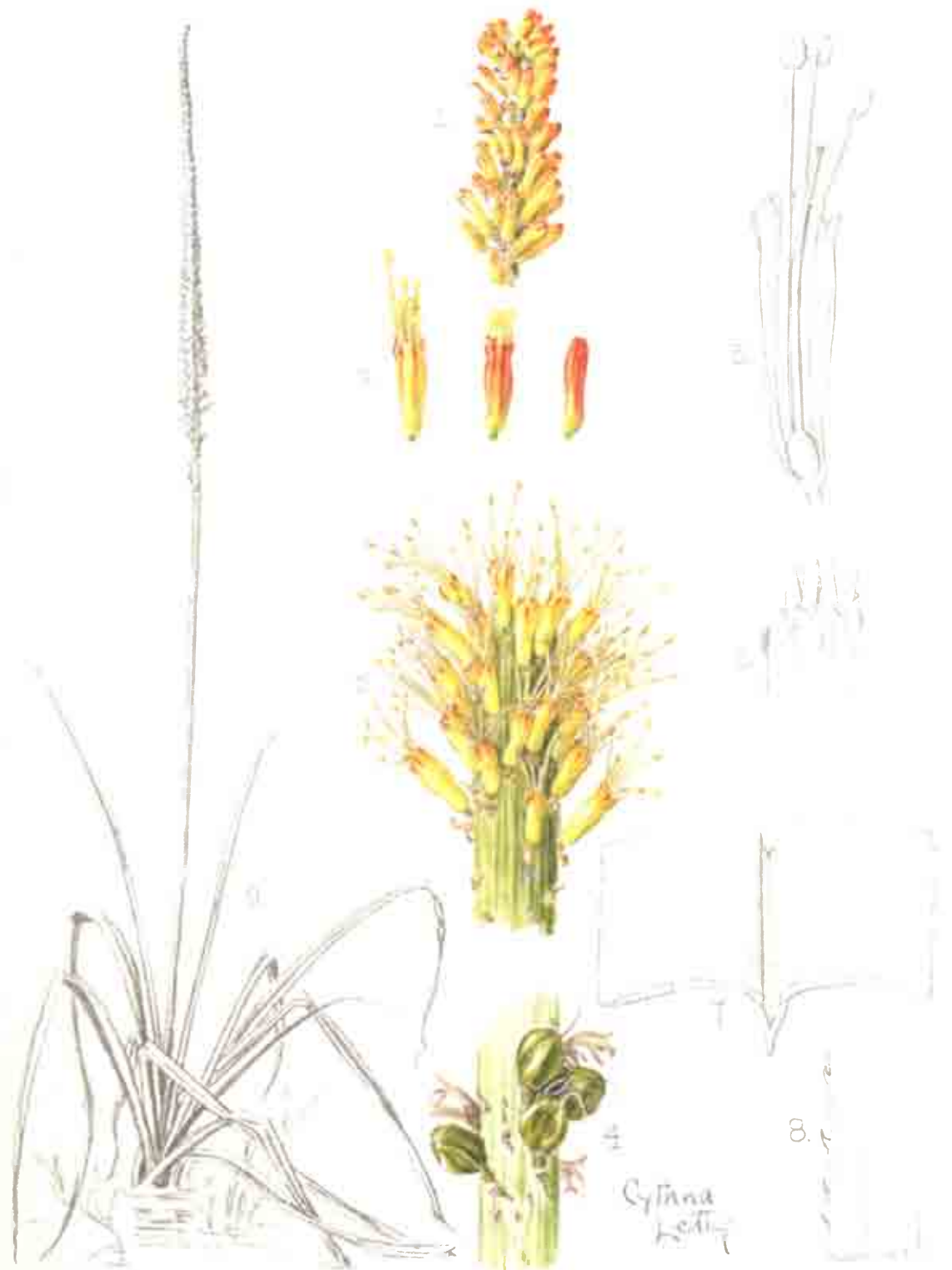


PLATE 1.—*Kniphofia multiflora* Wood & Evans

Distributed along the Drakensberg escarpment from Van Reenen and Harrismith in the south to northern Natal, Swaziland and eastern Transvaal, reaching its northernmost limit in the Soutpansberg. It grows in mountain marshes, vleis and streambanks, usually at altitudes of 4,000 to 6,000 ft. but, in the eastern Transvaal, it is found in vleis at altitudes as low as 2,500 ft. Flowering occurs from February to April.

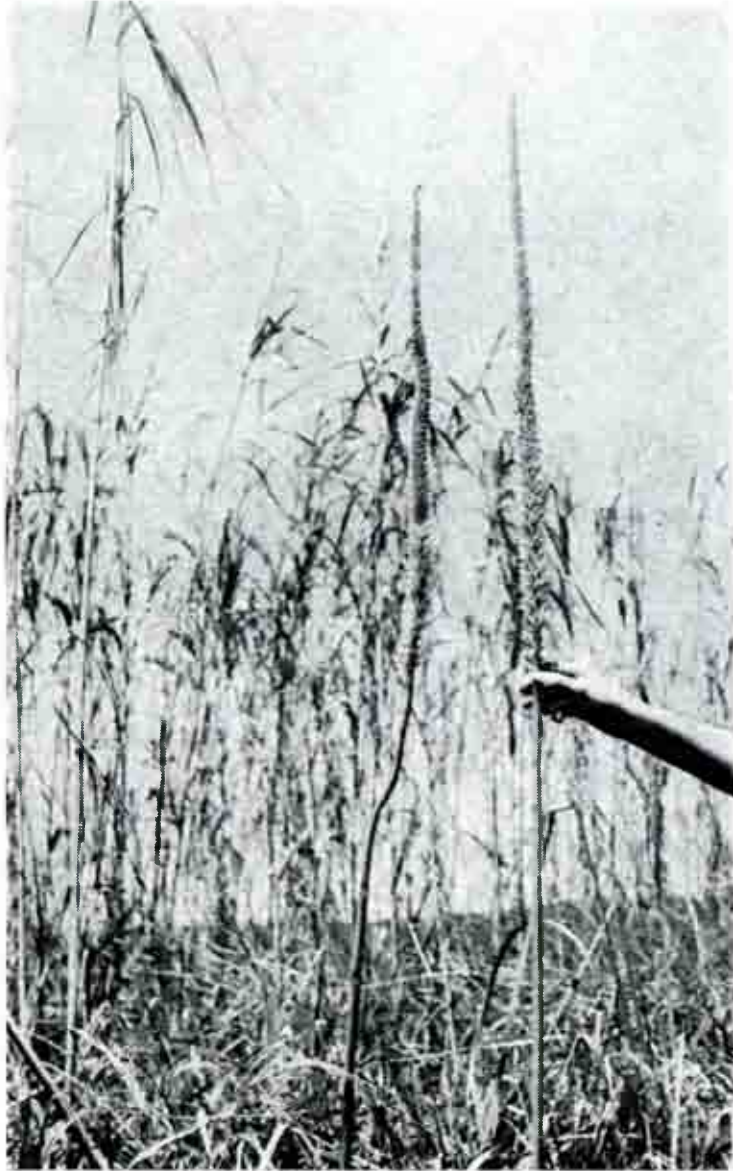


FIG. 13. *K. multiflora*, on Nelshoogte Forestry Station (Bruce 313).

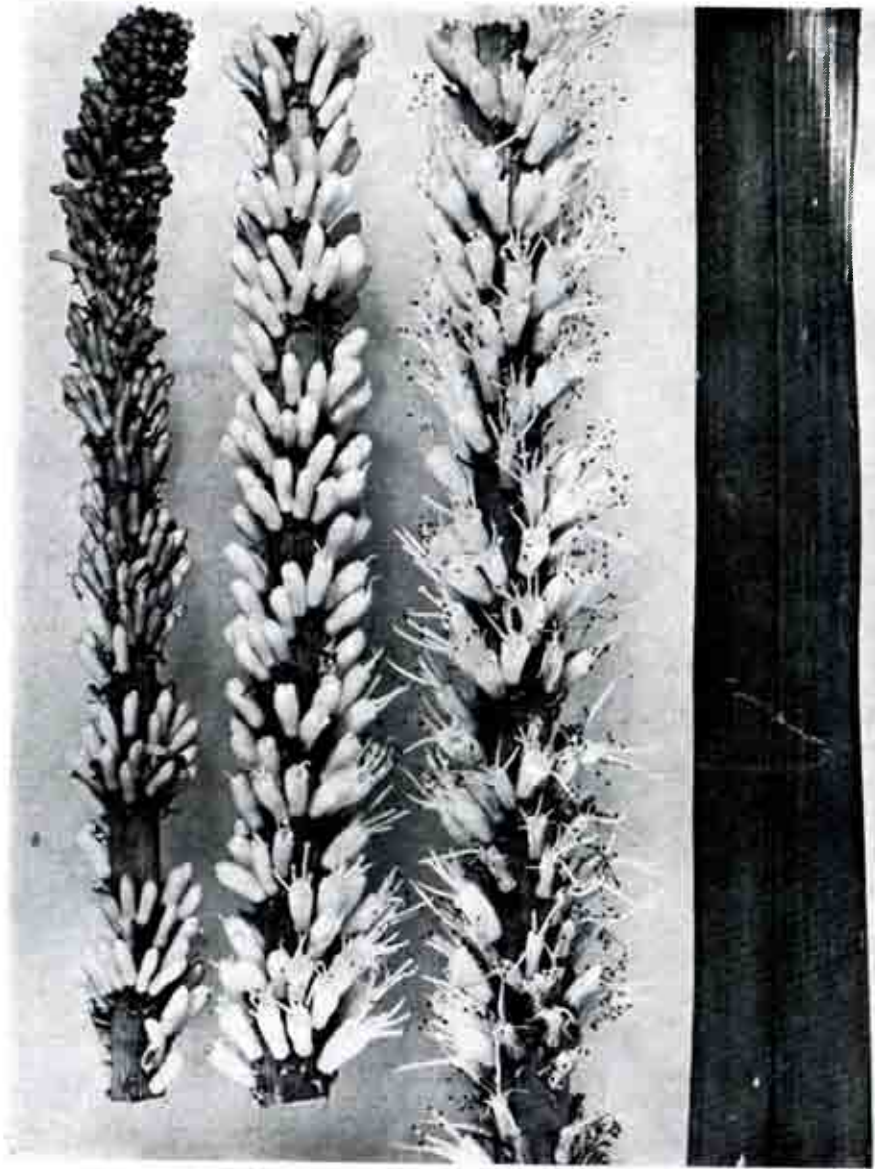


FIG. 14.—*K. multiflora*, inflorescence, $\times \frac{3}{4}$ (Bruce 313).

O.F.S.—Harrismith: Kerkenberg, *Jacobsz* 299.

NATAL.—Klip River: near Van Reenen, *Medley Wood* 5972 (K, NH); 6684. Utrecht: Altemooi, *Thode* s.n. (NH, STE); $3\frac{1}{2}$ miles S.E. of Groenvlei, *Codd* 6952. Vryheid: Kambula Mission Station, *Gerstner* 4326; 17 miles N. of Vryheid, *Bruce* 292; Pevaan Store, *Shirley* s.n. (NU).

SWAZILAND.—Goedgegun, *Nel* s.n.

TRANSVAAL.—Barberton: Nelsberg, 28 miles W. of Barberton, *Bruce* 313; *Codd* 10334; *Looke* s.n.; *Van der Merwe* 1671; *Van Balen* s.n.; Botha's Nek, near Nelshoogte Forestry Station, *Meeuse* 10089. Carolina: 6 miles N. of Carolina, *Adelaar* s.n.; 7 miles E. of Zevenfontein, *Codd* 10340. Letaba: near Tzaneen, Pigeon Hole Farm, *McCallum* in PRE 12466; near Duiwelskloof, *Scheepers* s.n. Nelspruit: Townlands, *Unkles* s.n.; Mtimba, *Cholmondeley* s.n.; Crocodilepoort Mt., 24 miles

E. of Nelspruit, *Codd* 7771. Pietersburg: Haenertsburg, *Thompson* s.n.; 2 miles S. of Houtbosch, *Bruce* 410. Pilgrims Rest: 3 miles W. of Acornhoek, *Codd* 7851; 10 miles E. of Graskop, *Codd* 10051. Soutpansberg: near Hangklip, *Meeuse* 10152. Wakkerstroom: *Thode* s.n.; Oshoek, *Devenish* 608.

Readily distinguished from other South African species by the exceptionally long, narrow inflorescence, 30–80 cm in length, and its tall stature, frequently reaching a height of 2 m or more. It exhibits two colour forms, which are associated with differences in distribution. In the south, from Van Reenen to Wakkerstroom, the typical form occurs with greenish-white buds and whitish to cream flowers. From the Carolina and Barberton Districts, northwards, the buds are orange-yellow, sometimes tinged with red, and the flowers on opening are pale to deep yellow. Otherwise the species is relatively constant throughout its range and therefore separate taxonomic status for the colour variant is not considered justified.

The flowers, unlike other species of *Kniphofia* in South Africa, do not become pendulous with age, but remain ascending. Its relationship to certain tropical species previously placed in a separate genus, *Notosceptrum*, is discussed on p. 394.

2. *Kniphofia parviflora* *Kunth*, Enum. Pl. 4: 553 (1843); *Bak.* in *J. Linn. Soc.* 11: 361 (1871); *J. Bot. Lond.* 23: 277 (1885); *Fl. Cap.* 6: 277 (1896); *Berger* in *Pflanzenr.* 4, 38: 40 (1908), excluding var. *albiflora* *Berger*. Type: Pondoland, hills between Umzimvubu and Umsikaba Rivers, *Drege* 4528 (K!, lecto.; G!).

K. modesta *Bak.* in *J. Bot. Lond.* 27: 43 (1889); *Fl. Cap.* 6: 277 (1896), partly, as to type, non *Bot. Mag.* t.7293. Type: East Griqualand, near Kokstad, upper slopes of Mt. Currie, Feb. 1884, *Tyson* 1418 (K!, holo.; PRE!, BOL!, GRA!, G!). *K. krookii* *A. Zahlbr.* in *Ann. Hof-Mus. Wien* 15: 14 (1900). Type: East Griqualand, Mt. Insizwa, *Krook* sub *Penther* 547 (W, holo.†; BOL!).

Plants usually solitary with a number of spreading, fleshy, cylindrical roots. *Leaves* 5–8 per peduncle, narrowly linear, at first ascending and later recurving, 20–75 cm long, 3–7 mm broad, keeled, nerves fairly distinct, breaking into numerous persistent fibres at the base; margin smooth or, rarely, sparingly serrulate; outer two leaves usually shorter and broader, clasping the base of the plant. *Peduncle* overtopping the recurved leaves, 25–80 cm long, with a few to several sterile bracts below the inflorescence. *Inflorescence* elongate oblong, secund, fairly lax, 6–28 cm long, 1.2–1.7 cm broad; buds ascending, flowers at first spreading and later pendulous; buds greenish-brown to maroon, flowers creamy-yellow, yellow, yellow-green to greenish, rarely suffused with dull red. *Bracts* ovate, usually broadest about the middle then narrowing abruptly to an acute to acuminate apex, 4–6.5 mm long, 2–2.5 mm broad, concave, pale brown with a dark brown central region; margin entire. *Pedicels* 1–2 mm long at flowering stage, elongating to 2.5–3 mm in fruit. *Perianth* cylindrical, sometimes slightly constricted above the ovary, 9–10 mm long, 2 mm broad at the base, scarcely increasing towards the apex; lobes ovate, 1 mm long, not spreading. *Stamens* of two lengths, the longest exerted by 1–2 mm at anthesis and later withdrawn into the perianth tube. *Style* equalling the anthers at anthesis and eventually exerted by 2–3.5 mm. *Fruit* subglobose, 5–6 mm long. FIGS. 15, 16. MAP 1.

Distributed from King William's Town District, through the Transkei, Pondoland, Tembuland and East Griqualand to the Polela District of southern Natal. Found in dense sourveld, usually on hillsides or, occasionally, in marshy places, from near sea level to 6,000 ft. altitude. The main flowering time is January to March, but occasional specimens are recorded in flower in August, September, November and December.

CAPE.—Without locality: *Mrs. Barber* (GRA). Bizana: 2 miles W. of Bizana, *Acocks* 13363. Elliot: 15½ miles N.E. of Engcobo, *Marais* 1382. Engcobo: near Engcobo, *Reynolds* 2503; Engcobo Mt., *Bolus* 10335 (BOL); *Flanagan* 2712; 3½ miles from Engcobo on road to Cala, *Bruce* 559; 9½

miles from Engcobo on road to Cala, *Bruce* 560; 4 miles from Engcobo on road to Elliot, *Marais* 1388. Keiskammahoe: Cata Forestry Station, *Bruce* 550; Hogsback, *N. R. Smuts* s.n. Kentani: Sept. 1902, *Pegler* 851; 1906, *Pegler* 851 (GRA); Nov. 1911, *Pegler* 851. King William's Town: slopes of Mt. Kemp, *B. H. Dodd* sub Galpin 8032; near Evelyn Valley Forestry Station, *Bruce* 547; Komga: near Kei Mouth, *Flanagan* 1805. Lusikisiki: between Umzimbuvu and Umsikaba Rivers, *Drege* 4528 (G, K); near Lusikisiki, *Bruce* 597; near Magwa Falls, *Codd* 9317. Maclear: Glen Airy, *Galpin* 6864; Ugie, *Britten* 4582; 6 miles S.W. of Ugie, *Acocks* 21984; near Naudes Nek, *Bruce* 577. Mount Ayliff: Mt. Insizwa, *Krook* sub Penther 547 (BOL); *Schlechter* 6461 (Z). Mount Currie: near Kokstad, upper slopes of Mt. Currie, *Tyson* 1418; 6 miles S. of Kokstad *Bruce* 588. Stutterheim: summit of mountain above Toise River Railway Station, *Flanagan* 2261. Umtata: *Baur* 617 (K). Umzimkulu: Ensikeni, *Haygarth* sub Wood 12068 (NH). Xalanga: near Cala, *McNeil* s.n.

NATAL.—Polela: 10 miles from Bulwer on road to Himeville, *Marais* 1446.



FIG. 15.—*K. parviflora*, from Naudes Nek (*Bruce* 577).



FIG. 16.—*K. parviflora*, inflorescence, life size (*Bruce* 577).

K. parviflora is unique in the genus in having a second inflorescence. In the bud stage the inflorescence is narrowly cylindrical but, as the flowers open, the inflorescence usually leans to one side and the flowers turn in that direction. Considering the relatively wide distribution, variation is comparatively slight and is noted chiefly in stature and flower colour. According to collectors' notes, the latter varies from creamy-yellow or whitish-green to yellow or yellow-green. The flower colour of dried specimens is usually yellow-brown to greenish-brown, and the bracts are pale brown with a dark brown central region. Berger, l.c., mentions that the collector Baur records the flowers as being scented, which suggests a relationship with *K. typhoides* and *K.*



PLATE 2a.—*Kniphofia rufa* Bak



PLATE 2b.—*Kniphofia acraea* Codd

umbrina. In the early flowering stage *K. parviflora* may sometimes be confused with *K. breviflora*, but can usually be distinguished by the longer inflorescence, darker flower colour and broader more ovate bracts.

K. modesta Bak. (1889) is based on *Tyson* 1418, which is conspecific with *K. parviflora* Kunth. Subsequently Baker misinterpreted his species because the plant figured in *Bot. Mag.* t.7293 (1893) as *K. modesta* is not that species, being clearly distinct from *Tyson* 1418. It is mainly in this wrong sense, also, that Baker treats *K. modesta* in *Flora Capensis* (1896). This erroneous interpretation was followed by subsequent authors, such as Mallett in the *Gardener's Chronicle* (1906) and Berger (1908). Berger correctly cites *Tyson* 1418 (type of *K. modesta* Bak.) under *K. parviflora* Kunth, but he then upholds *K. modesta* in the sense of the *Bot. Mag.* t.7293 as a distinct species, whereas the correct procedure should have been to give the plant illustrated in the *Bot. Mag.* plate a new name. N. E. Brown made the necessary correction when he renamed the *Bot. Mag.* plate *K. sparsa* N. E. Br. The latter is now placed as a synonym of *K. gracilis*, though the possibility is not excluded that further study may prove that it is worthy of separate status of some sort.

3. *Kniphofia acraea* Codd in *Bothalia* 9: 142 (1966). Type: Cape, Cradock District, National Mountain Zebra Park, on top of Bankberg, alt. about 6,800 ft., flowering 6.3.1964. *Liebenberg* 7120 (PRE!, holo.).

Plants in small groups. *Leaves* about 12 per peduncle, 50–70 cm long and 1–1.5 cm broad, V-shaped in cross section, tending to fold along the midrib, nerves conspicuous in dried specimens; margin minutely and somewhat distantly denticulate, keel smooth. *Peduncle* subequal to the leaves, 50–60 cm long. *Inflorescence* dense, ovoid to subcylindrical, tapering to the apex in the young stage, 6–12 cm long and 2.2–2.5 cm in diameter; buds greenish-yellow, spreading; mature flowers yellow, at first spreading, later deflexed. *Bracts* broadly ovate, obtuse, 4–5 mm long and 2–2.5 mm broad, chartaceous, at first erect and overlapping the buds in the young stage,



MAP 1.—Distribution of *Kniphofia multiflora*, *K. parviflora* and *K. acraea*.



MAP 2.—Distribution of *Kniphofia umbrina*, *K. typhoides* and *K. brachystachya*.

later reflexed; margin minutely eroso-denticulate. *Pedicels* 1.5–2 mm long. *Perianth* shortly cylindrical, not constricted above the ovary, 8–9 mm long, about 2 mm wide at the base, widening to 2.5–3 mm at the mouth; lobes broadly ovate to oblong, rounded to acute, 1.5–2 mm long. *Stamens* exerted by 2–3 mm at anthesis. *Style* equal to the stamens at anthesis, eventually exerted by 3–4 mm. *Fruit* not seen. PLATE 2b. MAP 1.

Known from only one gathering (3 specimens) from the top of the Bankberg in the Cradock District, where it was found growing in small seepage areas among rocks. It was collected in flower in March 1964, and has been successfully cultivated in Pretoria.

CAPE.—Cradock: National Mountain Zebra Park, on top of Bankberg, *Liebenberg* 7120; from same locality, cultivated in Pretoria, *Liebenberg* 7120a.

A distinctive species, resembling *K. breviflora* Harv. ex Bak. in the length and colour of the flowers but from which it may be distinguished by the ovate, obtuse bracts and the denser inflorescence. Its true relationship is not altogether clear, but probably is closer to *K. brachystachya* (A. Zahlbr.) Codd than to any other species.

4. *Kniphofia umbrina* Codd in *Bothalia* 9: 141 (1966). Type: Swaziland, 4 miles south of Forbes Reef, flowering 20.2.1951, *Bruce* 272 (PRE!, holo.).

Plants usually in small groups. *Leaves* not in clear ranks, 6–8 per peduncle, at first erect, later reflexed, mid-green, somewhat flaccid, 45–70 cm long and 1–2 cm broad, tapering towards a rather blunt apex, V-shaped in cross section, breaking up into a few persistent fibres at the base; margin and keel smooth. *Peduncle* overtopping the leaves, 70–90 cm tall, with several sterile bracts below the inflorescence. *Inflorescence* subcylindrical, tapering slightly towards the apex, very dense, 7–15 cm long and 1.5–2 cm in diameter; buds spreading, flowers eventually pendulous; buds purplish-brown, flowers reddish-brown to burnt umber, drying blackish, slightly scented. *Bracts* linear-lanceolate, acuminate, 9–11 mm long and 1.5 mm broad; margin entire. *Pedicels* 0.5 mm long. *Perianth* cylindrical, not constricted above the ovary, 8–9 mm long, 1.5 mm wide at the base, increasing to 2.5 mm at the mouth; lobes ovate, 1 mm long, not spreading. *Stamens* of two lengths, exerted by up to 2 mm at anthesis. *Style* exerted by 1–2 mm at anthesis and eventually up to 3 mm. *Fruit* ovoid-triangular, 5–6 mm long. FIG. 17.

The species is known only from a small area a few miles south of Forbes Reef, in Swaziland, at an altitude of about 4,500 ft., where it grows in or near grassy vleis. The flowering time is February to early March.

SWAZILAND.—4 miles S. of Forbes Reef, *Bruce* 272; *Codd* 9521; 12 miles N. of Mbabane on Forbes Reef road, *Reynolds* 5866; near Forbes Reef, *Compton* 27552; 31290.

With its brown, slightly scented flowers, *K. umbrina* shows an obvious relationship to *K. typhoides* Codd, but differs in several important characters: the leaves are not distichous or glaucous, as in *K. typhoides*, and they are V-shaped in cross section; the perianth is longer and more pendulous; and the floral bracts are longer and acuminate, not rounded.

The species was first collected in 1951: on 19.2.1951, by Dr. G. W. Reynolds and, independently, on 20.2.1951 by Miss E. A. Bruce, accompanied by the author, who collected it again in March, 1956. All the above gatherings are from one small locality adjoining the road about 4 miles south of Forbes Reef. Further information is desired as to the possibility of its occurring at other localities as well because, with the growing pressure of agricultural activity, steps should be taken to preserve it in its natural state if it is indeed as rare as would appear.



FIG. 17.—*K. umbrina*, 4 miles S. of Forbes Reef (Bruce 272).

5. *Kniphofia typhoides* Codd in Flow. Pl. Afr. 36: t.1424 (1964). Type: Natal, "Klip River County", Mrs. K. Saunders in Herb. Medley Wood 3895 (K!, holo.; BM!, NH!).

Notoseptrum natalense Bak. in Fl. Cap. 6: 285 (1896); in Hook. f., Ic. Pl. t.2523 (1897); Berger in Pflanzenr. 4, 38: 71 (1908); non *Kniphofia natalensis* Bak.

Plants solitary or two or three stems together from a short thickened rhizome from which a number of cylindrical fleshy roots arise. Leaves mainly distichous, 6–8 per peduncle, glaucous, erect, eventually bending over at the apex, shorter than the peduncle, 35–65 cm long, 0.8–2.5 cm broad, with a distinct midrib, shallowly chan-

nelled above, slightly keeled, tending to be spirally twisted, firm and semi-fleshy in texture, not conspicuously nerved but outer leaves breaking into persistent fibres at the base; margin smooth. *Peduncle* 50–75 cm long with several sterile bracts below the inflorescence. *Inflorescence* cylindrical, very dense, 15–30 cm long and 1.5–2.5 cm in diameter, rounded at the apex; buds erect, dark brown; flowers erect or spreading, brown to purplish-brown, faintly scented. *Bracts* obovate or subrotund to ovate, rounded at the apex, concave, 4–6 mm long, 3 mm broad, scarioso with a central brown nerve; margin entire to minutely eroso-denticulate. *Pedicels* 0. *Perianth* subcampanulate or shortly cylindrical, not constricted above the ovary, 4.5–6.5 mm long, 2.5–3 mm broad; lobes ovate to rounded, 1.5 mm long, not spreading. *Stamens* of two lengths, exserted by 3–4 mm at anthesis; anthers brown. *Style* exserted by 1–2 mm at anthesis and finally by up to 3 mm. *Fruit* ovoid, more or less triquetrous, 5–6 mm long. FIG. 18. PLATE 3. MAP 2.

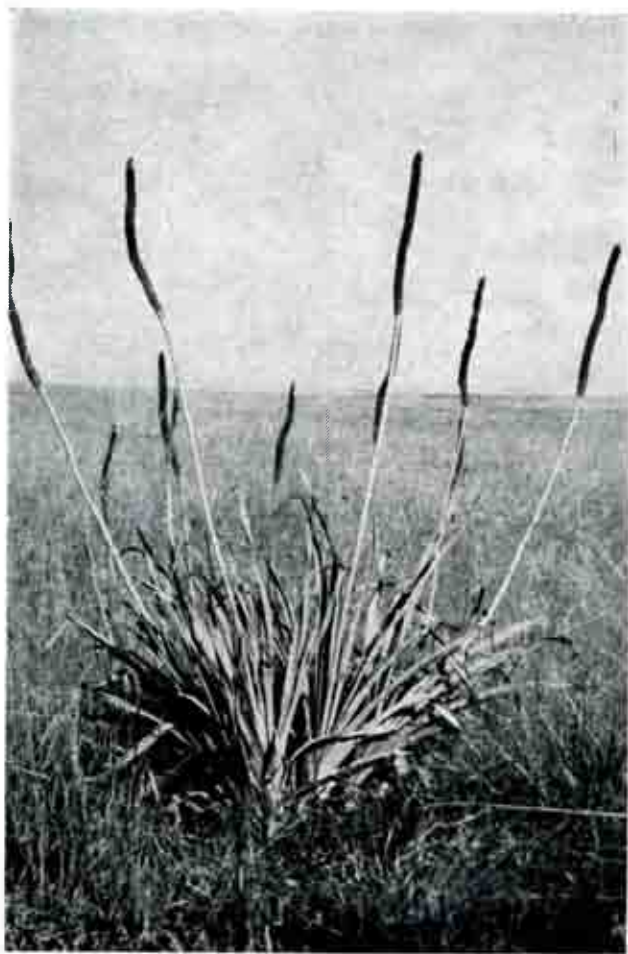


FIG. 18.—*K. typhoides*, Heidelberg District, Transvaal (Codd 8509).

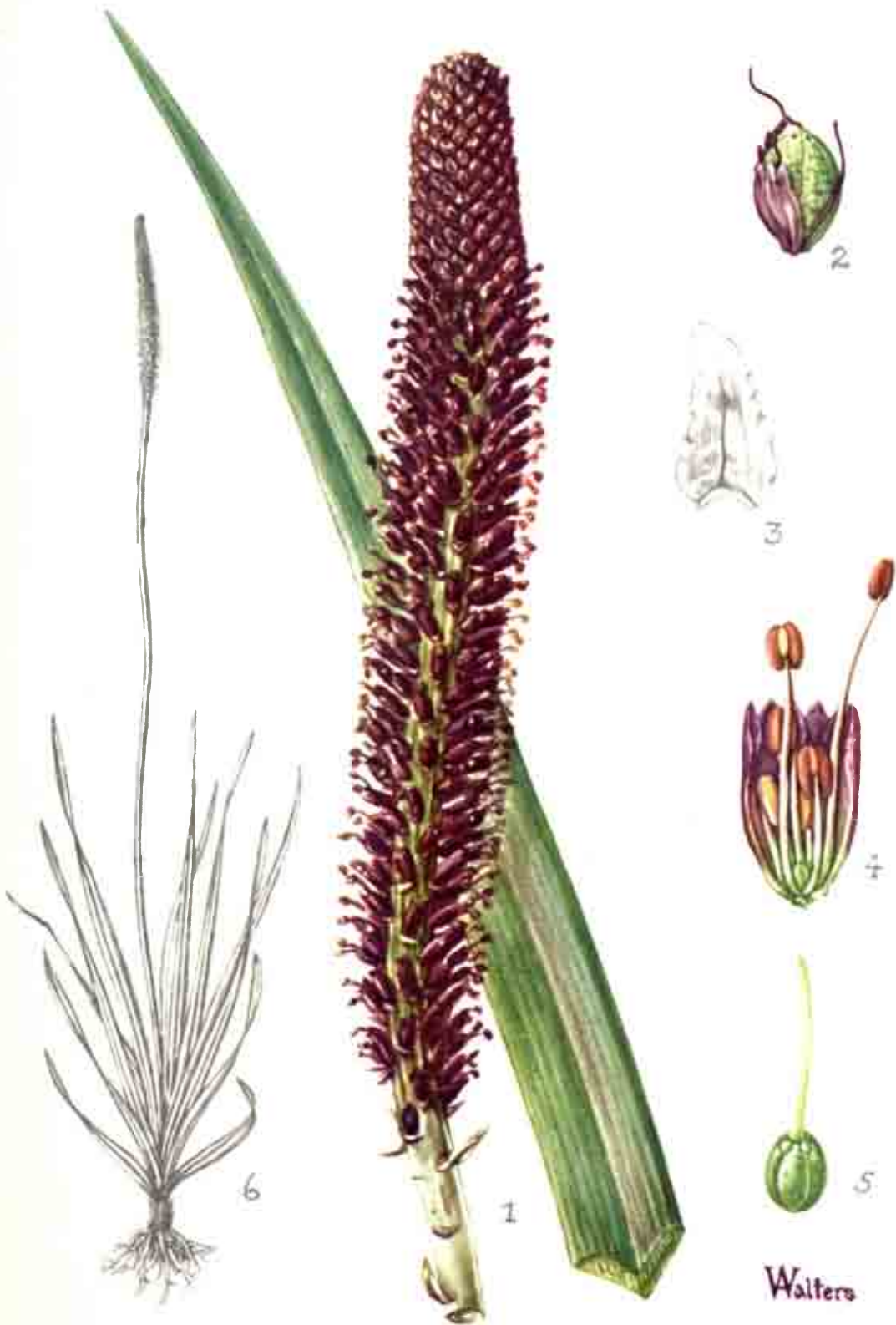


PLATE 3.—*Kniphofia typhoides* Codd

Recorded from the northern districts of Natal, southern, central and western Transvaal and the north-eastern part of the Free State, at medium altitudes of 4,000 to 5,500 ft. It is almost invariably found on black clay soil and shows a preference for low-lying pans or vleis. The type locality is given by Baker as Klip River County, but on the sheet in the Natal Herbarium the locality is given as "near Newcastle". The main flowering season is from mid-February to near the end of March.

NATAL.—Newcastle: near Newcastle, *Mrs. Saunders* sub Wood 3895 (BM, K, NH); Utrecht: farm Klipspruit, *Sprengel* s.n. Vryheid: 13½ miles N. of Vryheid, *Bruce* 293.

O.F.S.—Vredefort: between Leeuwspruit and Vredefort, *Barrett-Hamilton* s.n. (BM); near Parys, *Hutchinson* 2979; between Parys and Greenland Station, *Wagener* sub NBG 264.32 (BOL).

TRANSVAAL.—Bethal: 1½ miles W. of Bethal, *Bruce* 259; 9 miles E. of Bethal, *Bruce* 260; 1 mile E. of Kinross, *Codd* 7693. Brakpan: near Witpoort, *Murray* 202. Heidelberg: 10 miles N. of Villiers, *Bruce* 339; 8 miles N. of Villiers, *Codd* 8509. Lydenburg: *Van der Merwe* s.n.; between Lydenburg and Orighstad, *Strey* 3758; 10 miles N. of Lydenburg, *Dyer* 3953; 14 miles N. of Lydenburg, *Bruce* 322. Potchefstroom: *De Wet* 1230; Haaskraal, *Louw* 1689. Rustenburg: between Swarttruggens and Groot Marico, *Gilliland* in Hb. Moss 27050. Springs: vlei near Delmas, *Pole Evans* s.n.; *Codd* 2683; *Bruce* 258. Vereeniging: *Burt Davy* s.n. (K).

K. typhoides is characterised by the erect, glaucous leaves arranged mainly in a distichous manner, and the dense inflorescence of small brown flowers, carried well above the leaves and bearing some resemblance to a bullrush (*Typha* sp.), from which the species name is derived. This name was given when the species *Notosceptrum natalense* was transferred to *Kniphofia*, because the name *K. natalensis* has already been used for a different species. The reasons for the transfer are discussed on p. 392.

Notes on the relationship of *K. typhoides* are given in the discussion on *K. umbrina* (p. 406) and *K. brachystachya* (p. 411). These three species form a closely related group with relatively small, closely placed, brown or yellow-brown, slightly scented flowers. They may, however, readily be separated from one another on perianth length and bract shape.

6. *Kniphofia brachystachya* (*A. Zahlbr.*) *Codd* in Flow. Pl. Afr. 36: sub. t.1424 (1964). Type: Griqualand East, Mt. Insizwa, 26.1.1895, *Krook* sub *Penther* 536 (W, holo.†); neotype: Cape Province, Umzimkulu District, Ensikeni, December, 1912, *Haygarth* sub Wood 12062 (PRE!).

Notosceptrum brachystachyum *A. Zahlbr.* in Ann. Hof-Mus. Wien 15: 15, t.3 (1900); *Berger* in Pflanzenr. 4, 38: 71 (1908).

Plants solitary or in small clusters. Leaves 6–8 per peduncle, not noticeably distichous, linear-lanceolate, acute, erect or somewhat falcate, rigid, 15–28 cm long, 4–12 mm broad, shallowly keeled, breaking up into persistent fibres at the base; margin thickened, smooth to minutely denticulate; bases of outer leaves broader and clasping base of plant. Peduncle overtopping the leaves, 25–65 cm long, with several sterile bracts below the inflorescence. Inflorescence cylindrical, dense, 4–9 cm long, 1–1.5 cm in diameter; buds erect and flowers erect to spreading; buds brownish, flowers dull yellow to brownish, drying purplish-brown. Bracts ovate to ovate-deltoid, acute, 4–5 mm long and 2 mm broad at the base, brown to purplish-brown; margin eroso-denticulate. Pedicels 0. Perianth campanulate to subturbinate, not constricted above the ovary, 4–5 mm long, 1.5–2 mm broad at the base, increasing gradually to 2.5 mm at the apex; lobes ovate, 1–1.5 mm long, not spreading. Stamens subequal, the longest exerted by 2 mm at anthesis. Style subequal to the anthers at anthesis and finally exerted by 3 mm. Fruit globose, mature fruits not seen. FIG. 19. MAP 2.

Recorded from the mountains of East Griqualand and the foothills of the Drakensberg in the midlands of Natal, where it grows at altitudes of 4,000 to 6,500 ft. in mountain grassland. The flowering time is from November to January.

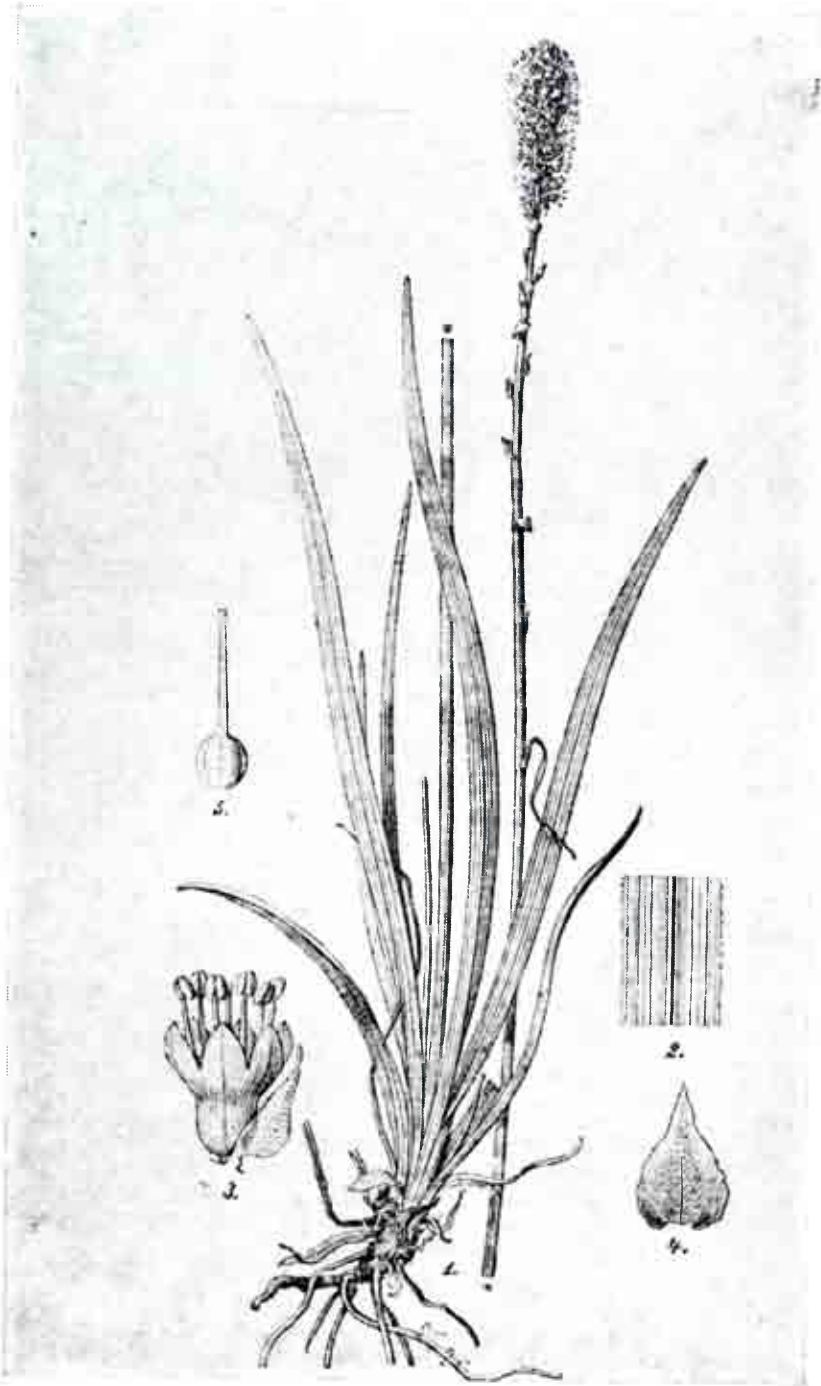


FIG. 19.—*K. brachystachya*, from Ann. Naturhist. Hofmus. Wien 15: t.3 (1900).

CAPE.—Mount Ayliff: Insizwa Mt., *Schlechter* 6462 (BOL, Z). Umzimkulu: Ensikeni, December 1912, *Haygarth* sub Wood 12062.

NATAL.—Estcourt: Little Berg above Champagne Castle Hotel, *Killick* 1867; Giants Castle Game Reserve, *Trauseld* 582; Highmoor Forest Station, *Killick & Vahrmeijer* 3630. Lions River: Nottingham Road, *Medley Wood* 5238 (NH); near Lidgetton, *Medley Wood* 6391 (K, NH); Shawlands, near Nottingham Road, December 1941, *Coetsee* 4 (NH).

A species of the small stature with short, dense inflorescences of very short flowers, 4–5 mm long. The only other South African species with such short flowers is *K. buchananii* Bak. Collectors report on the flower colour in the living state as “dull yellow”, “brown and yellow”, “brown and white” or “buds yellow-green, flowers brown”, but in dried specimens the buds and flowers are uniformly dark purplish-brown, as in *K. typhoides*. It may be separated from the latter species by the smaller stature, the shorter, narrower leaves, the usually shorter perianth and the bracts, which dry a purplish-brown colour and are ovate, acute. In *K. typhoides* the bracts dry a pale brown colour and are rounded at the apex. *K. buchananii*, on the other hand, has creamy-white flowers and lanceolate, acuminate bracts.

There is a specimen in PRE, *Nicholson* s.n., reputed to come from Karkloof, Natal, which is somewhat intermediate between *K. brachystachya* and *K. buchananii*. The bracts are ovate, acute, with lacinate margins, and are pale brown in colour. The flowers have dried a brownish colour. It is not possible to place this specimen with certainty until more material is forthcoming. It is considered to be a form of *K. brachystachya*.

The type of *K. brachystachya*, *Krook* sub *Penther* 536 in W. appears to have been destroyed during World War II and no further material of this gathering has been traced. The specimen in PRE of *Haygarth* sub Wood 12062 from Ensikeni has been nominated as the neotype.

7. *Kniphofia buchananii* Bak. in J. Bot. Lond. 23: 276 (1885); Fl. Cap. 6: 276 (1896); Berger in Pflanzenr. 4, 38: 39 (1908), partly, excl. *Cooper* 1029, 3294; Engl. & Drude, Veg. Erde 9, 2: 313 (1908). Type: Natal, *Rev. J. Buchanan* (K!, holo.).

K. buchananii var. *flavescens* Berger, l.c. 40 (1908), partly, as to *Wood* 1972.

Plants usually solitary with a number of spreading, fleshy, cylindrical roots. Leaves about 8 per peduncle, narrowly linear and grass-like, at first ascending and later recurving, 40–60 cm long, 2.5–4 mm broad, keeled, triangular in cross section, mid-green, strongly nerved, breaking into numerous persistent fibres at the base; margin smooth; outer two leaves often shorter and broader, clasping the base of the plant. Peduncle overtopping the leaves, 40–85 cm long, with several sterile bracts below the inflorescence. Inflorescence oblong to cylindrical, dense at the apex, often laxer below, 3.5–9 cm long and 1–1.4 cm in diameter, rounded at the apex; buds erect, flowers erect to spreading, sometimes eventually deflexed; buds greenish-cream or tinged with red, flowers white. Bracts ovate-lanceolate to lanceolate, acute to gradually acuminate, 4–5.5 mm long, 1–1.5 mm broad; margin entire or minutely eroso-denticulate. Pedicels 0.5–1 mm long at flowering stage, elongating to 2 mm in fruit. Perianth subcampanulate to oblong, not constricted above the ovary, 4–5.5 mm long, 1.5 mm broad at the base increasing gradually to 2 mm at the apex; lobes broadly ovate, 1 mm long, not spreading. Stamens subequal, the longest exerted at anthesis by 1–1.5 mm. Style equalling the stamens at anthesis, eventually exerted by 2.5–3 mm. Fruit globose to ovoid, 2.5 mm long. FIG. 20. PLATE 4a. MAP 3.

Found in the Natal Midlands and semi-coastal grassland, mainly at medium altitudes from about 1,000 to 4,000 ft., on grassy slopes, often among dolerite rocks. The main flowering period is February–March with an occasional record as early as October and as late as April.



FIG. 20.—*K. buchananii*, Pinetown District, Natal (Lansdell s.n.).

NATAL.—District not known: Liddesdale, *Medley Wood* 3753 (NH); *Medley Wood* 4798 (NH); near Boston, *Medley Wood* 4572 (K, NH); Mowbray, *Handley* 87 (NH). Camperdown: Drummond, *Van Nouhuys* s.n.; between Alverstone and Drummond, *Forbes* 397 (NH); Alverstone, *Strey* 7374. Helpmekaar: *Reynolds* sub NBG 418/41 (robust plants with flowers 6–7 mm long). Lions River: Howick, *Junod* 202 (Z); Shafton, near Howick, *Evans* s.n.; Cedara, *Wylie* sub Wood 9977; Lidgettton, *Medley Wood* 7431; near Balgowan, *Dyer* 4867; Caversham, *Mogg* 2455; Tweedie, *Mogg* 6819; 10 miles S.E. of Nottingham Road, *Acocks* 13879; Merrivale, *Moll* 1339; Karkloof, *Moll* 3457. Nkandla: *Wylie* sub Wood 8958 (NH); 9 miles S. of Nkandla, *Codd* 6986. Pietermaritzburg: near Sweetwaters, *C. A. Smith* 8890. Pinetown: Forest Hill above Kranskloof, *Lansdell* s.n.; Fields Hill *Medley Wood* 1972 (BM, K, NH, Z). Richmond: *Schlechter* 6723; Hele Hele, *Gerstner* 7025; 7½ miles N.E. of Richmond, *Acocks* 22014. Umyoti: Greytown, *Galpin* 14835; *Van der Merwe* 2495. Umzinto: Ellismere, *Rudatis* 1469 (BM, G, K, Z).

In length of perianth *K. buchananii* resembles *K. brachystachya*, but may be distinguished by its taller stature, its creamy-white flowers and the bracts which are straw-coloured, ovate-lanceolate to lanceolate and usually acuminate.

Its nearest relative is *K. breviflora* Harv. ex Bak., from which it is distinguished mainly on perianth length, which is usually 4–5.5 (rarely –7) mm in *K. buchananii* and 7–11 mm long in *K. breviflora*. There are one or two specimens which are intermediate and difficult to place with certainty, but the great majority of specimens present no difficulty. *K. breviflora* occurs more inland and at higher elevations than *K. buchananii*. Thus *K. parviflora* var. *albiflora* Berger, based on *Wood* 4826 from Glencoe with flowers 6–7 mm long, is placed in synonymy under *K. breviflora*.

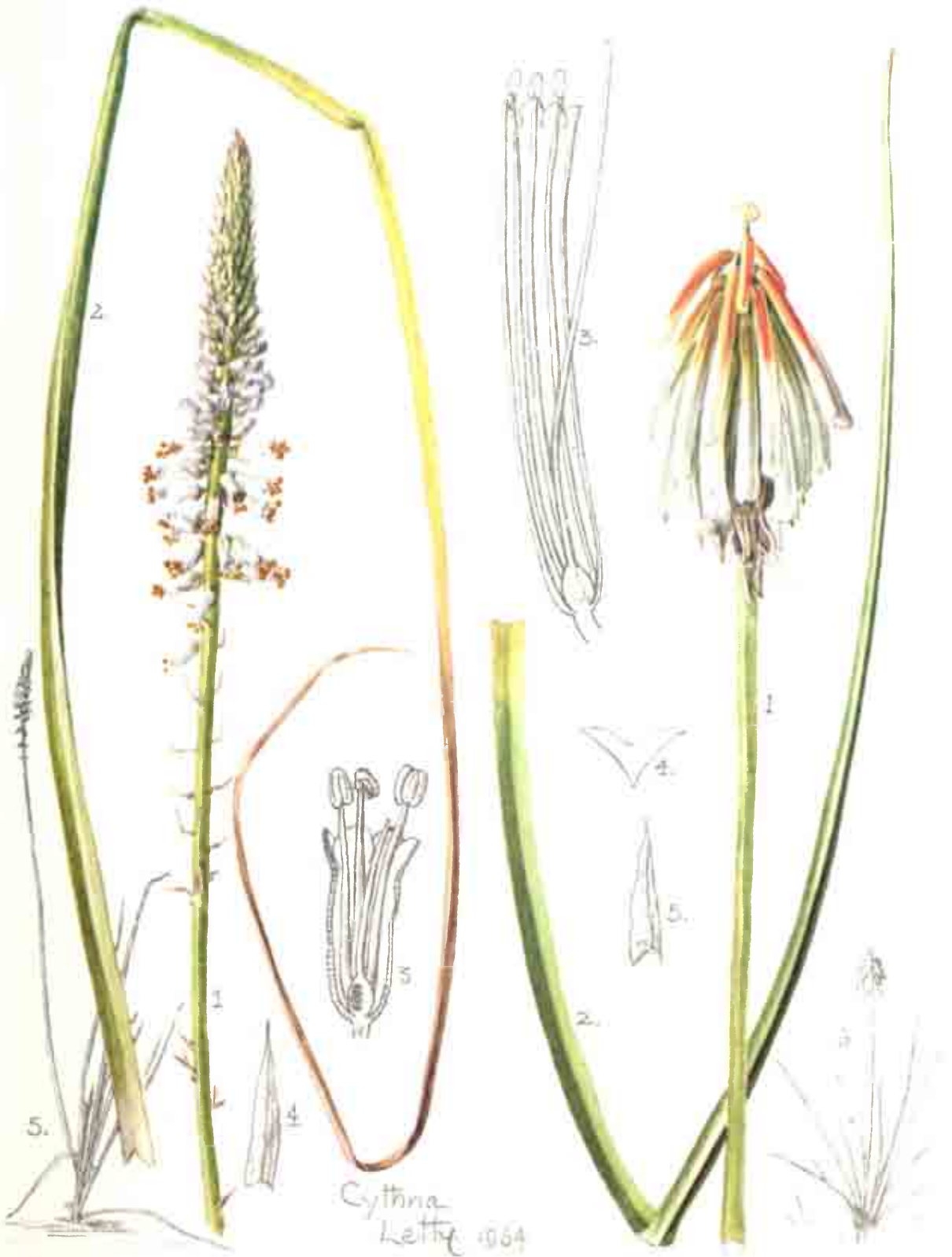


PLATE 4a.—*Kniphofia buchananii* Bak.

PLATE 4b.—*Kniphofia thodei* Bak.

There is an element of confusion in the type material of *K. breviflora* which is discussed more fully under that species. *K. breviflora* is based on *Cooper* 1029, of which two sheets are in Kew Herbarium. One sheet has a specimen with an inflorescence devoid of flowers but with three loose flowers, measuring about 5 mm long, in a capsule (these, of course, may or may not belong to the specimen); the other sheet has an inflorescence with a few apical flowers 7–7.5 mm long attached, and is now designated as the lectotype of *K. breviflora*. The presence of the short flowers in the capsule no doubt led Berger to place *K. breviflora* (1871) as a synonym of *K. buchananii* (1885), though he then upheld *K. breviflora* sensu Bak. in Bot. Mag. t.7570 (1897) as distinct (see p. 416).

8. *Kniphofia breviflora* Harv. ex Bak. in J. Linn. Soc. 11: 361 (1871); Bak. in Fl. Cap. 6: 277 (1896); Bot. Mag. t.7570 (1897); Berger in Pflanzenr. 4, 38: 40 (1908). Type: Orange Free State, Drakensberg, *Cooper* 1029 (there are two specimens of this gathering in K and the specimen with flowers attached, mounted on the same sheet as *Cooper* 3924, is selected as the lectotype).

K. schlechteri Schinz in Mem. Herb. Boiss. No. 20: 10 (1900). Type: Natal, Van Reenen's Pass, *Schlechter* 6940 (Z!, holo.; PRE!; BOL!, GRA!, K!, G!, BM!). *K. concinna* Bak. in Bull. Herb. Boiss. 2 sér., 1: 784 (1901). Type: Natal, near Newcastle, *Rehmann* 7024 (Z!, holo.). *K. fibrosa* sensu Wood, Natal Pl. t.322 (1903). *K. buchananii* var. *flavescens* Berger, l.c. 40 (1908), partly, excl. *Wood* 1972. Type: Based on *K. breviflora* Bak. *K. parviflora* var. *albiflora* Berger, l.c. 40 (1908). Type: Natal, near Glencoe, *Medley Wood* 4826 (K!, holo.; NH!). *K. breviflora* var. *concinna* (Bak.) Berger, l.c. 40 (1908).

Plants usually solitary with a number of spreading, fleshy, cylindrical roots. *Leaves* 6–10 per peduncle, narrowly linear, at first erect then bending over about the middle, grass-like, 40–70 cm long, 2.5–6 mm broad, keeled, distinctly nerved, breaking into persistent fibres at the base; margin smooth; outer few leaves broad-based, clasping base of plant. *Peduncle* overtopping the recurved leaves, 40–80 cm long with a few sterile bracts below the inflorescence. *Inflorescence* ovoid to oblong, usually dense at the apex, medium lax below, 5–8 cm long and 2–2.4 cm in diameter, narrower towards the apex; buds erect to spreading, flowers ascending to spreading eventually becoming pendulous; buds yellow-green, often tinged with red, flowers whitish to yellow. *Bracts* ovate-lanceolate to lanceolate, acute to gradually acuminate, 4.5–7.5 mm long and 1.5–2 mm broad; margin usually entire, occasionally very minutely denticulate. *Pedicels* 1–2 mm long at flowering stage and in fruit. *Perianth* oblong to shortly subcylindrical, not constricted above the ovary, 7–11 mm long, 1.5–2 mm broad at the base, widening gradually to 3 mm at the apex, in occasional specimens broadest above the middle (3.5 mm) and then narrowing again to 3 mm at the apex; lobes broadly ovate, 2–2.5 mm long, not spreading. *Stamens* of two lengths, the longest exerted by 1–1.5 mm at anthesis, later withdrawn into the perianth tube. *Style* equalling the longest stamens at anthesis, eventually exerted by 3–4.5 mm. *Fruit* globose to ovoid, 4.5–5 mm long. FIGS. 21, 22, 23. MAP 3.

Recorded from the foothills and slopes of the Drakensberg from Underberg District to Newcastle and extending into the Free State in the Harrismith District, occurring in dense mountain grassland on hillsides or in vleis. The flowering season is mainly from January to March, but it has been collected in flower as early as October.

NATAL.—Cultivated by Max Leichtlin, Baden-Baden, October, 1896, from seed collected in Natal by *Medley Wood*, type of Bot. Mag. t.7570 (K). Bergville: Tugela Valley, *Hafstrom & Acocks* 237; Royal Natal National Park, *Schelte* 1246 (NH); *Trauseld* 165; Mont-aux-Sources, *Bayer & McClean* 155; Oliviershoek, *Thode* 4502 (STE); *Vogts* s.n.; *Codd* 10530. Dundee: Glencoe, *Medley Wood* 4826 (K, NH). Estcourt: Kamberg, *Pentz* 426; 11 miles from White Mt. Inn on road to Hlatikulu,

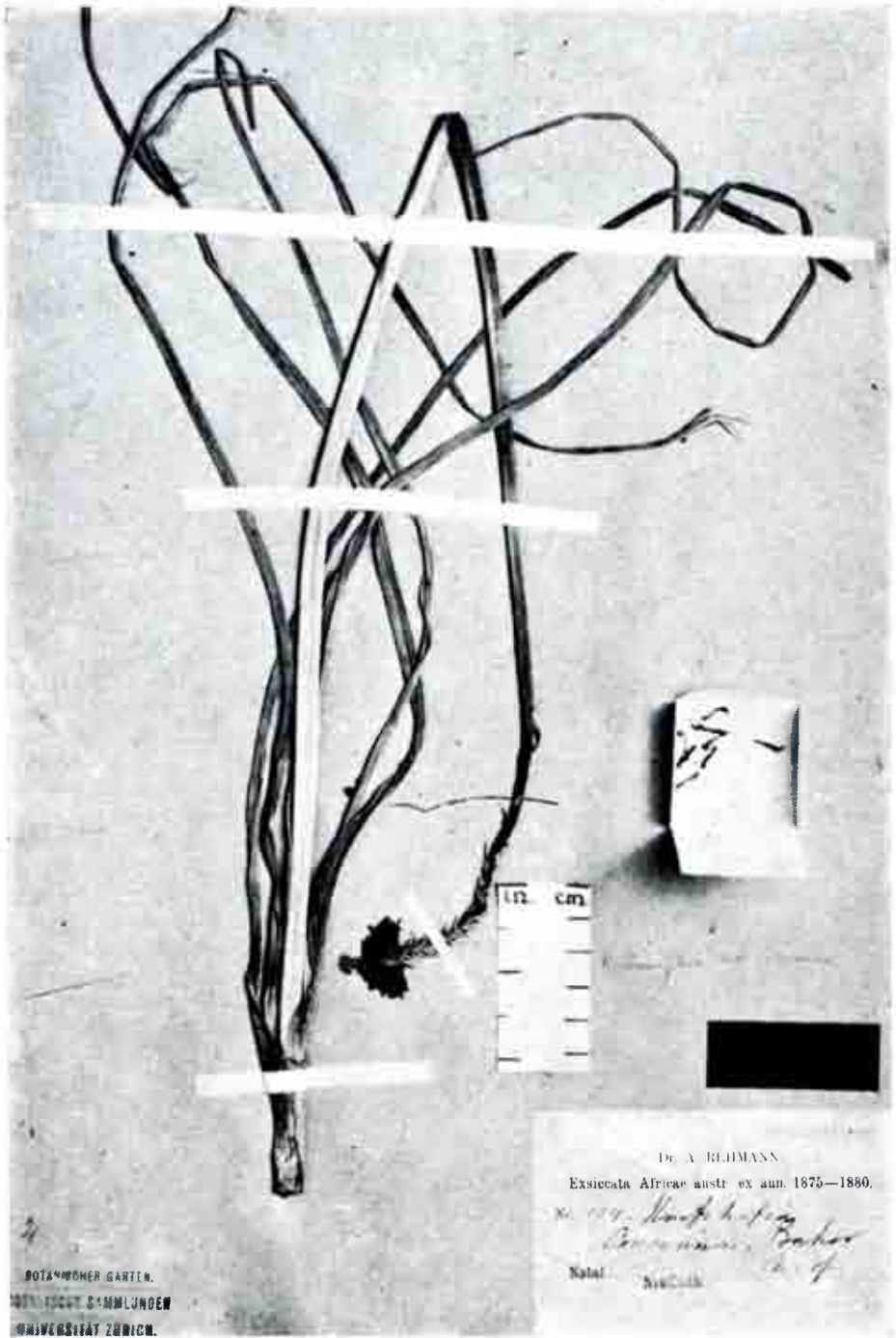


FIG. 21.—Holotype of *K. concinna* (Rehmann 7024 in Z), now placed as a synonym of *K. breviflora*.

Killick & Marais 2157; Ntabamhlope, *Downing* s.n. Klip River: Van Reenen's Pass, *Krook* sub *Penther* 538 (S); *Schlechter* 6940; *Medley Wood* 5606; 8922 (NH); *Bews* 543; *Germishuizen* s.n. Newcastle: near Newcastle, *Rehmann* 7024 (Z). Underberg: near Underberg, *McClellan* 622 (NH),

O.F.S.—Without locality, *Cooper* 1029 (K); 3924 (K). Harrismith: near Swinburne, farm Rensburgskop, *Jacobsz* 182; *Codd* 10522.

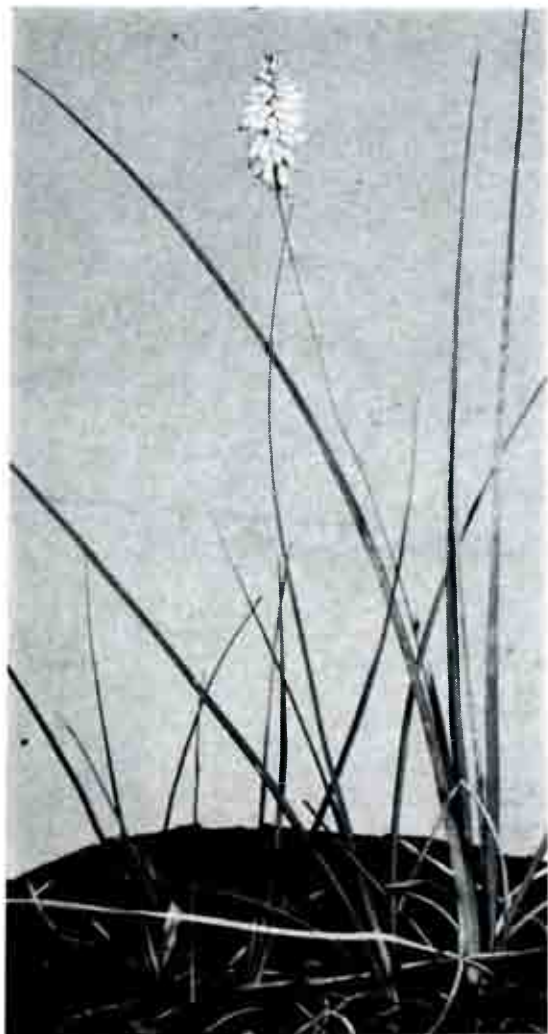


FIG. 23.—*K. breviflora*, inflorescence, life size (*Killick & Marais* 2157).

FIG. 22.—*K. breviflora*, habit (Estcourt District, *Killick & Marais* 2157).

It appears that two colour forms are found in this species. The plants seen in eastern O.F.S. and the neighbouring Oliviershoek Pass had clear yellow flowers, while those in the Estcourt area had white flowers. *Medley Wood* describes the flower colour of his plant No. 8922 (figured in *Natal Plants* t.322, 1903, under the name *K. fibrosa* and represented by a specimen in the Natal Herbarium) as pale yellow, so it is possible that there are intermediate colours as well. In the herbarium all flowers dry a dirty white colour and so it is not possible to form an opinion of flower colour in the absence of collector's notes. *Cooper*, who records the locality of the type plant as O.F.S., does not mention colour of flowers but the locality indicates that the typical flower colour for the species is probably yellow.

K. breviflora shows affinities with the three species *K. buchananii* Bak., *K. parviflora* Kunth and *K. albescens* Codd. From the first, *K. buchananii*, it differs in the longer flowers, which are usually 9–10 mm long, although the range extends from (6–) 7–11 mm, as against 4–5·5 rarely –7 mm in *K. buchananii*, and the inflorescence is often more lax than in *K. buchananii*. The distributions of the two species do not appear to overlap, *K. breviflora* occurring more inland and at higher altitudes than *K. buchananii*. The type of *K. parviflora* var. *albiflora* Berger, *Medley Wood* 4826 from near Glencoe, has flowers 6–7 mm long and is thus somewhat intermediate between the two species.

From the second species, *K. parviflora*, it differs in the inflorescence not being secund. In living material, the difference is usually clear cut but, in the herbarium, it sometimes happens that specimens of *K. parviflora* are pressed in such a way as to obscure the secund nature of the inflorescence. There are, however, additional small differences which assist one to decide on the plant's identity; for example, in *K. parviflora* the flowers tend to dry a greenish-brown colour (pale brown to yellow-brown in *K. breviflora*), the inflorescence is usually longer, the leaves are shorter and the bracts are usually broader and more abruptly acute. There is also a difference in distribution, as *K. parviflora* occurs mainly in the eastern Cape Province, reaching its northernmost limit in southern Natal.

The third affinity mentioned earlier, namely *K. albescens*, is closely related to *K. breviflora*, but is altogether a more robust plant, usually growing in clusters, with longer flowers (11–15 mm) and longer bracts (7–9 mm). It has, in general, a more northerly distribution, but where the two species overlap in northern Natal it is sometimes difficult to distinguish between them with certainty.

The type material of *K. breviflora* has been mentioned under *K. buchananii* (p. 413). *K. breviflora* is based on *Cooper* 1029, of which two specimens, mounted on different sheets, are in Kew Herbarium. One of these specimens is mounted on the same sheet as *Cooper* 3924 and has an inflorescence with a few apical flowers 7–7·5 mm long attached. This specimen agrees with Baker's concept of *K. breviflora* and is now selected as the lectotype. The other specimen is alone on a sheet and has an inflorescence devoid of flowers, but there are three flowers, measuring about 5 mm long, in a capsule. These flowers resemble those of *K. buchananii* but, of course, they may or may not belong to the inflorescence. If the former specimen is accepted as the lectotype, the two names *K. buchananii* and *K. breviflora* can be maintained for the two species separated by Baker on the basis of perianth length.

Berger, l.c., adopted a course which is in conflict with the present rules of nomenclature. He placed *K. breviflora* Harv. ex Bak. (1871) in synonymy under *K. buchananii* Bak. (1885), apparently basing his view on a drawing in Kew Herbarium made by Harvey of *K. breviflora*. I have not seen this drawing, so I cannot say if it conflicts with the concept of Baker, who published the species without citing the drawing. Berger went on to describe *K. buchananii* var. *flavescens* Berger, basing it on "*K. breviflora* Bak.", and citing *Wood* 1972 (which is, in my opinion, *K. buchananii*). Then, on p. 40, he upheld *K. breviflora* Bak. in *Bot. Mag.* t.7570 (1897) as a valid species. A specimen corresponding to this *Bot. Mag.* plate has been seen in Kew Herbarium and, although more robust than *Cooper* 1029 (lectotype of *K. breviflora*), is considered to fall within the range of this species.

Regarding the synonyms *K. schlechteri* Schinz and *K. concinna* Bak., the type specimens have been examined and both have flowers about 8 mm long. They are, therefore, not distinguishable from *K. breviflora* Bak. The plant figured in *Medley Wood's Natal Plants* t.322 (1903) as *K. fibrosa* should also be included in *K. breviflora*. The figured plant is *Medley Wood* 8922 from Van Reenen's Pass and is represented in the Natal Herbarium.

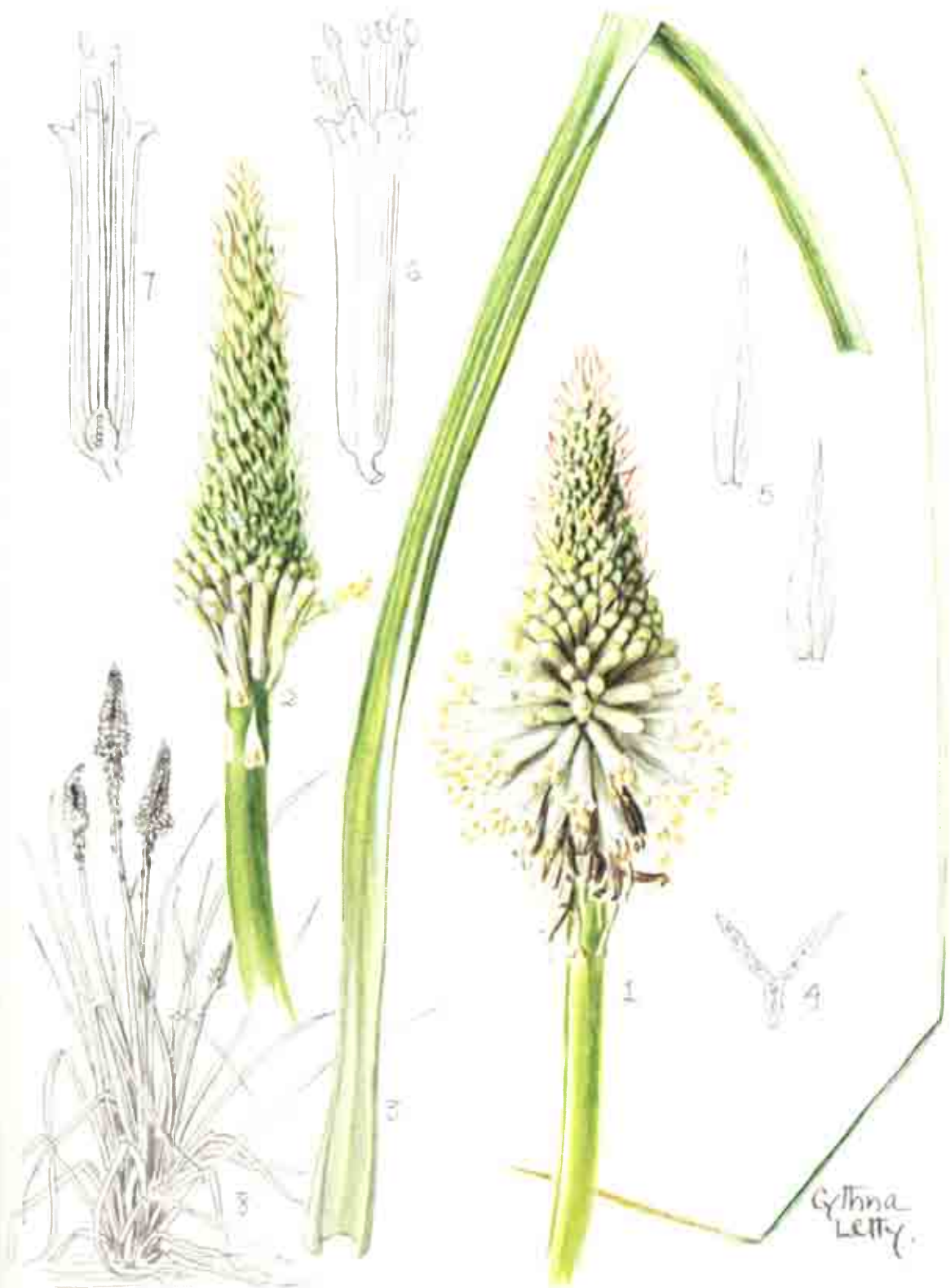


PLATE 5.—*Kniphofia albescens* Codd

9. *Kniphofia albescens* Codd in Flow. Pl. Afr. 34: t.1325 (1960). Type: Natal, mountains north of Utrecht, Codd 8248 (PRE!, holo.).

Plants usually in groups. *Leaves* about 8 to each peduncle, spreading-recurved, dull green to glaucous, tough and fibrous in texture, 60–100 cm long, 8–15 mm broad, keeled, breaking up into numerous persistent fibres at the base; margin and keel smooth or sometimes distantly and minutely scabrid. *Peduncle* overtopping the recurved leaves, 40–75 cm long, with several sterile, ovate-lanceolate bracts below the inflorescence. *Inflorescence* long-ovoid to subcylindrical, tapering to the base and apex, dense, often with a coma of bracts at the apex, 6–10 cm long, elongating to 30 cm long in fruit, 2.7–3.5 cm in diameter; buds greenish-white or tinged with pink, erect; flowers becoming white or cream, spreading at anthesis, later pendulous. *Bracts* lanceolate to linear-lanceolate, acuminate, 7–9 mm long and 2 mm broad, chartaceous, 1-nerved, erect in the bud stage, longer than the buds; margin smooth to minutely denticulate. *Pedicels* 1 mm long. *Perianth* cylindrical, not constricted above the ovary, 11–15 mm long, 2.5–3 mm broad; lobes ovate, rounded, 2 mm long, slightly spreading. *Stamens* exerted by 2–2.5 mm at anthesis; anthers yellow, oblong, 1–1.5 mm long, drying brown. *Style* equal to the stamens at anthesis, eventually exerted by 5–6 mm. *Fruit* ovoid-triangular, 7–8 mm long. FIG. 24. PLATE 5. MAP 3.

Distributed mainly from Utrecht District in Natal to Piet Retief and Ermelo Districts in southern Transvaal, with one record from Mont-aux-Sources. It occurs in dense grassveld on mountain slopes and, occasionally, on the flats and in marshy places, at altitudes from 4,500 to 6,500 ft. The flowering season is from mid-January to early March.

NATAL.—Bergville: Mont-aux-Sources, *Pardoe* s.n. Utrecht: mountains north of Utrecht and cultivated in Pretoria, Codd 8248; between Utrecht and Vryheid, *Bruce* 289; Altemooi, *Thode* s.n.; *Thode* 3333 (STE); Wonderhoogte Farm, *Parkhouse* s.n.; 4 miles W. of Viljoenspos, Codd 6956;

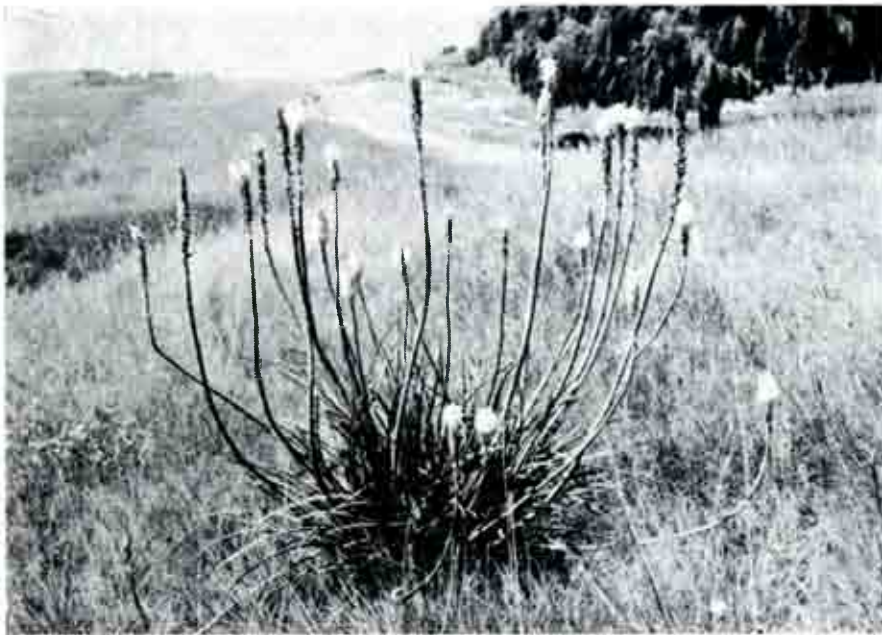


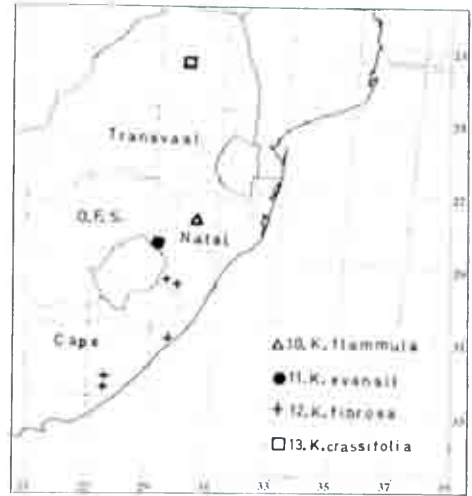
FIG. 24.—*K. albescens*, Utrecht District (*Marais* 1472). Photo by W. Marais.

12½ miles S.E. of Groenvlei, *Marais* 1472; 4½ miles S.E. of Groenvlei, *Codd* 6953; 7 miles N.W. of Groenvlei, *Codd* 2532; 5 miles S. of Wakkerstroom, *Bruce* 282; near Wakkerstroom, *Reynolds* 1135 (BOL).

TRANSVAAL.—Ermelo: near Athole Pasture Research Station, *Bruce* 266; Spitskop, *Scheepers* in TRV 15228; 14 miles S. of Ermelo, *Codd* 10267; Vlakfontein, *Du Plessis* 100. Piet Retief: near Iswepe, *Sidey* 1564; 4 miles N. of Iswepe, *Bruce* 275; 4 miles S. of Idalia, *Bruce* 277; near Moolman Station, *Bruce* 274. Wakkerstroom: in vlei, *Van der Merwe* 28; farm Oshoek, *Devenish* 559; Goedegun, *Du Plessis* 108; Driehoek, *Du Plessis* 109; 5 miles S. of Wakkerstroom, *Mauve & Tölken* 4518.



MAP 3.—Distribution of *Kniphofia b Buchananii*, *K. breviflora* and *K. albescens*.



MAP 4.—Distribution of *Kniphofia flammula*, *K. evansii*, *K. fibrosa* and *K. crassifolia*.

For differences between *K. albescens* and the related species *K. breviflora*, see p. 416. In perianth length, *K. albescens* approaches *K. fibrosa* (p. 422) and *K. crassifolia* (p. 424), but these two species are much less robust, with narrow, grasslike leaves which have distinctly serrulate margins.

10. *Kniphofia flammula* *Codd* in Flow. Pl. Afr. 34: t.1326 (1960). Type: Natal, 3½ miles N.W. of Glencoe, *Codd* 6779 (PRE!, holo.).

Plants growing in groups or occasionally singly. *Leaves* 6–8 per peduncle, at first erect then curving over towards the apex or bending at the middle, dull green to semi-glaucous, 60–90 cm long, 6–12 mm broad, narrowly keeled below, shallowly channelled above, not prominently nerved, breaking into some persistent fibres at the base; margin and keel smooth. *Peduncle* subequal to the leaves, 50–85 cm long with several sterile bracts below the inflorescence. *Inflorescence* ovoid to shortly rhomboid, 3–7 cm long and 2–3.5 cm in diameter, dense, often with a coma of sterile bracts at the apex; buds pendulous, flame scarlet; flowers at first subspreading, later becoming pendulous, pale orange-yellow tinged with salmon-orange. *Bracts* ovate-lanceolate, lanceolate or linear-lanceolate, acuminate, 6.5–7.5 mm long, 2 mm broad; margin almost entire or minutely serrulate. *Pedicels* 0.5–1 mm long at flowering stage, elongating to 2 mm long in fruit. *Perianth* subcylindrical, not constricted above the ovary, 1.3–1.5 cm long, 2–2.5 mm broad at the base, increasing gradually to 3.5–4 mm at the apex; lobes ovate, 1.5 mm long, not spreading. *Stamens* of different lengths, the longest exerted by 3–4 mm at anthesis, later withdrawn into the mouth of the perianth tube. *Style* subequal to the stamens at anthesis, eventually exerted by 4–5 mm. *Fruit* subglobose to ovoid 6–7 mm long. FIG. 25. PLATE 6. MAP 4.



PLATE 6.—*Kniphofia flammula* Codd



FIG. 25.—*K. flammula*, from Glencoe, Natal (Codd 6779).

Known only from a restricted area near Glencoe in the Dundee District of Natal where it grows with dense tall grasses and sedges in and at the margins of vleis, at an altitude of about 4,500 ft. The main flowering season is from mid-November to the end of January.

NATAL.—Dundee: Kelvin Grove, *Medley Wood* 5188 (NH, Z); 3½ miles N.W. of Glencoe, *Codd* 6779; *Codd* 8247; near Glencoe, *Killick* 2219.

If the pressed material is scrappy or the collector's notes incomplete, this species might be confused with *K. albescens* or *K. breviflora*. From the latter it differs in the longer perianth, which is 13–15 mm as against 7–11 mm in *K. breviflora*. From both species it differs in the buds being distinctly pendulous, instead of erect, and in the flower colour. The bracts of *K. flammula* are also not as long acuminate as in the other two species, though the specimen *Medley Wood* 5188 is intermediate in this respect.

11. ***Kniphofia evansii* Bak.** in Fl. Cap. 6: 278 (1896); Berger in Pflanzenr. 4, 38: 42 (1908). Type: Natal, Drakensberg, Tiger Valley, Jan. 1895, *Evans* 353 (K!, holo.; NH!).

Plants solitary or in small groups. Leaves up to 30 per peduncle, grass-like, fibrous, somewhat spreading, green to slightly glaucous, 60–75 cm long, 2–3 mm broad, keeled, distinctly nerved, breaking into persistent fibres at the base; margin and keel smooth;

outer few leaves broad-based, clasping base of plant. *Peduncle* subequal to or shorter than the leaves, 55–65 cm long, with a few sterile bracts below the inflorescence. *Inflorescence* oblong to subcylindrical, dense, 5–10 cm long and 3–4 cm in diameter; buds ascending, flowers spreading, eventually pendulous; buds and flowers yellow-orange to scarlet, becoming dark purple on withering. *Bracts* ovate-lanceolate to lanceolate, long acuminate, 4–6 mm long, 1.5 mm broad, concave, scarioso; margin entire. *Pedicels* 1 mm long, elongating to 2 mm in fruit. *Perianth* subcylindrical, not or scarcely constricted above the ovary, 1.3–1.6 cm long, 2 mm broad at the base, expanding rather abruptly at the apex to 4 mm; lobes ovate, rounded, 2.5 mm long, distinctly spreading. *Stamens* in the basal part of the perianth tube, of two lengths, reaching approximately 4 mm and 6 mm from the base of the tube respectively. *Style* 1–1.5 mm long at anthesis, not elongating further. *Fruit* subglobose, 5–6 mm long. FIGS. 26, 27.



FIG. 26.—*K. evansii*, from Cathedral Peak (Killick 1640).

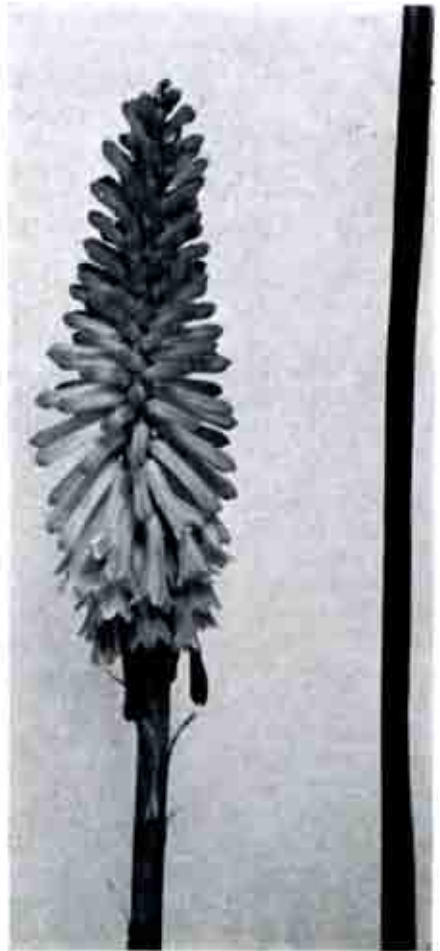


FIG. 27.—*K. evansii*, inflorescence, life size (Killick 1640).

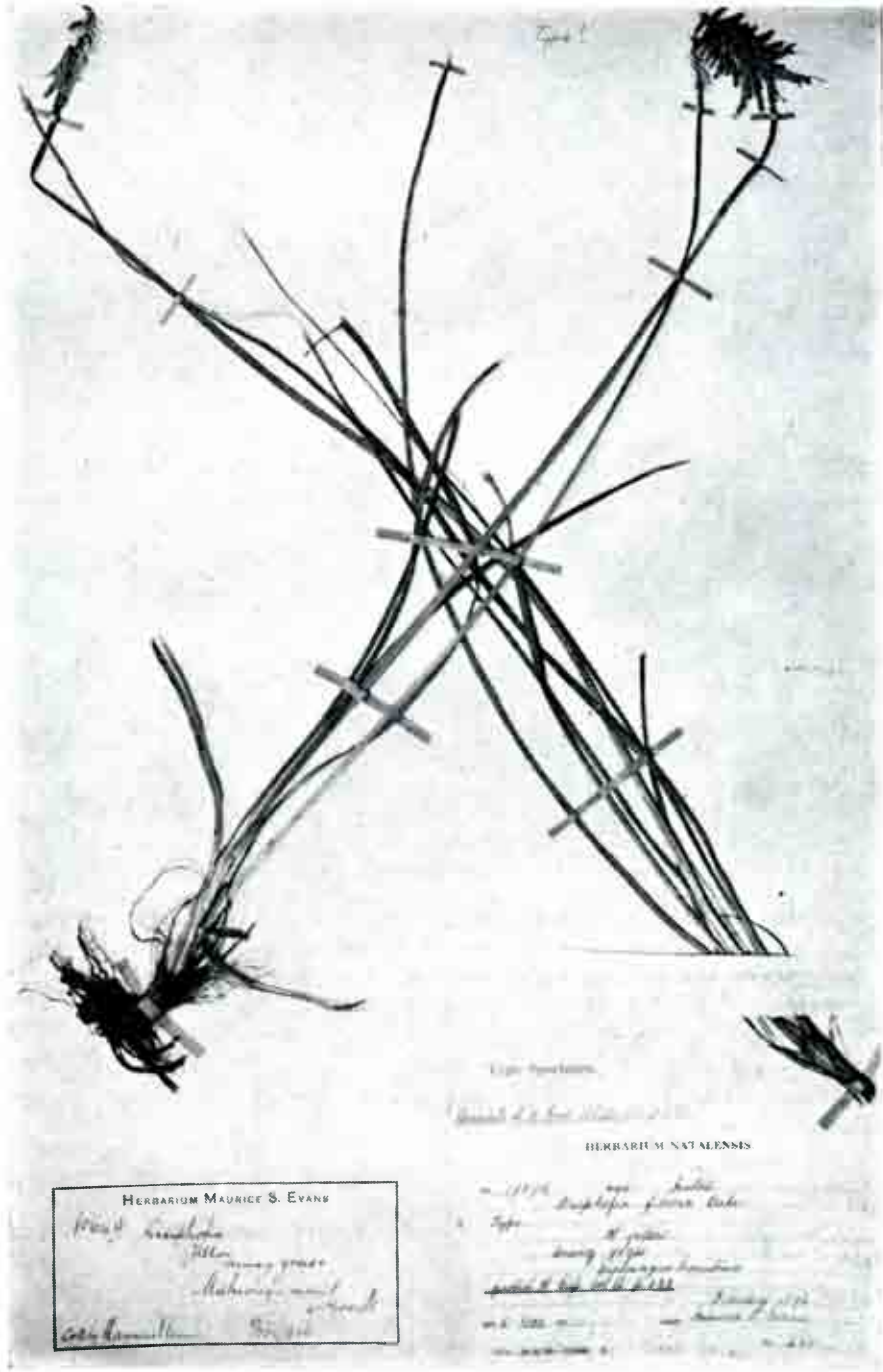


FIG. 28.—*K. fibrosa*, isotype in Natal Herbarium (Evans 649).

Known at present from only a small area on the upper slopes of the Drakensberg in the Bergville District at altitudes of 6,000 to 7,000 ft., where it grows among hygrophilous grasses and herbs on stream-banks and moist ledges. Its flowering time is January to early February.

NATAL.—Bergville: Drakensberg, Tiger Cave Valley, *Evans* 353 (K, NH); Cathedral Peak Forest Research Station, *Killick* 1640; *Killick* 1642; *Killick* 1653; *Germishuizen* 42; *Killick & Vahrmeijer* 3552. Estcourt: Giants Castle Game Reserve, *Trauseld* 341.

The concolorous inflorescence of orange to scarlet flowers with spreading lobes indicates a close relationship to the species in Berger's Section *Obtusilobae*, in which he includes *K. triangularis* Kunth, *K. nelsonii* Mast., *K. macowanii* Bak. and *K. obtusiloba* Diels ex Berger (see p. 470). From all these entities *K. evansii* may be recognised by its shorter flowers. In addition, *K. evansii* shows a characteristic which is unique in the genus, namely, the fact that the stamens are included in the lower half or third of the perianth tube, while the style does not exceed 1.5 mm in length. This results in the stigma being placed below the anthers at anthesis and about 3 mm from the base of the tube. After anthesis, the style does not elongate as is the case in other species. It is a rare species, first collected by Maurice Evans in January, 1895.

An odd specimen, *Trauseld* 741, was recently collected on Giants Castle Game Reserve which combines characters of *K. evansii* and *K. porphyrantha*, and is assumed to be a natural hybrid between the two. In perianth length, which is 3.2 cm, and general appearance the specimen resembles *K. porphyrantha* but the coral-red perianth colour and the stamens extending to only half the length of the perianth tube suggest hybridization with *K. evansii*.

12. ***Kniphofia fibrosa* Bak.** in Fl. Cap. 6: 533 (1896); Berger in Pflanzenr. 4, 38: 41 (1908). Type: Natal, "Mahwaqua Mt.", Feb. 1896, *Evans* 649 (K!, holo.; NH!).

Plants apparently solitary. *Leaves* 6–10 per peduncle, grass-like, at first erect then bending over about the middle, 35–60 cm long, 3–4 mm broad, keeled, breaking into persistent fibres at the base; margin scaberulous to finely denticulate especially towards the apex, often smooth towards the base. *Peduncle* overtopping the recurved leaves, 30–60 cm long, with a few sterile bracts below the inflorescence. *Inflorescence* subglobose to oblong, dense, 2.5–7 cm long and 2.5–3 cm in diameter; buds spreading, flowers pendulous, pale yellow. *Bracts* ovate-lanceolate, acuminate, 5–7 mm long, 1.5–2 mm broad; margin entire to minutely denticulate towards the apex. *Pedicels* 0.5–1 mm long. *Perianth* cylindrical, not constricted above the ovary, 1.2–1.5 cm long, 2.5–3 mm broad; lobes broadly ovate, 1 mm long, not spreading. *Stamens* of two lengths, the longest exerted by up to 3 mm at anthesis. *Style* equalling the anthers at anthesis, eventually exerted by 4–5 mm. *Fruit* not seen. FIG. 28. MAP 4.

A little known species recorded from scattered localities in the eastern Cape Province and the mountains of the Natal midlands, occurring usually in dense, sour grassveld. The flowering season is February to March.

CAPE.—King William's Town: Pirie, *Taylor* sub NBG 268/36 (BOL); Evelyn Valley, S.E. of Keiskammahoek, *Bruce* 549. Lusikisiki: near Port Grosvenor, *Long* s.n. Stutterheim: Dohne Hill, *Sim* 1143 (BOL).

NATAL.—Drakensberg, *Mrs. Prescott Decie* s.n. (BM). Polela: Marwaga Mt., *Evans* 649 (K, NH). Underberg: *McClellan* 622.

Related to *K. breviflora* Bak. but differs in the longer flowers and minutely denticulate leaves. For differences between *K. fibrosa* and *K. crassifolia*, see p. 424.

A specimen from Ceza in the Mahlabatini District, *Gerstner* 4316, appears to be closely allied to *K. fibrosa*. The bract and perianth characters agree very well, but the leaf margins are smooth. More material is required from this locality before a definite decision on its identity can be reached.

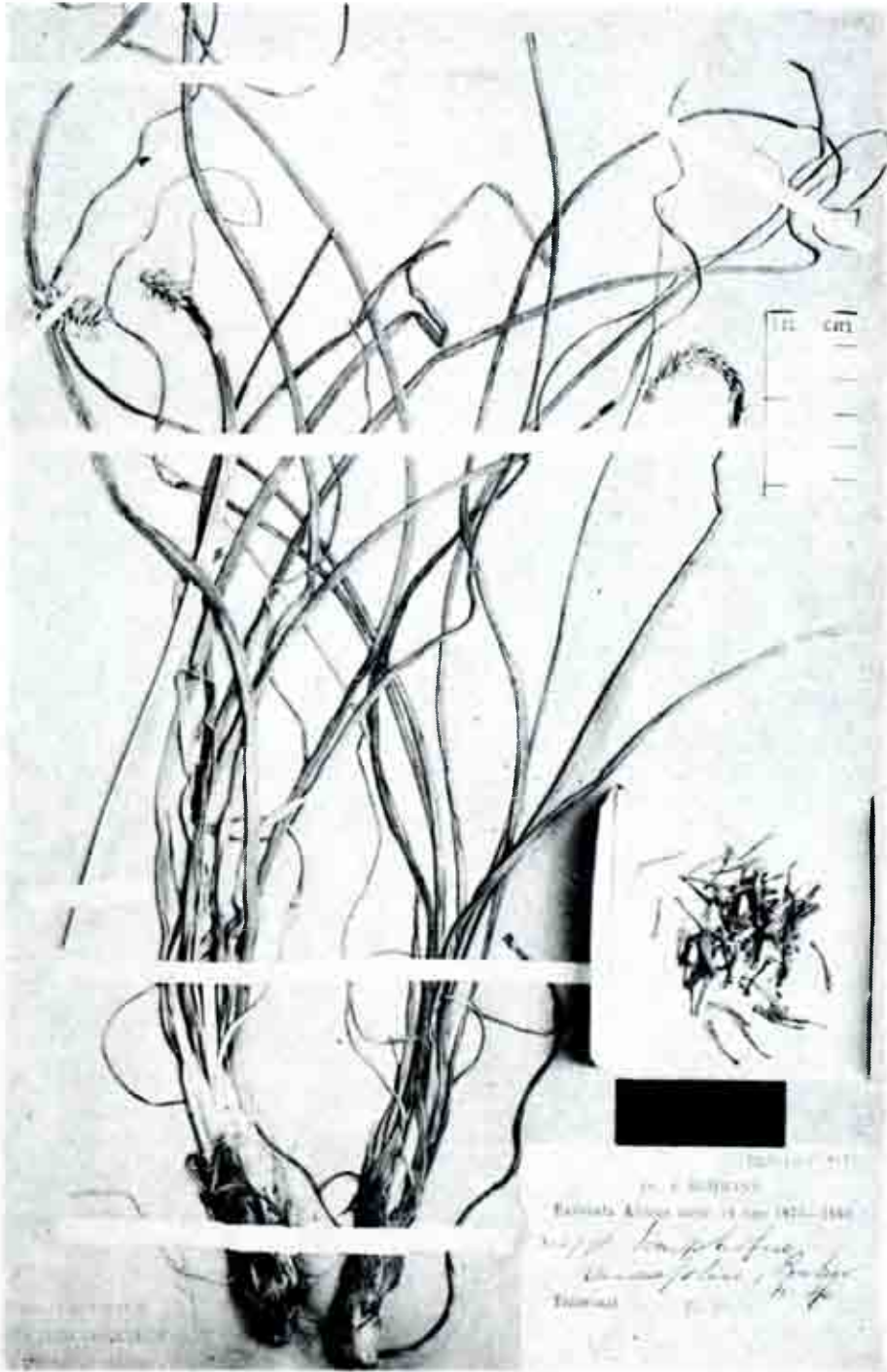


FIG. 29.—*K. crassifolia*, holotype in Z (*Rehmann* 5796 from Houtbosch, Transvaal). Known only from this gathering.

13. *Kniphofia crassifolia* Bak. in Bull. Herb. Boiss. 2 ser., 1: 784 (1901); Berger in Pflanzenr. 4, 38: 42 (1908). Type: Transvaal, Houtbosch, *Rehmann* 5796 (Z!, holo.).

Plants probably solitary. *Leaves* about 8 per peduncle, narrow, grasslike, 40–50 cm long, 3–6 mm broad, keeled, breaking into persistent fibres at the base; margin conspicuously serrulate; outer leaves broad-based. *Peduncle* about 30 cm long. *Inflorescence* subglobose to oblong, dense, about 5 cm long; flowers probably whitish or pale yellow. *Bracts* lanceolate, acuminate, 5–7 mm long, entire. *Pedicels* 1–1.5 mm long. *Perianth* cylindrical, not constricted above the ovary, 1.5–1.8 cm long, 1.5 mm broad at the base, increasing to 2.5 mm broad at the throat; lobes ovate, 1.5–2 mm long, slightly spreading. *Stamens* of two lengths, the longest exerted by 3 mm at anthesis. *Style* equal to the anthers at anthesis, eventually exerted by 4 mm. *Fruit* not seen. FIG. 29. MAP 4.

Known only from the type gathering in the Houtbosch area of the Transvaal.

TRANSVAAL.—Pietersburg: Houtbosch, *Rehmann* 5796 (Z).

Related to *K. fibrosa* Bak., but differs in the slightly longer flowers and the conspicuous and characteristic serrulation of the leaf margin. More material of both species is, however, required in order that the relationship between the two may be more accurately evaluated.

14. *Kniphofia gracilis* Harv. ex Bak. in J. Linn. Soc. 11: 362 (1871); Fl. Cap. 6: 278 (1896); Berger in Pflanzenr. 4, 38: 41 (1908). Type: Zululand, *Gerrard* & *McKen* (K!, holo.).

K. modesta sensu Bak. in Bot. Mag. t.7293 (1893); Fl. Cap. 6: 277 (1896) partly as to Bot. Mag. 7293 and *Wood* 4409; Mallett in Gard. Chron. 39: 83 (1906); Berger, in Pflanzenr. 4, 38: 42 (1908); non *K. modesta* Bak. (1889). *K. woodii* Wats. in The Garden 48: 292 (1895) (as "woodi"). Type: Hort. Kew, Oct. 14, 1895 (K! holo.). *K. natalensis* var. *condensata* sensu Bak. in Fl. Cap. 6: 533 (1897), partly, as to syn. *K. woodii*. *K. modesta* var. *woodii* (Wats.) Berger, l.c. (1908). —var. *lutescens* Berger, l.c. 43 (1908). Type: Manderston, *Wood* 5463 (K!, holo.; SAM!). *K. sparsa* N. E. Br. in Gard. Chron. ser. 3, 56: 410 (1910). Type: the plant on which Bot. Mag. t.7293 is based, hort. Kew, Oct. 1893 (K!, holo.). *K. wyliei* N. E. Br. in Kew Bull. 1910: 129 (1910). Type: Zululand, *Wylie* sub *Wood* 8996 (K!, holo.; NH!).

Plants solitary or in small clusters. *Leaves* 8–10 per peduncle, recurving about the middle, 40–120 cm long, 4–14 mm broad, channelled above, keeled below; margin smooth to sparingly serrulate, often only towards the apex. *Peduncle* overtopping the recurved leaves, 25–80 cm long, usually with a few sterile bracts below the inflorescence. *Inflorescence* oblong to narrowly cylindrical, usually tapering towards the apex, 9–35 cm long and 2.8–3.8 cm in diameter dense or lax; buds ascending, overlapped by the bracts, whitish tinged with pink, to yellow or orange; flowers at first spreading, later deflexed, whitish, creamy-yellow or yellow. *Bracts* broadly ovate to oblong, 4–6.5 mm long, 2.5–3 mm broad, concave, obtuse to rounded, rarely acute, scarioso with a median brown nerve; margin minutely serrulate. *Pedicels* 1.5–2 mm long. *Perianth* subcylindrical to narrowly funnel-shaped, 1.1–2.0 cm long, slightly to markedly constricted above the ovary, 1–2 mm in diameter near the base, widening gradually to 4–5 mm at the throat, or widening more or less abruptly about the middle; lobes ovate to oblong, 2–2.5 mm long, rounded, often spreading. *Stamens* in the throat of the perianth or exerted by up to 2 mm at anthesis. *Style* subequal to the stamens at anthesis, eventually exerted by 5 mm. FIGS. 30, 31, 32. PLATE 7. MAP 5.

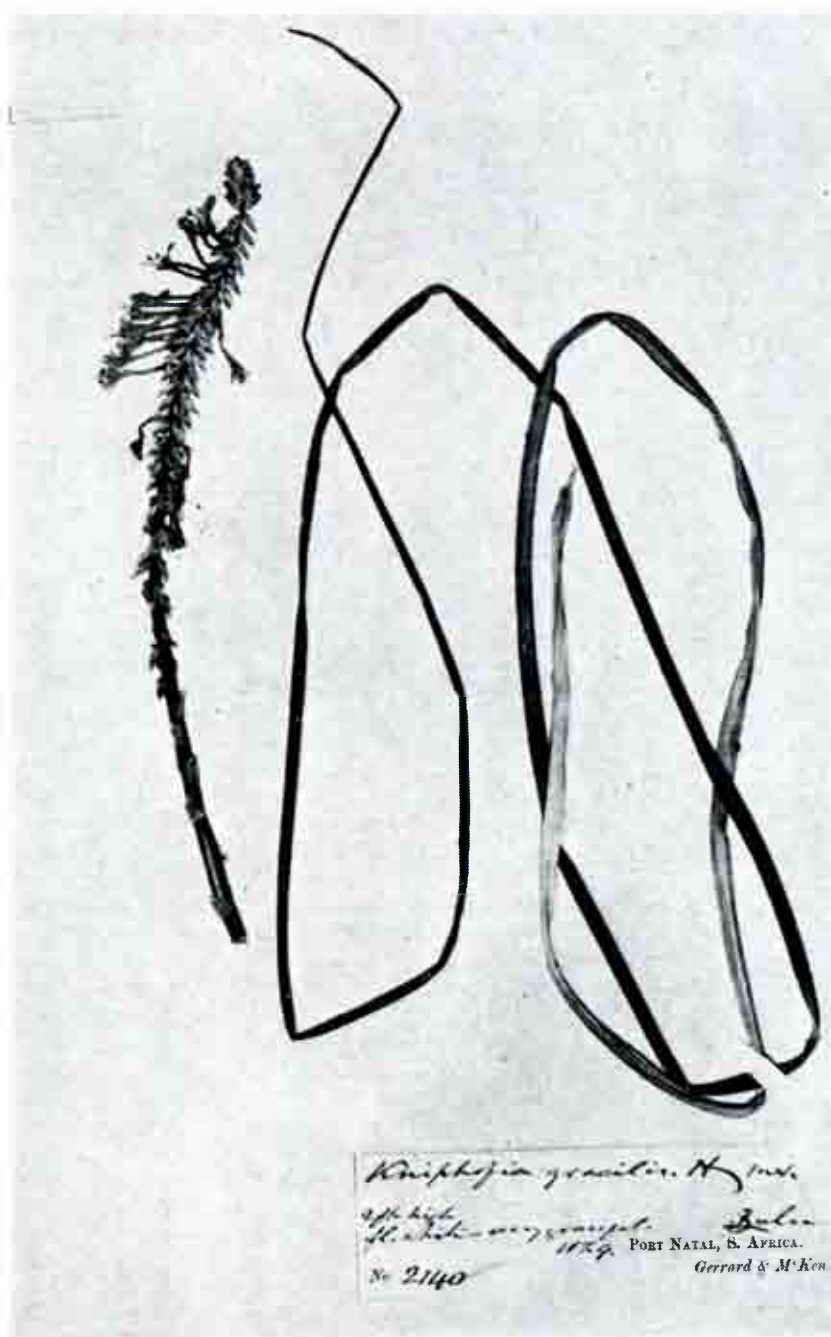


FIG. 30.—*K. gracilis*, holotype in K (Gerrard & McKen 2140 from Port Natal).

Distributed from Mt. Ayliff District in the eastern Cape Province to Hlabisa District in Zululand, occurring on grassy slopes from near sea level to mountain grassland at altitudes of 2,000 to 5,000 ft. The flowering season is from December to April.

CAPE.—Mt. Ayliff: 15½ miles from Kokstad on road to Port St. Johns, flowered in cultivation, Pretoria, *Marais* 850.

NATAL.—Without locality: Hort. Kew, Oct. 1895, type of *K. woodii* (K). District unknown: Mandarston, *Medley Wood* 4827 (K, NH); 5463 (K, SAM); Zululand, *Medley Wood* in NH 11316 (NH) Camperdown: Near Botha's *Medley Wood* s.n. (NH, this sheet bears an original label with the number 978 which is crossed out); 978 (BM); 4409 (K); 6652; Inchanga, *McClellan* s.n. (NH); Bothas Hill, *Strey* 7376; Drummond, *Strey* 7377. Durban: near Durban, *Medley Wood* 11591 (NH); *Jenkins* in TRV 7047; Brighton Beach, *Forbes* 503 (NH); *Bruce* 148; Bluff, near Wentworth, *Strey* 7380. Eshowe: *Medley Wood* 11098 (NH); *Lawn* 279 (NH); Ngoye, *Medley Wood* 10367 (NH); Entumeni, *Medley Wood* in NH 3726 (NH); *Wylie* sub Wood 8996 (K, NH); Umhlatuzi Valley, *Gerstner* in NH 22565 (NH); Melmoth, *Schelpel* 5187 (BM). Hlabisa: Hluhluwe Game Reserve, *Ward* 3376. Ixopo: Highflats, *Gerstner* 7005. Kranskop: 11 miles N.W. of Mapumulo, *Codd* 10191. Nkandla: *Wylie* sub Wood 8824 (NH); near Qudeni, *Codd* 6995; 8 miles S. of Nkandla, *Reynolds* 5851. Port Shepstone: Uvongo Beach, *Liebenberg* 8047. Richmond: Inhlakusa, *Gerstner* 7006. Umzinto: Campbelltown, *Rudatis* 1881 (G, Z).

A good deal of variation is included among the above citations, particularly with regard to length and density of the inflorescence and degree of constriction of the perianth above the ovary (sometimes difficult to interpret in herbarium specimens). Flower colour may also vary from almost white to cream or yellow, usually more deeply pigmented, or tinged with red, towards the apex. In typical *K. gracilis* the inflorescence is short and relatively dense with the perianth 14–20 mm long, more or less parallel-sided, expanding at the mouth. On the other hand, the plants described as *K. woodii* and *K. sparsa* (i.e. "*K. modesta*" of Bot. Mag. t.7293) have lax, elongate inflorescences with the perianth 11–16 mm long, constricted above the ovary and expanding about the middle, varying in colour from white (*K. sparsa*) to yellow (*K. woodii* and *K. modesta* var. *lutescens*). There are, however, several herbarium specimens (including the type of *K. wyliei*) which are intermediate in inflorescence and perianth characters, making it impossible to separate the material satisfactorily into infraspecific groups in the herbarium. The possibility cannot be excluded that further investigation in the field may well reveal good grounds for separating the lax-flowered form as having distinct status.

The somewhat involved citations included in the synonymy of the species have resulted from several extraordinary misconceptions and nomenclatural errors perpetuated by Baker and Berger, and may be clarified by the following explanatory notes. A plant with lax inflorescences and short, white flowers was figured in Bot. Mag. t.7293 (1893), to which the name "*K. modesta*" was erroneously applied by Baker, the true *K. modesta* Bak. (1889) being a synonym of *K. parviflora* Kunth. The mistake was recognized by N. E. Brown, who gave the name *K. sparsa* N. E. Br. (1910) to the Bot. Mag. plate, based on a plant which flowered in Kew Gardens in October, 1893, and is preserved in Kew Herbarium.

Shortly after the above Bot. Mag. plate appeared, W. Watson, in *The Garden* (October, 1895), described a lax-flowered plant under the name *K. woodii* which had yellow flowers and was related to "*K. modesta*". One feels that this was a provisional description and scarcely qualified as valid. Two specimens (flowered September and October, 1895, respectively) are preserved in Kew Herbarium, annotated "*K. woodii*" in N. E. Brown's handwriting. Although the authorship of *K. woodii* is attributed to "Bak." or "Bak. ex Wats.", Baker did not uphold the name and, in *Flora Capensis* 6: 533 (1897), he included "*K. woodii* Bak." in synonymy under *K. natalensis* var. *condensata* Bak., a variety described in *Fl. Cap.* 6: 281 (1896) from a specimen received from Max Leichtlin in January, 1895. This latter specimen is somewhat intermediate, but is nearer to *K. laxiflora* (= *K. natalensis*) than it is to *K. gracilis*.

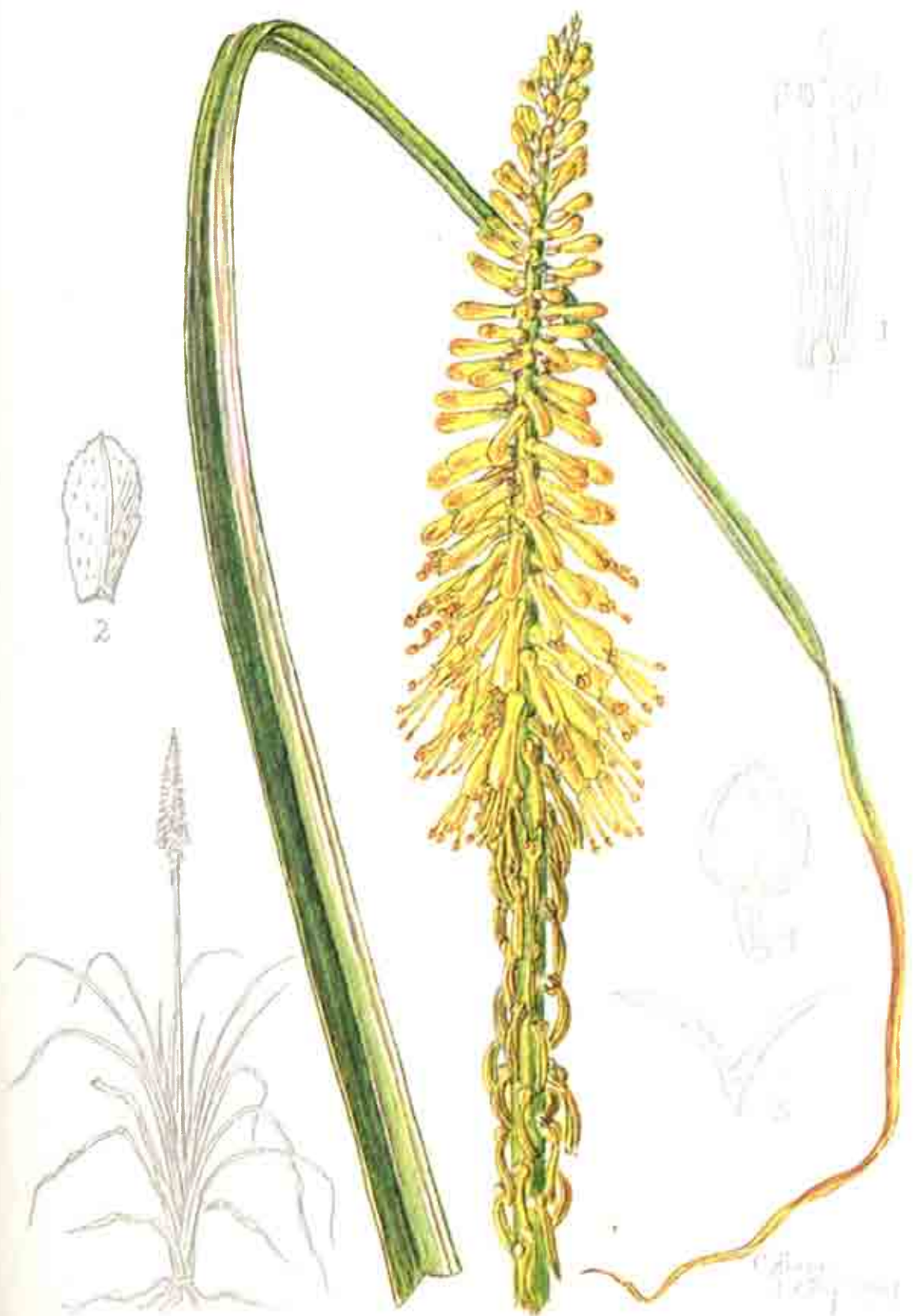


PLATE 7.—*Kniphofia gracilis* Harv. en Bak.



FIG. 31.—*K. gracilis*, typical form with relatively dense inflorescences, at Qudeni (Codd 6995).



FIG. 32.—*K. gracilis*, form with elongate inflorescence from near Durban (Bruce 148).

There followed an inexplicable step by Berger in his monograph, p. 42 (1908). Having correctly cited the type specimen of true *K. modesta* Bak. (1889) under *K. parviflora* Kunth, he upheld the name *K. modesta* Bak. in the sense of the Bot. Mag. plate 7293 (1893). This he distinguished from *K. gracilis* mainly on the basis of the perianth being distinctly constricted near the base. Berger also separated two additional varieties within his "*K. modesta*". One of these, var. *lutescens* Berger, was based on *Medley Wood* 5463 from Manderston, Natal. The other, var. *woodii* Berger (which he validly published), is based on the same plant as *K. woodii* Wats. Both varieties have long, lax inflorescences of yellow flowers and are indistinguishable from one another.

Finally N. E. Brown described *K. wyliei* in 1910. The type, *Wylie* sub Wood 8996 in Kew Herbarium, has a somewhat laxer inflorescence than the type of *K. gracilis*, but there is no justification for separating it from that species.

A few specimens have been seen with perianths about 2 cm long, which are thus intermediate between *K. gracilis* and *K. laxiflora* (perianth usually 2.4–3.2 cm long). The distinction between *K. gracilis* and *K. laxiflora* becomes, therefore, a bit arbitrary, but no advantage can be seen in merging the two and making an even more heterogeneous aggregation of material. Thus the present view is that *K. gracilis* varies in perianth length from 1.1 to 2.0 cm, and in colour from white to yellow (often tinged with red at the apex). In *K. laxiflora*, plants with yellow flowers may be found but there are, in addition, striking shades of red, orange and salmon colours which are not recorded in *K. gracilis*. Both species have oblong, obtuse to rounded bracts as against the species *K. rufa* and *K. ichopensis* in which the bracts are lanceolate and acute to acuminate at the apex.

15. ***Kniphofia laxiflora* Kunth**, Enum. Pl. 4: 552 (1843); Bak. in Fl. Cap. 6: 281 (1896); Berger in Pflanzenr. 4, 38: 50 (1908). Type: Pondoland, between Umtentu and Umsikaba Rivers, *Drege* 4527 (K!, lecto.).

K. natalensis Bak. in J. Bot. Lond. 23: 278 (1885); Fl. Cap. 6: 281 (1896), partly, excl. var. *angustifolia* Bak.; Wood, Natal Pl. 4, 1: t.305 (1903); Berger, l.c. 50 (1908). Type: Inanda, *Medley Wood* 636 (K!, holo.; BM). —var. *condensata* Bak. in Fl. Cap. 6: 281 (1896). Type: Hort. Leichtlin, received Jan. 1895 (K!, holo.). —var. *robustior* Berger, l.c. 52 (1908). Type: Zululand, Tugela River, *Medley Wood* 3871 (K!, holo.). *K. decaphebia* Bak. in Bot. Jahrb. Beibl. 35: 6 (1892); Fl. Cap. 6: 282 (1896); Berger, l.c. 57 (1908). Type: Pondoland, Feb. 1888, *Bachmann* 281 (B†).

Plants solitary or in groups. *Leaves* 8–12 per peduncle, recurving about the middle, 50–120 cm long, 6–10 (rarely–15) mm broad, channelled above, keeled below, semi-glaucous; margin smooth or serrulate. *Peduncle* overtopping the recurved leaves, 40–90 cm long, usually with few to many long sterile bracts below the inflorescence. *Inflorescence* oblong and fairly dense to markedly elongate and lax, tapering at the apex, 10–45 cm long and 4.5–5.5 cm in diameter; buds at first ascending overlapped by the broad bracts; flowers at first spreading, later deflexed, varying greatly in colour from pale yellow or yellow-green to orange, salmon-pink, coral-red or red-orange, but not white or cream, buds usually darker in colour, but not producing a distinctly bicolorous effect. *Bracts* broadly ovate to ovate-oblong, 6–9 mm long, 3 mm broad, concave, obtuse or rounded at the apex, scariose, with a median brown nerve; margin minutely eroso-serrulate. *Pedicels* 1.5–2 mm long. *Perianth* sub-cylindrical, 2.4–3.5 cm long, slightly to markedly constricted above the ovary, often somewhat curved, 2–2.5 mm in diameter above the ovary, widening gradually to 4–5 mm at the throat; lobes ovate to oblong, 2–2.5 mm long, rounded, often spreading. *Stamens* of different lengths, scarcely exerted at anthesis, later withdrawn. *Style* subequal to the stamens at anthesis, eventually exerted by 4–5 mm. *Fruit* ovoid-triquetrous, large, up to 1 cm long. FIGS. 33, 34, 35, 36, 37. MAP 6.

A variable species, found on grassy slopes and among rocks at altitudes from near sea level in the neighbourhood of Port St. Johns, through Pondoland, Natal coastal districts and midlands, to over 5,000 feet above sea level in northern Natal, and just entering southern Transvaal on the northern slopes of the Drakensberg Range. The normal flowering time is from February to May.



FIG. 33.—*K. laxiflora*, typical form growing near Lusikisiki (Codd 9307).

CAPE.—Lusikisiki: between Umtentu and Umsikaba Rivers, *Drege* 4527 (K); near Lusikisiki, *Bruce* 598; *Codd* 9307; 3½ miles N.W. of Mtafufu Mouth, *Codd* 9305; near Dindini Store, *Codd* 9319. Mt. Currie: *Tyson* 1768 (BOL, GRA, SAM); 2 miles W. of Ingeli Forest, *Codd* 8560. Port St. Johns: near Port St. Johns, *Flanagan* 2547; *Bruce* 599. Tabankulu: 5 miles S. of Tabankulu, *Bruce* 593; 14 miles S. of Tabankulu, *Bruce* 595. Umzimkulu: 6 miles S. of Umzimkulu, *Marais* 840; 2½ miles S. of Kingscote, *Marais* 1421.

NATAL.—Alfred: near Staffords Post, *Marais* 844. Dundee: *Shirley* s.n. (NU). Durban: Berea *Medley Wood* 11452. Estcourt: Griffins Hill, *Acocks* 11217; 11218; 11219; 10 miles S.E. of Estcourt *Codd* 8518; near Mooi River, *O'Connor* s.n.; *Germishuizen* 51. Hlabisa: St. Lucia Bay, *Van der Merwe* 2390; *Rodin* 4736; Dukuduku Forest, *Harrison* s.n.; *Codd* 7004; *Killick* 3835; near Hluhluwe, *Harrison* s.n. Mthole Hill, *Letley* H. 18. Impendhle: *Gordon-Gray* s.n.; 10 miles S.E. of Impendhle *Marais* 822. Ixopo: 3 miles N.W. of St. Faiths, *Codd* 9365. Lions River: *Reynolds* 3440; *Codd* 6796; Balgowan, *Bruce* 159; 160; 163; *Tweedie*, *Mogg* 1357; Lidgetton *Medley Wood* 9762 (NH); *Mogg* 3568; near Nottingham Road, *Gerstner* s.n.; near Howick, *Medley Wood* in NH 3583 (NH); Karkloof, *Wylie* s.n. (NH). Mtunzini: Ngoya, *Medley Wood* 10367 (NH); *Huntley* 264; near Mtunzini, *Codd* 9646; *Gerstner* s.n. (NH). Ndwedwe: Inanda, *Medley Wood* 636 (BM, K); 4762 (NH). Ngotshe: near Ngome, *Bruce* 294; 296; 299. Paulpietersburg: between Kempplust and Paulpietersburg, *Bruce* 290. Pietermaritzburg: Zwartkop, *Medley Wood* 11424 (NH). Polela: near Bulwer, *Codd* 8541. Port Shepstone: 8 miles N. of Port Shepstone, *Codd* 9354. Richmond: *Gerstner*

7007; 7008. Stanger: Tugela River, *Medley Wood* 3871 (K). Umzinto: Dumisa, *Rudatis* 617 (BM, K, Z). Underberg: *McClellan* 620 (NH); 621 (NH). Utrecht: 4 miles W. of Viljoenspos, *Codd* 7955; 9 miles N.E. of Utrecht, *Bruce* 288.

TRANSVAAL.—Amersfoort: 12 miles S.W. of Dirkiesdorp, *Bruce* 279.

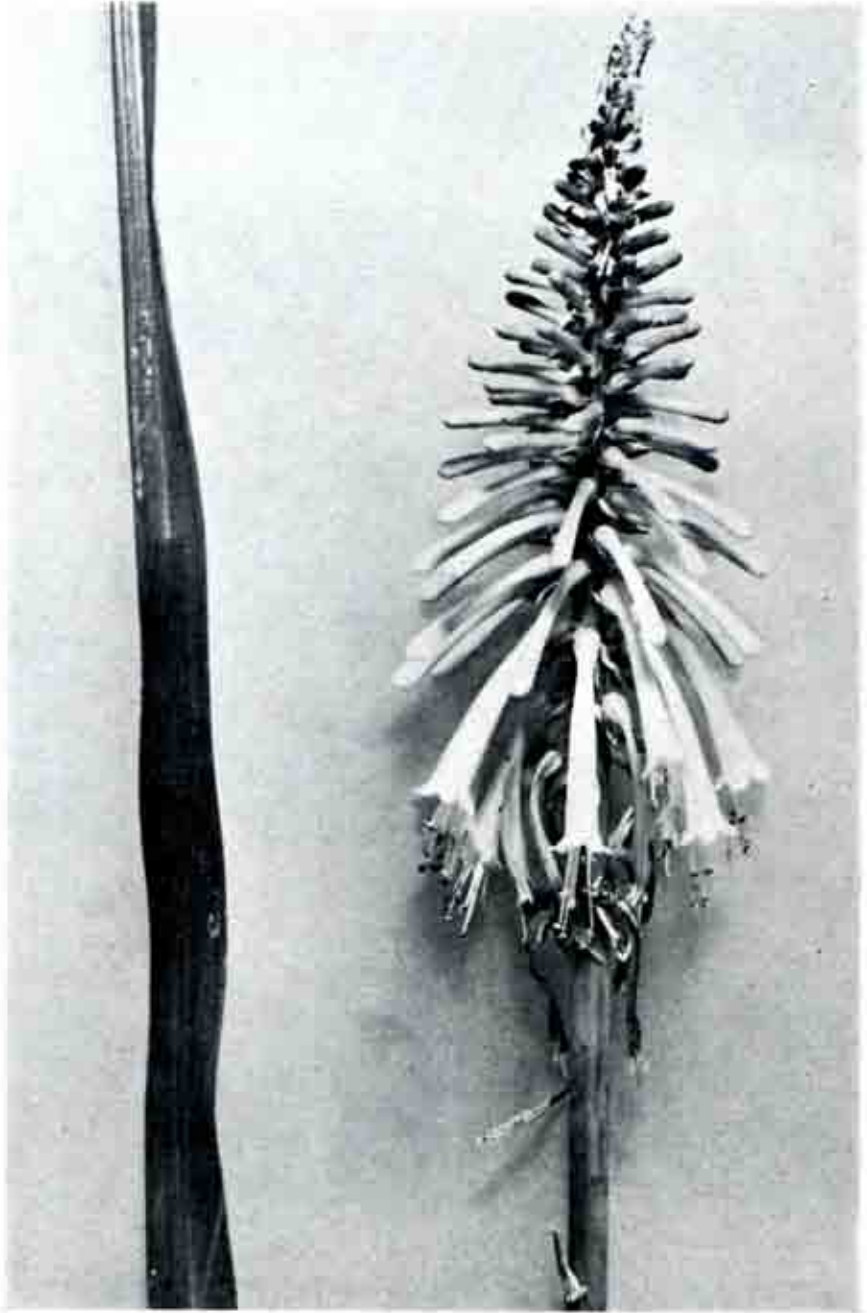


FIG. 34.—*K. laxiflora*, typical form (*Codd* 9307 from Lusikisiki).



FIG. 35.—*K. laxiflora*, form with fairly elongate inflorescences, near Nottingham Road (N. R. Smuts 1021).

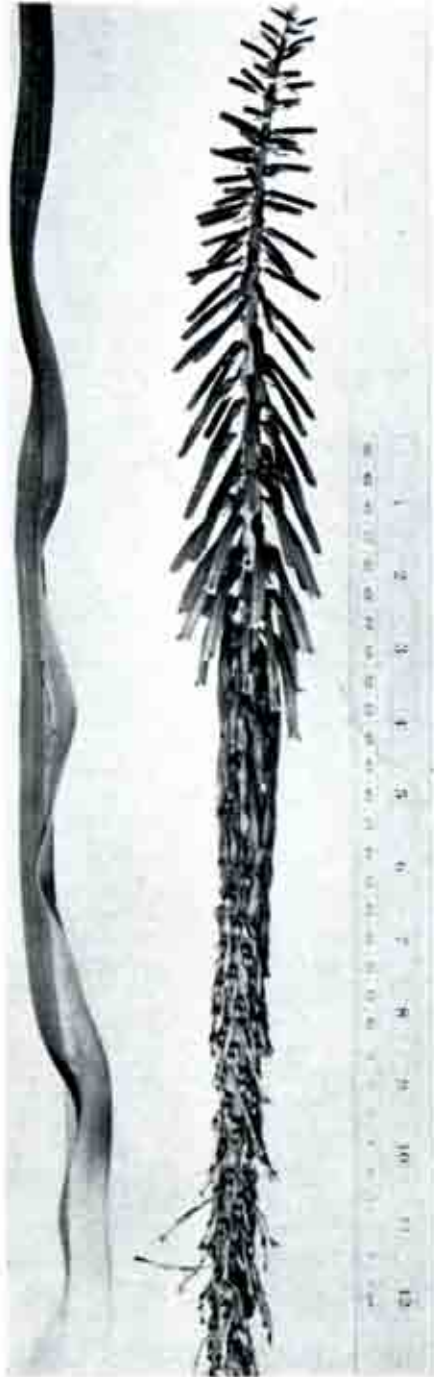


FIG. 36.—*K. laxiflora*, form with markedly elongate inflorescences, from near Estcourt, $\times \frac{1}{2}$ (Codd 8518).

The decision to reduce *K. natalensis* to synonymy results from the difficulty experienced in attempting to subdivide the specimens cited above into distinct groups. *K. decaphlebia* has also been included although the type in Berlin has been destroyed and no further material of the type gathering has been seen. Berger, who saw the type, included it in the *K. uvaria* complex but, from the description, flowering time and locality, it could equally well be a form of *K. laxiflora*. The separation of these as distinct species on the basis of the keys provided in *Flora Capensis* and Berger's monograph does not work in practice when a range of material is available.

However, it is possible to recognise three main forms among the above citations and further field work is necessary to determine what status should be given to them. At this stage in our knowledge it is preferred not to give them separate taxonomic rank. The characteristics and distribution of the three forms is set out below.

Form A. This is the typical form represented by *Drege* 4527. The plants tend to be solitary or in small groups; the inflorescence is relatively short, 8–20 cm long, fairly dense about the middle, tapering and more lax towards the apex; flower colour varies mainly from orange-red to yellow. The distribution of this form covers a wider area than the other two, extending from Port St. Johns, through Pondoland and along the coastal areas of Natal to Lake St. Lucia in the north. In the northern part of the range, for example in Mtunzini and Hlabisa Districts, only the yellow flower colour is recorded, and the plants tend to flower later (April–May) than is the case further south (February–April).

Form B. This form is commonly found in the Natal Midlands and extends from East Griqualand to the Estcourt District and may overlap with Form A between Pietermaritzburg and Durban. The two forms cannot always be distinguished in the herbarium. The plants of Form B tend to be in clusters, on grassy slopes or among rocks; the inflorescence is distinctly elongate, 18–45 cm long, and lax-flowered, tapering gradually to the apex; flower colour shows an extensive range from pale yellow or yellow-green to orange, salmon-pink, coral-red or orange-red, the colour varying among adjacent plants. Flowering time is normally February–March, and the groups of graceful inflorescences in various shades of colour make this one of the most attractive members of the genus. Although the name *K. natalensis* Bak. has frequently been applied to this form, it is not at all certain that the type, *Wood* 636 from Inanda (in Herb. Kew), represents this form with the markedly elongate inflorescences. As regards the varietal names included in synonymy, var. *condensata* Bak. is based on a cultivated plant in the garden of Max Leichtlin, Baden-Baden. The type material at Kew consists of several inflorescences in the bud stage with densely imbricate bracts; one inflorescence, which is partly open, has flowers (possibly abnormal) about 2 cm long, and a leaf about 2 cm broad. This may be an abnormal specimen of Form B, but var. *condensata* Bak. is best treated as a name of dubious application. The other variety, *robustior* Berger, is based on *Wood* 3871 (in Herb. Kew) from Zululand and also appears to represent Form A rather than Form B.

Form C. This form occurs among dolerite rocks in the Drakensberg range north-east of Utrecht. The plants grow in groups with subglaucous, arcuate-spreading leaves, and the inflorescence is relatively short, 12–18 cm long, dense at the middle and somewhat laxer towards the tapering apex; the flower colour is generally yellow-green with the buds often tinged with dull red. Not many gatherings of this form are known and it requires further investigation.

K. laxiflora may be distinguished from other lax-flowered species, such as *K. ichopensis* and *K. tabularis*, by its broader bracts which are rounded or obtuse at the apex. A few specimens have been seen, however, with bracts of intermediate shape, which may be hybrids.



FIG. 37.—*K. laxiflora*, form growing in northern Natal, always among rocks (Codd 6955).

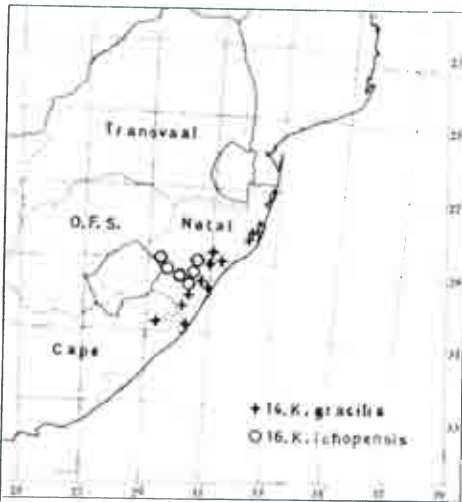
16. ***Knopphofia ichopensis*** Bak. ex Schinz in Bull. Herb. Boiss. ser. 2, 2: 1066 (1902); Berger in Pflanzenr. 4, 38: 52, t.20E (1908); Codd in Flow. Pl. Afr. 33: t.1292 (1959). Type: Natal, Ixopo, *Schlechter* 6662 (K!, holo.; BOL!, GRA!, PRE!, Z!).

K. schlechteri Bak. in Bull. Herb. Boiss. ser. 2, 1: 784 (1901), non Schinz (1900). Type: as for *K. ichopensis*.

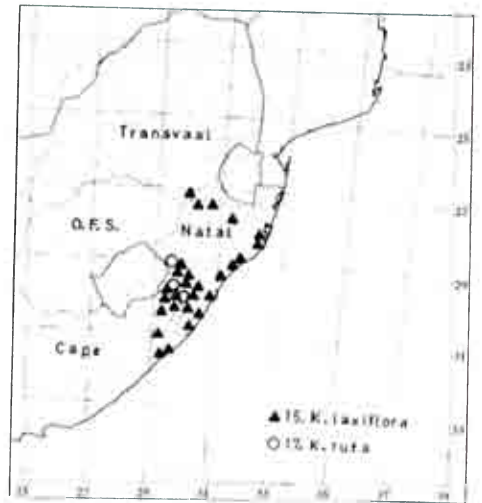
Plants solitary or in small groups. *Leaves* 6–8 per peduncle, more or less distichous, soft, erect or curving over near the apex, 50–80 cm long and 5–10 mm broad, dull green to subglaucous, shallowly channelled above and keeled below; margin and keel smooth or remotely and minutely denticulate towards the apex. *Peduncle* 50–90 cm long, overtopping the leaves, with 2 or 3 sterile deltoid bracts below the inflorescence. *Inflorescence* lax, oblong-cylindrical, 10–30 cm long and 6–7 cm in diameter; buds dull yellow, often tinged with red, to coral or dull red; flowers at first spreading, soon deflexed, varying in colour from cream to yellow-green or, rarely, salmon-pink. *Bracts* lanceolate to linear-lanceolate, acute to acuminate, 7–11 mm long, 2.5 mm broad

near the base; margin entire. *Pedicels* 2–3.5 mm long. *Perianth* subcylindric, often slightly arcuate, not constricted above the ovary, 3.0–4.2 cm long, 2.5–3.5 mm broad at the base, widening gradually to 4–5 mm at the throat; lobes ovate, 4 mm long, not spreading. *Stamens* included or slightly exerted at anthesis, later withdrawn; anthers usually visible through the perianth tube. *Style* subequal to the stamens at anthesis, finally exerted by 3–5 mm. *Fruit* subglobose to ovoid, about 6 mm long, not markedly triquetrous. PLATE 8. MAP 5.

Found in grassy vleis and marshy places, occurring mainly in the Natal Midlands, from Pietermaritzburg and Greytown to the foothills of the Drakensberg in the Estcourt District, at altitudes of 3,000 to 6,500 ft. Flowering is mainly from December to March, but may be as early as November and as late as April.



MAP 5.—Distribution of *Kniphofia gracilis* and *K. ichopensis*.



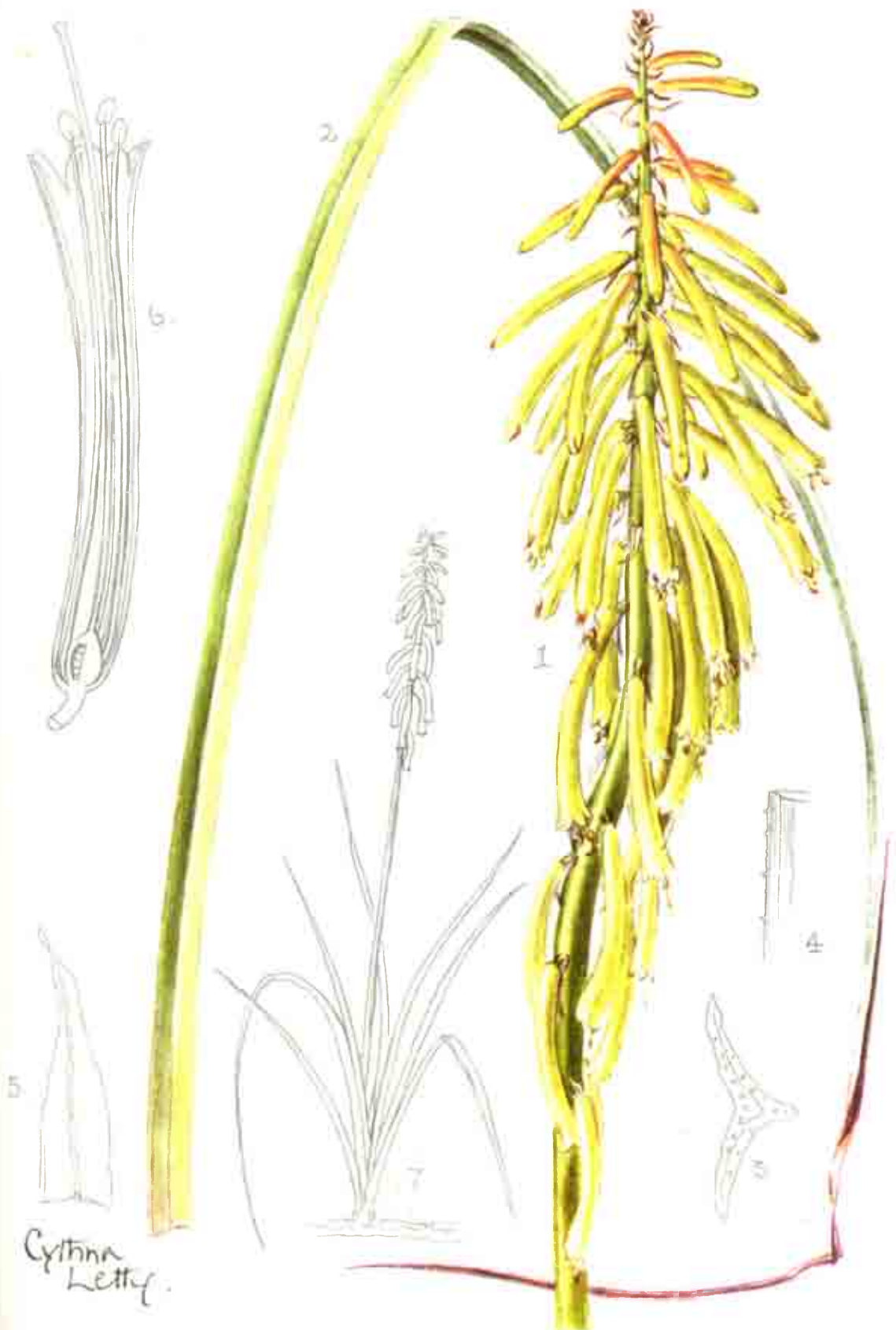
MAP 6.—Distribution of *Kniphofia laxiflora* and *K. rufa*.

NATAL.—Estcourt: Kamberg, *Smuts* 1066; Tabamhlope, *Pentz* 67; *West* 595; *Killick & Marais* 2167; Highmoor Forest Station, *Killick & Vahrmeijer* 3590; 3648; Giants Castle Game Reserve, *Trauseld* 372a. Ixopo: *Schlechter* 6662. Lions River: Fort Nottingham, *Buchanan* 142 (K); *Wylie* sub Wood 7154; Lidgetton, *Medley Wood* 6334 (K, NH); Nottingham Road, *Shirley* s.n. (NU); 15 miles S.W. of Nottingham Road, *Codd* 10651. New Hanover: between Pietermaritzburg and Greytown, *Killick & Marais* 2112; *Hardy* s.n. Pietermaritzburg: Zwartkop, *Medley Wood* in NH 11341 (NH); *Reynolds* 3721. Umvoti: near Greytown, *Wylie* in NH 21686 (NH); *Killick & Marais* 2114.

In its lax, usually concolorous inflorescence, *K. ichopensis* resembles some forms of *K. laxiflora*, but it may be recognised by the narrowly lanceolate, acute to acuminate bracts, and by the perianth showing no constriction above the ovary. Its nearest affinity is *K. rufa* Bak. a variable species discussed under the next heading, and there is some indication of intergrading between the two. *K. ichopensis* is the more robust of the two with longer, broader (5–10 mm) leaves and taller, stouter peduncle with longer flowers (3.0–4.2 cm long).

17. *Kniphofia rufa* Bak. in *Bot. Mag.* t.7706 (1900); Mallett in *Gard. Chron.* 39: 101 (1906); Berger in *Pflanzenr.* 4, 38: 56 (1908). Type: Hort. Max Leichtlin, Baden-Baden (K!, holo.).

K. natalensis var. *angustifolia* Bak. in *Fl. Cap.* 6: 281 (1896). Type: Natal, Tabamhlope Mt., 6–7,000 ft., February, 1895, *Evans* 411 (K!, holo.; NH!, PRE!).



Cytherea
Letty.

PLATE 8.—*Kniphofia ichopensis* Bak. ex Schinz

Plants solitary or in small groups. *Leaves* 6–10 per peduncle, not distichous, soft, erect at first, later arcuate, 40–70 cm long and 2–5 (–8) mm broad, dull green to subglaucous, more or less triangular in cross section with a narrow channel above, slightly keeled below; margin and keel smooth or remotely denticulate towards the apex. *Peduncle* 40–65 cm long, slender, overtopping the leaves, with an occasional sterile deltoid bract below the inflorescence. *Inflorescence* usually lax, rarely subdense, oblong-cylindrical, 8–25 cm long and 5–6 cm in diameter; buds cream or dull yellow to orange-red; flowers pendulous, often somewhat arcuate, varying in colour from white to cream, yellow or coral-red. *Bracts* lanceolate to linear-lanceolate, acute to acuminate, 6–10 mm long, 2–2.5 mm broad near the base, margin entire. *Pedicels* 2–3 mm long. *Perianth* subcylindric, not constricted above the ovary, 1.9–3.0 cm long, 2.5 mm broad at the base, widening gradually to about 4 mm broad at the throat; lobes ovate, 2.5 mm long, not or slightly spreading. *Stamens* included or slightly exerted at anthesis, later withdrawn; anthers usually visible through the perianth tube. *Style* subequal to the stamens at anthesis, finally exerted by 3–5 mm. *Fruit* subglobose to ovoid, about 6 mm long, not markedly triquetrous. FIGS. 38, 39, 40. PLATE 2a. MAP 6.

Found beside mountain streams, on grassy slopes and in marshy places in mountain grassland, at altitudes of 4,500 to 7,500 ft., chiefly along the eastern slopes of the Drakensberg range from Polela to Estcourt Districts. The flowering season extends from the end of November to early April, the peak period being January–March.

NATAL.—Estcourt: Tabamhlope Mt., *Evans* 411; *West* s.n.: Bushmans Pass, *West* s.n.; Cathkin Park, *Galpin* 11347; 11759; 11774; Cathedral Peak Forest Station, *Killick* 1405; 1431; 1442; 1466; 1467; *Bruce* 407; *Germishuizen* 47; 48; near White Mt. Inn, *Killick & Marais* 2161; *Kamberg*, *Smuts* 1064; 1065; 1072, *Wright* 2. Lions River: near Nottingham Road, *Smuts* 1028/1; 1028/2; 1038; 1039; 1414; *Codd* 8533. Polela: near Bulwer, *Lansdell* in NH 15802 (NH); *Killick & Marais* 2099; Marwagwa Mt., *Pole Evans* 4869; upper Umkomaas, *Van der Merwe* 2830.

This species is characterised by its narrow, grass-like leaves and slender inflorescences which are medium-lax to very lax, with flowers about 2–3 cm long, varying in colour from white to yellow or coral-red. The latter colour is particularly attractive and is reminiscent of the flower colour found in the *K. triangularis* complex. The variation is reflected in the multiple gatherings made by several modern collectors (usually with notes on flower colour) but, unfortunately, the colours cannot be discerned in most herbarium specimens. Largely for this reason, no attempt has been made to subdivide the species into varieties, though further study may well reveal that subdivision is possible.

There is, for instance, some indication that colour may be associated with perianth length. At one end of the range of variation is the type of *K. natalensis* var. *angustifolia* (*Evans* 411) with white flowers about 1.9 cm long, and medium-lax inflorescences. At the other extreme are specimens with coral-red flowers about 3 cm long, borne on elongate, often arching inflorescences. These latter plants are among the most graceful members of the genus. Some specimens of this form have inflorescences which are more compact than usual, and are then difficult to separate with certainty from the Natal form of *K. triangularis* subsp. *triangularis* (see p. 000). Thus it is necessary to consider whether the plants with coral-red flowers should not rather be placed as a lax-flowered variety of *K. triangularis* than as a colour form of *K. rufa*. It seems probable that *K. triangularis* has played a part in the evolution of the lax, coral-red inflorescences but, as mentioned earlier, colour is not easily discerned in herbarium specimens, whereas a separation can be made on the basis of relative density. It is, therefore, preferred to include these plants as a colour form of *K. rufa*.

The type of *K. rufa* is a plant of doubtful background and is not matched exactly by any plant collected in the wild state. It was grown by Max Leichtlin in his nursery at Baden-Baden and forwarded to Kew in June, 1899, where it was figured for the

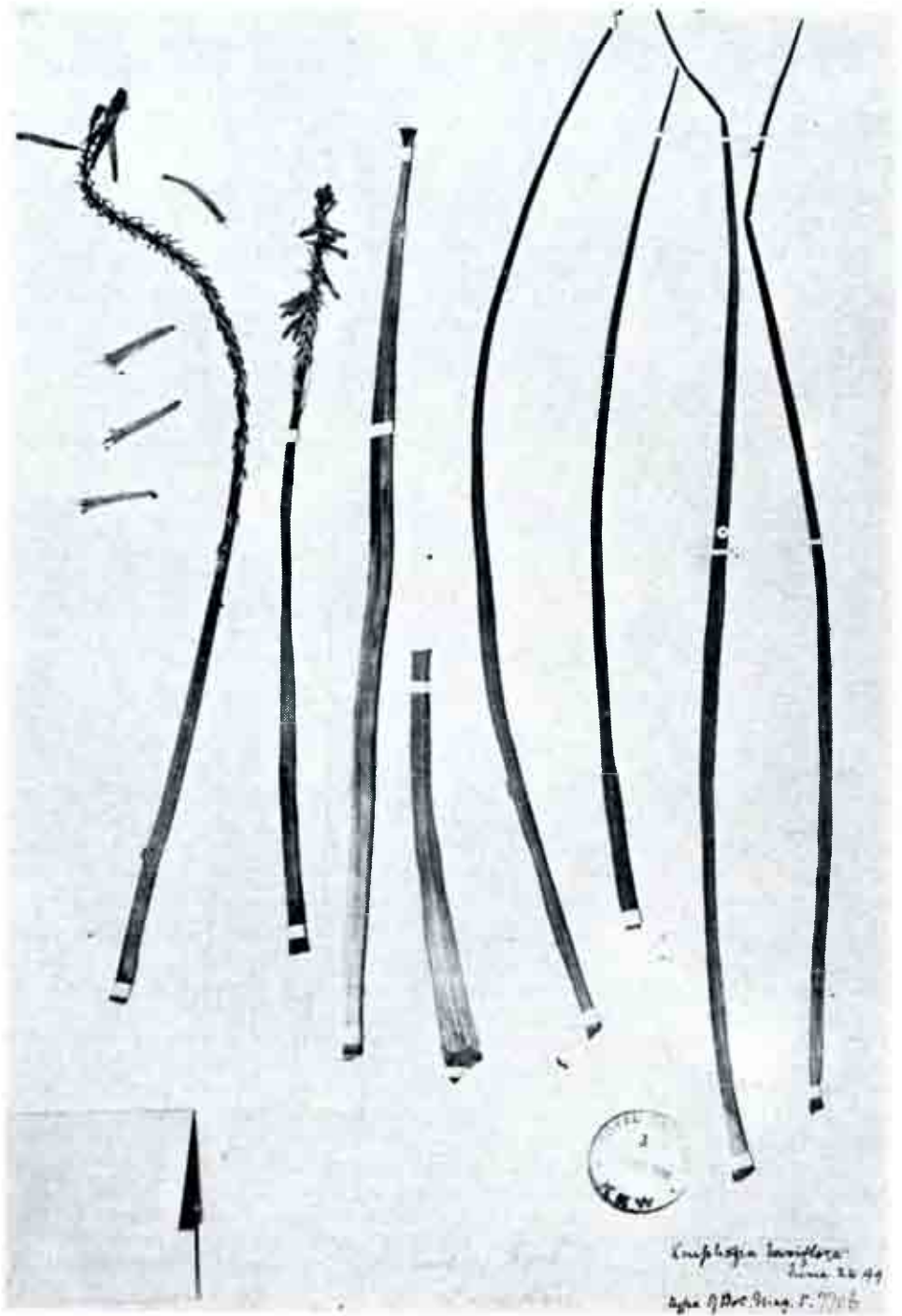


FIG. 38.—*K. rufa*, holotype in K (cultivated plant).

Botanical Magazine t.7706, published in 1900. The specimen is preserved in Kew Herbarium, together with a specimen cultivated subsequently at Kew. The illustration shows a medium-lax inflorescence of yellow flowers about 2.4 cm long, tinged with red in the bud stage. The floral characters are not unlike some of the wild specimens cited above, but the leaves are somewhat broader, namely, 8 mm broad as against 2–5 mm for the wild specimens.



FIG. 39.—*K. rufa*, form with coral-red flowers (N. R. Smuts 1064, Kamberg, Natal). Photo by Dr. N. R. Smuts.

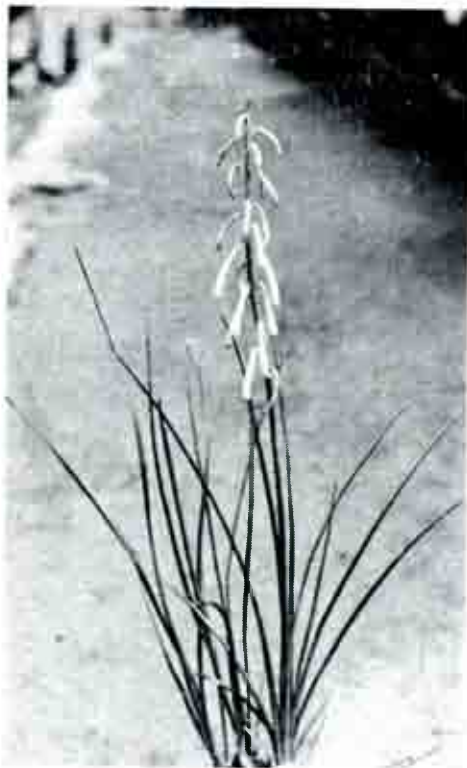


FIG. 40.—*K. rufa*, form with white flowers (N. R. Smuts 1028 I from Nottingham Road, Natal). Photo by Dr. N. R. Smuts.

Regarding the origin of the type plant, Max Leichtlin reports in a letter to Kew, which is filed with the type specimen: "The *Kniphofia* came with original seeds of *K. nelsonii* and seeing some difference in leafage I kept it separate". Unfortunately he does not record where the seeds of *K. nelsonii* (now placed as a synonym of *K. triangularis*, p. 469) came from. It may also be significant to quote from Mallett in Gard. Chron. 39: 101 (1906): "It appears incapable of producing seeds, and the pollen is often sterile".

There is thus some indication that the type of *K. rufa* is of hybrid origin, but the evidence is inconclusive. Although the most desirable procedure would be to discard the name *K. rufa*, it seems necessary to accept, though with reluctance, the nomenclatural legacy resulting from the repeated descriptions of species based on cultivated plants, and to apply the name to the taxonomic group which it resembles most closely (see also *K. praecox*, p. 445 and *K. citrina*, p. 497).



FIG. 42.—*K. pauciflora*, inflorescence, life-size (Reyburn s.n.).

FIG. 41.—*K. pauciflora*, from near Pinetown (Reyburn s.n.).

18. *Kniphofia pauciflora* Bak. in J. Bot. Lond. 23: 280 (1885); Gard. Chron. ser. 3, 12: 65, t.10 (1892); Bot. Mag. t.7269 (1892); Fl. Cap. 6: 279 (1896); Mallett in Gard. Chron. 39: 101, t.43 (1906); Berger in Pflanzenr. 4, 38: 41 (1908). Syntypes: Natal, Sanderson 416 (K!); Clairmont Flats, Wood 1096 (K!, NH!).

K. pedicellata Bak. in Bull. Herb. Boiss. ser. 2, 4: 998 (1904). Type: Clairmont, Schlechter 3160 (Z!).

Plants with short stolons forming groups of stems. *Leaves* 4–6 per peduncle, soft, erect, yellow-green, 20–35 cm long, 2–8 mm broad, shallowly channelled above and keeled below, more or less triangular in cross section; keel and margin smooth. *Peduncle* overtopping or subequal to the leaves, 30–50 cm long. *Inflorescence* ovoid, lax, few-flowered, 3–10 cm long and 3–3.5 cm in diameter; buds ascending, deep yellow; flowers at first ascending, eventually deflexed, yellow to pale yellow. *Pedicels* 3–4 mm long. *Bracts* narrowly lanceolate, gradually acuminate, 4–6 mm long; margin entire. *Perianth* narrowly funnel-shaped, 1.4–1.8 cm long, not constricted above the ovary, 2.5 mm in diameter near the base, increasing to 5–6 mm at the throat; lobes

ovate, obtuse, 3 mm long, spreading. *Stamens* exerted by 2–3 mm at anthesis, later withdrawn. *Style* subequal to the stamens at anthesis, eventually exerted by 5 mm. *Fruit* small, subglobose. FIGS. 41, 42.

Known only from a restricted area near Durban, where it grows in marshy grassland. Flowering is mainly from September to November.

NATAL.—District unknown: *Sanderson* 416 (K); between Durban and Pietermaritzburg, *Wahlberg* s.n. (S). Durban: Clairmont, *Medley Wood* 1096 (BOL, K, NH); 4662 (BOL, NH, Z); 7293; 10495 (NH, Z); *Schlechter* 3160 (Z). Pinetown: on road to Marionhill, *Reyburn* s.n.

With its short stature and small lax inflorescences, this is one of the least conspicuous members of the genus. It shows some relationship to *K. rufa* (p. 434), but its nearest affinity is clearly to the solitary species in Madagascar, *K. pallidiflora* Bak., which has short, funnel-shaped flowers and long pedicels.

The species is threatened as a result of urban development around Durban and can no longer be found at the type locality, Clairmont. The late Mr. J. W. Reyburn, who collected specimens near Marionhill in 1951 and 1954, informed me that the area has since been drained and the plants which he knew can no longer be found.

19. *Kniphofia tabularis* *Marl.* in Trans. S.A. Phil. Soc. 18: 49 (1907); Fl. S. Afr. 4: 102, t.24c (1915); Berger in Pflanzenr. 4, 38: 329 (1908). Type: Cape, Table Mountain, *Marloth* 4366 (PRE!, holo.; BOL!).

Plants in groups in crevices on moist cliff faces. *Leaves* 12–18 per peduncle, soft, bright green, pendulous, 60–150 cm long, 6–20 mm broad, channelled above and keeled below, breaking into numerous fibres at the base, the outer short, broad and sheathing at the base; keel and margin smooth. *Peduncle* curving-erect, 60–120 cm long, with an occasional sterile bract below the inflorescence, occasionally branching. *Inflorescence* very lax, oblong to cylindrical, 10–25 cm long, 5.5–7 cm in diameter; buds ascending; flowers at first ascending, later spreading and eventually deflexed, red or scarlet to pale orange, blackish at the tips of the lobes. *Pedicels* conspicuous, 5–7 mm long, elongating to 10 mm in fruit. *Bracts* linear-lanceolate, long-acuminate to aristate, 7–11 mm long, 2–2.5 mm broad; margin entire. *Perianth* subcylindrical, 2.4–3 cm long, not constricted above the ovary, 2.5 mm wide at the base, widening to 6–7 mm at the throat; lobes ovate, 3 mm long, not spreading. *Stamens* in the throat or slightly exerted at anthesis, yellow. *Style* finally exerted by 3 mm. *Fruit* subglobose to ovoid, 7 mm long. MAP 8.

Grows on moist cliffs on the southern aspect of Table Mountain and in similar situations on mountains in neighbouring districts at altitudes of 2,500 to 5,500 ft. Flowers appear in December and January. *Marloth* states: "A very handsome plant which seems to grow in a few, not easily accessible spots and, as the flowering season hardly lasts one month, the plant would not be noticed during the remainder of the year. The flowers were visited by sugarbirds (*Anthobaphes violacea*) and a butterfly (*Meneris tulbaghia*)".

CAPE.—Caledon: Hottentot Holland Mts., *Stokoe* 201; Landdrost Kop, *Esterhuysen* 2638 (BOL). Peninsula: Table Mt., *Bolus* in BOL 24692 (BOL); *Marloth* 4366; *Bruce* 245; *Esterhuysen* 24694; *Compton* 12936 (NBG). Stellenbosch: Banhoek Mts., *Marloth* 10028; *Esterhuysen* 14369; Victoria Peak, *Esterhuysen* 9733; Drakenstein Mts., *Stokoe* s.n. (BOL, SAM). Tulbagh: Groot Winterhoek, *Andrae* 903; 1132. Worcester: Milner Peak, *Esterhuysen* 14236 (BOL); Waaihoek Peak, *Esterhuysen* 18341.

A distinct species with long, pendulous leaves, markedly lax inflorescences and long pedicels, first collected on Table Mt. by *Bolus* in December, 1879. The peduncle occasionally branches sparingly.

20. *Kniphofia ensifolia* Bak. in J. Bot. Lond. 23: 278 (1885). Type: Transvaal, Matebe River, *Holub* 1530 (K!, holo.).

Plants in groups. *Leaves* 8–12 per peduncle, erect, bending over towards the apex, glaucous, 50–120 cm long, 1.5–3.5 cm broad, V-shaped in cross section, broad and chartaceous at the base, not breaking up into fibres; margin and keel usually conspicuously serrulate, rarely smooth. *Peduncle* 60–180 cm long with usually a few sterile bracts below the inflorescence. *Inflorescence* very dense, cylindrical, tapering slightly towards the apex, 9–20 cm long and 3.5–4 cm in diameter; buds spreading, greenish-white, red-tinged, or dull to flame-red; flowers pendulous, greenish white to cream or yellow (subsp. *autumnalis*) with a green line down each perianth lobe. *Pedicels* 2–3 mm long, increasing to 5 mm in fruit. *Bracts* lanceolate to linear-lanceolate, gradually acuminate, 7–10 mm long, 2 mm broad at the base; margin smooth or, rarely, minutely eroso-serrulate. *Perianth* narrowly funnel-shaped, 1.5–2 cm long, 2–2.5 mm in diameter at the base, expanding about the middle to 4–5 mm and eventually 5–6 mm at the throat; lobes ovate, 2.5 mm long, not spreading. *Stamens* exerted by 6–8 mm or more at anthesis. *Style* subequal to the anthers at anthesis, eventually exerted by 8–10 mm. *Fruit* subglobose, 6 mm long.

A robust species with an essentially inland distribution west of the Drakenberg escarpment. Two subspecies are recognized as indicated below.

Flowering time October–December; flowers on opening white to greenish white (a) subsp. *ensifolia*
Flowering time February–March; flowers on opening usually yellowish. (b) subsp. *autumnalis*

(a) subsp. *ensifolia*.

K. ensifolia Bak. in J. Bot. Lond. 23: 278 (1885); Fl. Cap. 6: 280 (1896); Berger in Pflanzenr. 4, 38: 45 (1908); Letty, Wild Flows. Tvaal. 33, t.19, 2 (1962). Type: Transvaal, Matebe River, *Holub* 1530 (K!, holo.). *K. tuckii* Bak. in Gard. Chron. 13: 68 (1893); Fl. Cap. 6: 278 (1896); Bot. Mag. t.7644 (1899); Bean in The Gard. 58: 232 (1900); Mallett in Gard. Chron. 39: 101 (1906); Berger, l.c. 56 (1908). Type: Hort. Leichtlin, from plants collected originally at Colesburg by Mr. Tuck (K!, holo.). *K. foliosa* sensu Bak. in Fl. Cap. 6: 279 (1896), non Hochst. *K. pumila* sensu Bak., l.c. 279 (1896), non (Ait.) Kunth. *K. rivularis* Berger, l.c. 55, t.21D, E (1908); Dyer in Fl. Pl. S. Afr. 22: t.866 (1942). Type: Transvaal, Modderfontein, *Conrath* 643 (W, holo.†; K!). *K. ensifolia* var. *albiflora* E. A. Bruce in Bothalia 7: 231 (1951). Type: Transvaal, 13 miles W. of Witbank, *Codd & de Winter* 3156 (PRE!, holo.).

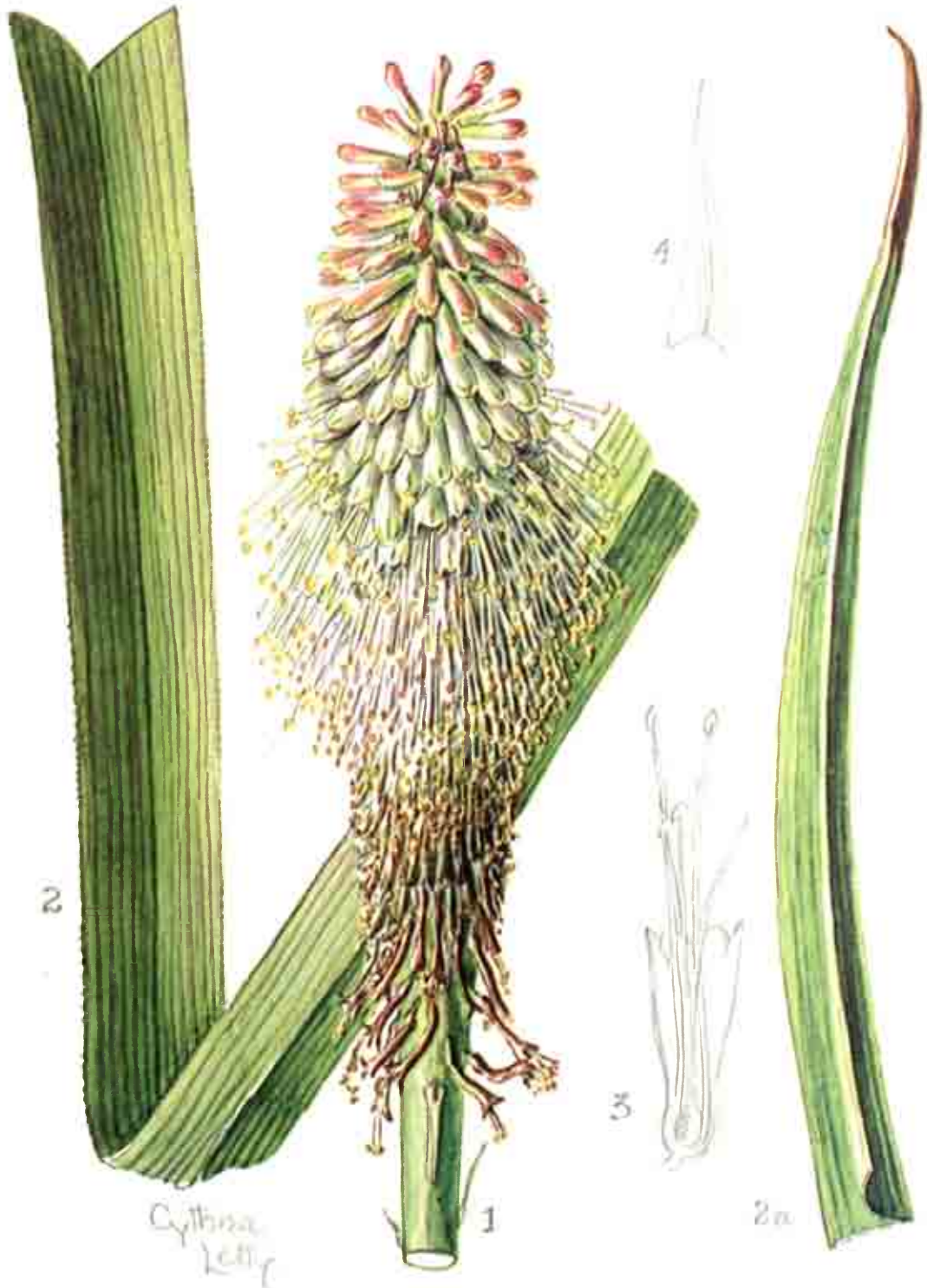
In the typical subspecies the open flowers are white to greenish white while the buds may or may not be pigmented with red to dull red. Flowering time is during early summer from October to December and the plants are locally frequent in marshy places and on stream banks, usually on black clay soil, from the relatively dry areas of the northern Cape and western O.F.S., across the western and central Transvaal to Lydenburg District in the east and northwards to the Waterberg District. FIG. 43. PLATE 9. MAP 7.

WITHOUT LOCALITY: ex Hort. Kew 1786 (BM).

CAPE.—Barkly West: near Koopmansfontein, *Leistner* 948. Burghersdorp: *Rev. T. W. Pocock* 86 (GRA); Colesberg: near Colesberg, *Shaw* s.n. (K); *Bruce* 220; between Colesberg and Steynsburg, *Marais* 276. Kuruman: *Kosifontein*, *Burchell* 2554 (K). Phillipstown: near Petrusville, *Van der Walt* s.n.; 16 miles S.W. of Phillipstown, *Bruce* 219a. Steynsburg: between Steynsburg and Venterstad, *Theron* 889.

O.F.S.—Bloemfontein: Dewetsdorp road, *Potts* 1018 (UOFS); Fauresmith: near Groenvlei, *Verdoorn* 1035; 2176; near Veld Reserve, *Bruce* 217a, 217b; 16 miles S.E. of Fauresmith, *Bruce* 218; 24 miles S.W. of Fauresmith, *Bruce* 221.

TRANSVAAL.—Belfast: near Draaikraal, *Codd* 8058. Bronkhorstspruit: 5½ miles E. of Bronkhorstspruit, *Codd* 10077; farm Wag-n-bietjekop, *Francis* 1. Johannesburg: Bezuidenhout's Valley, *Rand* 1091 (BM); near Zoo Lake, *Moss* 17750 (WU); Parkwood, *Moss* 17815 (WU); Wattles, *Moss* 13700 (WU); Florida, *Moss* 10020 (WU); Frankenwald, *Gilliland* in WU 26173; Jackson's Drift, *Gilliland* in WU 26225; Modderfontein, *Conrath* 643 (K). Krugersdorp: King's Kloof, *Moss* 10506 (WU). Lydenburg: Sekukuniland; farm Schoonoord, *Barnard* 163. Marico: Matebe River, *Holub* 1530



Cyrtosia
Lettig

PLATE 9.—*Kniphofia ensifolia* Bak. subsp. *ensifolia*

(K); Linokana, *Bruce* 231; 462; Eersteling, *Leendertz* 4043. Middelburg: 40 miles N. of Middelburg: *Rogers* 24829; Olifants River, *Reynolds* 2142; Slaghoek, *Prosser* 1878; 2 miles E. of Middelburg, *Codd* 5767. Potgietersrus: Klein Magalakwin, near Koenap, *Van der Merwe* 1743. Pretoria: *Rehmann* 4769 (Z); hort. Kew ex Pretoria, *Loveday* s.n. (K); Aapias River, *Leendertz* 5710; near Boys' High School, *Goossens* 33; *Forssman* s.n.; Rietvlei, *Dyer & Verdoorn* s.n.; 14 miles S.E. of Pretoria, *Codd & Bruce* 3519; *Bruce* 24; 25; 26; 27; 28; 35; 229; near Irene, *C. A. Smith* 5164; 25 miles N.E. of Pretoria, *Codd* 8025. Rustenburg: Swarttruggens, *Sutton* 937; *Bruce* 230; Kroondal, *Von Wolff* in TRV 34695. Ventersdorp: *Louw* 775; 1615. Waterberg: Warmbaths, *Leendertz* 5695; Krantzberg, farm Groothoek, *Van der Merwe* 2022; *Codd* 8020; Nylstroom, *Van der Merwe* 2003; 10 miles N.W. of Nylstroom, *Erens* 2249; 16 miles N.W. of Nylstroom, *Codd* 6153; Sandrivierspoort, *Codd* 8833; Palala Heights, *Erens* 1941. Witbank: *Gilfillan* sub *Galpin* 7259; 13 miles W. of Witbank, *Codd & De Winter* 3156; *Codd* 4774.



FIG. 43.—*K. ensifolia* subsp. *ensifolia*, from Middelburg, Transvaal (*Reynolds* 5765).

The earliest specimen seen is in BM herbarium, "ex Hort. Kew 1786", said to be introduced by Francis Masson. Subsequently the species was collected by Burchell at Kosifontein and Dr. Shaw at Colesberg, but Baker wrongly identified these gatherings as *K. pumila*, which has been shown to be an Ethiopian species (Codd in J. S. Afr. Bot. 29: 145, 1963). This led to a search for *K. pumila* at Colesberg by Mr. Tuck, at the instigation of Max Leichtlin, and the resulting plant was, in fact, the same species as the Shaw plant, but was described as a new species, *K. tuckii*. In the meantime *K. ensifolia* had been described, based on a plant collected by Dr. Holub on the Matebe River, some miles west of Zeerust, and this is the oldest name for the species.

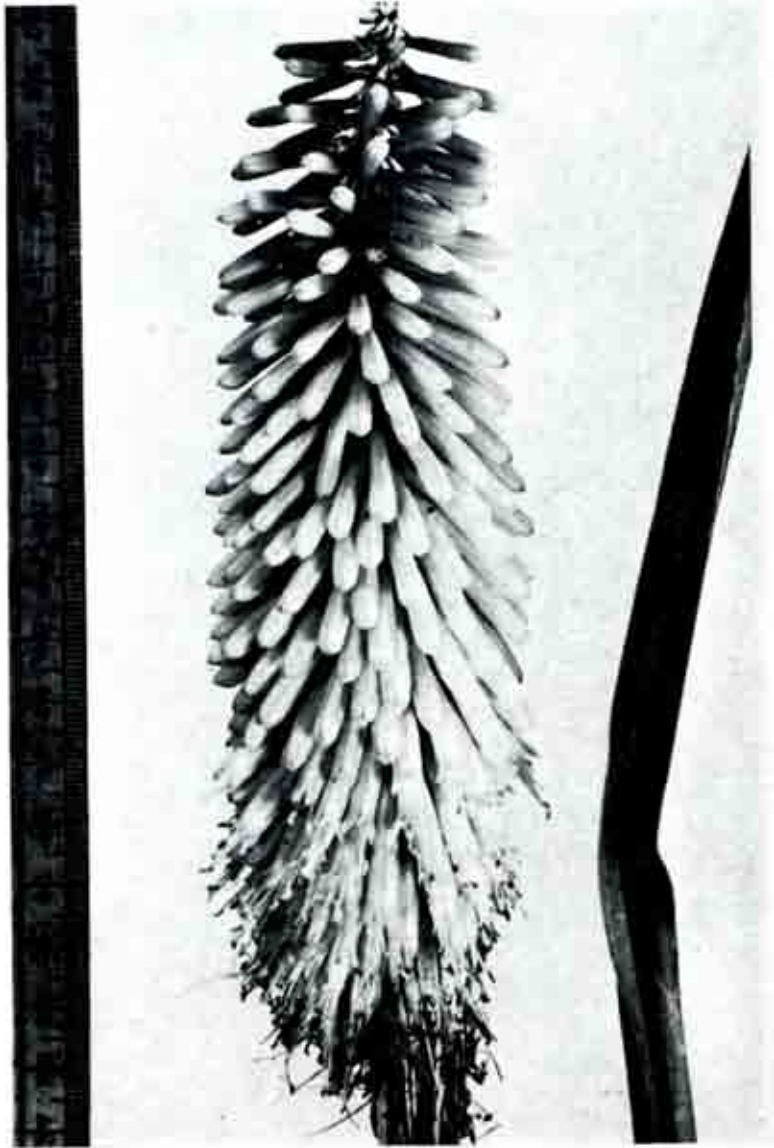


FIG. 44.—*K. ensifolia* subsp. *autumnalis*, from Harrismith District (Jacobsz s.n.).

Consideration was given to separating *K. tuckii* as a distinct variety. In its typical form around Colesberg and western O.F.S., the leaves are relatively short and markedly glaucous, while the inflorescences are distinctly bright red in the upper half (bud stage). However, there are many intermediates linking this form with typical *K. ensifolia*.

K. rivularis Berger is described as having smooth-margined leaves. Such specimens are found in *K. ensifolia*, but are rare. It has even been found that on a single plant the margins of the outer leaves are smooth and the inner leaves serrulate. In all other characters the type of *K. rivularis* does not deviate from typical *K. ensifolia*.

K. ensifolia var. *albiflora* E. A. Bruce is merely a colour form in which the buds completely lack red pigment and, as this is the only difference, it is not worth separate taxonomic rank. This form is commonly encountered in the eastern part of the distribution range, for example in the Witbank and Middelburg Districts.

(b) subsp. **autumnalis** Codd, subsp. nov., a subsp. *ensifolia* plantis autumnno florentibus, floribus luteis differt.

Type: O.F.S., Harrismith District, farm Rensburgskop, February, 1967, *Jacobsz* s.n. (PRE!, holo.).

In this subspecies there is usually (but not always) yellow pigment in the buds and flowers which, when present, produces more colourful inflorescences than in the typical subspecies, while the flowering time is in autumn, during February and March. Recorded only from the Harrismith District in the eastern Free State, where it occurs on black clay soil on stream banks and low-lying areas. FIG. 44. MAP 7.

O.F.S.—Harrismith: 15 miles S.E. of Harrismith, *Codd* 8510; near Swinburne, *Codd* 10520; 10521; farm Rensburgskop, *Jacobsz* s.n.; 306; *Codd* 10523.

This subspecies flowers at the same time as *K. linearifolia* near Swinburne in the Harrismith District and, when they occur in close proximity to one another, occasional hybrids between the two are found (see p. 393).

21. **Kniphofia splendida** E. A. Bruce in Flow. Pl. Afr. 30: t.1183 (1955); Letty, Wild Flows. Tvaal. 33, t.20, 1 (1962). Type: Transvaal, Magoebaskloof (cultivated in Pretoria), *Groeneveld* in PRE 28420 (PRE!, holo.).

Plants in groups. *Leaves* 12–20 per peduncle, fairly rigid, distinctly nervose when dry, generally more or less recurved, dull green to slightly glaucous, 80 cm to 2 m long and usually 1–2 cm broad (rarely to 3 cm); leaf surface more or less flat, keeled below and channelled above, or folded along the midrib, breaking into numerous fibres at the base; keel and margin finely and somewhat irregularly serrulate, rarely almost smooth. *Peduncle* 1.2–2.5 m long, overtopping the recurved leaves, usually with several triangular to linear-caudate sterile bracts below the inflorescence. *Inflorescence* very dense, subcylindrical, 10–22 cm long, 5–6 cm in diameter, usually tapering towards the apex; buds ascending to spreading, yellow to yellow-green, usually tipped with orange-red to scarlet; flowers pendulous, lemon-yellow to yellow. *Pedicels* 1.5–4 mm long. *Bracts* ovate-lanceolate to lanceolate, 5–9 mm long, 2 mm broad at the base, acute; margin slightly to distinctly serrulate. *Perianth* narrowly funnel-shaped, 1.9–2.5 cm long, slightly constricted and 1.5–2 mm in diameter above the ovary, expanding about the middle to 4–6 mm and about 5–7 mm near the throat. *Stamens* well exerted by 5–10 mm at anthesis. *Style* subequal to the stamens at anthesis, eventually exerted by 10–12 mm. *Fruit* subglobose, 5–6.5 mm long. FIG. 45, PLATE 10. MAP 7.



FIG. 45.—*K. splendida*, near Lochiel, eastern Transvaal (Bruce 303).

Distributed from Swaziland, through eastern Transvaal to the mountains of eastern Rhodesia and Malawi, growing among rocks or on grassy slopes, often adjacent to forest. The main flowering season is February–March.

SWAZILAND.—4 miles N. of Forbes Reef, *Reynolds* 3483; *Bruce* 273; Hlatikulu, *Compton* 29258.

TRANSSVAAL.—Carolina: 4 miles E. of Lochiel, *Bruce* 303; Nelshoogte, near the Carolina/Barberton boundary, *Codd* 10336. Letaba: Westfalia Estate, *Scheepers* 626; Grootbos Forest Reserve, *Scheepers* 925; Magoebaskloof, *Van der Schijff* 4410; cultivated in Pretoria, *Groeneveld* in PRE 28420. Pietersburg: 2 miles S. of Houtbosch, *Bruce* 413; Haenertsburg, *Thompson* s.n. Pilgrims Rest: near Sabie *Van der Merwe* 1290; *Bruce* 315. Soutpansberg: near Louis Trichardt, *Meeuse* 10151.

RHODESIA.—Melsetter: Martin Forest Reserve, *Crook* 546; Farm Rocklands, *Crook* 547; between Melsetter and Cashel, *Pole Evans* 5700; Chimanimani Mts., *Plowes* 2171.

MALAWI.—Zomba Plateau, *Brass* 16323.

A robust species, allied to *K. ensifolia* but with somewhat narrower and more fibrous leaves, longer and more colourful flowers. It flowers in autumn, whereas *K. ensifolia* flowers mainly in early summer, and it occurs along the eastern escarpment, so that the two do not overlap in distribution. The first known gathering of the species was by Dr. F. Z. van der Merwe near Sabie in March 1937.

22. *Kniphofia praecox* Bak. in Saund., Ref. Bot. t.169 (1870). Type: *Hort. Saunders* (K!, holo.).

Plants robust, in groups. Leaves more or less in four ranks, 12 or more per peduncle, fairly rigid, distinctly nervose when dry, erect to more or less spreading, dark green, 90 cm–2 m long and 2–4 cm broad, deeply keeled below and channelled above; keel and margin serrulate to obscurely serrulate, rarely almost smooth. Peduncle 1.2–2 m long, well overtopping the recurved leaves, with several triangular



PLATE 10.—*Kniphofia splendida* E. A. Bruce

sterile bracts below the inflorescence. *Inflorescence* dense to very dense, subcylindrical, 12–30 cm long, 6–7 cm in diameter, tapering somewhat towards the apex; buds spreading, orange to reddish orange or scarlet; flowers spreading to pendulous, pale yellow, often brown-tipped especially when dry. *Pedicels* distinct, 4–5 (–8) mm long, elongating to 8–10 mm in fruit. *Bracts* lanceolate to linear-lanceolate, 8–12 mm long, 1.5–2 mm broad at the base, tapering gradually to the small rounded apex; margin finely eroso-denticulate. *Perianth* subcylindrical to narrowly funnel-shaped, 2.4–3.4 cm long. *Stamens* exerted by 4–15 mm at anthesis. *Style* subequal to the stamens at anthesis, eventually exerted by about 16 mm. *Fruit* subglobose, erect, 5–7 mm long.

K. praecox is a robust species with a long history of cultivation in Europe. It has been the subject of considerable misinterpretation due to confusion with *K. uvaria* and *K. linearifolia*, which some forms of *K. praecox* superficially resemble in the large, showy inflorescences. There is evidence that it has hybridized with other species in cultivation to produce many of the spectacular Redhot Pokers of gardens; in fact, as indicated below, the possibility cannot be excluded that the type specimen itself may be of hybrid origin.

It is clear that the chief monographers of the genus, Baker (1896) and Berger (1908), included within one circumscription (under “*K. alooides*” by Baker and under “*K. uvaria*” by Berger) elements which are now separated into two species: *K. praecox* Bak. and *K. linearifolia* Bak. The separation is made on the basis of the long, acuminate bracts and longish pedicels of *K. praecox* and the oblong, acute to obtuse bracts of *K. linearifolia* and allied species. In addition, two subspecies within *K. praecox* are recognized, as indicated in the key below which is based on plants occurring naturally in two restricted, but separate, areas in the Cape Province. Of these, subsp. *bruceae*, known from Komga and King William’s Town Districts, shows a close affinity to *K. splendida* E. A. Bruce (p. 442) of the eastern Transvaal, and flowers in April–May, but it cannot always be readily separated in the herbarium from some specimens of subsp. *praecox* from the Knysna–Uniondale area, which flower in December–January.

The latter are clearly related to the type of *K. praecox*, a specimen preserved in Kew Herbarium, cultivated by Mr. W. W. Saunders of Reigate and reputed to have been collected by Mr. Thomas Cooper in South Africa. Unfortunately, this cannot be verified because, although Cooper made some herbarium specimens in the field, an original *Kniphofia* specimen matching the cultivated type of *K. praecox* in its narrow, acuminate bracts has not been seen. The possibility exists, therefore, that the type plant of *K. praecox* was not introduced by Cooper, but was a garden plant which Saunders had obtained from some other source. In fact, the type specimen does not match exactly any plants now known from the wild state, but it resembles plants known in Europe for many years (see p. 448) and which were present in England at least by 1852 (see cited specimen ex Herb. Thomas Moore).

Baker’s description of *K. praecox* was somewhat tentative and he subsequently did not uphold the species stating, in *Flora Capensis* 6: 283 (1896): “*K. praecox* . . . is a plant imported by Mr. T. Cooper, that on one occasion flowered in summer, and at other times in autumn”. The question may be asked whether some confusion did not perhaps take place in the records maintained by Mr. Saunders and, although one may wish that adequate grounds could be advanced for discarding the name *K. praecox* altogether, such a course does not seem feasible.

Key to Subspecies

- Perianth tube 25–35 mm long, expanding more or less gradually from base to apex; stamens exerted by up to 6 mm; buds red, flowers red to yellow: flowering time December–January (a) subsp. *praecox*
- Perianth tube 23–26 mm long, expanding abruptly about 1 cm from the base; stamens exerted by up to 15 mm; buds orange, flowers pale yellow; flowering time April–May (b) subsp. *bruceae*

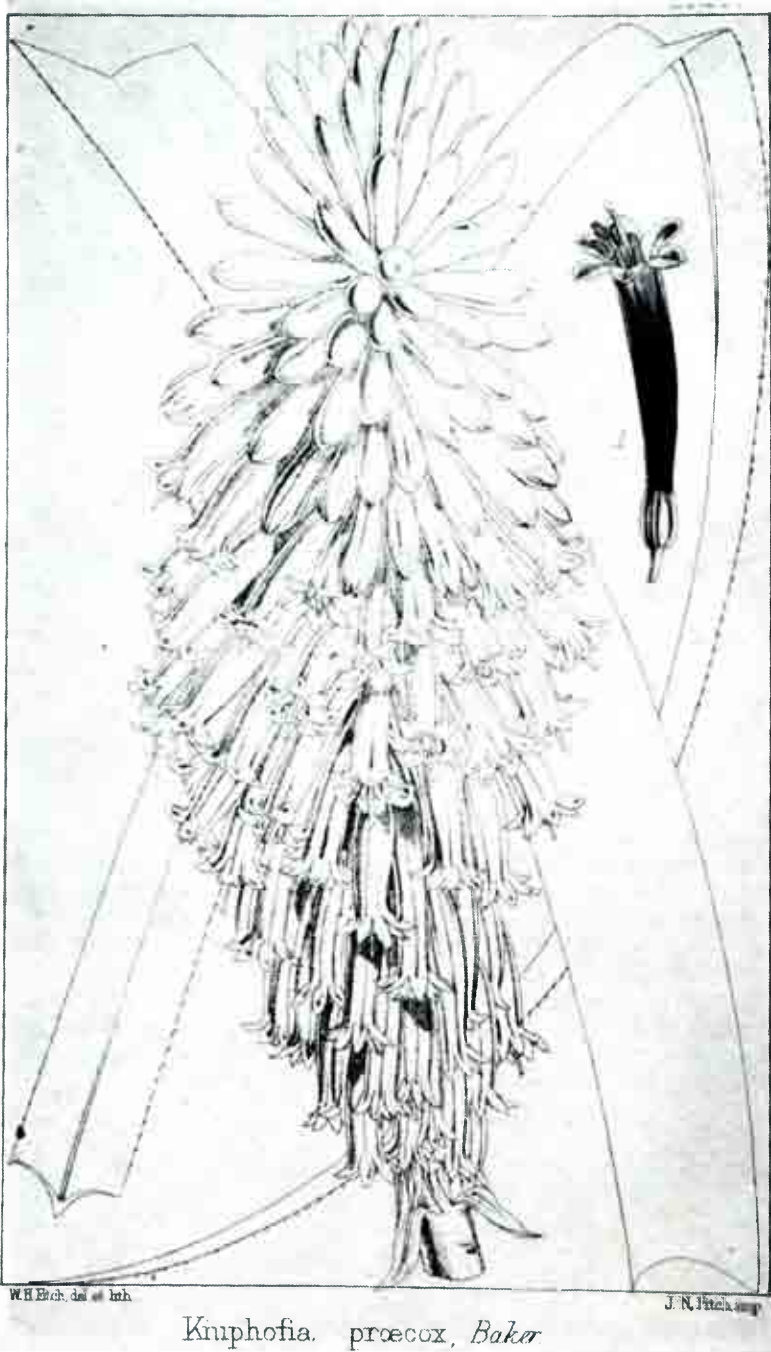


FIG. 46.—*K. praecox* subsp. *praecox*, illustration of type plant in Saunders' Ref. Bot. t.169 (1870.)

(a) subsp. *praecox*

K. praecox Bak. in Saund., Ref. Bot. t.169 (1870). Type: *Hort. Saunders* (K, holo.).
K. alooides sensu Bak. in Fl. Cap. 6: 283 (1896), partly. —var. *nobilis* Bak., l.c. 283 (1896). Type: a specimen in K (!) labelled: “*Hort. Kew* as *K. nobilis*, Sept. 14, 1883” (see discussion on p. 449). *K. uvaria* var. *praecox* (Bak.) Berger in Pflanzenr. 4, 38: 62 (1908). —var. *nobilis* (Bak.) Berger, l.c. 62 (1908).

The naturally occurring plants now included in this subspecies consist of a few gatherings from the Uniondale, George and Knysna Districts of the Cape Province, where they occur on stream banks and low-lying places. The flowering time is November–January. A few cultivated specimens are listed together with the type on the basis of the characteristic narrow, acute to acuminate bracts, while the flowering time is given where it is known. A further discussion of the plants in cultivation follows after the citations. FIG. 46, 47. MAP 8.

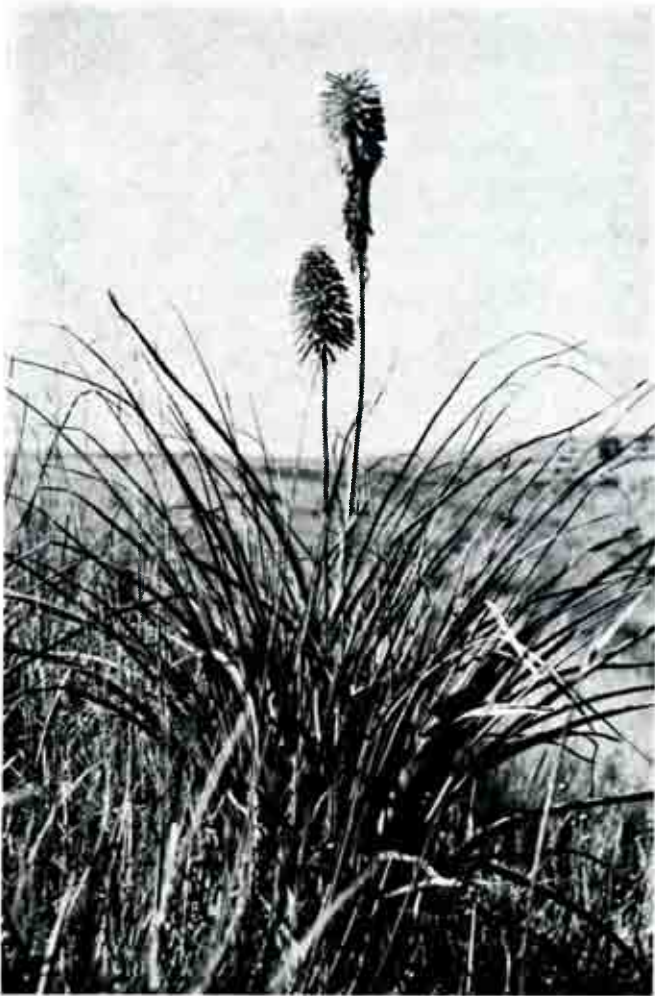


FIG. 47.—*K. praecox* subsp. *praecox*, garden escape near Pretoria (Codd 9965).

CAPE.—George: Wilderness, *Mogg* s.n. Knysna: 6 miles E. of Knysna, *Codd* 9922; 16 miles E. of Plettenberg Bay, *Marais* 577. Uniondale: Saptou, Bo-Kouga Valley, *Van Breda & Admiraal* 2174.

CULTIVATED.—Pretoria: Union Buildings, Nov. 1936, *Dyer* s.n.; Division of Botany Jan. 1950, *Bruce* 148A; Botanic Garden, Nov. 1951, *Van der Ende* s.n.; garden escape, 10 miles S.E. of Pretoria, on stream bank, Dec. 1959, *Codd* 9965. Great Britain: *Hort. Saunders*, type of Ref. Bot. t.169 (K); Hort. Chelsea, Jul. 1852, Herb. Thomas Moore (K); Hort. T. Cooper, Sept. 1877, *Cooper* 3629 (K).

Cultivated specimens cited above as subsp. *praecox* may superficially resemble some forms of *K. linearifolia*, suggesting that grounds for separating two species on the shape of the bracts may seem inadequate. It must be admitted that this is one of the most difficult problems in the genus. The decision to regard bract shape as being important in this case is consistent with the separation, for example, of *K. ichopensis* and *K. laxiflora* and is prompted largely by the obvious differences between some of the wild specimens now included in subsp. *praecox* (e.g. *Van Breda & Admiraal* 2174) and those placed in *K. linearifolia* (very short pedicels and acute to obtuse bracts).

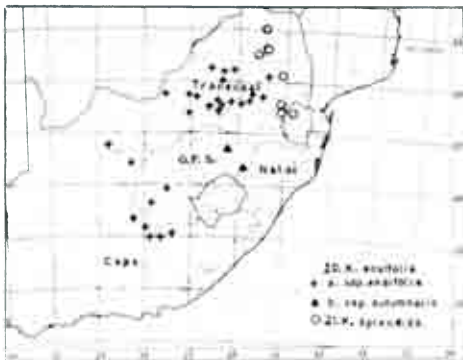
Although *K. linearifolia* is very much more widespread in its natural distribution, *K. praecox* appears to have been more widely cultivated in Europe, as indicated by the following specimens, which are of considerable historical interest, and which are included in *K. praecox* on grounds of the longish pedicels and narrow, acuminate bracts. Unfortunately, the older specimens lack information on date and place of cultivation, but the species must have been introduced to Europe before 1800. As these specimens are not referred to by the chief monographers of the genus, Baker and Berger, several of them are listed in some detail below.

Herbarium of the Conservatoire et Jardin Botaniques, Geneva (G). Four sheets seen, as follows:

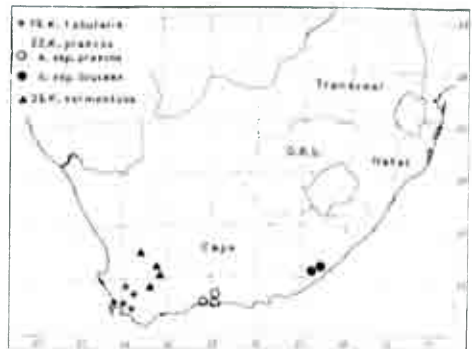
1. Herb. Ventenat, named *Veltheimia uvaria*, with no collector or date.
2. Herb. Delessert, in Herb. DC., labelled *Aletris uvaria* L. with no collector or date.
3. A specimen labelled *Aletris sarmentosa*, without any information on origin or date.
4. Herb. Daniel De la Roche, "fait au Jard. de Leyde sous van Royen. acq. en 1829". Labelled *Aloe uvaria*, without collector or date.

Herbarium of the British Museum (Natural History) (BM). Three sheets seen:

1. A sheet with two inflorescences and two leaves, with the name *Aletris uvaria* on the front of the sheet and, on the back, (i) "Russia, Dr. Thornton" and (ii) "Herb. Pallas".



MAP 7.—Distribution of *Kniphofia ensifolia* subsp. *ensifolia*, subsp. *autumnalis* and *K. splendida*.



MAP 8.—Distribution of *Kniphofia tabularis*, *K. praecox* subsp. *praecox*, subsp. *bruceae* and *K. sarmentosa*.

2. A sheet with an inflorescence and leaf, with no label on the front but, on the back: "Hort. 1782".

3. A sheet with an inflorescence only, labelled on the front *Aletris uvaria* and, on the back: "Herb. Pallas".

It may be noted that Peter Simon Pallas (1741–1811) lived in Leningrad and his collection was purchased by the British Museum in 1842.

Rijksherbarium, Leiden (L). One sheet seen with the name *Tritomanthe uvaria* Link, without collector or date.

Royal Botanic Gardens, Kew (K). Several specimens seen, extending over the period from 1852 to 1952. Some of these are not quite typical, suggesting that they may be of hybrid origin. The following are worth noting:

1. A specimen with a label in N. E. Brown's handwriting: "*Kniphofia alooides* Moench. *Tritoma nobilis* Guillon in Rev. Hort. 1882, p. 24: Hort. Kew (as *K. nobilis*) Sept. 14, 1883. The flower stem of this specimen was seven feet high". This specimen has flowers 3.5 cm long, but is otherwise quite a good match of *K. praecox*.

2. A specimen with two labels, one in N. E. Brown's handwriting: "From the garden of Mr. Gumbleton . . . Ireland, 1884". The other label, no doubt supplied with the specimen, states: "*Kniphofia nobilis* ex Horto Aureliae Aquensis. M.L. Baden-Baden", i.e. from Max Leichtlin's Nursery.

3. Three specimens collected in Kew Gardens during July, 1952, *Bruce* C, D and I (flowers 2.5 cm, 3.2 cm and 3 cm long, respectively), bear some resemblance to *K. praecox*. Specimen D is labelled: "*Kniphofia* sp. (hybrid), named *K. nobilis* in gardens"; and specimen I: "*Kniphofia* sp., named *K. uvaria* var. *nobilis*".

The repeated use of the epithet "nobilis" requires that it should be carefully scrutinised. *Tritoma nobilis* Guillon is published in Rev. Hort. p. 24 (1882). The description is a very general one and makes no reference to diagnostic characters, such as length and shape of the perianth and floral bracts, nor does Guillon contrast it with a known species. In fact, he appears doubtful whether it is a good species. A few years later an illustration of *Tritoma nobilis* was published by Carrière in Rev. Hort. p. 252 (1885), accompanied by a description similar to Guillon's, which adds nothing of diagnostic value.

Herbarium specimens of the actual plants dealt with by Guillon and Carrière would assist in establishing the identity of their "T. nobilis", but no such specimens have been found in the Herbarium of the Museum National d' Histoire Naturelle, Paris, nor in Herb. de Vilmorin. There is thus justification for discarding the species name used by Guillon (1882) and Carrière (1885) as being of uncertain application. A clue to its identity is provided by the two contemporary specimens in Kew Herbarium listed as 1 and 2 above. An annotation on the former specimen in Baker's writing may be accepted as typifying *K. alooides* var. *nobilis* Bak. in Fl. Cap. 6: 283 (1896). It is now included in *K. praecox* subsp. *praecox*.

(b) subsp. *bruceae* Codd, subsp. nov., a subsp. *praecoci* floribus brevioribus, staminibus circa 15 mm exsertis differt.

Veltheimia uvaria sensu Jacq., Fragm. t.4 (1800/01).

Type: Cape, plant collected on Bedeford Farm, near Komga and flowered in Pretoria, 7.4.1955, *Bruce* 604 (PRE, holo.!).

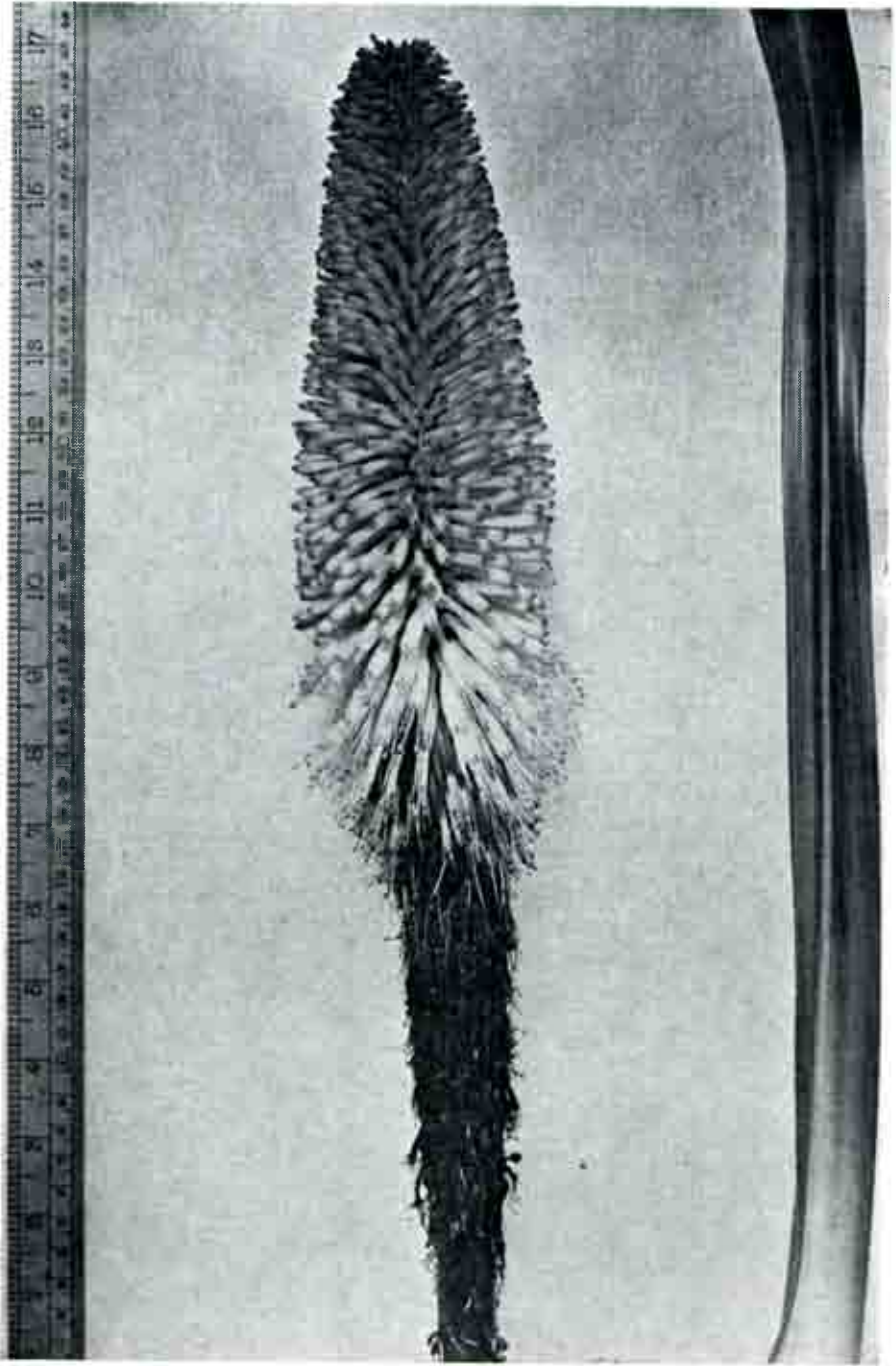
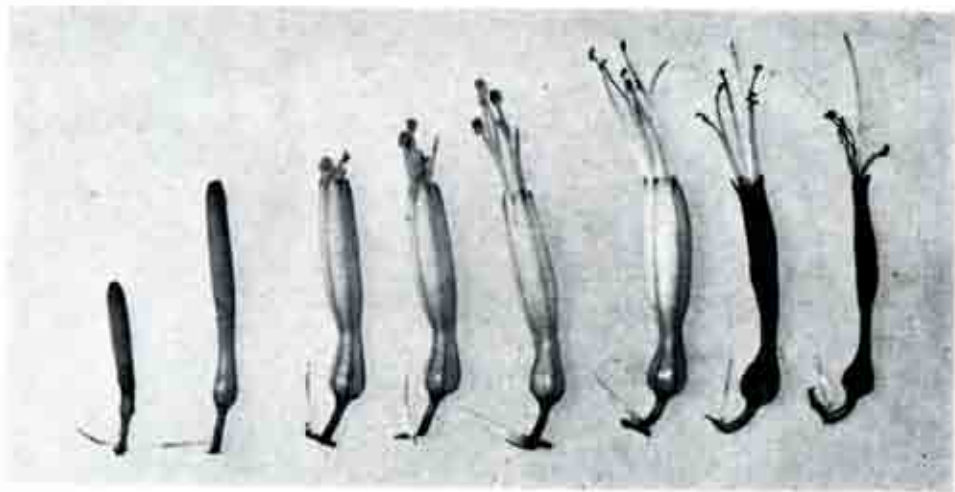


FIG. 48.—*K. praecox* subsp. *bruceae*, inflorescence, reduced (*Bruce* 604). Compare this with the *Jacquin* illustration in Fig. 9.



↑ FIG. 49.—*K. praecox* subsp. *bruceae*, individual flowers, life size (Bruce 604).



← FIG. 50.—*K. praecox* subsp. *bruceae*, from Komga District (Bruce 605)

As indicated in the key on p. 445, the perianth tube in this subspecies is 23–26 mm long and it expands abruptly about 1 cm from the base, giving it a narrowly funnel-shaped appearance, while the anthers are exerted by up to 15 mm at anthesis. FIGS. 48, 49, 50. MAP 8.

Its distribution appears to be restricted to small areas in the Komga and King William's Town Districts, where it occurs in grassy valleys. The flowers appear in April and May.

CAPE.—King William's Town: near Kei Road, *Comins* 1552. Komga: near Komga, May, 1894, *Flanagan* 2323; Bedeford Farm, *Bruce* 604.



FIG. 51.—Miss E. A. Bruce at Krantzkloof Falls, Natal, January 1951.

The illustration in Jacquin's *Fragmenta* t.4, published in 1800 or 1801, was confused in the past with *K. uvaria*, from which it differs strikingly in the well-exserted stamens, the shape of the perianth and the narrow, acuminate bracts. It is a perfect match of the modern gatherings cited above. Although the origin of Jacquin's plant is not recorded, there is a strong possibility that it was sent to Vienna by the collectors Boos and Scholl, who penetrated well into the eastern Cape Province in search of interesting plants for the Emperor's garden at Schönbrunn. The subspecies was first recorded in the wild state by Flanagan, who collected it near Komga in May, 1894. Miss E. A. Bruce (see Fig. 51), who recognised it as distinct, made a special effort to locate plants and eventually succeeded in 1954, with the help of Miss Courtenay-Latimer and Mr. G. G. Smith of East London.

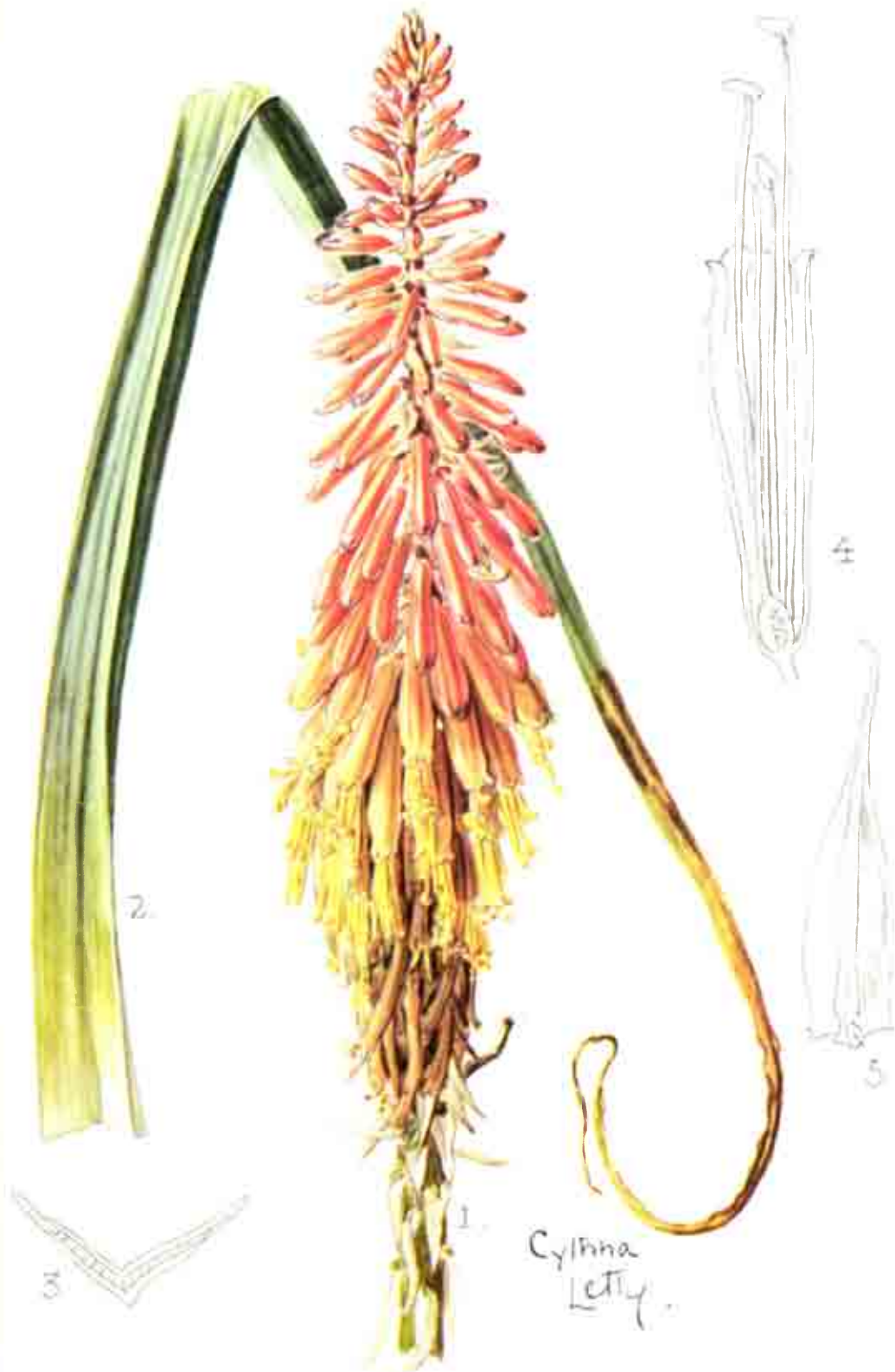


PLATE 11.—*Kniphofia sarmentosa* (Andr.) Kunth

23. *Kniphofia sarmentosa* (Andr.) Kunth, Enum. Pl. 4: 552 (1843); Bak. in J. Linn. Soc. 11: 362 (1871); J. Bot. Lond. 23: 279 (1885); Fl. Cap. 6: 282 (1896); Berger in Pflanzenr. 4, 38: 62 (1908), partly, excl. *Rehmann* 4769; Codd in Flow. Pl. Afr. 34: t.1327 (1960). Type: the illustration in Andrews' Bot. Rep. t.54 (1797), of a plant said to be introduced from the Cape about 1789; collector not recorded.

Aletris sarmentosa Andr., Bot. Rep. t.54 (1799).

Veltheima media Donn, Hort. Cantab. ed. 2: 131 (1800), nom. illegit. Type: as for *A. sarmentosa*. *V. repens* Ker, Recens. Pl. 18 (1801), nom. illegit. Type: as for *A. sarmentosa*. *V. sarmentosa* (Andr.) Willd., Enum. Hort. Berol. 380 (1809).

Tritoma media (Donn) Ker-Gawl. in Bot. Mag. t.744 (1804); Red., Liliac. t.161 (1807); Ait. f., Hort. Kew. ed. 2, 2: 290 (1810). nom. illegit.

Tritomanthe media (Donn) Link, Enum. Hort. Berol. 1: 333 (1821); Roem. & Schult., Syst. Veg. 7: 630 (1829), nom. illegit.

Plants with short rhizomes, forming small groups of stems. *Leaves* 6–8 per peduncle, erect to recurved, glaucous, soft and flaccid in texture, linear-ensiform. 30–65 cm long, 0.8–3 cm broad, V-shaped in cross section; keel and margin smooth. *Peduncle* stout, 30–60 cm long, overtopping the recurved leaves, with several oblong-lanceolate sterile bracts below the inflorescence. *Inflorescence* pyramidal, ovoid or subcylindrical, tapering to the apex, at first dense but often elongating considerably and becoming laxer, 8–30 cm long, 5–6.5 cm in diameter; buds at first erect, soon spreading, coral to coral-scarlet with a greyish bloom; flowers pendulous, salmon to creamy-buff. *Bracts* long, erect in the bud stage and covering the buds, later deflexed, lanceolate to oblong-lanceolate, acuminate, 11–15 mm long and 2–2.5 mm broad at the base, chartaceous; margin entire. *Pedicels* 1–3 mm long. *Perianth* subcylindrical, not constricted above the ovary, 2–2.5 cm long, 2–3 mm broad near the base, widening gradually to 5 mm broad at the middle and at the mouth: lobes ovate, rounded, 2 mm long, not spreading. *Stamens* exerted by 2–5 mm at anthesis, later withdrawn. *Style* subequal to the stamens at anthesis, eventually exerted by 6–8 mm. *Fruit* ovoid-triquetrous, 7–8 mm long. PLATE 11. MAP 8.

Found beside mountain streams in the Sutherland (Roggeveld), Calvinia, Worcester and Caledon Districts. Flowering has been recorded in nature from June to October.

CULTIVATED: without locality or date (G, L); cult. France, 1815, Herb. J. Gay (K); cult. Luxemburg, 1818, Herb. J. Gay (K); cult. Cobham, Surrey, 1833, Herb. Forbes Young (K); Hort. Kew, 1882 (K); Hort. Kew, 1883 (K); cult. Ledbury by W. J. Grant, 1887 (K).

CAPE.—Calvinia: Augustfontein Mt., *Acocks* 18982. Sutherland: Klein Roggeveld, *Marloth* 9609; *Compton* 22239 (NBG); between Matjiesfontein and Sutherland, *Comins* 1100; 1101; *Acocks* 16843. Worcester: top of Hex River Pass, *Hardy* 47; Matroosberg, *Van Breda* s.n.; between Osplaats and Tunnel Siding, *Rogers* 30226 (Z).

A fairly distinctive species whose closest affinity is with the Transvaal species, *K. coralligemma* E. A. Bruce. It differs from that species (see below) in the longer bracts (which are probably the longest in the genus), the somewhat shorter and more glaucous leaves which are never serrulate, in the flowering time, and in flower colour.

When Andrews described the species in 1799, he recorded that it was introduced from the Cape of Good Hope in 1789, but made no mention of the original collector. One is inclined to attribute the introduction to Francis Masson, who was collecting in South Africa at the time. The species was not again collected until over 130 years later, when Marloth rediscovered it in the Roggeveld in 1920. This gathering was the first indication of the natural habitat of the species.

24. *Kniphofia coralligemma* E. A. Bruce in Flow. Pl. Afr. 30: t.1186 (1955); Letty, Wild Flows. Tvaal. 36, t.20, 2 (1962). Type: Waterberg District, Kransberg, farm Groothoek, *Codd & Erens* 2090 (PRE! holo.).

Plants solitary or in small groups. *Leaves* 8–12 per peduncle, at first erect, later bending over above the middle, dull mid-green to slightly glaucous, 55–110 cm long, 1–2 cm broad, soft in texture, channelled above and keeled below, not conspicuously fibrous at the base; margin distantly serrulate towards the apex, generally smooth in the lower part and on the keel. *Peduncle* 60–120 cm long, overtopping the reflexed leaves, with several lanceolate sterile bracts below the inflorescence. *Inflorescence* ovoid-cylindrical, usually tapering slightly towards the apex, 8–15 cm long, 4–5 cm in diameter, dense, or sometimes rather lax towards the apex; buds at first erect, later spreading, coral to pale orange or orange-scarlet; flowers spreading, varying in colour according to colour form (see notes) from cream or ivory to creamy-yellow or orange-yellow. *Pedicels* 2–5 mm long. *Bracts* erect and covering the buds in the early bud stage, later deflexed, oblong-lanceolate to narrowly lanceolate, acute to acuminate, 7–12 mm long, 1.5–2 mm broad at the base; margins generally minutely serrulate especially towards the apex or, occasionally, entire. *Perianth* subcylindrical, not constricted above the ovary, 2.2–2.5 cm long, 2 mm in diameter at the base, widening slightly to 3 mm near the mouth and with a slight constriction at the base of the lobes; lobes oblong-ovate, about 3 mm long, slightly spreading. *Stamens* exerted by about 2 mm at anthesis, later withdrawn. *Style* subequal to the stamens at anthesis and eventually exerted by 5 mm. *Fruit* ovoid-triangular, 5 mm long. FIG. 52. PLATE 12. MAP 1.

Found in marshy places, forest margins and grassy, south-facing slopes at altitudes of 5,000 to 6,000 ft. in the following mountain areas of the Transvaal: Kransberg (Waterberg), Blouberg, Soutpansberg, Wolkberg and Haenertsburg. Flowering has been recorded from the end of February to early April.

TRANSVAAL.—Letaba: The Downs, *Thompson* s.n. Pietersburg: Iron Crown Mt., *Meeuse* 9856; Haenertsburg, *Bruce* 195; *Thompson* s.n.; Magoebaskloof, *Cunliffe* s.n.; *Mogg* 20301; *Hodge* s.n.; near Houtbosch, *Bruce* 414; Wolkberg, *Van Biljon* s.n.; Blouberg, *Codd* 8764 (cult. in Pretoria); *Esterhuysen* 21474. Soutpansberg: near Louis Trichardt, *Koker* 13; Hangklip, *Govt. Forester* s.n.; *Meeuse* 10177; near Hangklip, *Meeuse* 10192; Pisankop, *Meeuse* 10235. Waterberg: Kransberg, farm Groothoek, *Codd & Erens* 2090; 3966; *Bruce* 408; *Story* 6518; *Meeuse & Strey* s.n.

Three forms, differing mainly in colour of the inflorescence, are included in the above citations. In the typical form, known only from a small area on the western extremity of the Waterberg (Kransberg), the inflorescence is coral-pink at the apex, shading to creamy-white or ivory as the flowers open. The second form, represented by plants from the Soutpansberg and Haenertsburg areas, on the other hand, have orange-scarlet buds which change to orange-yellow as the flowers open, while the leaves tend to be somewhat longer and broader. Miss Bruce referred tentatively to this form as *K. pulchra*, but the differences are inadequate for separating it as a distinct species and this name was never validly published. The difference in inflorescence colour, though striking, is not of great significance but, combined as it is with a difference in distribution, there may be support for an argument in favour of giving this form the status of a variety.

The third form, from the Blouberg, requires further study in the field. It is known at present mainly from cultivated plants of one gathering, from which its taxonomic status cannot easily be assessed. These cultivated plants show the following deviations from the typical form: the buds are orange-yellow, becoming pale yellow as the flowers open; the leaves are narrower (6–10 mm); the peduncle is shorter (20–50 cm); and the perianth is shorter (1.9–2.3 cm). Experience has shown that cultivated plants, especially those from mountain areas, are frequently abnormal when grown in the hotter and drier climate of Pretoria; stature and perianth length, in particular, tend to be below normal. For this reason, the measurements given above for this form are not included in the description of the species. Flowering specimens collected in the natural habitat are required before a decision can be reached regarding the status of this form.



PLATE 12.—*Kniphofia coralligemma* E. A. Bruce



FIG. 52.—*K. coralligemma* at the type locality, Kransberg, Waterberg (Bruce 408).

The Soutpansberg–Haenertsburg form is the most common of the three and was collected several times before the Waterberg plant was discovered and described, the earliest known herbarium specimen having been sent in by Mrs. Cunliffe from Magoe-baskloof in April, 1928. Although the flame-coloured inflorescence of this form suggests an affinity with the *K. uvaria* complex (and this no doubt explains why the species was not described earlier), the long, narrow bracts and the soft-textured leaves indicate the relationship to *K. sarmentosa*. For the differences between *K. coralligemma* and *K. sarmentosa*, see the discussion under the latter species (p. 453).

25. ***Kniphofia caulescens*** Bak. in Bot. Mag. t.5946 (1872); J. Bot. Lond. 23: 281 (1885); Fl. Cap 6: 284 (1896); Mallett in Gard. Chron. 39: 82 (1906); Berger in Pflanzenr. 4, 38: 65 (1908). Type: the Bot. Mag. plate, made from a plant cultivated by Mr. W. W. Saunders of Reigate, originally collected by Thomas Cooper in the Stormberg.

Tritoma caulescens (Bak.) Carr. in Rev. Hort. 132, t28 (1887).

K. tysonii sensu Phillips in Ann. S.A. Mus. 16: 294 (1917), as to Dieterlen 642.

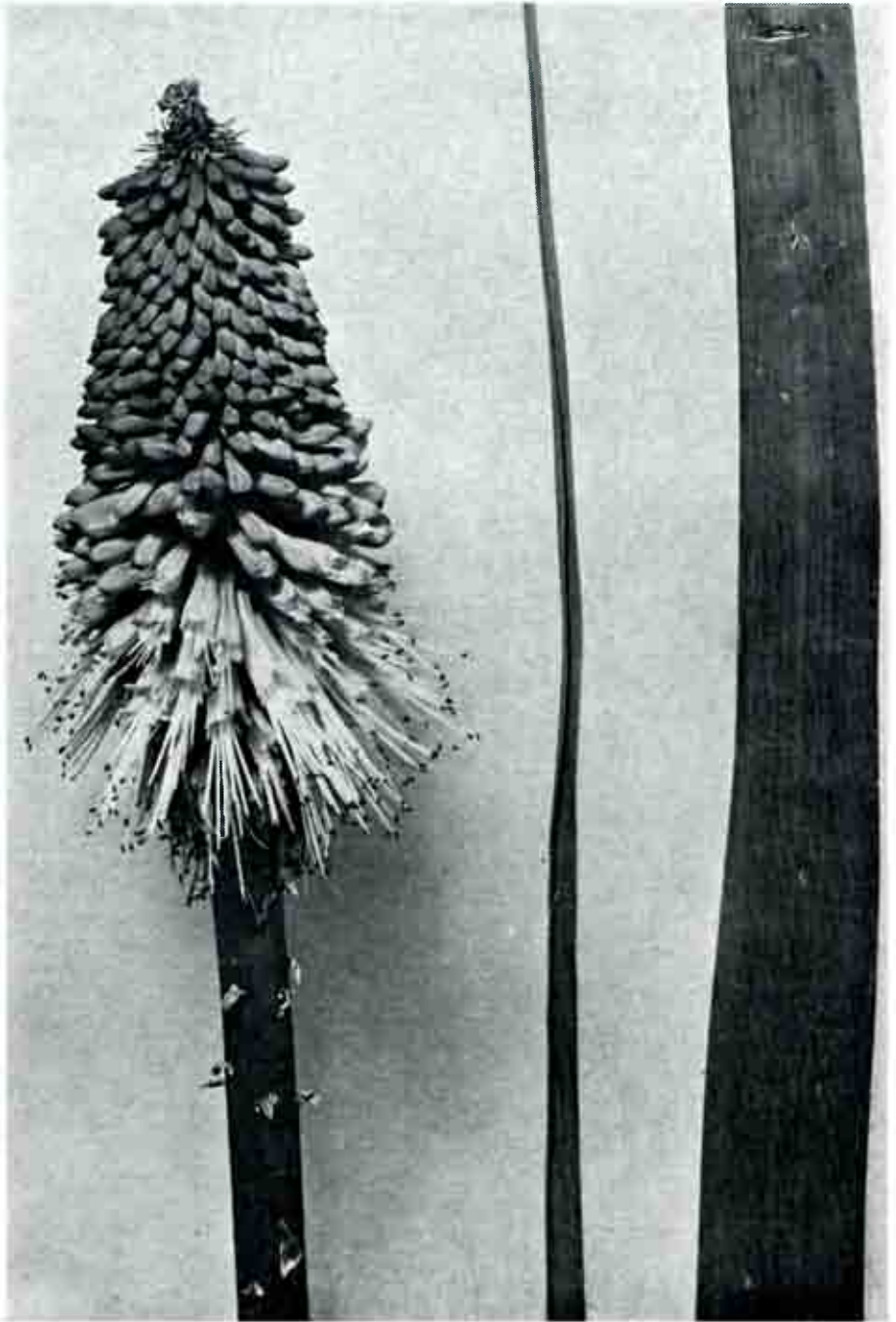


FIG. 53.—*K. caulescens*, inflorescence, slightly reduced, from Basutoland (Bruce 344).

Plants in groups, usually caulescent, gregarious, often forming large colonies. *Stems* simple or sparingly branched, up to 60 cm tall, crowned with a large rosette of leaves. *Leaves* many per peduncle, erect or bending over towards the apex, very glaucous, somewhat fleshy in texture, outer leaves 45–70 cm long, 2.5–5 cm broad, V-shaped in cross section, tapering rapidly (inner leaves much narrower), drying with a purplish tinge towards the base, not breaking up into fibres; margin and keel distinctly and finely serrulate. *Peduncle* stout, 30–60 cm long, overtopping or subequal to the leaves, with several sterile bracts below the inflorescence. *Inflorescence* oblong to subcylindrical, 9–30 cm long, 5–6 cm in diameter, tapering slightly towards the apex, very dense; buds coral-pink to flame-coloured; flowers pale greenish-yellow to creamy-yellow. *Pedicels* 3–5 mm long. *Bracts* linear-oblong to linear, acute to acuminate, 7–11 mm long, 1.5–2 mm broad, chartaceous, brownish; margin entire or sometimes finely denticulate at the apex. *Perianth* subcylindrical, 2.2–2.4 cm long, slightly constricted and about 1.5 mm in diameter above the ovary, widening gradually to about 3.5 mm above the middle and to about 4 mm at the mouth; lobes ovate-oblong, 2 mm long, not or slightly spreading. *Stamens* markedly exerted by 8–13 mm at anthesis. *Style* subequal to the stamens at anthesis, eventually exerted by about 1.5 cm. *Fruit* ovoid-triquetrous, erect, 5 mm long. FIGS. 53, 54. MAP 9.

Occurs in high mountain areas at altitudes of 6,000 to 10,000 ft. on peaty soil overlying rock formations, marshy places and seepage areas in mountain grassland, in north-eastern Cape Province, eastern O.F.S., Lesotho and the adjoining crest of the Drakensberg in Natal. The main flowering time is January to March, though flowering specimens have been collected in Natal in late November and December.

CAPE.—Barkly East: Ben McDhui, *Galpin* 6865; Witteberg, *Bruce* 570; Lundeans Nek, *Reynolds* 578 (BOL); 3451: near Rhodes, *Naude* 6. Herschel: Majuba Nek, *Hepburn* s.n. (GRA); near Lundeans Nek, *Marais* 1347. Lady Grey: *Bruce* 569. Sterkstroom: Stormberg, *Andriesberg*, *Galpin* 1929. Tarkastad: Great Winterberg, *Story* 3754; *Bruce* 525.

LESOTHO.—Without locality, *Staples* 244. Likolobeng, *Compton* 21261 (NBG); Ntibokho Valley *Jacot Guillarmod* 272; Butha Buthe, *Jacot Guillarmod* 4350; Pulane, *Bruce* 366; near Mateka, *Bruce* 344; 379; Berea, Mamalapi, *Marais* 1309; Leribe, *Dieterlen* 642; near Qachas Nek, *Galpin* 14254; Machaba Peak, *Galpin* 13667; Mokhotlong, *Liebenberg* 5760; summit of Drakensberg, Cleft Peak area, *Killick* 1871; *Killick & Marais* 2179.

O.F.S.—Bethlehem: 24 miles N.E. of Clarens, *Bruce* 395; Golden Gate National Park, *Scheepers* s.n. Harrismith: Drakensberg, Nelson's Kop, *Medley Wood* 6071 (NH); Rensburgskop, *Jacobsz* 286; 314.

NATAL.—Bergville: adjoining Basutoland, *Cuthbert* sub *Edwards* 2292; Mont-aux-Sources, *Schweickerdt* 696; Cathedral Peak area, *Schelppe* 488 (NU). Underberg: Sani Pass, *Killick & Vahrmeijer* 3771.

The species is described in *Bot. Mag.* t.5946 (1872) and this plate may be regarded as the type as no specimen of the figured plant appears to have been preserved. It was originally collected by Thomas Cooper and cultivated by Mr. W. W. Saunders of Reigate.

It is a very distinctive species and shows relatively little variation. One of the few caulescent species, the stem may be simple or may branch dichotomously, with each branch ending in a dense rosette of glaucous leaves which are markedly serrulate on the margins. The inflorescence is very dense and is bicolorous, the upper half varying from coral-pink to flame and the lower half from pale greenish-yellow to cream. The plants tend to be gregarious and a colony in full flower is an impressive sight. In herbarium specimens the leaf-bases dry with a characteristic purplish tinge not found in any other species, while the densely placed, medium-length flowers with markedly exerted stamens assist in the easy identification of this species.

K. caulescens is related to *K. sarmentosa* and *K. ritualis* but differs from both in its caulescent habit, the denser and less tapering inflorescence, and the markedly exerted stamens.



FIG. 54.—*K. caulescens*, Castle Butress, Drakensberg. Photo by Dr. D. J. B. Killick.

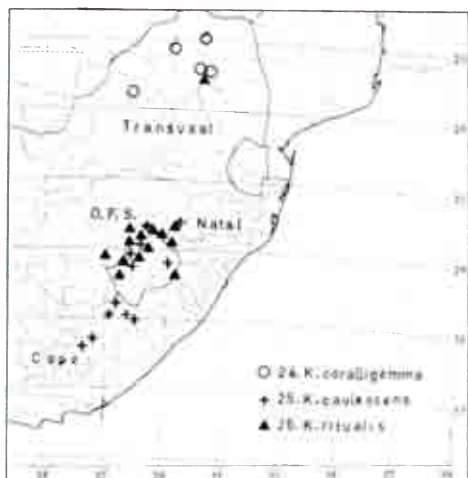
The Basutos regard it as a charm against lightning and so, for this reason, it is frequently cultivated near their huts.

26. *Kniphofia ritualis* Codd in *Bothalia* 9: 139 (1966). Type: Lesotho, Berea District, Bitsolebe area, flowering 22.1.1957, *Marais* 1327 (PRE!, holo.).

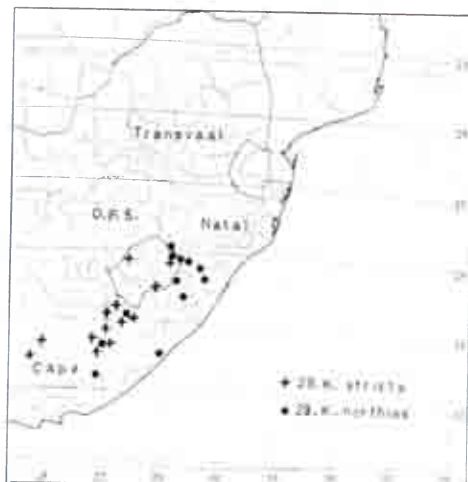
K. sarmentosa sensu Phillips in *Ann. S. Afr. Mus.* 16: 294 (1917), as to *Dieterlen* 174; 174a.

Plants solitary or in small groups. *Leaves* in 3 or 4 ranks, 8–12 per peduncle, at first erect, later bending at the middle or semi-spreading, soft in texture, glaucous, 40–90 cm long and 1.2–2.4 cm broad near the base, deeply keeled; margin conspicuously and regularly serrulate. *Peduncle* subequal to or shorter than the leaves, 40–80 cm long. *Inflorescence* rhomboid-cylindrical to ovoid, dense in the centre, laxer at the apex, 9–14 cm long and 4–5 cm in diameter; buds and flowers pendulous; buds coral or salmon to orange-red, becoming greenish-yellow as the flowers open. *Bracts* lanceolate to linear-lanceolate, tapering to the acute or acuminate apex, 10–12 mm long and 2 mm broad; margin usually minutely denticulate. *Pedicels* 1–2 mm long at flowering stage, elongating to 5 mm in the fruiting stage. *Perianth* subcylindrical, 2.5–3 cm long, very slightly constricted above the ovary, 3 mm wide at the base, increasing gradually to 5 mm wide at the mouth; lobes ovate, rounded, 3–3.5 mm long, not spreading. *Stamens* 6, of two lengths; anthers not or scarcely exerted at anthesis, later withdrawn into the perianth tube. *Style* equal to the stamens at anthesis, later included or exerted by up to 3 mm. *Fruit* subglobose, not markedly triquetrous, 7–8 mm long. FIG. 55. MAP 9.

Common in Lesotho and in the adjoining areas of the eastern Orange Free State, mainly on sandstone formation, in shallow soil in rock crevices, in dry water-courses and on grassy slopes, at altitudes of 5,500 to 9,000 ft., extending to the Bergville District in Natal and with recent records from the Wolkberg in Transvaal. Some additional specimens from the Natal Drakensberg region may also belong to this species. The flowering time is from January to March.



MAP 9.—Distribution of *Kniphofia coralligemma*, *K. caulescens* and *K. ritualis*.



MAP 10.—Distribution of *Kniphofia stricta* and *K. northiae*.

O.F.S.—Bethlehem: near Generaalskop, *Liebenberg* 6979; near Clarens, cult. in Pretoria, *Marais* 1287; Golden Gate National Park, *Roberts* 3430: 3452. Ficksburg: Farm Wintershoek, near Kirklington, *Codd* 10540; 10541; Farm Franschoek, 20 miles N.E. of Ficksburg, *Codd* 10549. Fouriesburg: 23 miles N.E. of Ficksburg, *Bruce* 343; 12 miles S.E. of Clarens, *Bruce* 393; near Golden Gate, *Codd* 10537; near Fouriesburg, cult. in Pretoria, *Marais* 1288. Harrismith: Witzieshoek, *Thode* 5677 (STE); Rensburgskop, *Jacobsz* 322; 323. Senekal: *Goossens* 838. Thabanchu: Thabanchu Mt., *Roberts* s.n.

LESOTHO.—Berea: Below Molimo-Nthuse, *Marais* 1326; Bitsolebe area, *Marais* 1327; at foot of Pulane Mt., *Bruce* 360; Pulane area, *Bruce* 364; Thaba Chitja, *Bruce* 365; Mamathes, *Bruce* 390. Leribe: *Dieterlen* 174; 174a; *Phillips* 574 (SAM). Mafeteng: Malealea, and cult. in Pretoria, *Munro* s.n. Maseru: Thaba Bosigo, *Van der Merwe* 1156; Jordan Valley, *Jacot Guillarmod* 1671; Senqunyane Valley, *Jacot Guillarmod* 2256; Roma, *Ruch* 1722. Summit of Drakensberg in Cathedral Peak area, *Killick* 1857; *Killick & Marais* 2174.

NATAL.—Bergville: Cathedral Peak, *Kromhout & Knuffel* s.n.; *Killick & Vahrmeijer* 3547; 3550; Cleft Peak, *Edwards* 1186; Champagne Castle, slopes of Grey's Pass, *Cuthbert* sub Edwards 2290; Organ Pipes Pass, *Cuthbert* sub Edwards 2297; Mont-aux-Sources, *Trauseld* 204. Underberg: Sani Pass, *Killick & Vahrmeijer* 3759.

TRANSVAAL.—Pietersburg: Wolkberg, *Van Biljon* s.n.; *Hardy* 2330.

Phillips, l.c., misidentified this species as *K. sarmentosa* (Ait.) Kunth, a species largely restricted to the Roggeveld area of the north-western Cape Province. He records the Sotho common names as "Leloëlè" or "Lelolè" and states that: "A decoction prepared from this species is drunk to cure pains in the shoulders. Women, during the times girls are undergoing initiation rites, make use of this plant for some purpose, but this being one of the sacred rites of the tribe, no further information could be obtained". It is on the basis of this information that the name *K. ritualis* was chosen for this species in preference to a manuscript name "*K. basutica*" given tentatively to the species by Miss E. A. Bruce.

K. sarmentosa and *K. ritualis* are similar in having conspicuously long narrow bracts. The latter species can, however, readily be distinguished by its markedly serrulate leaves and the longer perianth which is 2.5–3 cm long, as against 2–2.5 cm long in *K. sarmentosa*.

The long bracts and serrulate leaves of *K. ritualis* are also reminiscent of *K. caulescens* but, among the many characters that distinguish the two, are the caulescent habit of the latter and its shorter perianth with markedly exerted stamens.



FIG. 55.—*K. ritualis*, Lesotho (Marais 1327).

27. *Kniphofia hirsuta* Codd in *Bothalia* 9: 140 (1966). Type: Lesotho, Berea District, Mamalapi, alt. 8,500 ft., in flower 20.1.1957, *Jacot Guillarmod & Marais* 1307 (PRE!, holo.).

Plants usually solitary. *Leaves* in 3 or, rarely, 4 ranks, 8–12 per peduncle, erect, soft in texture, dull green, 40–60 cm long and 1.5–2.5 cm broad near the base, deeply keeled, hirsute along the nerves on both surfaces; margin conspicuously and regularly serrulate. *Peduncle* equal to or longer than the leaves, 45–60 cm long. *Inflorescence* shortly rhomboid-cylindrical to ovoid, dense, 8–12 cm long and 4–4.5 cm in diameter; buds and flowers pendulous; buds orange or dull coral to salmon-pink tipped with green, becoming dull greenish-yellow as the flowers open. *Bracts* linear-lanceolate, tapering to the acuminate apex, 10–14 mm long and 2 mm broad; margin minutely denticulate to entire. *Pedicels* 2–3 mm long at flowering stage, elongating to 4 mm in fruit. *Perianth* subcylindrical, 2.2–2.7 cm long, very slightly constricted above the

ovary, 3.5 mm wide at the base, increasing gradually to 5 mm wide at the mouth; lobes ovate, rounded, 2.5 mm long, not spreading. *Stamens* not or scarcely exerted at anthesis, later withdrawn into the perianth tube. *Style* equal to the stamens at anthesis, later exerted by up to 3 mm. *Fruit* subglobose, not markedly triquetrous, 7–9 mm long.

Found in the mountains of Lesotho on grassy slopes and stream banks, at altitudes of 8,000 to 9,000 ft. Flowering takes place in December and January.

LESOTHO.—Berea: Mamalapi, December 1948, *Compton* 21266; *Jacot Guillarmod* 1238; *Jacot Guillarmod & Marais* 1307; 1308.

K. hirsuta is closely allied to *K. ritualis*, its inflorescence, perianth and bract characters being similar, but the former species is unique in the genus in having pubescent leaves. The only other species which approaches it in this respect is *K. stricta* Codd, which sometimes has a few scabrid hairs on the nerves. *K. hirsuta* was first collected by Prof. R. H. Compton at Mamalapi at an altitude of about 8,500 ft. Since then, good flowering and fruiting material has been collected by Mrs. A. Jacot Guillarmod and Mr. W. Marais, who report that it tends to flower earlier than *K. ritualis* and to grow at higher altitudes (though this is not strictly correct) where it is associated with *Danthonia-Erica-Cliffortia* scrub of rocky slopes or streams.

28. *K. stricta* Codd in *Flow. Pl. Afr.* 34: t.1328 (1960). Type: Cape, Graaff Reinet, Loskop near New Bethesda, *Kitching* 54 (PRE!, holo.).

Plants in groups. *Leaves* not clearly in ranks, 8–12 per peduncle, erect, rigid, strongly nerved, dark green, 30–70 cm long and 0.8–1.4 cm broad near the base, U-shaped in cross section (not keeled), channelled above; margin serrulate; nerves prominent on lower surface with occasional scabrid papillae on the nerves. *Peduncle* subequal to the leaves, 30–60 cm long, bearing usually several large deltoid sterile bracts below the inflorescence. *Inflorescence* subcylindrical to ovoid, dense, 8–14 cm long and 5–6 cm broad; buds pendulous to spreading, flowers at first spreading but soon becoming pendulous; buds orange or pale orange-red to coral, becoming yellow to greenish-yellow as the flowers open. *Bracts* ovate to ovate-lanceolate, rounded to acute at the apex, 7–10 mm long and 2.5–3 mm broad at the base; margin eroso-denticulate. *Pedicels* 1.5–3 mm long at flowering stage, elongating to 6 mm long in fruit. *Perianth* subcylindrical, slightly constricted above the ovary, 2.7–3.3 cm long and 3 mm wide at the base increasing gradually to 5–6 mm wide at the mouth; lobes ovate, rounded, 3 mm long, slightly spreading. *Stamens* exerted at anthesis by 0–8 mm, usually withdrawn eventually into the perianth tube though sometimes remaining exerted. *Style* subequal to the anthers at anthesis, finally exerted by 8–12 mm. *Fruit* subglobose, not markedly triquetrous, 7–9 mm long. FIG. 56. PLATE 13. MAP 10.

Found on grassy slopes, often among dolerite rocks, at altitudes of 5,500 to 8,000 ft., in the mountains of the north-eastern Cape Province and the adjoining area of south-western Lesotho. Its flowering season is from mid-January to early March.

CAPE.—Barkly East: Kraalberg, near Barkly Pass, *Ratray* sub Galpin 7326; 1 mile S. of Lundean's Nek Post Office, *Marais* 1349; Naude's Nek, *Marais* 1361; 1364; *Godfrey* VH 1526; Buttermead, near Rhodes, *Naude* 2; Maartenshoek, *Lavranos* 1091. Graaff Reinet: Loskop, on Farm De Toom, 6 miles from New Bethesda on road to Graaff Reinet, cult. in Pretoria, *Kitching* 45: 54. Herschel: 4 miles N. of Lundean's Nek, *Marais* 1346. Lady Grey: 6 miles from Lady Grey on Joubert Pass road, *Bruce* 567. Middelburg: Sneeuwberg, between Compassberg and Rhenosterberg, *Drege* s.n. (K., partly). Sterkstroom: Halseton, Farm Buffelsfontein, *Stretton* 5. Wodehouse: Stormberg Mts., west of Dordrecht on road to Boshoff's Kraal, *Bruce* 563; near Dordrecht, *Bruce* 565.

LESOTHO.—Berea: *Jacot Guillarmod* 1716; 1744; 1753. Mokhotlong: Magapung Valley, *Coetsee* 556. Qachas Nek: On top of Rafase Kop near Qachas Nek, *Galpin* 14083.



FIG. 56.—*K. stricta*, from New Bethesda (Kitching 54).

In the herbarium, *K. stricta* might be confused with *K. ritualis* but the differences are clear-cut. The leaves of *K. stricta* are U-shaped in cross section, not V-shaped as in all other species in South Africa with the exception of *K. northiae*; when herbarium specimens are prepared, however, the leaves are often folded in such a manner that the characteristic shape of the cross section cannot be seen. When living plants are available, no confusion will arise; the leaves of *K. stricta* are stiff and erect with the margin tending to be inrolled, so that they appear to be terete at the apex. While at first sight there does not appear to be a distinct mid-vein, there is always one nerve more strongly developed than the others, but this nerve is not centrally placed, being always nearer one margin than the other. Along the leaf margins and on the nerves are minute papillae, making the leaf surface slightly scabrid to the touch. In occasional specimens, for example *Godfrey* VH 1526 and *Marais* 1364, both from Naude's Nek, there are minute protuberances on the nerves which vary from scarcely raised, discoloured spots to bristle-like papillae, similar to the serrulations on the leaf margins.



PLATE 13.—*Kniphofia stricta* Codd

In floral characters, *K. stricta* resembles *K. ritualis* but there is a constant difference in the bracts, which are shorter and ovate to ovate-lanceolate in *K. stricta*, while in *K. ritualis* they are lanceolate and long-acuminate. The two species were, at first, confused in the herbarium until living plants were sent in by Mr. S. Kitching, when it became obvious that two distinct species were involved.

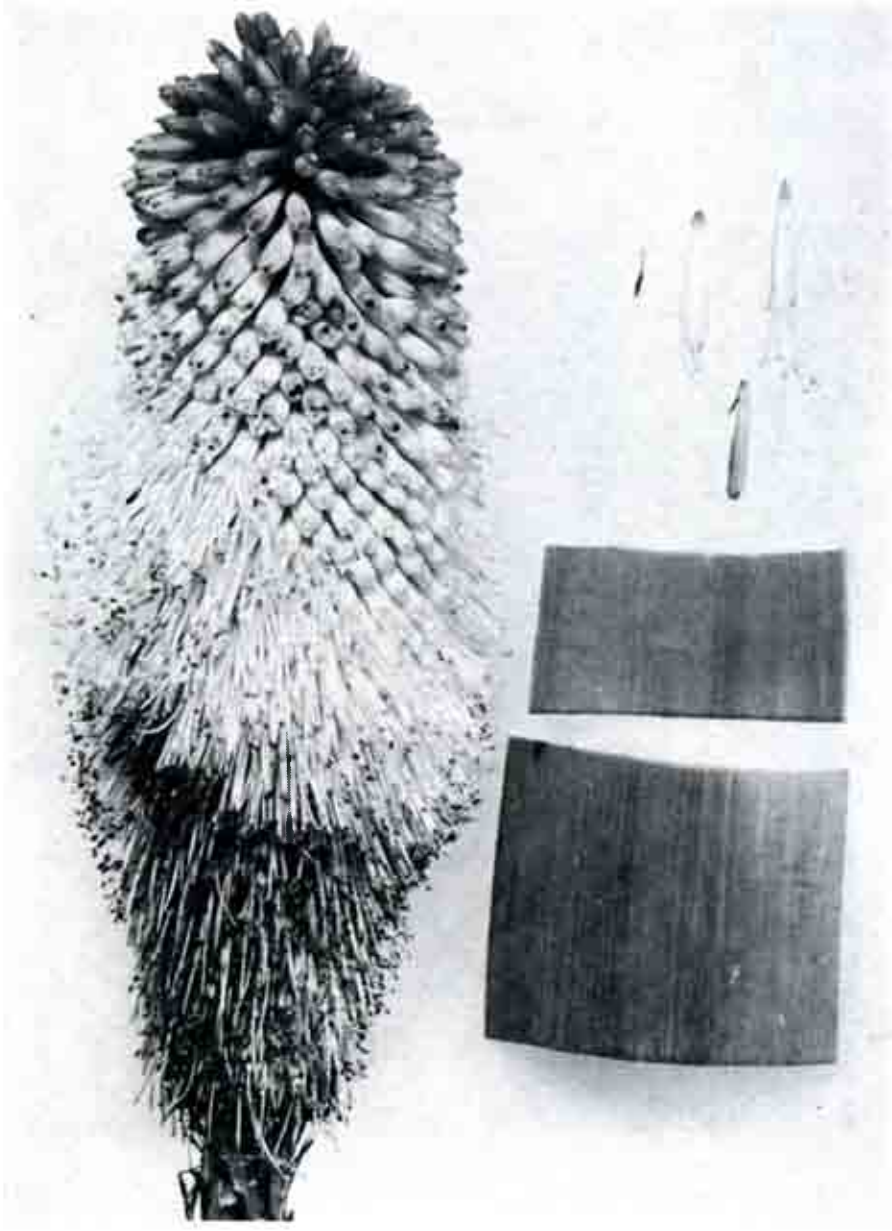


FIG. 57.—*K. northiae*, from Cathcart, $\frac{3}{4}$ (Mrs. Bowker s.n.).

The species was first discovered by Drege on the Sneeuwberg, but was not recognized as distinct. A sheet at Kew shows a mixed gathering, consisting of an inflorescence and leaf of *K. stricta* together with an inflorescence and leaf of *K. linearifolia*.

The leaves of typical *K. northiae* also lack a keel, but they are much broader (3–12 cm) and are recurved, while the perianth is shorter (2–2.5 cm) and the anthers are more conspicuously exerted than in *K. stricta*.

29. *Kniphofia northiae* Bak. in J. Bot. Lond. 27: 43 (1889); Gard. Chron. 10: 67 (1891); Bot. Mag. t.7412 (1895); Fl. Cap. 6: 284 (1896); Mallett in Gard. Chron. 39: 100, t.42 (1906); Berger in Pflanzenr. 4, 38: 65 (1908). Type: A drawing by Miss North of a plant from the mountains north of Grahamstown (in K); a plant from this locality was also sent to Kew, where it was cultivated and figured in Bot. Mag. l.c.

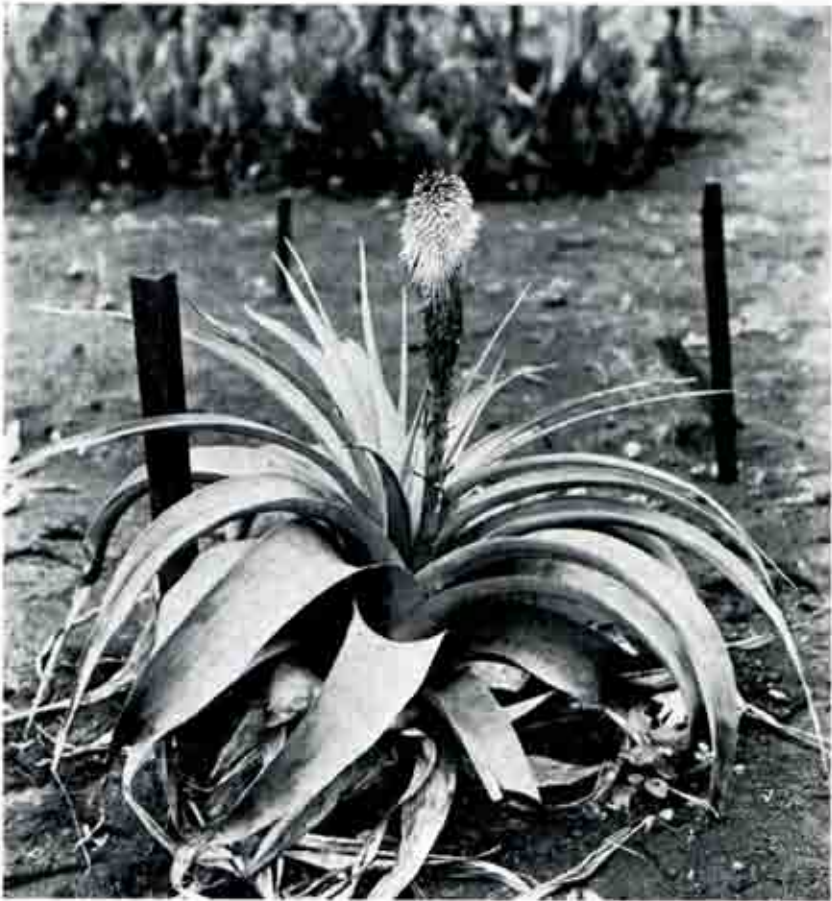


FIG. 58.—*K. northiae*, from Cathcart (Mrs. Bowker s.n.).

Plants solitary, caulescent; stems simple or, rarely, branching from the base, 20 cm to 1.7 m tall. Leaves in a rosette at the apex of the stem, broad, persistent, broadly V-shaped in cross section to non-keeled, leathery, recurved, shallowly and

broadly channelled above, 0.5—1.5 m long and (3) 3.5—12 cm broad, nervose; margin strongly serrulate. *Peduncle* overtopping the recurved leaves, 20–30 cm long, 1–2.5 cm in diameter, bearing several to many large, oblong, empty bracts below the inflorescence. *Inflorescence* cylindrical to ovoid, very dense, 10–22 cm long and 5–6 cm in diameter; buds and flowers subspreading; buds pinkish red opening to whitish flowers, or orange-red opening to yellow flowers. *Bracts* oblong-lanceolate to linear-oblong, 7–12 mm long and 1.5–2 mm broad, acute to obtuse at the apex; margin entire or minutely eroso-denticulate at the apex. *Pedicels* 2.5–3 mm long at flowering stage, elongating to 7–10 mm in fruit. *Perianth* subcylindrical, 2.2–3.2 cm long, 3 mm broad near the base, slightly constricted above the ovary, increasing to 5 mm broad below the middle and then approximately parallel-sided to the mouth; lobes ovate, 2 mm long, not spreading. *Stamens* markedly exerted by 1–1.3 cm at anthesis. *Style* subequal to the anthers at anthesis, eventually exerted by about 1.5 cm. *Fruit* subglobose, obscurely triquetrous, erect, 8 mm long. FIGS. 57, 58, 59. MAP 10.

Occurs in mountain areas at altitudes of 5,000 to 10,000 ft. in grass or on sparsely wooded, stony slopes in the eastern Cape Province, the Midlands and Drakensberg region of Natal, and eastern Lesotho, with outliers at lower altitudes near Mqanduli in the Transkei and Pietermaritzburg in Natal. The main flowering time is December to February, though cultivated plants from the two last-mentioned localities flowered in September and October (see notes on variation below).

CAPE.—Barkly East: Ben McDhui, *Galpin* 6866; near Rhodes *Bruce* 572. Cathcart: *Hart* in NBG 169/29 (BOL, NBG); Gaikas Kop, *Bowker* s.n. Mqanduli: 6 miles N. of Mqanduli, *Marais* 1014. Queenstown: Katberg, *Bruce* 530; *King* s.n.; near Fairford, *Bruce* 539; *Cotterell* s.n. (GRA). Stockenstrom: Top of Katberg Pass, *Dyer* 2307. Umzimkulu: near Kokstad, *Mogg* 1843.

LESOTHO.—Summit of Drakensberg, Cleft Peak area, *Killick & Marais* 2175; Castle Buttress area *Killick* 1872.

NATAL.—Bergville: Cathedral Peak, *Killick* 3223; Mont-aux-Sources, *Trauseld* 174. Estcourt: Cathkin Park, *Galpin* 11733; Tabamhlope, *Pentz* 34; *West* 709; *Marais* 1469; Giants Castle Game Reserve, *Trauseld* 498; Highmoor Forest Station, *Killick & Vahrmeijer* 3640. Lions River: Spioen Kop, 18 miles S. of Nottingham Road, *N. R. Smuts* 1022. Pietermaritzburg: near Pietermaritzburg (locality uncertain), *Beard* s.n.

The original description of the species is based on a painting by Miss North which may be accepted as the type. A living plant was also presented to Kew by Miss North and this plant flowered and was illustrated in the *Bot. Mag.* t.7412 (1895). This shows the colour form found commonly in the eastern Cape Province, with pale red buds changing to creamy-white flowers. There is another colour form, in which the buds are orange-red to flame-red, changing to yellow as the flowers open, occurring in Natal (*Beard* s.n. and *Trauseld* 498) and near Mqanduli in the Transkei (*Marais* 1014). Although the usual flowering time for the species is December to February in the high mountain areas, two of these gatherings from lower altitudes (*Marais* 1014 and *Beard* s.n.) flowered in cultivation in September and October.

In its typical form, *K. northiae* may be separated from all other species by its broad, shallowly channelled, arched leaves, which lack a distinct keel. However, specimens collected in Lesotho and the Bergville and Estcourt Districts (*Schelppe* s.n., *Killick* 3223, *West* 709) may have narrower leaves, 3–4 cm wide, which are broadly V-shaped in cross section with a distinct midrib. Further study is required to determine whether the species should be subdivided into groups with separate taxonomic status but, at the present state of our knowledge, it is considered best to leave the specimens in one variable species.

The large, dense inflorescence resembles that of *K. cualescens* and, like that species, *K. northiae* may also develop a distinct stem.



FIG. 59.—*K. northiae*, near Nottingham Road (*N. R. Smuts* 1022). Photo by Dr. N. R. Smuts.

30. *Kniphofia galpinii* Bak. in Fl. Cap. 6: 281 (1896); Berger in Pflanzenreich 4, 38: 56 (1908); Phillips in Flow. Pl. S. Afr. 20: t.783 (1940); Letty, Wild Flow. Tvaal. 36, t.20, 3 (1962). Type: Barberton District, Upper Moodies, *Galpin* 1208 (K!, holo.; BOL!, PRE!).

Plants solitary or in small groups. *Leaves* not clearly in ranks, 8–12 per peduncle, narrow, grass-like, 40–65 (–100) cm long, 3–6 (–8) mm broad, dull green, markedly nervose, triangular in cross section, recurved, breaking into numerous fibres at the base; margin entire or occasionally minutely denticulate towards the apex. *Peduncle* standing above the recurved leaves, 30–60 cm long, bearing several sterile bracts below the inflorescence. *Inflorescence* subglobose to ovoid, pyramidal, with a coma of sterile bracts at the apex, dense, 5–8 cm long and 4 cm broad, buds and flowers pendulous; buds flame-red to orange-red, flowers yellow to orange. *Bracts* linear-lanceolate,



PLATE 14.—*Kniphofia galpinii* Bak.



FIG. 60.—*K. galpinii*, Barberton District (Bruce 304).

9–13 mm long, 1·5–2 mm broad, acuminate to subcaudate, especially the lowermost which may be up to 2 cm long; margin subentire to minutely denticulate towards the apex. *Pedicels* 1·5–3 mm long at flowering stage, elongating to 4 mm in fruit. *Perianth* subcylindrical, 2·7–3·5 cm long, 3 mm broad at the base, not constricted above the ovary, expanding gradually to 4 mm broad near the throat; lobes ovate, obtuse, 2 mm long, not spreading. *Stamens* not or scarcely exerted at anthesis, later withdrawn. *Style* subequal to the stamens at anthesis, finally included or shortly exerted by up to 5 mm. *Fruit* not seen. FIG. 60. PLATE 14. MAP 11.

Grows in dense grass on hillsides and grassy vleis at altitudes of 3,000 to 6,000 ft. Recorded from the south-eastern Transvaal, northern Swaziland, northern and central

Natal. The flowering period is mainly from January to March, though flowering specimens have been collected as early as December.

TRANSVAAL.—Barberton: *Pott-Leendertz* 5544; *Thorncroft* in TRV 5137; Upper Moodies, *Galpin* 1208; 6 miles S. of Barberton on road to Havelock Mine, *Reynolds* 4241; 20 miles S. of Barberton, *Reynolds* 4138; near Angle Station, *Bruce* 311; 2 miles S.E. of Havelock Mine, *Reynolds* 5874; near Transvaal border, *Bayliss* 2749; Sheya-lo-ngubo Dam, 10 miles S.W. of Louws Creek, *Reynolds* 5885; *Bruce* 314. Nelspruit: near Kaapschehoop, *Van der Merwe* 1648; *Reynolds* 3462 (BOL, K); near Montrose Falls, *Key* s.n.; *Codd* 4878. Pilgrim's Rest: Mt. Anderson, *Galpin* 13717; *Reynolds* 5895; *Meeuse* 10082; Peach Hill, *Galpin* 14501; Jubilee Peak, *Galpin* 14510; Mauchsberg, *Van der Merwe* 333; 1665; in PRE 2105; *Brent* 109; Long Tom Pass, *Werdermann & Oberdieck* 2145.

SWAZILAND.—6 miles W. of Piggs Peak, *Codd* 9524; Piggs Peak, Emlembe, *Comton* 30528.

NATAL.—Dundee: *Medley Wood* 11628 (NH). Helpmekaar: between Helpmekaar and Vants Drift, *Codd* 6799; 14 miles S.E. of Dundee on road to Rorkes Drift, *Codd* 6782. Vryheid: Hlobane Mt., *Johnstone* 609.

Some thought was given to placing *K. galpinii* as another subspecies of *K. triangularis*, but it is felt that the many small differences in a number of features justify retaining it as a separate species. The narrow, grass-like leaves are very similar to those of *K. triangularis* but are, in general, more nervose and fibrous. The floral characters are also similar, though the inflorescence of *K. galpinii* is not concolorous (except in the early flowering stage), the flame-red buds changing eventually to orange-yellow as the flowers open; the perianth tends to be longer and the lobes are not spreading, while the bracts are longer and more narrowly acuminate.

Four specimens (not included in the citations above) from Carolina and Ermelo Districts need further investigation. Three of these are from Jessievale Plantation, Carolina District, collected on 18th November, 1961, by *Germishuizen* and do not entirely agree with *K. galpinii*. They have narrow, fibrous leaves 5–8 mm broad with a few scattered teeth on the margins near the apex, and the bracts vary from narrowly acuminate in the sheet designated "c", to oblong-lanceolate, acute to obtuse in the sheets labelled "a" and "b". The last two cannot be reconciled with *K. galpinii*, which consistently has narrowly acuminate bracts. The fourth specimen of doubtful identity was collected by *Miss O'Connor* on the Athole Pasture Research Station, Ermelo District, in November, 1948, and has ovate-lanceolate, acute bracts. This matches sheets "a" and "b" above. It may also be significant that all four specimens flowered in November, earlier than is normal for *K. galpinii*. Although they are now excluded from *K. galpinii*, these specimens are obviously closely related to that species, but further information is required before their taxonomic status can be determined.

The specimens cited from Natal (*Medley Wood* 11628, *Codd* 6782, 6799 and *Johnstone* 609) also differ slightly from typical *K. galpinii* in their longer (70–100 cm), broader (4–8 mm) and more glaucous leaves, but the differences do not appear sufficient to warrant separate status. They represent a form which also requires further investigation.

31. *Kniphofia triangularis* *Kunth*, Enum. Pl. 4: 551 (1843). Type: "Aliwal. District", Wittebergen, *Drege* 3524 (K! lecto.; G!).

Plants solitary or in small groups. *Leaves* not clearly in ranks, recurved, soft or somewhat fibrous, 28–60 cm long, 1.5–8 mm broad, triangular in cross section, or more or less flat with a narrow channel above, keeled below, breaking up into fibres at the base; margin entire to distinctly serrulate. *Peduncle* subequal to the leaves, 30–60 cm long, bearing several sterile bracts below the inflorescence. *Inflorescence* subcylindrical to ovoid, pyramidal at the apex, dense, 5–8 cm long and 4–5 cm broad; buds and flowers pendulous, more or less concolorous, coral-red, red-orange, salmon-red to orange-yellow. *Bracts* ovate-lanceolate to lanceolate, acute to long-acuminate, 6–8 mm long, 1.5–2 mm broad, entire or nearly so. *Pedicels* 1–2 mm long at flowering stage, elongating to 3 mm long in fruit. *Perianth* cylindrical, 2.4–3.5 cm

long, 3 mm broad, not constricted above the ovary, expanding abruptly at the mouth to 5–8 mm broad; lobes ovate, 1.5–2 mm long, usually somewhat spreading. *Stamens* exerted by 2–3 mm at anthesis, later withdrawn. *Style* eventually exerted by 5–10 mm. *Fruit* ovoid, obscurely triquetrous, 6–8 mm long, erect.

Two subspecies are recognized.

Key to Subspecies

Leaves 1.5–3 mm broad or, if broader, leaf-margins sparingly to distinctly serrulate

(a) subsp. *triangularis*

Leaves 3–9 mm broad; leaf margins smooth..... (b) subsp. *obtusiloba*

(a) subsp. *triangularis*.

K. triangularis Kunth, Enum. Pl. 4: 551 (1843); Bak. in J. Linn. Soc. 11: 362 (1871); J. Bot. Lond. 23: 278 (1885); Fl. Cap. 6: 280 (1896); Berger in Pflanzenreich 4, 38: 53 (1908); Bruce in Flow. Pl. Afr. 30: t.1184 (1955). Type: "Aliwal District", Wittebergen, *Drege* 3524 (K, lecto!; G!). *K. macowanii* Bak. in J. Bot. Lond. 12: 3 (1874); Bot. Mag. t.6167 (1875); J. Bot. Lond. 23: 278 (1885); Fl. Cap. 6: 280 (1896); Mallett in Gard. Chron. 39: 83, t.38 (1906); Berger in Pflanzenreich 4, 38: 54, t.21 C (1908). Type: Somerset East, Boschberg, *MacOwan* 1536 (K!, holo.; BOL!, G!, GRA!, PRE!, SAM!, Z!). *K. nelsonii* Mast. in Gard. Chron. 11: 554, t.83 (1892); Bak. in Fl. Cap. 6: 280 (1896); Mallett in Gard. Chron. 39: 82, t.37 (1906); Berger in Pflanzenreich 4, 38: 53 (1908); Phillips in Ann. S. Afr. Mus. 1: 6 (294) (1917). Type: O.F.S., *Nelson* s.n. (K!, holo.).

Tritoma macowanii (Bak.) Carr. in Rev. Hort. 390 (1879).

Included in subsp. *triangularis* are plants with leaves very narrow and grasslike, 1.5–3 mm in diameter, with smooth margins (typical), and those with leaves 2.5–6 (–8) mm broad and margins sparingly to distinctly serrulate, which were previously separated as *K. macowanii* (see notes below). FIG. 61. PLATE 15. MAP 11.

Found in mountain grassland, often in peaty soil, on grassy slopes, stream-banks and moist places among sandstone rocks at altitudes of 3,000 to 6,500 ft. in the eastern Cape Province, eastern O.F.S., Lesotho and the southern and central Drakensberg area of Natal. The flowering time is from January to April.

CAPE.—Without exact locality: Winterhoek, *Zeyher* (SAM). Barkly East: *Stretton* 120; Witteberg-*Drege* 3524 (K, G); *Thode* A. 520; *Bruce* 571; Barkly Pass, *Reynolds* 2506; Bittermead, *Naude* 1; 2 miles S. of Lundeans Nek, *Marais* 1350. Cathcart: *Mrs. Bowker* s.n.; near Hogsback, *Rattray* 32; *Storj* 3743; near Toise River Station, *Flanagan* 2250; near Hogsback, *Reynolds* 1176 (BOL). Keiskammahoeck: Ghulu Kop, *Dyer* 397 (GRA); Cata Forest Station, *Bruce* 551. King William's Town: Mt. Kemp, *B. H. Dodd* sub Galpin 8033. Maclear: Naudes Nek, *Bruce* 573; *Marais* 1371. Matatielie: *Galpin* 14084. Queenstown: Hangklip Mt., *Galpin* 1778; near Queenstown, *Bruce* 528. Somerset East: Boschberg, *MacOwan* 1536; *Bruce* 520. Stockenstrom: Katberg Pass, *Elfers* 2; *Bayliss* s.n.; 12 miles S.W. of Fairford, *Reynolds* 3794. Stutterheim: Dohne Hill, *Sim* 540. Tarkastad: 9 miles S. of Spring Valley, *Bruce* 523; Winterberg, *Reynolds* 1772. Umzimkulu: Ingeli Mt., *Tyson* 1380 (SAM).

LESOTHO.—Leribe, *Dieterlen* 474 (K, BM); *Phillips* s.n. (SAM). Qachas Nek, *Brooke* 33 (BM).

O.F.S.—Bethlehem: *Harding* s.n.; *Potgieter* in TRV 21936; near Retiefsnek, *Wium* 25; Golden Gate National Park, *Roberts* 3387; 20 miles S. of Kestell, *Codd* 10536. Ficksburg: Gum Tree, *Martley* in BOL 23830 (BOL). Fouriesburg: *Brierley* s.n. (BM); *Key* in PRE 28303; Wyndford, *Gemmell* 7556. Harrismith: Witzieshoek, *Junod* s.n. (G); Besters Vlei, *Bolus* 8260 (BOL); 8261 (BOL); *Flanagan* 1838; 1841; *Thode* s.n. (STE); *Junod* s.n. (G); Zaaihoek, *Thode* s.n. (BOL, Z); Van Reenens Pass, *Pole Evans* s.n.; Oliviershoek Pass, *Bruce* 401; Kerkenberg: *Jacobsz* 290; *Codd* 10528. Herschel: *Hepburn* s.n. (GRA).

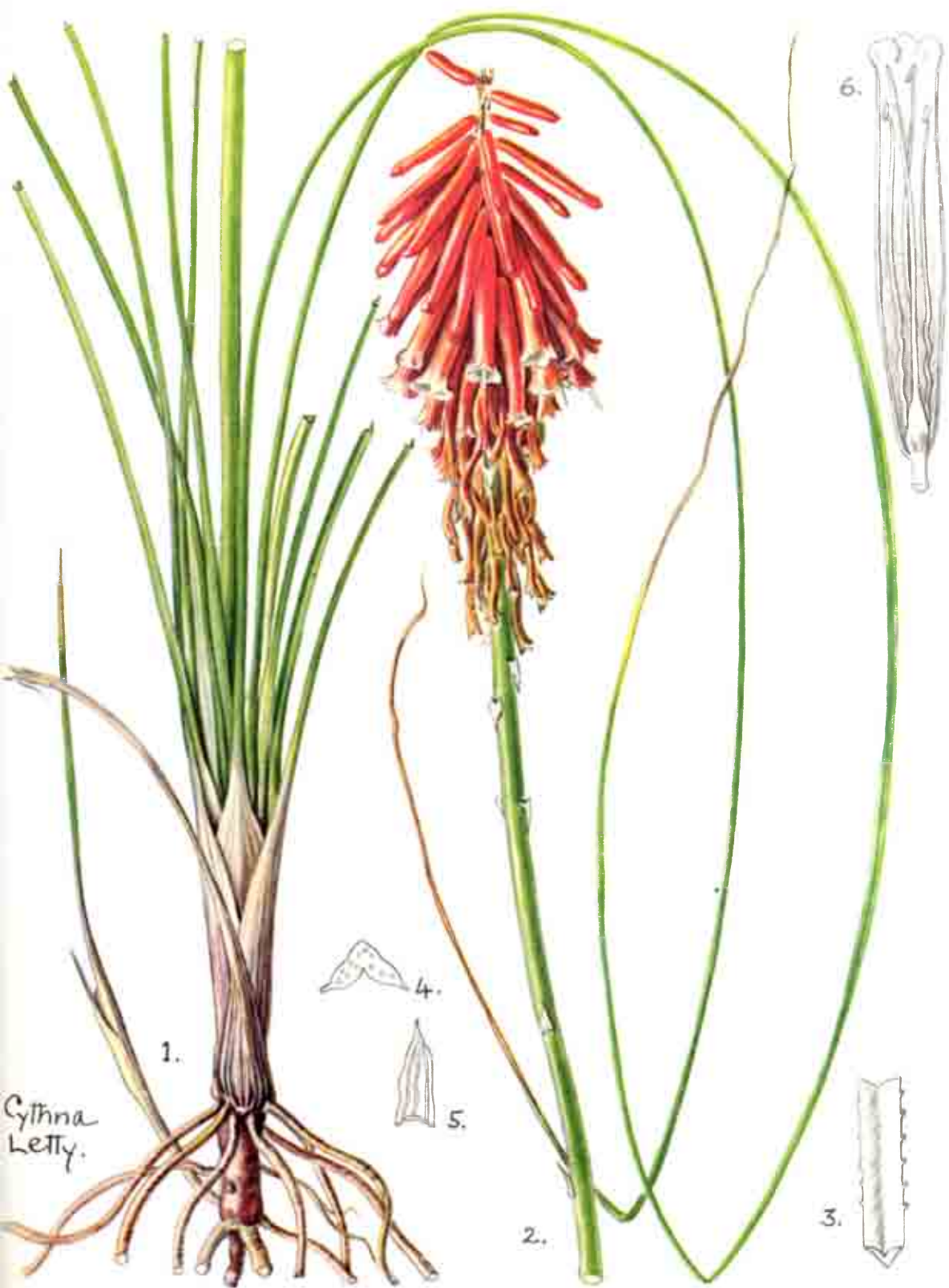
NATAL.—Kranskop: near Olifantshoek store, *Edwards* 3334. Polela: Marwaga Hill, near Bulwer, *Marais* 830; near Xumeni Forest, *Gerstner* 7012. Underberg: *McClellan* 672; Umkomazana River Valley, *Marais* 1429; 9 miles N. of Kingscote, *Codd* 8547.



FIG. 61.—*K. triangularis* subsp. *triangularis* illustrating the form with serrulate leaves described as *K. macowanii* Bak.

Berger in his monograph, l.c. (1908), upholds the following four species in his section Obtusilobae: *K. triangularis*, *K. nelsonii*, *K. macowanii* and *K. obtusiloba*. These are now included within the compass of one species as *K. triangularis* subsp. *triangularis* and *K. triangularis* subsp. *obtusiloba*. Berger distinguished *K. triangularis* and *K. nelsonii* on the basis of the perianth length in the former being 2.0–2.5 cm and, in the latter, 3.0–3.5 cm. However, in the present investigation, a complete range of perianth length was found from 2.4–3.5 cm, no specimens having flowers as short as 2.0 cm and only some specimens of subsp. *obtusiloba* being as long as 3.5 cm. The type of *K. triangularis* (Drege 3524) has flowers about 2.5 cm long and that of *K. nelsonii* (Nelson s.n.) flowers about 3.0 cm long. Both have narrow, grass-like leaves 1.5–3 mm broad with smooth margins, and no reliable basis can be found for separating them even at varietal level.

In view of the markedly serrulate leaf margins of the type of *K. macowanii*, consideration was given to separating it taxonomically, possibly as a variety. However, a complete range of intermediates is found linking it with the smooth, grass-like leaves (1.5–3 mm broad) of typical *K. triangularis*. Oddly enough, the intermediate specimens occupy a different geographical zonation to the east of the other two groups. Thus typical *K. triangularis* is distributed mainly to the west of the Drakensberg escarpment from Barkly East District in the extreme eastern Cape Province to the eastern O.F.S.



Cytha
Letty.

PLATE 15.—*Kniphofia triangularis* Kunth subsp. *triangularis*

and the adjoining parts of Lesotho; specimens matching the type of *K. macowanii* with leaves 2.5–6 mm broad and markedly serrulate margins occur to the south-west of this area in the districts of Cathcart, Keiskammahoek, King William's Town, Queenstown, Somerset East, Stockenström and Stutterheim; while the intermediate specimens with leaves 1.5–6 mm broad, sparingly serrulate to almost smooth, are found on the eastern foothills of the Drakensberg, from the Umzimkulu District (Cape Province) to Polela and Underberg Districts (Natal). This unusual situation cannot satisfactorily be ascribed to hybridization between typical *K. triangularis* and typical "*K. macowanii*".

Berger's Section Obtusilobae, now reduced to one variable species, is characterised by the small, dense, more or less concolorous inflorescences, coral-red to orange-red in colour, with the perianth lobes somewhat spreading at anthesis. On p. 435 reference is made to an attractive colour form of *K. rufa* which has lax, concolorous, coral-red inflorescences with flowers 2–3 cm long, and narrow leaves with smooth leaf margins. The distinction between lax and dense inflorescences is not always clear-cut and occasional specimens may be difficult to classify.



FIG. 62.—*K. triangularis*
subsp. *obtusiloba*, near
Machadodorp (Codd
10306).

In the herbarium, *K. thodei*, with its narrow leaves and sparingly toothed to entire margins, may be confused with some forms of *K. triangularis*. However, its inflorescence is bicolorous, the buds being dull red and the flowers whitish, with the perianth lobes not spreading, so that it is clearly closer to *K. porphyrantha* in its affinity than to *K. triangularis*.

(b) subsp. **obtusiloba** (*Berger*) *Codd*, stat. nov.

K. obtusiloba Diels ex *Berger* in *Pflanzenreich* 4, 38: 54, t.21 (1908); Letty in *Wild Flow. Tvaal* 33 (1962); *Codd* in *Flow. Pl. Afr.* 36: t.1422 (1964). Type: Transvaal, Lydenburg District, *Wilms* 1559 (B!, holo.; BM!, K!).

This subspecies is characterised by the leaves being relatively soft and (2.5–) 4–10 mm broad with entire margins. The flowers tend to dry a purplish-brown colour. FIG. 62. PLATE 16. MAP 11.

Occurs among quartzite rocks in mountain grassland at altitudes of 4,000 to 7,000 ft in the eastern Transvaal, with one record from Ngotshe District, Natal. The flowering season is mainly from mid-January to the end of April.

NATAL.—Ngotshe: near Ngome, *Bruce* 297.

TRANSVAAL.—Belfast: Elandskop, near Izaak Siding, *Galpin* 13275; near Machadodorp, *Rogers* 18198 (BM); 16 miles S.E. of Machadodorp, *Bruce* 477; 10 miles W. of Slaaihoek, *Bruce* 484; 16 miles N.E. of Machadodorp on road to Mareskop, *Bruce* 514; Mareskop, *Bruce* 516. Carolina: near Slaaihoek, *Pole Evans* 3923; 4724; *Codd* 8274; 10306. Lydenburg: *Wilms* 1559 (B, BM, K); farm Zwagershoek, *Obermeyer* 352; 10 miles S.E. of Lydenburg, *Prosser* 1790; Kemps Heights, 15½ miles S.E. of Lydenburg, *Codd* 8308; 17 miles S.E. of Lydenburg, *Marais* 51. Pilgrims Rest: Mariepskop, *Meeuse* 9956; *Van der Schijff* 4518; 6524.

Subsp. *obtusiloba* is separated geographically from subsp. *triangularis* and was, at first, considered to be specifically distinct. Recent gatherings from Mariepskop in eastern Transvaal are very reminiscent of *K. triangularis* in their narrow leaves which are, however, softer in texture and thus form a link between the two subspecies. In subsp. *obtusiloba* the leaves are consistently smooth-margined and herbarium specimens are apt to be confused with *K. porphyrantha*. The latter may be separated by its bicolorous inflorescence with flowers becoming lemon-yellow as they mature. The Mariepskop gatherings referred to above are not clearly distinct from *K. galpinii* which also occurs in the eastern Transvaal, but the latter species is again distinguished by its bicolorous, red and yellow, inflorescence and the more rigid, fibrous, grass-like leaves.

32. **Kniphofia thodei** *Bak.* in *Fl. Cap.* 6: 533 (1897); *Berger* in *Pflanzenreich* 4, 38: 57 (1908); *Codd* in *Flow. Pl. Afr.* 37: t.1446B (1966). Type: O.F.S., Caledon Range, Roodeberg, Moperis Peak, *Thode* 62 (BOL!, holo.; K!, NH!, PRE!, STE!).

Plants usually solitary. *Leaves* 6–8 per peduncle, narrow, at first erect, later recurved or bent downwards, 25–50 cm long, 2–5 mm broad, broadly triangular in cross section, narrowly channelled above and slightly keeled below, pale glaucous-green, soft in texture, breaking into fibres at the base; margin finely serrulate, particularly towards the apex, to smooth. *Peduncle* 30–50 cm long, usually overtopping the leaves, with an occasional sterile bract below the inflorescence. *Inflorescence* subglobose to ovoid, dense, 4–6 cm long and 4–5 cm in diameter; buds and flowers pendulous; buds dull red to reddish-brown often tipped with white; flowers white or tinged with reddish-brown towards the base. *Bracts* lanceolate, long-acuminate, 6–7 mm long, 2 mm broad near the base; margin entire. *Pedicels* 1.5–2 mm long. *Perianth* subcylindrical, somewhat curved, not constricted above the ovary, 2.8–3.5 cm long, 3 mm broad near the base, scarcely widening to 3.5–4 mm at the throat; lobes



PLATE 16.—*Kniphofia triangularis* Kunth subsp. *obtusiloba* (Diels ex Berger) Codd

broadly ovate, 1.5 mm long, not spreading. *Stamens* reaching the throat of the perianth at anthesis, later withdrawn. *Style* eventually exerted by 4 mm. *Fruit* not seen. FIG. 63. PLATE 4b. MAP 11.

Found in moist places in mountain grassland at altitudes of 7,500 to 9,000 ft in Lesotho and eastern O.F.S., and at altitudes of 5,000 to 6,000 ft. in the Estcourt District, Natal. The flowering season is mainly in January, but flowering specimens have been collected as early as November and as late as March.



FIG. 63.—*K. thodei* Bak., Kamberg, Natal (*N. R. Smuts* 1420). Photo by Dr. N. R. Smuts.

O.F.S.—Harrismith: Witzieshoek, Moperis Peak, *Thode* 62 (BOL, K, PRE, STE).

LESOTHO.—Without locality, *Staples* 245; Pitseng, Malutis, *Dieterlen* 1286; Leribe, *Dieterlen* 872; between Tsienyane Valley and Bokong River, *Coetsee* 505 (UOFS); Little Bokong Valley, *Jacot Guillarmod* 334; Jordan Valley, *Jacot Guillarmod* 1670; Butha Buthe, Tshlanyane Valley, *Jacot Guillarmod* 4011.

NATAL.—ESTCOURT: near White Mt. Inn, *Killick & Marais* 2155; 2163; Kamberg Nature Reserve, *Wright* 3; *N. R. Smuts* 1420. Lions River: Nottingham Road, *Shirley* s.n. (NU).

Herbarium specimens of *K. thodei* may be confused with either *K. porphyrantha* or *K. triangularis* but, when fresh specimens are available, the species may be recognized by the unusual colour combination in the inflorescence: the buds are coral-red to dull red, often tipped with white, while the open flowers are whitish in colour. Its nearest relation is *K. porphyrantha* (see p. 476), which has lemon-yellow flowers, tinged with red at the apex of the inflorescence, and leaves yellow-green in colour with smooth margins. The leaves of *K. thodei* are normally narrower than those of *K. porphyrantha*, pale glaucous-green in colour, while the margins are usually sparingly denticulate. It is the minute teeth on the leaf margins and the narrow leaves which suggest an affinity to some forms of *K. triangularis* (see p. 472), but the inflorescences of the latter are uniformly coral-red, while the perianth lobes spread when the flowers are open.

Baker, in *Flora Capensis*, states that there is no specimen of the species at Kew. However, a sheet of the type, *Thode* 62, is at present in Kew Herbarium. The specimen in Bolus Herbarium is annotated in Baker's handwriting and may thus be regarded as the holotype.

Justus Thode, after whom the species is named, came originally from Europe (probably Germany) and collected plant specimens in all four Provinces. In a paper on the Botanical Regions of Natal, presented to the Durban Field Naturalists Society in May, 1901, and published in the *Natal Mercury*, he mentions in passing the presence of the "showy, scarlet or orange Kniphofias (*K. thodei*, a brilliant crimson and white) . . ." at high altitudes in the Drakensberg.

33. *Kniphofia porphyrantha* Bak. in *J. Bot. Lond.* 12: 4 (1874); *ibid.* 23: 279 (1885); *Fl. Cap.* 6: 281 (1896); Berger in *Pflanzenreich* 4, 38: 59 (1908); Codd in *Flow. Pl. Afr.* 33: t.1291 (1959); Letty, *Wild Flow. Tvaal.* 32, t.19, 1 (1962). Type: O.F.S., *Cooper* 3208 (K!, lecto.); 3207 (K!).

K. conrathii Bak. in *Bull. Herb. Boiss.* 2 sér., 4: 998 (1904); Berger, *l.c.* 59 (1908). Type: Transvaal, Modderfontein, *Conrath* 644 (K!, holo.; Z!).

Plants usually in dense groups, rarely growing singly. *Leaves* 10–12 per peduncle, yellow-green, flaccid, 30–45 cm long, 6–14 mm broad, more or less flat above, shallowly channelled, narrowly keeled below, at first erect, later reflexed; margins and keel smooth. *Peduncle* overtopping the leaves, 40–60 cm long. *Inflorescence* subglobose to shortly cylindrical, dense, 4–8 cm long and about 5 cm broad, with a coma of sterile bracts at the apex; buds spreading, orange-flame tipped with yellow, flowers pendulous, lemon-yellow. *Pedicels* 1.5 mm long. *Bracts* ovate-lanceolate, 6–9 mm long, 2–3 mm broad, acute to acuminate, sometimes minutely toothed near the apex. *Perianth* narrowly subcylindrical, not constricted above the ovary, somewhat arcuate, 3–4.2 cm long, 3 mm broad at the base, widening gradually to 4–5 mm at the throat; lobes ovate, obtuse, 2.5 mm long, at first erect, sometimes spreading at a later stage. *Stamens* exerted by 1–3 mm at anthesis, finally withdrawn. *Style* subequal to the stamens at anthesis, finally exerted by about 6 mm. *Fruit* erect, subglobose, obscurely triquetrous, 8–10 mm long. FIG. 64. PLATE 17. MAP 12.

Widespread in grassy vleis and mountain grassland at altitudes of 4,500 to 7,000 ft in eastern O.F.S., north-western Natal, southern and south-eastern Transvaal, extending into the western part of Swaziland. The flowering season is mainly October to December especially in the Transvaal, but extends to January and February in Natal.



PLATE 17.—*Kniphofia porphyrantha* Bak.

O.F.S.—Without locality: *Cooper* 3207 (K); 3208 (K). Bethlehem: Golden Gate National Park: *Roberts* 3451. Harrismith: *Van Reenen, Bews* 541; near Witzieshoek, *Bolus* 8259 (BOL); *Van Reenens Pass, Jacobsz* s.n.; *Renburgskop, Jacobsz* 293.

NATAL.—Bergville: Mont-aux-Sources, *Schweickerdt* 697; Oliviershoek, *Vogts* s.n.; Royal Natal National Park, *Killick & Marais* 2212; Cathedral Peak Forest Station, *Killick* 1265; 1305; *Germis-huizen* 45; 46. Estcourt: Cathkin Peak, *Galpin* 11740; Tambamhlope, *West* 400. Newcastle: near Normandien Pass, *Codd* 9978. Utrecht: Tweekloof, *Altemooi, Thode* A213; near Groenvlei, *Bruce* 283; *Codd & Dyer* 6285; 13 miles S.E. of Groenvlei, *Codd* 6954; Naauwhoek, *Devenish* 1002.



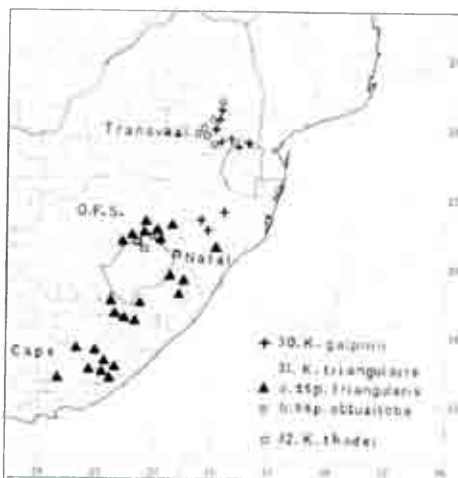
FIG. 64.—*K. porphyrantha*, Utrecht District (*Codd & Dyer* 6285). Photo by Dr. R. A. Dyer.

TRANSVAAL.—Belfast: near Belfast, *Leendertz* 9208; *Hutchinson* 2782; *Codd* 7592; near Dullstroom, *Galpin* 13175. Bronkhorstspuit: farm Wag-'n-bietjie-kop, *Francis* 2. Carolina: *Rademacher* in TRV 8204; Witpoort, *Van der Merwe* in PRE 24080; 8 miles N. of Carolina, *Reynolds* 3551; 11½ miles S.E. of Carolina, *Bruce* 302; 3 miles W. of Oshoek, *Codd* 4760. Ermelo: near Ermelo, *Burt Davy* 917 (K); *Van der Merwe* s.n.: Spitskop, *Pott-Leendertz* in TRV 15116; Nooitgedacht, *Potter* sub *Henrici* 1736; near The Gem, *Walker* 101; *Codd* 4768; *Gunn* s.n.; near Warburton, *Bruce* 267; 6½ miles N. of Ermelo, *Codd* 8069. Heidelberg: *Leendertz* 7711; near Heidelberg, *Schweickerdt* 983; *Prosser* 1677. Johannesburg: Diepkloof Farm, *Watt* 4684; Modderfontein, *Conrath* 644 (K, Z). Lydenburg: 14 miles S.W. of Spitskop on Lydenburg–Dullstroom road, *Bruce* 325. Middelburg: *Van der Merwe* s.n. Piet Retief: *Galpin* 9613; Iswepe, *Sidey* 2056. Potchefstroom: near Kraalkop, *Codd* 3434. Pretoria: Fairy Glen, *Leendertz* 3689; *Mogg* 18991; Derdepoort, *Leendertz* 4042; Baviaanspoort, *C. A. Smith* 3511; 19 miles E. of Pretoria, *Codd* 3188; near Tygerpoort, *Bruce* 30; 14 miles S.E. of Pretoria, *Bruce* 29; 228; Bapsfontein, *Codd & Bruce* 3382; *Bruce* 31; 32; 33; 34. Volksrust: near Volksrust, *Galpin* 11338. Wakkerstroom: *Van der Merwe* 3; 2056; *Austin Roberts* in TRV 12382; farm Oshoek, *Devenish* 225; 515; 793; farm Damascus, *Devenish* 298. Witbank: 15 miles W. of Witbank, *Reynolds* 2650.

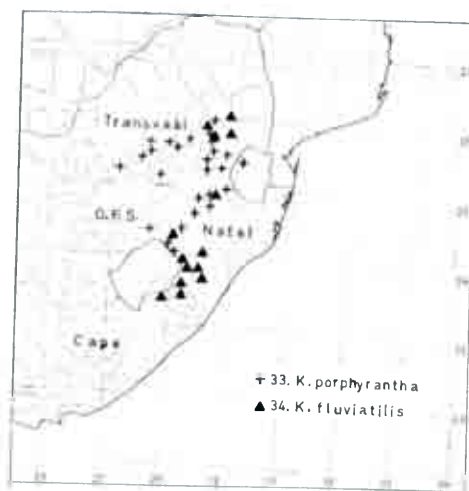
SWAZILAND.—Mbabane: Forbes Reef road, *Compton* 27186.

K. porphyrantha is a fairly widespread species, flowering from early to mid-summer, relatively small in stature with attractive small inflorescences, tinged with orange-flame at the apex, the flowers becoming pale to lemon-yellow. The leaves have smooth margins and are flaccid and yellow-green in colour, often with a waxy bloom. In the herbarium it is not always easy to distinguish between specimens of this and certain allied species with acute to acuminate bracts but, with fresh material, the above

characters provide a basis for separating *K. porphyrantha* from the following: (a) *K. triangularis* subsp. *obtusiloba*, which has a concolorous, coral-red to orange-red inflorescence and spreading perianth lobes; (b) *K. galpinii*, with its predominantly scarlet-red inflorescence and narrower, fibrous and somewhat grass-like leaves; (c) *K. thodei*, with the unusual colour combination in the inflorescence consisting of dull red buds and whitish flowers, while the leaves are narrower with sparingly denticulate margins; and (d) *K. fluviatilis*, in which the inflorescence has a similar colour pattern to that of *K. porphyrantha*, though the flowers tend to be longer (4–5 cm), and which differs mainly in the broader, more glaucous leaves which are V-shaped in cross section (see also p. 478).



MAP 11.—Distribution of *Kniphofia galpinii*, *K. triangularis*, subsp. *obtusiloba* and *K. thodei*.



MAP 12.—Distribution of *Kniphofia porphyrantha* and *K. fluviatilis*.

When he described *K. conrathii*, Baker related it to *K. citrina* Bak., an autumn-flowering species from the eastern Cape Province with obtuse bracts, shorter flowers and markedly exerted stamens. Berger, in his monograph, correctly aligned it to *K. porphyrantha*, but separated the two on the basis of the style eventually being exerted in *K. conrathii* and remaining within the perianth tube in *K. porphyrantha*. An examination of the respective type specimens shows little difference in this respect and the degree of exertion of the style depends largely on the age of the flower.

34. *Kniphofia fluviatilis* Codd in Flow. Pl. Afr. 36: t.1421 (1964). Type: Transvaal, Belfast District, 6 miles N.E. of Dullstroom, Codd 7625 (PRE!, holo.; K!).

Plants in groups. *Leaves* 8–12 per peduncle, erect, firm in texture, dull to glaucous green, tapering rapidly, 35–70 cm long, 0.8–2.5 cm broad, V-shaped in cross section with a rather thick keel, not strongly nerved and not breaking into fibres at the base; margin and keel quite smooth. *Peduncle* moderately stout, 45–60 cm long, sometimes with 1 or 2 sterile, lanceolate, acuminate bracts below the inflorescence. *Inflorescence* ovoid or subglobose, often pyramidal at the apex, dense, 6–9 cm long and 6–8 cm broad, with a coma of sterile bracts at the apex; buds and flowers pendulous; buds flame- to orange-red, flowers apricot-yellow to greenish-yellow. *Bracts* ovate-lanceolate to linear-lanceolate, acute to long-acuminate, 7–13 mm long, 3–4 mm broad; margin entire. *Pedicels* 1.5–2 mm long, elongating to 2.5–3 mm at fruiting stage. *Perianth*



PLATE 18.—*Kniphofia fluviatilis* Codd

subcylindrical, not constricted above the ovary, often somewhat arcuate, 4.2–5.0 cm long, 4 mm broad at the base, increasing gradually to 6 mm at the apex; lobes ovate, 2 mm long, obtuse, not spreading. *Stamens* just included or slightly exerted at anthesis, later withdrawn. *Style* subequal to the stamens at anthesis, finally exerted by 2–4 mm. *Fruit* erect, globose to ovoid, 8–10 mm long. FIG. 65. PLATE 18. MAP 12.

On the banks of streams in mountain grassland, usually growing partly in running water, at altitudes of 4,000 to 7,000 ft. recorded from the eastern Transvaal, and the foothills of the Drakensberg Range in Natal and East Griqualand. The main flowering time is during November and December, but specimens in flower have been collected as late as February.



FIG. 65.—*K. fluviatilis*, 8 miles north of Dullstroom (Codd 6655).

TRANSVAAL.—Belfast: *Doidge & Bottomley* s.n.; *O'Connor* 6; 6 miles N.E. of Dullstroom, *Codd* 5639; 6768; 7625; *Codd & De Winter* 3234; 8 miles N. of Dullstroom, *Codd* 6655; Velorevlei; Steenkampsberg, *Du Plessis* s.n. Nelspruit: Schagen, Amajuba Mt., *Liebenberg* 3116. Piet Retief: 10 miles N. of Iswepe, *Sidey* 1553; *Bruce* 276. Pilgrim's Rest: Mt. Anderson, *Smuts & Gillett* 2379. Wakkerstroom: farm Oshoek, *Devenish* 153; 168; 721.

O.F.S.—Harrismith: *Jacobsz* 321.

NATAL.—Estcourt: near White Mt. Inn, *Killick & Marais* 2154; 11 miles from White Mt. Inn on road to Hlatikulu, *Killick & Marais* 2156; Kamborg Nature Reserve, *Wright* 1. Lions River: near Rosetta, *Rogers* 28148 (Z); Nottingham Road, *Galpin* 9485; 3 miles N. of Nottingham Road, *Marais* 929; 3½ miles W. of Nottingham Road, *Marais* 932; Umgeni Poort, *Moll* 1367. Underberg: near Himeville, *Killick & Marais* 2088. Weenen: Culvers, *Rogers* 28274 (K, Z).

CAPE.—Matatiele: 8½ miles S.W. of Cedarville, *Bruce* 581. Umzimkulu: 28 miles from Swartberg on road to Underberg, *Killick & Marais* 2085.

The species was first collected by Miss Doidge and Miss Bottomley in 1924 near Belfast and later, in 1928, by Galpin near Nottingham Road. It is closely related to *K. porphyrantha* (see also p. 476), but has longer flowers, 4.2–5 cm long (among the longest recorded in the genus) and broader leaves which are dull green to semi-glaucous in colour, and are distinctly V-shaped in cross section. *K. fluviatilis* also shows an ecological distinction in its occurrence almost invariably along mountain streams, usually partly in the water, while *K. porphyrantha* inhabits grassy vleis and moist hillsides. The two species are rarely found growing together at the same locality, although their general distribution overlaps to some extent.

35. *Kniphofia littoralis* Codd, sp. nov., a *K. baurii* Bak. foliis integris vel subintegris, bracteis obtusis vel acutis, fructibus majoribus ovoideis 1.2–1.5 cm longis differt.

Planta 20–65 cm alta. *Folia* erecta vel recurvata, carinata, subglaucous, flaccida, 15–70 cm longa, 1–2.5 cm lata, margine integra vel parce serrulata. *Inflorescentia* densa, subglobosa vel breviter cylindrica, 5–9 cm longa, 5–5.5 cm lata, gemmis pendulis rubris vel lateritiis, floribus maturis flavo-virentibus. *Bractea*e ovatae vel oblongo-ovatae, acutae vel obtusae, 5–8 mm longae, 2.5–3 mm latae, integrae. *Pedicelli* 1–1.5 mm longi. *Perianthium* subcylindricum, 2.8–3.4 cm longum. *Stamina* inclusa vel vix exserta. *Stylus* 3–5 mm exsertus. *Capsula* ovodia, 1.2–1.5 cm longa, 8–10 mm lata.

Type: Natal, Umzinto District. near Park Rynie, *Codd* 9764 (PRE!, holo.).

Plants in groups. *Leaves* 6–10 per peduncle, erect (when growing in dense grass) to strongly recurved (when in an exposed place, or after the grass has been burnt in winter), dull to glaucous-green, soft in texture, 15–70 cm long, 1–2.5 cm broad, chartaceous at the base, not or scarcely breaking into persistent fibres at the base, V-shaped in cross section, usually folded along the midrib (especially in dried specimens with recurved leaves); margin and keel smooth or minutely serrulate towards the apex. *Peduncle* overtopping the spreading leaves, 20–65 cm long, with an occasional sterile bract below the inflorescence. *Inflorescence* globose to shortly cylindrical, dense, 5–9 cm long, 5–5.5 cm broad, usually with a few sterile bracts at the apex, buds and flowers pendulous; buds red to dull red (dragon's blood red, Ridgeway XIII), turning to pale yellow-green (primrose yellow, Ridgeway XXX to sea foam green, Ridgeway XXXI) as the flowers open. *Bracts* ovate to ovate-oblong, 5–8 mm long, 2.5–3 mm broad, acute to obtuse, white, chartaceous, with a median brownish nerve; margin entire. *Pedicels* 1–1.5 mm long at flowering stage, elongating to 5 mm long in fruit, arcuate. *Perianth* subcylindrical, slightly arcuate, 2.8–3.4 cm long, 3 mm broad at the base, very slightly constricted above the ovary, expanding to 5–6 mm broad about the middle and then parallel-sided to the throat; lobes broadly ovate, obtuse, not spreading. *Stamens* in the throat or slightly exserted at anthesis, later withdrawn. *Style* more or less equal to the stamens at anthesis, later exserted by 3–5 mm. *Fruit* ovoid, erect, 1.2–1.5 cm long, 8–10 mm broad, acute at the apex. PLATE 19.

Found in Natal in moist, grassy, low-lying places near the coast from just above sea level to about 600 ft. in altitude, from Umzinto District in the south to Hlabisa District in the north. The flowering time is from August to October.



PLATE 19.—*Kniphofia littoralis* Codd.

NATAL.—Durban: near Durban, *Medley Wood* 2634 (NH); 7162 (NH); Umgeni, *Rehmann* 8563 (Z). Eshowe: near Eshowe, *Lawn* 1074a. Hlabisa: Palm Ridge Farm, 8 miles N. of Mtubatuba, *Harrison* 1. Lower Tugela: Sheffield Beach, 37 miles N. of Durban, *Bruce* 155. Umlazi: Isipingo, *Miss Thompson* s.n. Mtunzini: Ngoye, *Venter* 316 (UCZ); Umhlatuzi River, *Venter* 2695; Hamewith, *Mogg* 4493. Umzinto: *Rudatis* 485; Park Rynie, *Gerstner* 6814 (K); 6815; *Bruce* 423; *Codd* 9699; 9764.

The large fruits of this species are characteristic, being ovoid in shape and acute to almost beaked at the apex, 1.2–1.5 cm long, carried erect on stout, arcuate pedicels up to 5 mm long. Thus when fruits are present, *K. littoralis* can be distinguished from all other members of the genus. In floral characters and general appearance, however, it bears a resemblance to *K. baurii* (p. 482), *K. drepanophylla* (p. 481), and to depauperate forms of *K. rooperi* (p. 487).

K. bauri is probably its closest affinity, but has leaves which are markedly serrulate while the bracts are broader and rounded at the apex. *K. drepanophylla* is similar to *K. baurii* in these respects and can be differentiated from *K. littoralis* in the same way. These two species are not known to occur near the coast in Natal. *K. rooperi*, on the other hand, is essentially a coastal species, extending to a few miles north of Port Shepstone in Natal. There is no clear evidence, as yet, that its distribution overlaps with that of *K. littoralis*, which reaches its southernmost known limit a few miles south of Scottburgh and extends northwards to beyond Mtubatuba.

K. rooperi is a robust species with broad, recurved leaves in four ranks, which flowers from about May to October. It reaches its maximum development in coastal marshes, and the plants are noticeably smaller towards the drier soil at the edges of the marsh. These smaller plants, which are referred to as depauperate specimens, may easily be confused with *K. littoralis* in the herbarium if fruits are lacking. However, there are small differences, which are not easy to put into words, but which enable specimens to be identified with a high degree of certainty. The bracts of *K. littoralis* are usually white and papery, acute to obtuse and not erect in bud while, in *K. rooperi*, they are usually discoloured and brownish, rounded at the apex and erect in the bud stage. *K. littoralis* also has slightly longer pedicels and the flowers are not so densely placed that the rhachis of the inflorescence cannot be seen; in *K. rooperi*, on the other hand, the almost sessile flowers are so densely placed as to obscure the rhachis. Although the leaves of *K. rooperi* are normally broader, with serrulate margins, in many of the depauperate specimens the leaves are narrower and with margins almost completely entire, or with a few teeth near the apex as in *K. littoralis*. Although such intermediate specimens may give the impression of being hybrids, it is considered that they are rather variants of *K. rooperi* (see p. 491).

On page 491 the name *K. longicollis* Bak., based on a cultivated plant said to have been introduced from Natal by Max Leichtlin of Baden-Baden, Germany, is discussed. The type specimen, which is in Kew Herbarium, superficially resembles the specimens now placed in *K. littoralis*, but has bracts which are oblong-lanceolate, tapering to a somewhat rounded apex, with three distinct nerves and minutely serrulate margins. These are so unlike the bracts of *K. littoralis* that the two cannot be regarded as conspecific. In addition, the flowers of *K. longicollis* are described as being “bright yellow without a tinge of red”, while no mention is made of its fruits, which are such a characteristic feature of *K. littoralis*. In many respects *K. longicollis* resembles the depauperate forms of *K. rooperi* mentioned above; the bracts do not match perfectly, but *K. rooperi* (and occasionally *K. baurii*) sometimes has 3-nerved bracts (see also p. 487). The plant illustrated in the *Botanical Magazine* t.7623 (1898) as *K. longicollis* is, of course, quite different from the type of that species.



FIG. 66.—*K. elegans*, at Mkambati Leper Institution, Pondoland (Marais 952). Photo by W. Marais.

36. *Kniphofia elegans* Codd, sp. nov., a *K. littorali* Codd bracteis subrotundis, capsulis globosis 6-8 mm longis differt.

Planta 40-65 cm alta. *Folia* erecta, angusta, subglauca, 30-60 cm longa, 0.8-1.5 cm lata, carinata, margine integra vel apicem versus parce serrulata. *Inflorescentia* densa, globosa, 5-7 cm longa, 5-6 cm lata, gemmis patentibus rubris, floribus maturis demum pendulis luteis vel luteo-aurantiacis. *Bracteae* late ovatae vel subrotundae, obtusae vel rotundatae, 6-8 mm longae, 3-4 mm latae, integrae vel minute erosodenticulatae. *Pedicelli* 1-2 mm longi. *Perianthium* subcylindricum, 2.8-3.2 cm longum. *Stamina* inclusa vel vix exserta. *Stylus* 4-5 mm exsertus. *Capsula* glbosa, 6-8 mm longa.

Type: Cape Province, Lusikisiki District, Mkambati Leper Institution, Codd 9720 (PRE!, holo.).



PLATE 20.—*Kniphofia drepanophylla* Bak.

Plants solitary or in small groups. *Leaves* 6–8 per peduncle, erect or rarely recurved, narrow, dull glaucous-green, 30–60 cm long (the outermost much shorter), 0·8–1·5 cm broad, chartaceous at the base, not breaking into fibres, V-shaped in cross section; margin and keel smooth or sparingly denticulate towards the apex. *Peduncle* overtopping or subequal to the leaves, 40–65 cm long with an occasional sterile bract below the inflorescence. *Inflorescence* globose, dense, 5–7 cm long and 5–6 cm broad; buds spreading, flame-red; flowers pendulous, yellow to orange-yellow. *Bracts* broadly ovate to subrotund, obtuse to rounded, 6–8 mm long, 3–4 mm broad, chartaceous; margin almost entire to minutely eroso-denticulate. *Pedicels* 1–2 mm long. *Perianth* subcylindrical, not or scarcely constricted above the ovary, somewhat arcuate 2·8–3·2 cm long, 2·5 mm broad at the base, increasing to about 5 mm broad about the middle and then parallel-sided to the throat; lobes broadly ovate, 2 mm long, not spreading. *Stamens* in the throat or just exerted at anthesis, finally withdrawn. *Style* subequal to the anthers at anthesis, finally exerted by 4–5 mm. *Fruit* globose, 6–8 mm long and 6–9 mm in diameter. FIG. 66.

Grows in grass associated with rocks of Table Mountain Sandstone at altitudes of 200 to 1,000 ft. in the Pondoland area of the eastern Cape Province. The flowering time is in spring, from August to October.

CAPE.—Bizana: 4 miles inland from Umtamvuna mouth, *Codd* 9713. Lusikisiki: Mkambati Leper Institution, *Codd* 9720; 9729; *Marais* 952; 970; *Hone* 26; 1½ miles N.W. of Port Grosvenor, *Codd* 9737.

K. elegans is a spring-flowering species with small, globose, brightly-coloured inflorescences, flame-red at the apex and turning yellow as the flowers open. Related to *K. littoralis*, it differs in the globose fruits, borne in dense clusters on short pedicels, the globose inflorescence and the more rounded bracts. The species was first collected by Mr. W. Marais in October, 1955, in the grounds of the Mkambati Leper Institution, where it is fairly common.

37. *Kniphofia drepanophylla* *Bak.* in Bot. Jahrb. 15, Beibl. 35: 5 (1892); Fl. Cap. 6: 282 (1896); Berger in Pflanzenr. 4, 38: 48 (1908); *Codd* in Flow. Pl. Afr. 37: t.1447 (1965). Type: Pondoland, *Bachmann* 281 (K, holo.!, B†).

Plants forming small groups. *Leaves* 6–8 per peduncle, broad, falcate, strongly recurved, flaccid, more or less in 4 ranks, pale yellow-green, 15–30 cm long at flowering stage, eventually elongating to 60 cm long, 1·5–3 cm broad, V-shaped in cross section, tending to fold along the midrib, often strongly nerved, not breaking up into persistent fibres at the base; margin and keel finely and distinctly serrulate. *Peduncle* overtopping the recurved leaves, 25–50 cm long. *Inflorescence* subglobose, 5–7 cm long and 5–6 cm broad, often lax at the apex, denser below; buds spreading, greenish-yellow, often suffused with dull red; flowers ultimately pendulous, lemon-yellow. *Bracts* broadly oblong, rounded to obtuse, 5–6 mm long, 3 mm broad, scariose; margin subentire to somewhat eroded. *Pedicels* 3·5–5 mm long. *Perianth* subcylindrical, not constricted above the ovary, 3·5–4 cm long, 3 mm in diameter at the base, increasing gradually to 5–6 mm at the throat; lobes spreading, broadly ovate to rotund, 3 mm long. *Stamens* exerted by up to 5 mm at anthesis, later withdrawn. *Style* subequal to the anthers at anthesis, finally exerted by 6 mm. *Fruit* ovoid-triquetrous, 7–9 mm long. PLATE 20.

Grows in marshy places at altitudes of 200 to 500 ft. near the coast in Pondoland, where it is locally common, with one record from southern Natal at an altitude of 3,500 ft. The flowering time is mainly August to October.

CAPE.—Without precise locality: Pondoland, *Bachmann* 281 (K). Lusikisiki: near Port Grosvenor, *Codd* 9738; Mkambati Leper Institute, *Story* 4233; *Codd* 9717; *Marais* 953; *Hone* 35.

NATAL.—Alfred: near Weza, *Killick & Marais* 2014.

This is a spring-flowering species, small in stature with relatively few-flowered inflorescences of lemon-yellow flowers, tinged with red at the apex. The leaves are broad,

yellow-green, strongly recurved, with finely serrulate margins. In the herbarium it may be confused with *K. baurii* which has somewhat narrower, glaucous leaves, slightly shorter flowers and a more inland distribution. Until a more detailed study of the two in the field has been made, it is preferred to keep them distinct. The specimen *Killick & Marais* 2014 from Weza falls within the distribution range of *K. baurii* but its characteristics render it almost indistinguishable from *K. drepanophylla*.

Until a few years ago the species was known only from the type material gathered in Pondoland by Bachmann in August 1888. The second collection was made by Dr. Story in August, 1953, also in Pondoland, where it is locally common in marshy grassland, protected from grazing, on the Mkambati Leper Institution.



FIG. 67.—*K. baurii*, typical form from Libode (*Marais* 1003).

38. *Kniphofia baurii* Bak. in Fl. Cap. 6: 281 (1896); Berger in Pflanzenr. 4, 38: 48 (1908); Codd in Flow. Pl. Afr. 36: t.1423 (1964). Type: Cape, Tembuland, Baziya, *Baur* 755 (K!, holo.).

Plants in small groups. *Leaves* 8–10 per peduncle, erect or somewhat falcate or occasionally recurved, soft in texture, glaucous, 20–50 cm long, 1·2–2·5 cm broad, V-shaped in cross section, often distinctly nerved, not breaking into persistent fibres at the base; margin and keel markedly to sparingly serrulate or almost entire. *Peduncle*



PLATE 21.—*Kniphofia baurii* Bak.

overtopping the leaves, 25–60 cm long. *Inflorescence* globose to oblong, sometimes broader than long, dense, 4–10 cm long, 4–6 cm broad; buds spreading, tinged with dull red; flowers becoming pendulous, greenish to greenish-yellow. *Bracts* ovate to ovate-oblong, obtuse to rounded, 4.5–10 mm long, 2.5–3 mm broad, scariose, with a brownish, central nerve; margin eroso-denticulate, especially towards the apex. *Pedicels* 1–2 mm long. *Perianth* cylindrical, 2.8–3.8 cm long, slightly constricted and 2 mm in diameter above the ovary, widening to 4–5 mm broad at the throat; lobes ovate, obtuse, 2.5 mm long. *Stamens* exerted by up to 2 mm at anthesis, later withdrawn. *Style* subequal to the anthers at anthesis, finally exerted by 3–5 mm. *Fruit* subglobose-triquetrous, 7 mm long. FIGS. 67, 68. PLATE 21.

Found in eastern Cape Province, southern and northern Natal on moist, grassy slopes or depressions and on stream banks, at altitudes of 2,000 to 4,000 ft. and flowers from about mid-September to early November. (See notes below for reference to a late-flowering form).

CAPE.—Engcobo: near Engcobo, *Marais* 1028; 1032; *Killick & Marais* 2051. Libode: near Libode, *Marais* 1003; *Killick & Marais* 2034. Mount Currie: 17 miles E. of Kokstad, *Killick & Marais* 2024. Nqamakwe: near Nqamakwe, *Killick & Marais* 2042. Umtata: Baziya, *Baur* 755 (K, 2 sheets); Baziya Forest Station, *Marais* 1020; 1021; 6 miles W. of Umtata, *Marais* 1018.

NATAL.—Alfred: Weza Forest Reserve, *Killick & Marais* 2016. Dundee: near Vants Drift, *Baker* s.n. Newcastle: 9 miles S. of Newcastle, *Codd* 5609; 6161; *Marais* 958; 7 miles S. of Newcastle, *Bruce* 461; Ingagane, *Reynolds* in NBG 624/40 (NBG); One Tree Hill, *Shirley* s.n. (NU). Nqutu: east bank of Buffalo River near Vants Drift, *Codd* 6797. Richmond: 8½ miles S. of Richmond, *Killick & Marais* 2000. Utrecht: near junction of Blood and Buffalo rivers, *Codd* 6788.

FIG. 68.—*K. baurii*, northern Natal form (*Codd* 6788).



The typical form, on which the description is largely based, is found in the eastern Cape Province and southern Natal. With its relatively small stature and often recurved leaves which are markedly serrulate, it may be confused in the herbarium with *K. drepanophylla* (p. 482), but a study of living plants leads to the conclusion that the two are distinct. *K. baurii* has dark green to glaucous leaves, while the inflorescence consists of dull red buds grading to greenish-yellow flowers, which are not well represented in Plate 21 reproduced herewith.

In northern Natal, separated geographically from the typical form, several gatherings have been recorded which are more robust and tend to grow in larger groups, with somewhat softer and less markedly serrulate leaves than in typical *K. baurii*. In essential characters they agree with *K. baurii* and are not given separate status. The citations referred to are from two main localities, namely: (a) several miles south of Newcastle on the road to Ladysmith; and (b) on the banks of the Buffalo and Blood Rivers, where the Districts of Dundee, Utrecht and Nqutu meet.

A further group of specimens which deviate from typical *K. baurii* and which have been collected mainly in East Griqualand, must be recorded. These were in flower during January to March, i.e. a good deal later than is normal for the species, which is essentially spring-flowering. Apart from this difference the plants compare well with *K. baurii*, having greenish flowers, often tinged with red at the apex, dull green to glaucous leaves which are hard and fibrous when dry and have serrulate margins. The leaf characters assist in separating this form of *K. baurii* from certain plants classified as *K. linearifolia* (see p. 502), which have similar inflorescence colour and approximately the same flowering time, but in which the leaves, although glaucous, are soft in texture with no tendency to recurve, as is the case with *K. baurii*. Difficulty may also be experienced in distinguishing between this form of *K. baurii* and the form of *K. uvaria* found in the eastern Cape Province, which has arcuate, glaucous and tough, fibrous leaves, but in which the leaf-margin is smooth (see p. 496).

The significance of these late-flowering specimens of *K. baurii* is not understood and, as they are not distinguishable morphologically, they are not accorded separate status at present. For convenience they are listed separately below.

CAPE.—Barkly East: 12 miles N.W. of Elands Heights, fld. in cult. 15.1.57, *Marais* 1046. Maclear: 6 miles E. of Naudes Nek, 24.2.52, *Bruce* 575; 12½ miles E. of Naudes Nek, 24.2.52, *Bruce* 576. Matatiel: 6½ miles N.E. of Paspalum, fld. in cult. March, 1956, and January, 1957, *Marais* 856. Mount Ayliff: 9 miles S. of Kokstad, 25.2.52, *Bruce* 590. Mount Currie: 5 miles W. of Kokstad, 25.2.52, *Bruce* 584; 6 miles N. of Kokstad, 25.2.52, *Bruce* 585; 6 miles S. of Kokstad, 25.2.52, *Bruce* 586; 3 miles W. of Kokstad, 25.2.52, *Bruce* 587; 10 miles E. of Kokstad, fld. in cult. 1.12.56, 18.12.56, *Marais* 942; 4½ miles S.E. of Kokstad, 29.1.57, *Marais* 1414; 3 miles N. of Kokstad, 29.1.57, *Marais* 1415; 12½ miles S.E. of Swartberg, 24.3.54, *Codd* 8555.

It is desirable that a study be made in the field to determine the extent to which individual plants vary in their flowering time from year to year. Obviously, weather conditions will exert an influence, but the impression gained from cultivated and wild plants is that flowering of a particular clump may extend over several weeks, but is relatively constant, within a few weeks, from year to year. An occasional late inflorescence may appear in a clump which has flowered several months earlier, but this does not account for the consistent later production of inflorescences in this late-flowering form of *K. baurii*. There is also no real evidence that these plants have been derived as a result of hybridisation between *K. baurii* and *K. linearifolia*.

39. *Kniphofia latifolia* Codd, sp. nov., a *K. baurii* Bak. foliis latioribus, per anthesin pedunculos aequantibus vel superantibus, inflorescentia versus apicem gradatim decrescenti differt.

Planta 60–100 cm alta. *Folia* carinata, erecta, ensiformis, 60–90 cm longa, 2–4 cm lata, margine carinae serrulata. *Inflorescentia* densa, anguste ovoidea, versus apicem gradatim decrescens, 7–11 cm longa, 4.5–5 cm lata, gemmis pendulis rubris

vel haematinis, floribus maturis flavo-virentibus. *Bracteae* latae oblongae, obtusae vel rotundatae, 7–9 mm longae, 3–4 mm latae, minutae denticulatae vel integrae. *Pedicelli* 1 mm longi. *Perianthium* subcylindricum, 3–3.5 cm longum. *Stamina* vix exserta. *Stylus* 6–8 mm exsertus. *Capsula* ovoidea, 5 mm longa.

Type: Natal, plant collected 3 miles S.W. of New Hanover and cultivated in Pretoria, flowered 28.10.1953, *Codd* 6791 (PRE. holo.).



FIG. 69.—*K. latifolia*, from New Hanover (*Codd* 6791).

Plants in groups. *Leaves* 8–12 per peduncle, broad, erect, yellow-green, overtopping the inflorescences at flowering stage, 60–90 cm long (the outermost much shorter), 2–4 cm broad, V-shaped in cross section, tapering rapidly to the apex, not breaking into fibres at the base; margin and keel finely and regularly serrulate. *Peduncle* shorter than the leaves at flowering stage, 40–80 cm long, eventually elongating to 100 cm. *Inflorescence* narrowly ovoid, conical to tapering at the apex, dense, 7–11 cm long, 4.5–5 cm broad; buds pendulous, red to dull blood-red; flowers pendulous, imbricate, greenish to yellow-green. *Bracts* broadly oblong, 7–9 mm long, 3–4 mm broad, obtuse to rounded and somewhat discoloured at the apex, very minutely serrulate to almost entire. *Pedicels* 1 mm long, elongating in fruit to 3 mm. *Perianth* subcylindrical, 3–3.5 cm long, scarcely constricted above the ovary, 2.5–3 mm broad near the base, widening gradually to 4–5 mm broad at the throat; lobes ovate, 3 mm

long, not spreading. *Stamens* exerted by 4–6 mm at anthesis, usually remaining exerted by 2–3 mm. *Style* subequal to the stamens at anthesis, finally exerted by 6–8 mm. *Fruit* erect, broadly ovoid, 5 mm long. FIGS. 69, 70.

Found on grassy slopes and river banks, usually in moist depressions with dense grass and sedge, in a restricted area in the Natal Midlands at altitudes of 2,500 to 3,500 ft. The flowering season is October–November.

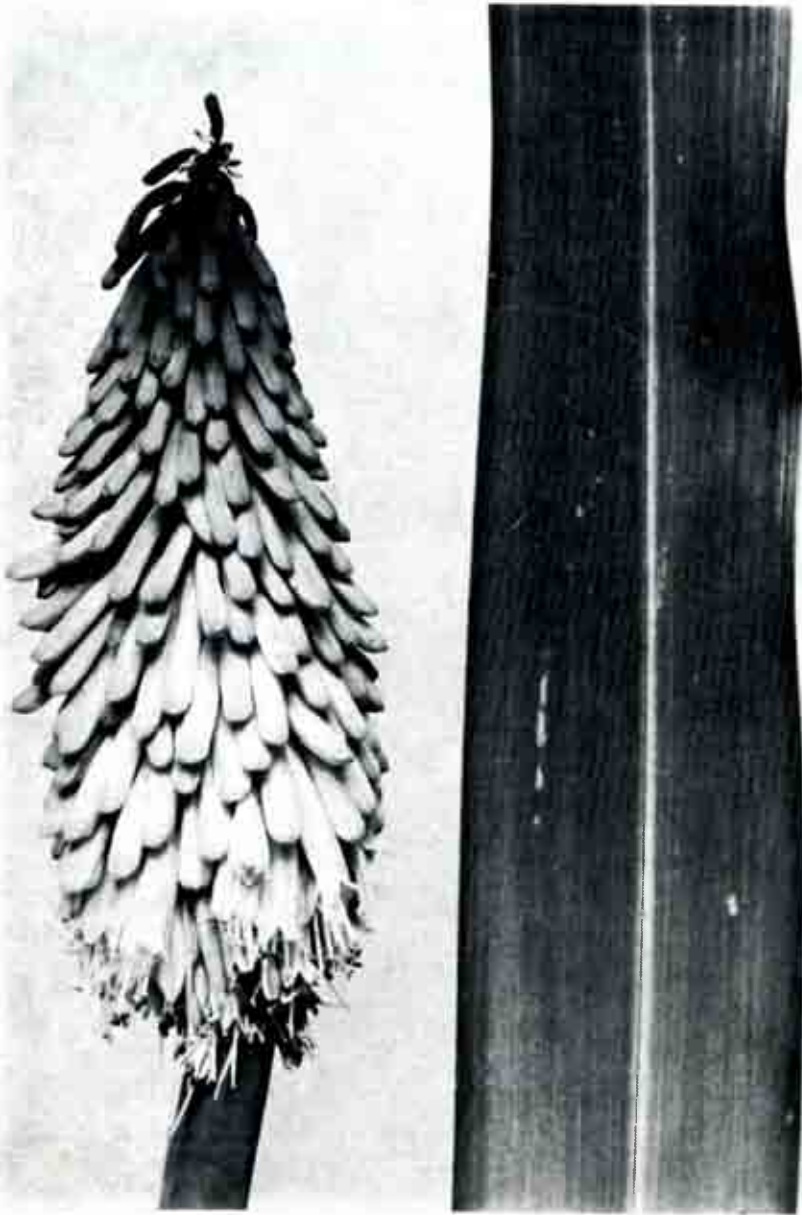


FIG. 70.—*K. latifolia* (Codd 6791), inflorescence and portion of leaf, life size.

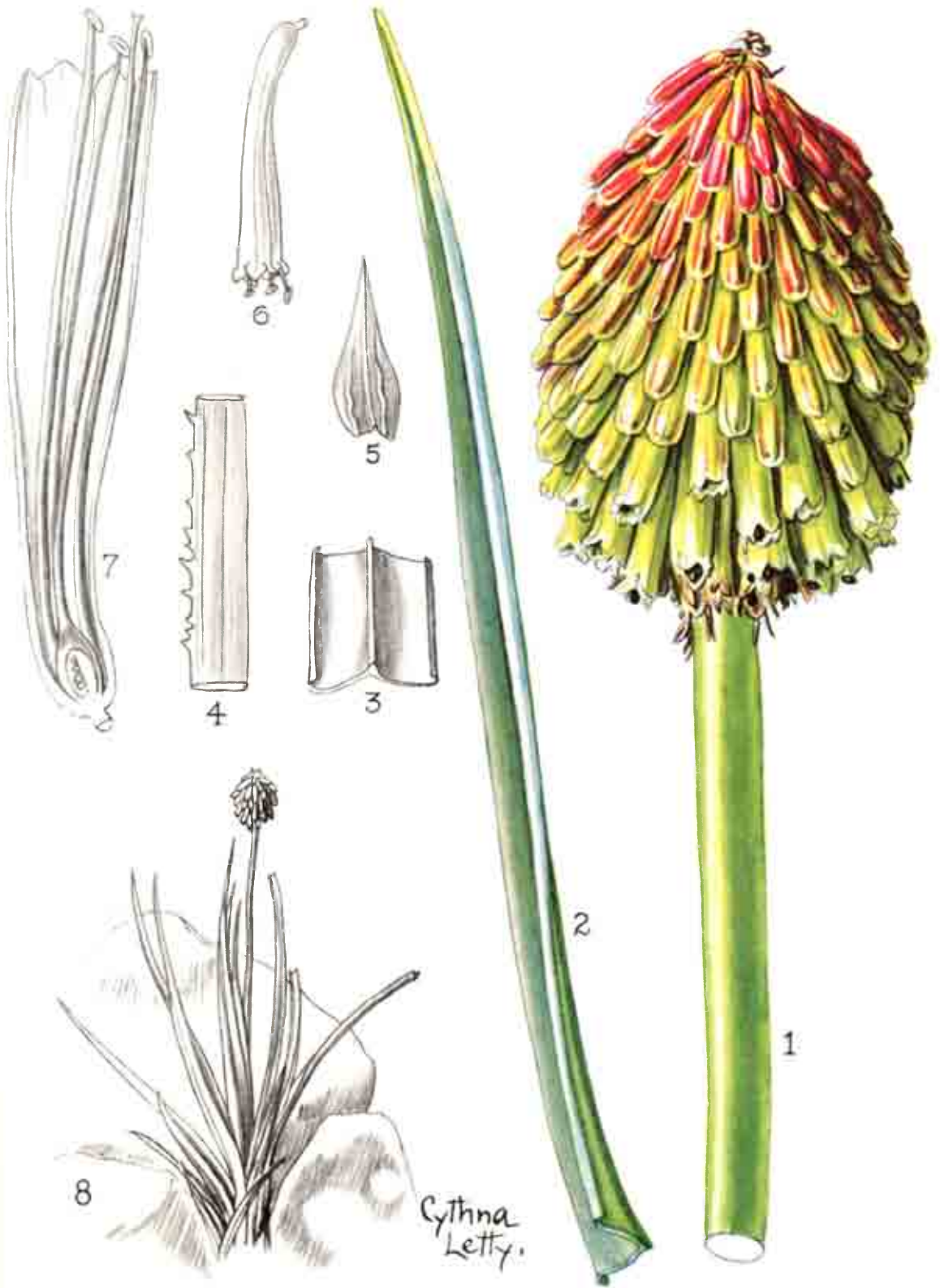


PLATE 22.—*Kniphofia rigidifolia* E. A. Bruce

NATAL.—New Hanover: 3 miles S.W. of New Hanover, cult. in Pretoria, *Codd* 6791. Nkandla: 5 miles W. of Nkandla, cult. in Pretoria, *Codd* 6989. Pietermaritzburg: Albert Falls, *Bruce* 460. Umvoti: 7 miles S. of Greytown, *Killick & Marais* 2113.

Related to *K. baurii* Bak. (p. 482), this species differs in its broader leaves and its inflorescence tapering at the apex. The tapering inflorescence and the broader, rounded bracts distinguish the species from *K. rigidifolia* E. A. Bruce (below), which is restricted to the eastern Transvaal. *K. latifolia* is a spring-flowering species in which the broad, erect leaves usually overtop the inflorescences at the flowering stage, but later the scapes elongate, eventually becoming longer than the leaves in the fruiting stage. It appears to have been first collected by Miss Bruce at Albert Falls in October, 1951.

40. *Kniphofia rigidifolia* E. A. Bruce in Flow. Pl. Afr. 30: t.1185 (1955); Letty, Wild Flows. Tvaal. 32 (1962). Type: Transvaal, Belfast District, 7 miles S. of Dullstroom, *Codd* 3224 (PRE!, holo.).

Plants in groups. Leaves 12–16 per peduncle, erect, ensiform, firm in texture, yellow-green, 50–80 cm long (1·5–) 2–3·5 cm broad, V-shaped in cross section, not breaking into fibres at the base; margin and keel finely serrulate. Peduncle subequal to the leaves or slightly longer, 50–90 cm long with an occasional deltoid sterile bract



FIG. 71.—*K. rigidifolia*,
Lydenburg District.

below the inflorescence. *Inflorescence* subglobose to broadly ovoid, very dense, 5–8 cm long, 5–6 cm broad, with a small coma of bracts at the apex; buds and flowers pendulous; buds flame or orange-red to coral-red, flowers yellow-green to greenish. *Bracts* oblong-ovate to oblong-lanceolate, subacute to obtuse, 5–7 mm long, 2–2.5 mm broad; margin finely eroso-denticulate to almost entire. *Pedicels* about 1 mm long, increasing to 3 mm long at fruiting stage. *Perianth* subcylindrical, not constricted above the ovary, 3–4 cm long, 3–3.5 mm broad near the base, widening gradually to 5–5.5 mm at the throat; lobes broadly ovate, 2.5 mm long, slightly spreading at anthesis. *Stamens* in the throat or slightly exerted at anthesis, later withdrawn. *Style* subequal to the stamens at anthesis, finally exerted by 2–5 mm. *Fruit* erect to spreading, subglobose to broadly ovoid, about 7 mm long. FIG. 71. PLATE 22.

Grows in dense grass among dolerite rocks and on fertile soil beside streams in the eastern Transvaal, at altitudes of 4,500 to 6,500 ft. The main flowering season is from mid-October to the end of November.

TRANSVAAL.—Belfast: *Van der Merwe* 1095; *Harding* 1; 2; 3; 4; 5; near Dullstroom, *Galpin* 13127; 7 miles S. of Dullstroom, *Codd* 3224; 5636; 11 miles N. of Belfast, *Codd* 6166; 6654; 5½ miles N.E. of Dullstroom, *Codd* 6770; 3 miles S. of Dullstroom, *Reynolds* 5771; 7 miles E. of Belfast, *Prosser* 1506; 14 miles N.E. of Machadodorp, *Codd* 8066. Lydenburg: *Van der Merwe* 1613; 21 miles S.W. of Lydenburg, *Codd* 5641; P.O. Skaapkraal, *Codd* 6661; near Kemps Heights, *Codd* 7596; 15 miles W. of Lydenburg, *Codd* 8047; Boschhoek, *Young* 440. Pilgrim's Rest: 6½ miles N. of Graskop, *Codd* 6740.

A spring-flowering species with globose inflorescences reminiscent of *K. rooperi* (below), but *K. rigidifolia* is readily distinguishable by its erect, yellow-green leaves, while the buds are not erect and covered by broad, imbricate bracts as is the case in *K. rooperi*. The two species are completely separated geographically.

41. *Kniphofia rooperi* (Moore) Lem., *Jard. Fleur.* t.362 (1854); Bak. in *J. Linn. Soc.* 11: 363 (1871); *J. Bot. Lond.* 23: 280 (1885), partly, excl. *Bot. Mag.* t.6116; *Fl. Cap.* 6: 283 (1896), partly, excl. *Bot. Mag.* t.6116; Berger in *Pflanzenr.* 4, 38: 62 (1908), partly, as to type only; Codd in *Flow. Pl. Afr.* 33: t.1290 (1959). Type: the specimen ex Herb. T. Moore on which the plate of the species in *Gard. Comp.*, l.c., is based (K!, holo.).

Tritoma rooperi Moore in *Gard. Comp.* 1: 113 cum tab. (1852).

K. longicollis Bak. in *Gard. Chron.* 13: 682 (1893); *Fl. Cap.* 6: 284 (1896); Berger l.c. 60 (1908). Type: "Natal, Hort. Leichtlin, May 30, 1893" (K!, holo.).

Plants usually in groups. *Leaves* 10–16 per peduncle, usually in four ranks, arcuate-spreading to strongly recurved, dull green, somewhat fibrous, 50–110 cm long, 1.5–3.5 (–4) cm broad, deeply keeled and broadly V-shaped in cross section; margin and keel distinctly to sparingly serrulate, rarely almost smooth. *Peduncle* overtopping the spreading leaves, stout, 60–140 cm long, usually with a few large, sterile, deltoid bracts below the inflorescence. *Inflorescence* large, very dense, ovoid in the early flowering stage, becoming globose and later obovoid, 8–11 cm long and 5–8 cm broad, apex rounded to truncate when in full flower, conical in the young stage with the buds erect, enclosed in the overlapping, imbricate bracts; buds brilliant flame-red, orange-yellow or greenish with scarcely a tinge of red; open flowers pendulous, orange-red to yellow-green. *Bracts* oblong to obovate, 7–11 mm long, 2.5–3.5 mm broad, obtuse to rounded, usually brownish, minutely serrulate to almost entire. *Pedicels* 1 mm long, elongating in the fruiting stage to 3–4 mm long. *Perianth* subcylindrical, straight or slightly arcuate, 3.5–4.2 cm long, scarcely constricted above the ovary, 2.5–3 mm broad near the base, widening gradually to 5–6 mm at the throat; lobes ovate, 2.5 mm long, slightly spreading at anthesis. *Stamens* slightly exerted at anthesis, later withdrawn. *Style* subequal to the stamens at anthesis, finally exerted by 4–6 mm. *Fruit* ovoid-triangular, erect, 8–10 mm long. FIGS. 72, 73, 74. PLATE 23. MAP 13.

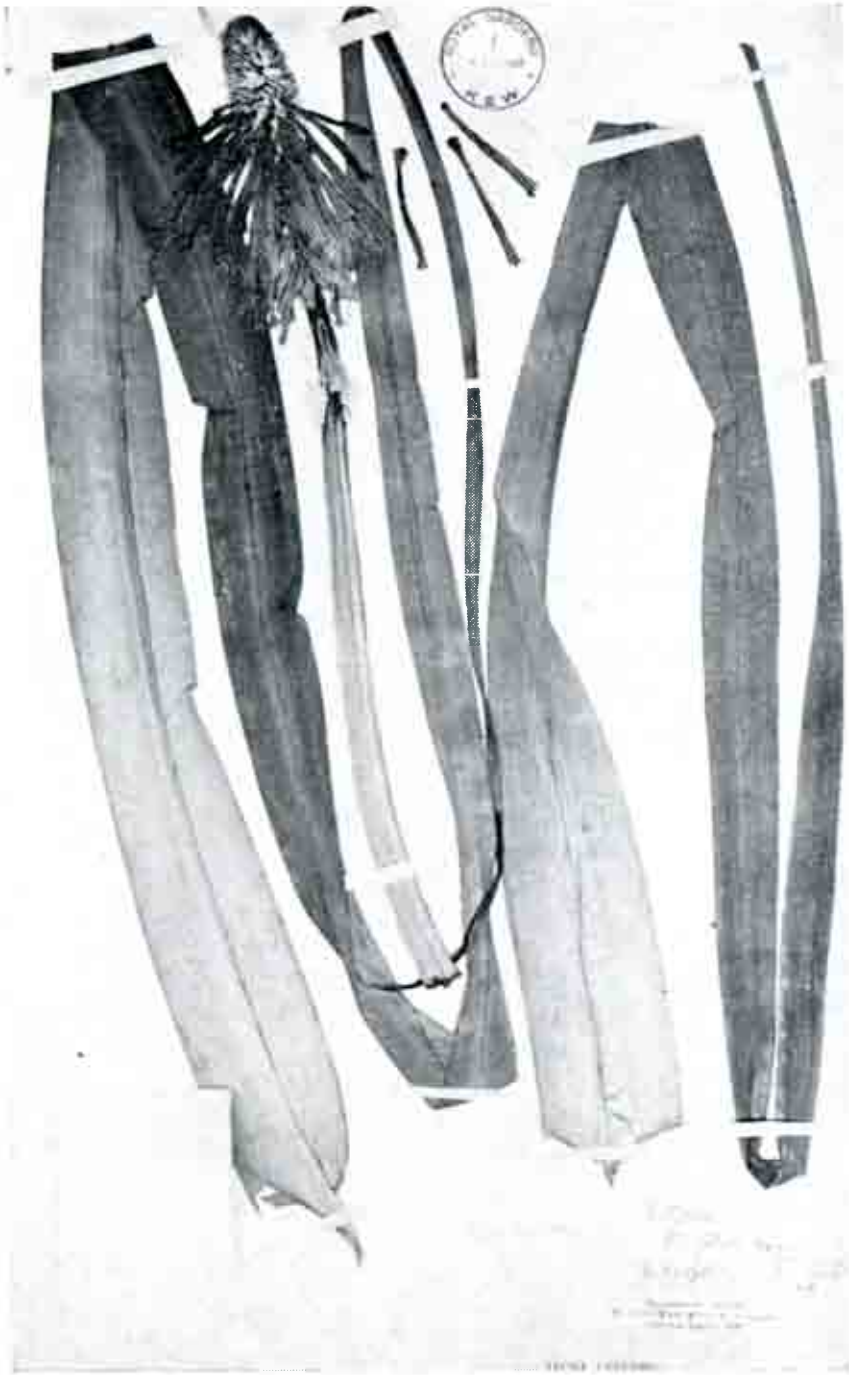


FIG. 72.—*K. rooperi*, holotype in Kew Herbarium.

Found in marshy places near the coast from East London district in the eastern Cape Province to several miles north of Port Shepstone in southern Natal. The main flowering season is during the winter and early spring, from June to September, but specimens have been known to flower, especially in cultivation, as early as March and as late as November.

CAPE.—Without locality: Cult. Brighton, ex Herb. T. Moore (K). Bizana: near Umtamvuna mouth, *Strey* 4134. East London: *Malcomess* in TRV 17129; Gonubie Springs, *Compton* 17036 (NBG); *Bruce* 605; 605A; near East London, *Galpin* 1862. Kentani: *Pegler* 838, partly, as to PRE specimen; near Mazeppa Bay, *Dyer* 5335. Komga: near Komga, *Bruce* 601; 603; *Flanagan* 761; Kei Mouth, *Codd* 6346. Lusikisiki: Mkambati Leper Institution, *Codd* 9728.

NATAL.—Without locality: Hort Leichtlin, 1878 (K); Hort. Leichtlin, May 30, 1893 (K). Port Shepstone: St. Michael-on-Sea, *Van der Merwe* 1940; near Margate, *Bruce* 417; 418; 419; 421; 422; 2 miles S. of Hibberdene, *Bruce* 424; 1½ miles S. of Melville, *Bruce* 425; 428; Sunwich Port, *Codd* 6793; Port Edward beach. *Strey* 5840; near Umtamvuna Bridge, *Strey* 5860.



FIG. 73.—*K. rooperi*, Mazeppa Bay (*Dyer* 5335). Photo by Dr. R. A. Dyer.



PLATE III.—*Cyrtosia rufes* (Merrill) Kuhn.

The original plant of *K. rooperi* which was described and figured by Thomas Moore in 1852 came from the garden of the Rev. Thomas Rooper, of Wick Hill, Brighton, who received it from his son, Capt. Edward Rooper of the Rifle Brigade, from "Kaffraria". Moore's herbarium, which included a specimen of the illustrated plant, was later acquired by Kew, and this specimen may be regarded as the holotype. The illustration and specimen agree in showing a plant with a large globose inflorescence, similar to those recorded above from near East London to southern Natal.

Capt. Rooper was stationed in the Border area from time to time between 1848 and 1850, and it so happens that a collection of his original water-colour paintings is in the library of the Botanical Research Institute, Pretoria. Plate 99 of this set is an illustration of a large, globose Redhot Poker, annotated by the artist: "Common in Albany and Kaffirland. Flowers nearly all year. March '49". On a list accompanying the paintings is the record: "99. Tuberous rooted, in marshy places, varies to deep red". His references to "Albany" and "flowers nearly all year" indicate that his observations may be based on more than one species, and it must be borne in mind that other members of the difficult *K. uvaria*-*K. linearifolia* complex may have been encountered by Capt. Rooper.

K. rooperi can usually be recognized by the large, globose inflorescences which appear mainly during the winter months, carried well above the arcuate-spreading leaves which are broad, dull green and are normally arranged in 4 or 5 ranks. Flower colour is not an important characteristic and may vary in wild populations, depending on the amount of red pigment present, from dull greenish-yellow to brilliant scarlet. The species reaches its maximum development of over 1½ m in height in boggy, peaty marshes near the coast. It is noticeable that the most robust plants are to be found in the wettest, central part of the marsh while, toward the drier edges, the plants tend to be smaller. Having noted this, it becomes possible to account for several gatherings from the Natal South Coast which, because of their smaller stature, shorter leaves and peduncles, were at first considered to be possible hybrids with other species, such as *K. littoralis* and *K. drepanophylla*. The following are, therefore, considered to be merely depauperate specimens of *K. rooperi*: Port Shepstone: near Melville, *Bruce* 426; 427; near Southport, *Bruce* 436; near Sunwich Port, *Bruce* 434; 435.

The type of *K. longicollis* Bak. is discussed under *K. littoralis* (p. 479). Apart from the bracts, which are more tapering, it closely resembles the smaller specimens of *K. rooperi* listed above. The type specimen was sent to Kew from Baden-Baden in May, 1893, with a note from Max Leichtlin which reads: "I beg to send you specimen of a new Kniphofia from Natal which is now flowering freely here. Perhaps longicollis or longitubulosa would be an appropriate name. In living specimens the unopened flowers have a tinge of orange but become bright yellow when opening". It may be significant that at Kew there is also a specimen labelled "Natal, Hort. Leichtlin, 1878" which is recognisable as *K. rooperi* and from which the 1893 specimen may possibly be derived.

The plant illustrated in the Botanical Magazine t.7623 (1898) as *K. longicollis* is, as already stated, quite a different plant (see also p. 387). It is probably a form of *K. praecox* Bak. It is also doubtful if the plant figured as *K. rooperi* in the Botanical Magazine t.6116 (1874) is correctly identified. The inflorescence is too elongate for *K. rooperi* and it appears to be a form of *K. linearifolia* Bak.

From the neighbourhood of East London two specimens have been collected which are of doubtful status, namely, *Bruce* 607 and *Comins* 1284. They are small in stature, as in the case of the "depauperate" specimens listed above, and have markedly curved, almost coiled leaves. These characters have remained constant in cultivation, suggesting that a distinct variety is involved, but obviously more field study is necessary before separate taxonomic rank can be allocated to these specimens.

FIG. 74.—*K. rooperi*, from South Coast, Natal (Codd 6793).



There is also some doubt about the identity of certain specimens listed below which occur where *K. rooperi* and the eastern forms of *K. uvaria* find a common meeting ground. They are somewhat intermediate between the two species but, because of their subglobose inflorescences with broad, rounded bracts, they are regarded as being nearest to *K. rooperi*.

CAPE.—Humansdorp: between Storms River and Humansdorp, *Bruce* 233. Knysna: near Noetzie, *Bruce* 238. King William's Town: near Berlin, *Bruce* 608; *Marais* 444; 729; *Van Breda* 890; near Kei Road, *Bruce* 557. Komga: 8 to 10 miles W. of Komga, *Bruce* 601; 602; *Codd* 6350; 6351. Stutterheim: 6 miles N. of Amabele Hotel, *Bruce* 558A; 558B.

42. *Kniphofia uvaria* (L.) Hook. in Bot. Mag. t.4816 (1854), partly, excl. fig. and descr.; Berger in Pflanzenr. 4, 38: 61 (1908), partly, excl. spec. cited; Adamson in Fl. Cape Penins. 170 (1950); Codd in Flow. Pl. Afr. 33: t.1289 (1959). Type: the specimen in Herb. Hort. Cliff. (BM).

Aloe uvaria L., Sp. Pl. 323 (1753); Kniphof, Herb. Viv. Cent. 9: t.805 (1762); L., Fl. Cap. 4 (1759); Burm. f., Prodr. Fl. Cap. 10 (1768); Mill., Dict. ed. 8: 23 (1768); Hill, Hort. Kew. ed. 2: 333 (1769); Knorr, Thes. rei Herb. Hort. t. A. 13 (1770); Buchoz, Hist. Univ. Reg. Veg. 8: 1 (1775). *A. longifolia* Lam., Encycl. 1: 90 (1783), nom. illegit. Type: as for *K. uvaria*.

Aletris uvaria (L.) L., Mant. 367 (1771); Ait., Hort. Kew. ed. 1: 464 (1789); Thunb., Prodr. Cap. 60 (1794); L., Syst. Veg. ed. 10: 359 (1797).

Kniphofia aloöides Moench, Meth. 631 (1794); Kunth, Enum. Pl. 4: 551 (1843); Heynh., Nom. Bot. 2: 335 (1846); Bak. in J. Linn. Soc. 11: 364 (1871); J. Bot. Lond. 23: 279 (1885); Fl. Cap 6: 283 (1896), partly; nom. illegit. Type as for *K. uvaria*. *K. burchellii* (Lindl.) Kunth, l.c. 552 (1843); Heynh., l.c. 335 (1846); Bak. in J. Linn. Soc. 11: 363 (1871); J. Bot. Lond. 23: 280 (1885); Fl. Cap. 6: 284 (1896); Berger in Pflanzenz. 4, 38: 63 (1908). *K. odorata* Heynh., Nom. Bot. 2: 335 (1846), nom. illegit. Type: as for *K. uvaria*. *K. bachmannii* Bak. in Bull. Herb. Boiss. 2 sér. 1: 784 (1901); Berger, l.c., 58 (1908). Type: Cape, Malmesbury District, *Bachmann* 1229 (B†, holo.; Z!). *K. occidentalis* Berger, l.c., 57 (1908). Type: Cape Peninsula, Smithwinkelbay near Simonstown, *Schlechter* 817 (Z!, holo).

Veltheimia uvaria (L.) Willd., Sp. Pl. 2: 182 (1799); Pers., Syn. Pl. Enchir. 1: 377 (1805); Thunb., Fl. Cap ed. Schult. 309 (1823); Willd., Ann. Blumist. 2: 291, t.17 (1827).

Tritoma uvaria (L.) Ker.-Gawl. in Bot. Mag. t.758 (1804); Ait. f., Hort. Kew. ed. 2, 2: 290 (1811). *T. burchellii* Herb. ex Lindl. in Bot. Reg. t.1745 (1836); Herb. ex Sweet, Hort. Brit. ed. 2: 517 (1836), nom. nud.; Nees & Sinning, Samml. Schönbl. Gew. 19, t.7 (1831). Type: Hort. Kew, originally from the Cape, *Burchell* s.n. (K!, holo.).

Tritomanthe uvaria (L.) Link, Enum. Pl. Berol. 333 (1821). *T. burchellii* (Lindl.) Steud., Nom. ed. 2: 718 (1840–41).

Tritomium uvaria (L.) Link, Handb. 170 (1829).

Triclissa uvaria (L.) Salisb., Gen. Pl. 75 (1866).

Plants usually in small groups, 50–120 cm high. *Leaves* 10–20 per peduncle, stiffly erect to arcuate-spreading, shorter than the peduncle, dull green to glaucous, 35–80 cm long and about 0.6–1.8 cm broad, keeled, V-shaped in cross section, usually tough and often drying with a hard, fibrous texture; margin and keel smooth to sparingly serrulate with few scattered teeth mainly towards the apex. *Peduncle* overtopping or subequal to the leaves, up to 100 cm long. *Inflorescence* oblong to globose, dense to subdense or sometimes lax at the apex, 4.5–11 cm long and 5.8 cm broad; buds spreading, brilliant scarlet to greenish tinged with red; flowers becoming pendulous, orange-yellow to greenish-yellow. *Bracts* broadly ovate to oblong-ovate, rounded or obtuse to subacute, 3–9 mm long; margin almost entire to eroso-denticulate. *Pedicels* (1.5–) 3–5 mm long, elongating to 8 mm long in the fruiting stage. *Perianth* subcylindrical, almost straight, 2.8–4.0 cm long, slightly constricted and about 3 mm broad above the ovary, widening to 4–5 mm broad at the throat; lobes ovate, obtuse, 2 mm long, slightly spreading. *Stamens* included or just exerted at anthesis, later withdrawn. *Style* subequal to the anthers at anthesis, finally exerted by 3–5 mm. *Fruit* ovoid-triangular, 7–14 mm long. FIGS. 75, 76. PLATE 24. MAP 13.

Plants now included in this species are distributed from Cape Peninsula, where the typical form occurs, northwards to Khamiesberg and eastwards to about Barkly East. It is found in seepage areas, marshy places and beside streams in fynbos of the south-western Cape from near sea-level to 4,000 ft. flowering profusely after veldfires, and in moist grassland in the eastern Cape Province from about 1,500 ft. in Albany District, to over 6,000 ft. from Queenstown to Xalanga Districts. Flowering occurs in the

eastern Cape Province in autumn, from January to December, but in the south-western Cape it may occur at almost any time from September to June, depending largely on veld-fires, with two peaks, namely from October to December, and in April–May.



FIG. 75.—*K. uvaria*, form with large fruits, Malmesbury District (Bruce 227A). Photo by E. A. Bruce.

CAPE.—Without locality: *Thunberg* s.n. (BM, UPS); *Oldenburg* s.n. (BM); *Burchell* s.n. (K). Albany: near Grahamstown, *Hill* s.n.; *Comins* 1020; Waainek, *Jacot-Guillarmod* s.n.; near Atherstone Station, *Bruce* 232. Alexandria: Ncanaha, *Comins* 1010. Bedford: Winterberg Mts., *Story* 3858; *Bruce* 526; 527; *Mapham* 70. Bredasdorp: Potteberg, *Barker* 4548 (NBG). Caledon: near Grabouw, *Bolus* 4216 (BOL); Swartberg, *Schlechter* 10367; Elgin, *Marloth* 11099; between Palmiet R. and Hangklip, *Pillans* 8333 (BOL); Rivier Sonder End, *Wilman* 516 (BOL); *Stokoe* 7483 (BOL); Babylons Tower, *Esterhuysen* 5008 (BOL); Genadendal, *Hodge* s.n.; *Middlemost* 1685; near Napier, *Admiraal* 2092. Cathcart: near Toise River, *Codd* 6354; near Thomas River, *Bruce* 545; near Hogsback, *Johnson* 1211; *Taylor* 2494. Ceres: Elandskloof stream, *Compton* 16789 (NBG). Clanwilliam: Paleisheuvel, *Compton* 20041 (NBG); Elandskloof, *Lewis* in SAM 58072 (SAM); between Citrusdal and Elandskloof, *Stokoe* 7420 (BOL); 7133 (BOL); Cedarberg, *Stokoe* in SAM 58194 (SAM); *Esterhuysen* 14340 (BOL); 18123; 18170; Langberg, *Bond* 1379 (NBG); Greys Pass, *Godfrey* SH 1253; Lamberts Bay, *Van Breda* 3; near Paleisheuvel, *Wedermann & Oberdieck* 482. Graaff Reinet: farm Konda, *Bayliss* 3917. Humansdorp: between Cambria and Combrink, *Lewis* in SAM 65735, 9 miles W. of Storms River Bridge, *Codd* 9911; Tsitsikama National Park, *Nichol* 1; 2. Keiskammahoek: Ndola Mt., *Story* 4564. King William's Town: Pirie, *Godfrey* s.n. (GRA). Knysna: Dieprivier, *Admiraal* s.n. Laingsburg: Matjiesfontein, *Pearson* in NBG 2533/14 (BOL). Malmesbury: *Bachmann*



PLATE 24.—*Kniphofia uaria* (L.) Hook.

1229 (Z); 6 miles S. of Velddrift, *Bruce* 227; 227A. Montagu: Montagu Pass, *Hutchinson* 1184 (K, BM). Murraysburg: Englishmans Kraal, *Tyson* 84 (GRA). Namaqualand: Khamiesberg, *Pearson* 6249 (BM, BOL, K); 6320 (K); Leliefontein, *Thorns* s.n. (NBG). Oudtshoorn: *Taylor* s.n. (BOL, GRA); Kamanassie Mt., *Zinn* s.n. (SAM). Paarl: French Hoek Pass, *Barker* 4914 (NBG). Peninsula: Hout Bay, *Thode* A59; Kirstenbosch, *Esterhuysen* 7620 (BOL); 21340; 24685 (BOL); *Barker* 1088 (NBG); 2948 (NBG); Klaassenbosch, *Marloth* 5896; near Kommetje, *Compton* 14017 (NBG); *Bruce* 223; between Millers Point and Smitswinkel, *Worsdell* s.n. (K); near Smitswinkel Bay, *Galpin* 12832; *Pillans* 7609 (BOL); *Isaac* in BOL 24680 (BOL); Orange Kloof, *Wolley Dod* 2444 (K); Schusters Kraal, *Bruce* 222; Steenberg Plateau, *Salter* in BOL 24682 (BOL); near Rhodes Memorial, *Isaac* s.n. Piquetberg: Veloren Vlei, *Barker* 2618 (NBG); *Leighton* 198 (BOL); *Pillans* 8067 (BOL); 8652 (BOL); Kapiteins Kloof Mt., *Pillans* 8076 (BOL). Port Elizabeth: Bethelsdorp, *Paterson* 669 (GRA), Queenstown: Hangklip Mt., *Galpin* 1810; 17½ miles S.W. of Whittlesea, *Marais* 880. Riversdale: near Albertinia, *Muir* 917; Garcias Pass, *Thorne* in SAM 38914 (SAM); *Admiraal* 1001. Somerset West: Viljoens Pass, *Strey* 2897. Stellenbosch: Velorekloof, *Van der Merwe* 23/65; *Van Rensburg* 271. Steynsburg: Zuurburg, *Schonland* 3246a. Stockenstroom: 41 miles S. of Queenstown, *Erens* 2187; between Fort Beaufort and Post Retief, *Story* 4027; Katberg Pass, *Elfers* 3. Swellendam: Swartberg, *MacOwan* s.n. (K); Warmbad, Little Karoo, *Hutchinson* 1136 (BOL, K); Leeuw River Mts., *Stokoe* 8519 (BOL); Lemoenshoek Peak, *Esterhuysen* 14419 (BOL); Zuurbak Peak, *Thorne* in SAM 50163 (SAM); National Bontebok Park, *Liebenberg* 7148. Tulbagh: Bokkeveld Kloof, Saron, *Compton* in NBG 1931/36 (BOL). Uitenhage: near Swartkops River, *Pappe* in SAM 22597 (SAM); Hilwacht, *Admiraal* 466. Vanrhynsdorp: Ebenezer, *Compton* in NBG 2082/36 (BOL). Worcester: Bosjesveld Mts., *Stokoe* in SAM 58195 (SAM); 20 miles S. of Worcester, *Andreae* 330; Bothas Halt, *Van Breda* 202; Brandwagt, *Van Breda* B; Dutoitskloof, *Van Breda* s.n.; *Bruce* 226; Stormsvlei, *Van Breda* 200. Xalanga: Cala Pass, *Marais* 878.



FIG. 76.—*K. uvaria*, the form found in Albany and King William's Town Districts (*Comins* 1010).

Four forms are recognisable, but they grade into one another and it has not been possible to define them adequately for separate taxonomic status, even at infraspecific level. They are outlined below.

(a) Typical *K. uvaria* occurs in the Peninsula and surrounding districts. The leaves are erect to somewhat arcuate and relatively soft. The inflorescences are medium-sized, ovoid to oblong, and brightly coloured (buds brilliant scarlet, grading down to orange yellow as the flowers open). The pedicels are fairly conspicuous (2–4 mm long). Towards the east, specimens are recorded which dry with hard, fibrous leaves (e.g. Worcester: Botha's Halt, *Van Breda* 202; Brandwagt, *Van Breda* B; Humansdorp: Baviaanskloof Mts., *Lewis* in SAM 65735) and these form a link with forms (c) and (d) below. Occasional specimens have abnormally short flowers (Oudtshoorn: *Taylor* s.n.; *Zinn* s.n.).

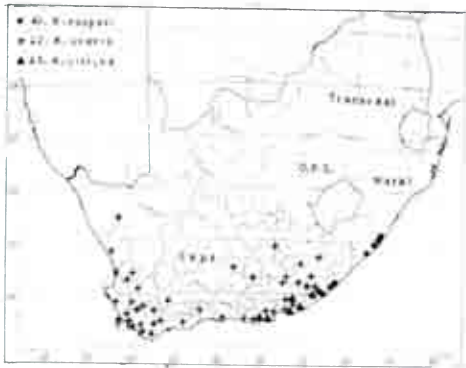
(b) From Malmesbury District *K. bachmannii* Bak. was described and from this district northwards the plants have somewhat longer and laxer inflorescences, but still brightly coloured, with conspicuous pedicels (3–5 mm). The leaves are similar to those of the typical form, but the fruits are exceptionally large (12–14 mm) in the few fruiting specimens seen.

(c) From Humansdorp to Albany Districts the plants are medium to small in stature with leaves often narrower than usual, erect to arcuate or recurved and fairly tough in texture. The inflorescences are oblong to globose, varying a good deal in colour from brilliant red to greenish yellow, while the pedicels are not very conspicuous (2–3 mm long). A representative of the smaller plants (*Paterson* 669) was listed without description as *K. patersoniae* by Schonland in Bot. Surv. S. Afr. Mem. 1: 38 (1919). This form, now included in *K. uvaria*, grades to some extent into *K. citrina* (p. 497), which is closely related and may even be considered hardly worthy of being placed as a separate species. It is, however, kept distinct on the basis of the short perianth (2.2–2.7 cm long) and the markedly exerted stamens.

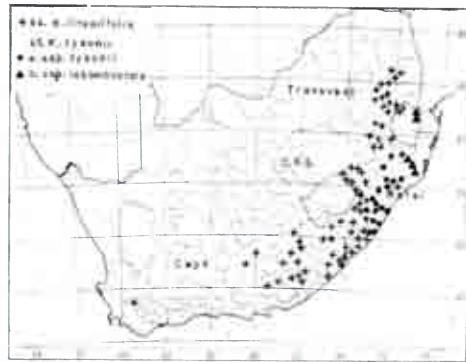
(d) Further to the north and north-east, and more inland at higher altitudes—usually on rocky (especially sandstone) formations, a form of medium stature occurs with arcuate, often very glaucous, tough leaves. The inflorescences are oblong or subglobose, fairly large, somewhat reminiscent of *K. rooperi* and, like that species, may vary from brilliant red to greenish-yellow tinged with red, or sometimes pure yellow (*Johnson* 1211; *Taylor* 2494). The bracts are oblong-ovate, longer than in typical *K. uvaria*, and the pedicels are shorter (1.5–3 mm). Morphologically, this form occupies a position between *K. uvaria* and *K. rooperi*, but it is separated from both geographically. This form may also be confused in the herbarium with specimens of *K. linearifolia*, but it can usually be recognized by the hard, fibrous and somewhat narrower leaves. Separate taxonomic status was considered for this form but insufficient support for such a step could be found.

As indicated on p. 370, *K. uvaria* is closely allied to plants now included in *K. linearifolia* (p. 498) and, where the two species overlap in the eastern Cape Province, some difficulty may be experienced in separating the two with certainty. The latter species is generally more robust, with broader, softer leaves that do not tend to fold along the midrib on drying, larger inflorescences and short pedicels.

The types of *K. burchellii* and *K. occidentalis* fall within the range of the typical form of *K. uvaria*. As stated on p. 370, Baker in *Flora Capensis* (1896) and Berger (1908) applied the epithets *alooides* or *uvaria* to the more robust species now dealt with under the names *K. praecox* and *K. linearifolia*. The varieties upheld by the two monographers are also allocated to these two species.



MAP 13.—Distribution of *Kniphofia rooperi*, *K. uvaria* and *K. citrina*.



MAP 14.—Distribution of *Kniphofia linearifolia*, *K. tysonii* subsp. *tysonii* and subsp. *lebom, boensis*.

43. *Kniphofia citrina* Bak. in Gard. Chron. 14: 552 (1893); Fl. Cap. 6: 278 (1896); Mallett in Gard. Chron. 39: 82 (1906); Berger in Pflanzenz. 4, 38: 57 (1908); Codd in Flow. Pl. Afr. 37: t.1448 (1965). Type: Hort. Leichtlin, Oct. 1893, "from mountains north of Grahamstown" (K!, holo.).

K. linearifolia sensu Phillips in Flow. Pl. S. Afr. 9: t.340 (1929).

Plants in small groups, 40–60 cm tall. Leaves 8–12 per peduncle, narrow, suberect to arcuate, 40–70 cm long, 6–10 (–12) mm broad, keeled, V-shaped in cross section, tending to fold along the midrib, somewhat glaucous, strongly nerved, breaking into fibres at the base; margin minutely and sparsely denticulate to smooth. Peduncle standing above the leaves, 40–60 cm long. Inflorescence subglobose to globose, dense, 4.5–5 cm long and 5–5.5 cm in diameter; buds erect to spreading, red, red-tipped or yellow; flowers pendulous, yellow to yellow-green. Bracts ovate-oblong, 4.5–5 mm long, 2–2.5 mm broad, subacute to obtuse; margin finely eroso-denticulate. Pedicels 1.5–2.5 mm long. Perianth subcylindrical, 2.2–2.7 cm long, scarcely constricted above the ovary and 2 mm broad for about 1 cm, then widening gradually to 4–5 mm in diameter at the throat; lobes broadly ovate, 2.5 mm long, spreading. Stamens exerted by 4–6 mm at anthesis and remaining exerted. Style subequal to the stamens at anthesis, finally exerted by 8 mm. Fruit globose-triquetrous, about 8 mm long. PLATE 25. MAP 13.

Found in dense grass from Humansdorp to Bathurst districts and, inland, to Albany and King William's Town Districts, from near sea level to 2,000 ft. in altitude. The flowering time is mainly March to May.

CAPE.—Albany: Mountains north of Grahamstown, Hort. Max Leichtlin (K); Highlands Station, Story 4542. Alexandria: near Bushman R. Mouth, Galpin 11809; Archibald 4222. Bathurst: farm "Brooklands", Comins 1018; 1019; farm "Cowley", Comins 2032. Humansdorp: near Humansdorp, Marais 380. King William's Town: Evelyn Valley, Story 3814. Port Elizabeth: Parsons Vlei, Long 1241.

The essential characters of *K. citrina* are its relatively small stature, the arcuate, somewhat fibrous leaves, the small globose inflorescences which appear in autumn, with short flowers and markedly exerted stamens. As stated on p. 496 it is closely related to plants from much the same area which are now included in *K. uvaria* and intermediate specimens may be found, for example: Comins 1015 from between Grahamstown and Port Elizabeth (perianth 3.0 cm), Urton s.n. from near Port Elizabeth (perianth 2.8 cm) and Story 3848 from Keiskammahoek (perianth also 2.8 cm). Further study in the field is required in order to determine the status of *K. citrina*; in the meantime it appears worthy of separate rank.

Inflorescences may vary in colour from clear yellow to bright red at the apex, often with a varnished appearance, grading to yellow flowers, or dull red at the apex grading to greenish-yellow flowers.

44. *Kniphofia linearifolia* Bak. in Bot. Jahrb. 15, Beibl. 35: 5 (1892); Fl. Cap. 6: 282 (1896); Berger in Pflanzenr. 4, 38: 58 (1908). Type: Pondoland, *Bachmann* 279 (B†, holo.); neotype: Cape, Idutywa, *Codd* 9262 (PRE!).

Tritoma uvaria sensu Redouté, Lil. t.291 (1810).

Kniphofia uvaria sensu Hook. in Bot. Mag. t.4816 (1854), non (L.) Hook; sensu Berger, l.c. 61 (1908), partly. —var. *maxima* Bak. in Bot. Mag. t.6553 (1881); Berger, l.c. 61 (1908). Type: Hort. Kew Nov. 1879, originally from Max Leichtlin (K!, holo.). *K. alooides* sensu Van Houtte in Fl. d. Serres 13: 187, t.1393 (1858); sensu Bak. in Fl. Cap. 6: 283 (1896), partly. —var. *maxima* (Bak.) Bak. in Fl. Cap. 6: 283 (1896). *K. rooperi* sensu Hook. in Bot. Mag. t.6116 (1874); sensu Berger, l.c. 62 (1908), partly, as to Bot. Mag. t.6116 and *Schlechter* 6518; sensu Wood, Natal Pl. 6: t.540 (1912). *K. longiflora* Bak. in Kew Bull. 1901: 134 (1901); Berger, l.c. 60 (1908). Type: “Natal, probably”, Hort. Kew Nov. 1898 from seeds communicated by Mrs. Watkins, Euston Square, London (K!, holo.). *K. linearifolia* var. *montana* Berger, l.c. 58 (1908). Syntypes: East Griqualand, Insizwa Mt., *Krook* 548 (W †); Tembuland, Umtata, *Krook* 368 (W †). —var. *kuntzei* Berger, l.c. 58 (1908). Type: Natal, near Colenso, *Kuntze* (K!, Z!). *K. rhodesiana* Rendle in J. Linn. Soc. Bot. 40: 214 (1911). Type: Rhodesia, Nyahodi River, *Swynnerton* 723 (BM!, holo.). *K. praecox* sensu Letty, Wild Flows. Tvaal. t.18 (1962).



FIG. 77.—*K. linearifolia* from Nqeleni District, eastern Cape Province (*Codd* 9280).



PLATE 25.—*Kniphofia citrina* Bak.

Plants robust, usually in groups, up to 1.5 m tall. *Leaves* 8–16 per peduncle, fairly broad, at first erect, usually folding back or bending with their weight towards maturity, 60–140 cm long, 1.2–2.8 cm broad, strongly keeled, fairly rigid to flaccid intexture, yellow-green to dull green, rarely subglauous; margin serrulate to sparingly serrulate or, occasionally, smooth. *Peduncle* standing above the reflexed leaves, 80–150 cm long. *Inflorescence* ovoid or oblong to rhomboid, dense, 6–16 cm long, 5.5–6.5 cm broad, usually tapering towards the apex; buds spreading to pendulous, pinkish-red to green tinged with dull red; flowers pendulous, yellow to yellow-green or greenish. *Bracts* broadly ovate to ovate-oblong, 4–10 mm long, 3–4 mm broad, subacute or obtuse to rounded; margin usually finely serrulate. *Pedicels* very short, 1–1.5 mm long. *Perianth* subcylindrical, 2.5–3.5 cm long, scarcely constricted above the ovary and 2.5 mm broad near the base, widening gradually to 5 mm broad at the throat; lobes broadly ovate, 2–3 mm long, sometimes spreading. *Stamens* exerted by 4–5 mm at anthesis, later almost or completely withdrawn. *Style* subequal to the stamens at anthesis, finally exerted by 8 mm. *Fruit* ovoid-triquetrous, about 8 mm long. FIGS. 77, 78, 79, 80. PLATE 26. MAP 14.

Found at altitudes of 1,000 to about 6,500 ft. in eastern and north-eastern Cape Province (with an outlier at Worcester), eastern Orange Free State, Natal, the mountainous regions of Swaziland, eastern Transvaal and probably eastern Rhodesia, in mountain grassland, marshy places and on stream banks. The main flowering period is January to March, but specimens may be found in flower in the eastern Transvaal until April.

WITHOUT LOCALITY: Hort. Saunders Nov. 1872, type of Bot. Mag. t.6116 (K); Hort. Kew Nov. 1879, originally from Max Leichtlin, type of Bot. Mag. t.6533 (K); Hort. Kew Oct. 12, 1886 (K).

CAPE.—Aliwal North: Elandshoek, *F. Bolus* 199. Bedford: "Smalldeel", *Burke* s.n. (K). Bizana: Zuurberg, *Codd* 9342. Cathcart: near Thomas River, *Codd* 6355; *Bruce* 546; near Hogsback, *Bruce* 536; 537; 8½ miles N. of Hogsback, *Bruce* 538; Kingsnek, near Hogsback, *Erens* 2216; Windvogelberg, *Marais* 515. Elliotdale: *Marais* 1009. Flagstaff: 10½ miles N.W. of Holy Cross Mission, *Codd* 9329; 6 miles N.E. of Flagstaff, *Codd* 9332; 13 miles N. of Bizana, *Codd* 9334. Graaff Reinet: 26 miles S.W. of New Bethesda, *Kitching* 55. Idutywa: near Idutywa, *Codd* 9262; 5 miles N. of Idutywa, *Codd* 9263. Keiskammahoek: *Bruce* 553; Cata Forest Station, *Strey* 3794; *Bruce* 552. Kentani: *Abernethy* A; 2 miles N.W. of Nqunzuza Store, *Codd* 9256. Libode: 9 miles W. of Libode, *Marais* 1006. Lusikisiki: *Bruce* 596; near Magwa Falls, *Codd* 9316; 9322; Mkambati, *Marais* 974; 7 miles S. of Mkambati, *Marais* 994. Maclear: Between Naudes Nek and Maclear, *Bruce* 579; 2½ miles S.W. of Maclear, *Marais* 871; 5 miles S.W. of Ugie, *Marais* 876; Gatberg, *Marais* 877; Naudes Nek, *Marais* 1370; 28½ miles from Rhodes to Maclear, *Marais* 1379. Matatielie: near Paspalum, *Marais* 858. Middelburg: *Potts* 1704 (UOFS); between Compassberg and Rhenosterberg, *Drege* s.n., partly (K); Grootfontein, *Theron* 160; s.n. Mqanduli: near Mqanduli, *Codd* 9264; 9265; *Marais* 1012. Mt. Ayliff: Mt. Insizwa, *Schlechter* 6518 (Z); 9 miles W. of Mt. Ayliff, *Codd* 8558; 5½ miles W. of Old Goxe Store, *Marais* 851; 9 miles S. of Kokstad, *Marais* 852; 3 miles S. of Connomore, *Marais* 854. Mt. Fletcher: *Bruce* 580. Nqeleni: *Codd* 9280; *Killick* 2036. Port St. Johns: 5 miles N. of Port St. Johns, *Codd* 9304. Queenstown: *Galpin* 1786. Somerset East: Boschberg, *MacOwan* 1908 (GRA, K, Z); *Galpin* 9287; *Bruce* 519; 522; Oudekraal, *Admiraal* s.n. Sterkstroom: Stormberg Mts., *Bruce* 564; Halseton, *Stretton* 6. Stockenstrom: 12 miles N. of Deelkraal, *Marais* 882. Tarkastad: 9 miles S.E. of Spring Valley, *Bruce* 524. Umtata: Baziya, *Bruce* 600; *Killick* 2064. Umzimkulu: 10 miles S. of Umzimkulu, *Codd* 8564. Wodehouse: 10 miles N.W. of Dordrecht, *Bruce* 561; 13 miles N.W. of Dordrecht, *Bruce* 562; 6 miles S. of Jamestown, *Reynolds* s.n. Worcester: Bothas Halt, *Van Breda* 210.

O.F.S.—Without locality: *Cooper* 3599 (K, Z). Harrismith: Oliviershoek Pass, *Bruce* 400; Rensburgskop, *Jacobsz* 305; *Codd* 10524; Walton, *Jacobsz* 304; Kerkenberg, *Jacobsz* 307; Van Reenen's Pass, *Codd* 8515.

"BASUTOLAND".—*Cooper* 3234 (K, Z).

NATAL.—Without locality: Hort. Kew Nov. 1898, from Mrs. Watkins (K). Alfred: 2½ miles W. of Harding, *Marais* 846. Bergville: Royal Natal National Park, *Trauseld* 251; Cathedral Peak area, *Bruce* 416; *Killick* 1333; 1407; 1465; *Codd* & *Dyer* 6252; 6289; *Germishuizen* 43; 44. Eshowe: near Mbongolwane, *Strey* 4189. Estcourt: Colenso, *Kuntze* s.n. (K, Z.); Cathkin Park, *Galpin* 11831; near White Mt. Inn, *Killick* 2162; Giants Castle Game Reserve, *Trauseld* 372; Highmoor Forest Station, *Killick* & *Vahrmeijer* 3669. Impendhle: 27 miles S.W. of Nottingham Road, *N. R. Smuts* 1037; 20 miles N. of Bulwer, *Codd* 8534. Ixopo: 3½ miles N. of Highflats, *Codd* 9367. Klip River:

20 miles from Ladysmith on road to Van Reenen, *Germishuizen* 2. Kranskop: 2 miles N. of P.O. The Ranch, *Codd* 9668. Lions River: 10 miles W. of Nottingham Road, *Dyer* 5318; near Caversham, *Edwards* 2303. Ngotshe: Ngome, *Bruce* 298. Polela: Bulwer, *Codd* 8539; 3 miles from Donnybrook on Polela Road, *Edwards* 3108. Underberg: 12 miles S. of Underberg, *Codd* 8546. Utrecht: Groenvlei area, *Bruce* 284; 285; 286; *Codd & Dyer* 6258; 6266; *Codd* 6951; 5 miles N.E. of Utrecht, *Bruce* 287; *Marais* 1471; 2 miles S.E. of Viljoenspos, *Codd* 6957. Vryheid: 17 miles N. of Vryheid, *Bruce* 291.

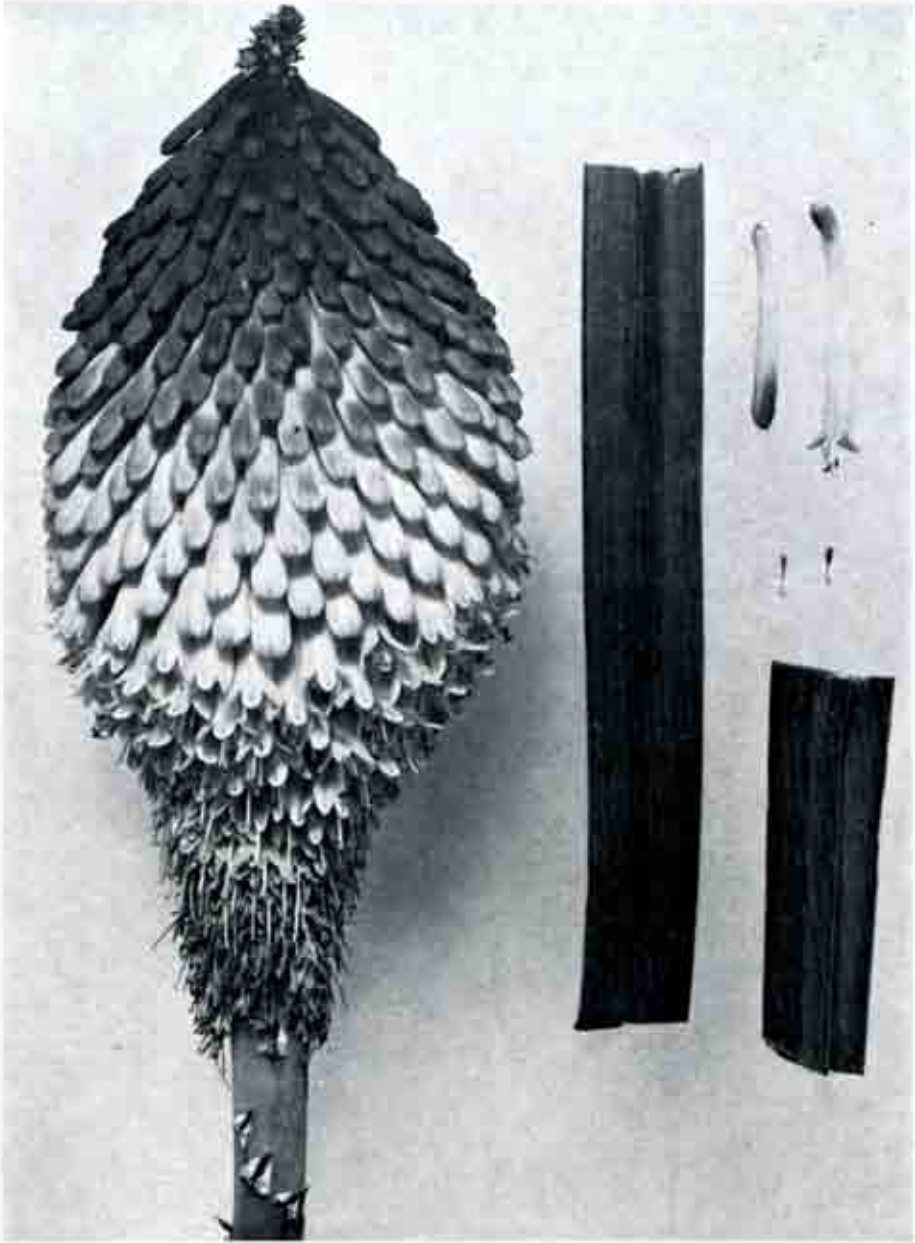


FIG. 78.—*K. linearifolia* from Utrecht District, $\times \frac{3}{4}$ (*Codd & Dyer* 6258).

SWAZILAND.—Near Mbabane, *Nicholson* s.n.; *Bruce* 305; *Dlamini* s.n.; 5½ miles S. of Forbes Reef, *Bruce* 307; 7 miles N.E. of Forbes Reef, *Bruce* 309; Piggs Peak, *Compton* 30626; 5½ miles E. of Havelock Mine, *Bruce* 310.

TRANSVAAL.—Amersfoort: 5 miles S.W. of Dirkiesdorp, *Bruce* 278; 10 miles E. of Wakkerstroom, *Bruce* 280. Barberton: near Barberton, *Repton* 1000; Saddleback Range, *Galpin* 1230; Nelsberg, *Van der Merwe* 1672; *Bruce* 312; *Meeuse* 10090; Berlin Forest Station, *Codd* 5593; 2 miles N.W. of Havelock Mine, *Codd* 7845. Belfast: 2 miles E. of Airlie Station, *Vermeulen* s.n.; near Machadodorp, *Van der Merwe* 1249; *Bruce* 330; 338; Schoemanskloof, *Bruce* 337. Carolina: Waterval Boven, *Van der Merwe* 901; 4½ miles E. of Lochiel, *Bruce* 304; Slaaihoek, *Bruce* 504; 5 miles S.E. of Grootkop, *Codd* 9559. Ermelo: 25 miles E. of Ermelo, *Bruce* 265; *O'Connor* s.n.; Iswepe, *Sidey* s.n. Lydenburg: near Lydenburg, *Wilms* 1558; *Galpin* 13718; 13 miles S.E. of Lydenburg, *Bruce* 323; 8½ miles S.W. of Lydenburg, *Bruce* 324; 12 miles W. of Lydenburg, *Bruce* 326. Nelspruit: near Kaapschehoop, *Rogers* 21053; *Bruce* 331. Pilgrims Rest: *Rogers* 18717 (K, Z); Sabie Valley, *Galpin* 13607; farm London, *Galpin* 14516; near Sabie, *Van der Merwe* 1666; *Munro* s.n.; *Brent* 41; near Graskop, *Van der Merwe* 1291; *Codd* 4307; *Bruce* 318; 319; *Brent* 33; 4½ miles W. of Pilgrims Rest, *Bruce* 320; Bushbuckridge, *Verdoorn* 2453; Mariepskop, *Codd* 7878; 7922; *Van der Schijff* 5111; *Verdoorn* 2456. Piet Retief: 16 miles E. of Moolman, *Codd* 7037. Wakkerstroom: *Van der Merwe* 29; *Galpin* 10014; Oshoek, *Devenish* 592; 1010.

RHODESIA.—Melsetter District: Nyahodi River, *Swynnerton* 723 (BM); farm Albany, *Crook* 544; Pasture Research Station, *Crook* 545.



Fig. 79.—*K. linearifolia*, near Mqanduli, eastern Cape Province (*Codd* 9265).

The somewhat lengthy synonymy is partly due to the fact that the name *K. uvaria* came to be applied mainly to the more robust plants of the eastern Cape Province now included in *K. linearifolia*. It is also apparent that previous monographers of the genus were not clear in their concepts of species such as *K. uvaria*, *K. rooperi*, *K. praecox*, *K. linearifolia* etc. with the result that too many species names were upheld.

K. praecox (p. 447), which may superficially resemble the large inflorescences of *K. linearifolia*, is distinguished from the latter on the grounds of the lanceolate, acuminate bracts. *K. uvaria*, *K. rooperi* and *K. linearifolia* have ovate-oblong, rounded to subacute bracts, and form a closely related complex. Although intermediates are found between the three species, it is considered that over ninety per cent of the ample modern gatherings can be allocated with a high degree of certainty, so no justification is seen for a broader view which would include the entire range within one species.

As here defined, *K. linearifolia* is the most widespread species in South Africa. The plants are robust with large, showy inflorescences which are ovoid or oblong, but usually not subcylindrical (see *K. tysonii*, p. 504). The leaves are fairly broad and usually soft in texture so that they tend to bend over about the middle, or lower, often at a sharp angle. Variation is mainly in stature (due largely to growing conditions), size and colour of inflorescences, and width and colour of leaves. Although the inflorescences are usually brightly coloured with pinkish-red at the apex, a colour form is found in Natal (*Bruce* 406, *Codd & Dyer* 6252, 6289 etc.) in which the buds are green (sometimes tinged with dull red) and the flowers are greenish-yellow. This colour form is associated with leaves that are more glaucous than is generally the case, and is not easily distinguishable from the late-flowering specimens of *K. baurii* listed on p. 482.

The species appears to have been introduced into Europe in the early part of the 19th Century, judging by the illustration by Redouté (1810 or 1811). The illustrations in *Bot. Mag.* t.4816 (1854) and *Flore des Serres* 13: t.1393 (1858) also probably belong here, but it is necessary to refer back to the statement made on p. 3/0 when dealing with *K. praecox*, that it is often not possible to distinguish between illustrations of *K. praecox* and *K. linearifolia* without supporting herbarium specimens. N. E. Brown's apt comment on hybridization in gardens (see p. 393) should also be remembered.

Due to the absence of corresponding herbarium specimens, it is possible to ignore such semi-horticultural epithets as *Tritoma grandis* (1865), *T. saundersii* (1882) and *T. nobilis* (1882, 1885), even if it is claimed that the descriptions are sufficiently adequate for the names to be taken into account. They could equally well apply to *K. praecox* as to *K. linearifolia*, and no corresponding specimens have been traced.

The plant illustrated as *K. rooperi* in *Bot. Mag.* t.6116 (1874) belongs rather in *K. linearifolia* and was grown in the garden of Mr. W. W. Saunders of Reigate, where it flowered in November, 1872. Thomas Cooper, who collected for Mr. Saunders, made two herbarium specimens of the species while in South Africa, Nos. 3234 and 3599. The former is recorded from "Basutoland", though no other gathering is known from the territory as defined at present.

The name *K. uvaria* var. *maxima* Bak. was applied to a plant of this species which was illustrated in *Bot. Mag.* t.6553 (1881). It flowered at Kew in November, 1879, and came from Max Leichtlin. Apart from this, its origin is obscure.

K. linearifolia Bak. (1892) appears to be the earliest available specific name for the widespread species now under discussion. There appears to be no type material extant and thus some explanation of its interpretation and the reasons for selecting *Codd* 9262 as the neotype would be appropriate.

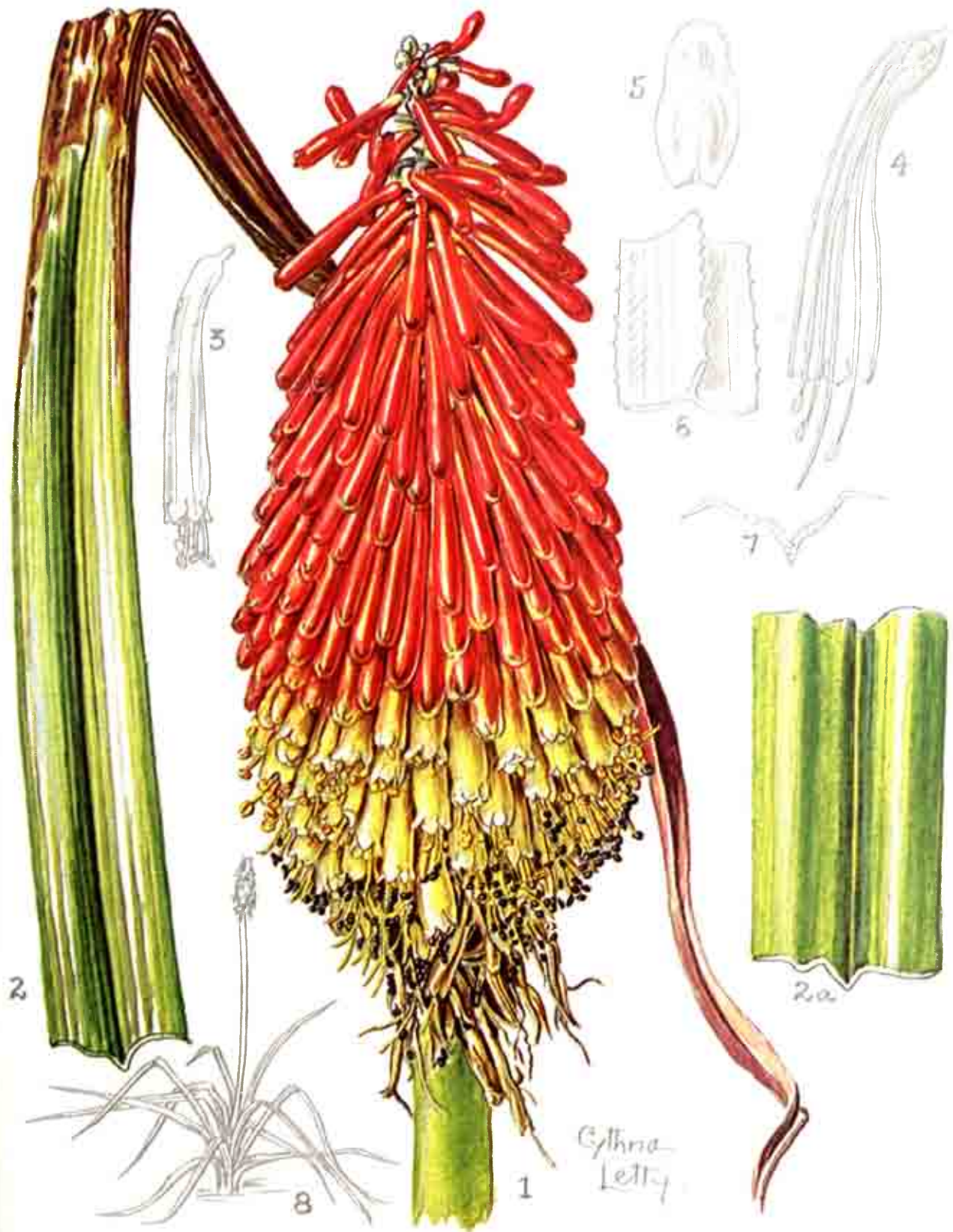


PLATE 26.—*Kniphofia linearifolia* Bak.



FIG. 80.— *K. linearifolia*,
Ermelo District. Photo
by Miss O'Connor.

Baker described three species in 1892, based on *Bachmann* gatherings in Pondoland, namely: *K. linearifolia* (*Bachmann* 279, no date recorded); *K. decaphebia* (*Bachmann* 280, February, 1888); and *K. drepanophylla* (*Bachmann* 281, August, 1888). A specimen of the last mentioned exists in Kew Herbarium, so the identity of *K. drepanophylla* is not in doubt. No material has been traced, however, of the types of *K. linearifolia* and *K. decaphebia*.

Bachmann published an account of his travels (1901), from which his route in Pondoland can be roughly traced, but he makes no mention of collecting *Kniphofia* specimens. A fairly thorough study of the area was, therefore, made during 1955 and 1956 in order to investigate the species that *Bachmann* is likely to have encountered. Two autumn-flowering species were found to be widespread in Pondoland. One of these is *K. laxiflora* Kunth which may have a relatively dense inflorescence and to which the description of *K. decaphebia* Bak. agrees quite well. The other is the species to which the name *K. linearifolia* Bak. is now applied.

Reference to the description of *K. linearifolia* indicates that *Bachmann* 279 had a smaller inflorescence (5–7 cm) and shorter flowers (25–30 mm) than is normal for the specimens now cited in *K. linearifolia*. This reduction in size is found on plants growing under relatively dry conditions. A good example of this is *Codd* 9262. The original

plant found growing a little distance from a stream near Idutywa (in the Transkei) had inflorescences about 6 cm long, flowers 27 mm long and leaves 11 mm broad. In cultivation in Pretoria, the same plant developed inflorescences about 10 cm long, flowers 30 mm long and leaves 2 cm broad. The wild specimen is, therefore, selected as the neotype.

The type of *K. longiflora*, cultivated at Kew of unknown origin, as well as the types of *K. linearifolia* var. *kuntzei* Berger and of *K. rhodesiana* Rendle are all very scrappy specimens but are considered to fall within the range of variation now included in *K. linearifolia*.

45. ***Kniphofia tysonii*** Bak. in J. Bot. Lond. 27: 43 (1889). Type: East Griqualand, Zuurberg, *Tyson* 1709 (K!, holo.; BOL!, SAM!).

Plants in groups, robust, up to 2 m tall. *Leaves* 8–16 per peduncle, at first erect but later folding over at about the middle, 80–150 cm long, 12–40 mm broad, yellow-green to dull green or subglaucous, strongly keeled, relatively flaccid in texture; margin serrulate to smooth. *Peduncle* overtopping the reflexed leaves, 1–2 m tall. *Inflorescence* oblong to subcylindrical, dense, 7–15 cm long, 4.5–6 cm broad; buds spreading to



FIG. 81.—*K. tysonii* subsp. *tysonii*, from The Dargle (Mrs. Forssman s.n.).

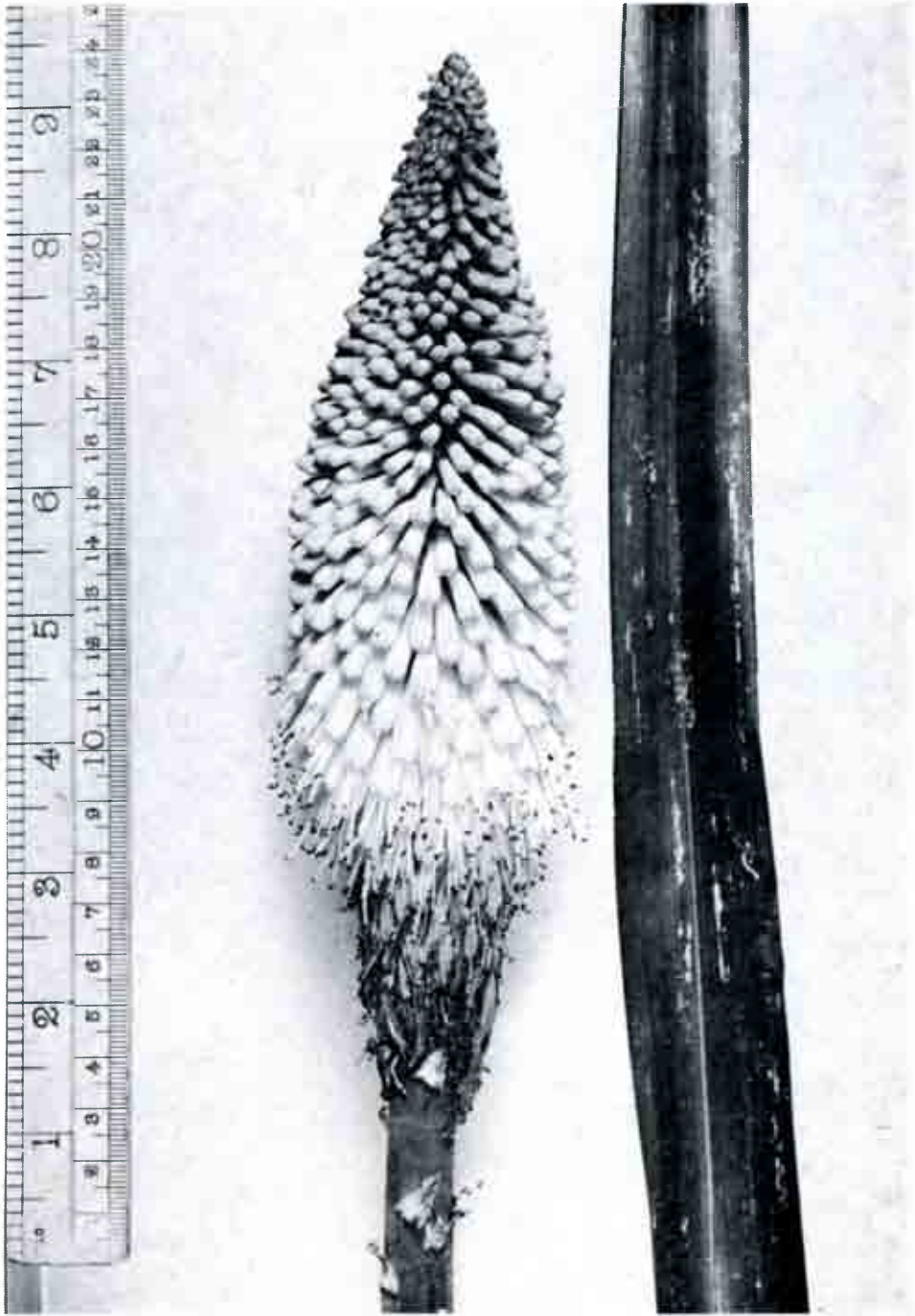


FIG. 82.--*K. tysonii* subsp. *tysonii*, form from Zululand (Codd 7000).

pendulous, orange-red to dull blood-red; flowers spreading to pendulous, yellow to greenish. *Bracts* oblong-ovate to oblong, obtuse to rounded 4–8 mm long, 2.5–3 mm broad; margin finely serrulate. *Pedicels* almost obsolete, about 1 mm long. *Perianth* subcylindrical, scarcely constricted above the ovary, 2.0–2.8 cm long, 2.5 mm broad near the base, increasing to 4 mm at the throat; lobes broadly ovate, 2.5 mm long, scarcely spreading. *Stamens* exerted by 6–9 mm at anthesis and remaining exerted. *Style* subequal to the anthers at anthesis, finally exerted by 1 cm or more. *Fruit* subglobose-triquetrous, 4–5 mm long.

Two subspecies are recognized.

Leaves relatively broad (up to 3.5 cm), usually serrulate; buds usually spreading, orange-red; flowers spreading to pendulous, yellow to yellow-green..... subsp. *tysonii*
 Leaves 1.2–2 cm broad, usually smooth or almost so; buds imbricate, dull blood-red; flowers pendulous, greenish..... subsp. *lebomboensis*

(a) subsp. *tysonii*.

K. tysonii Bak. in J. Bot. Lond. 27: 43 (1889); Fl. Cap. 6: 279 (1896); Berger in Pflanzenr. 4, 38: 56 (1908).

Characterised by the broader (1.5–3.5 cm), usually yellow-green leaves, larger and more oblong inflorescences with buds spreading, orange-red to pinkish-red. FIGS. 81, 82. PLATE 27. MAP 14.

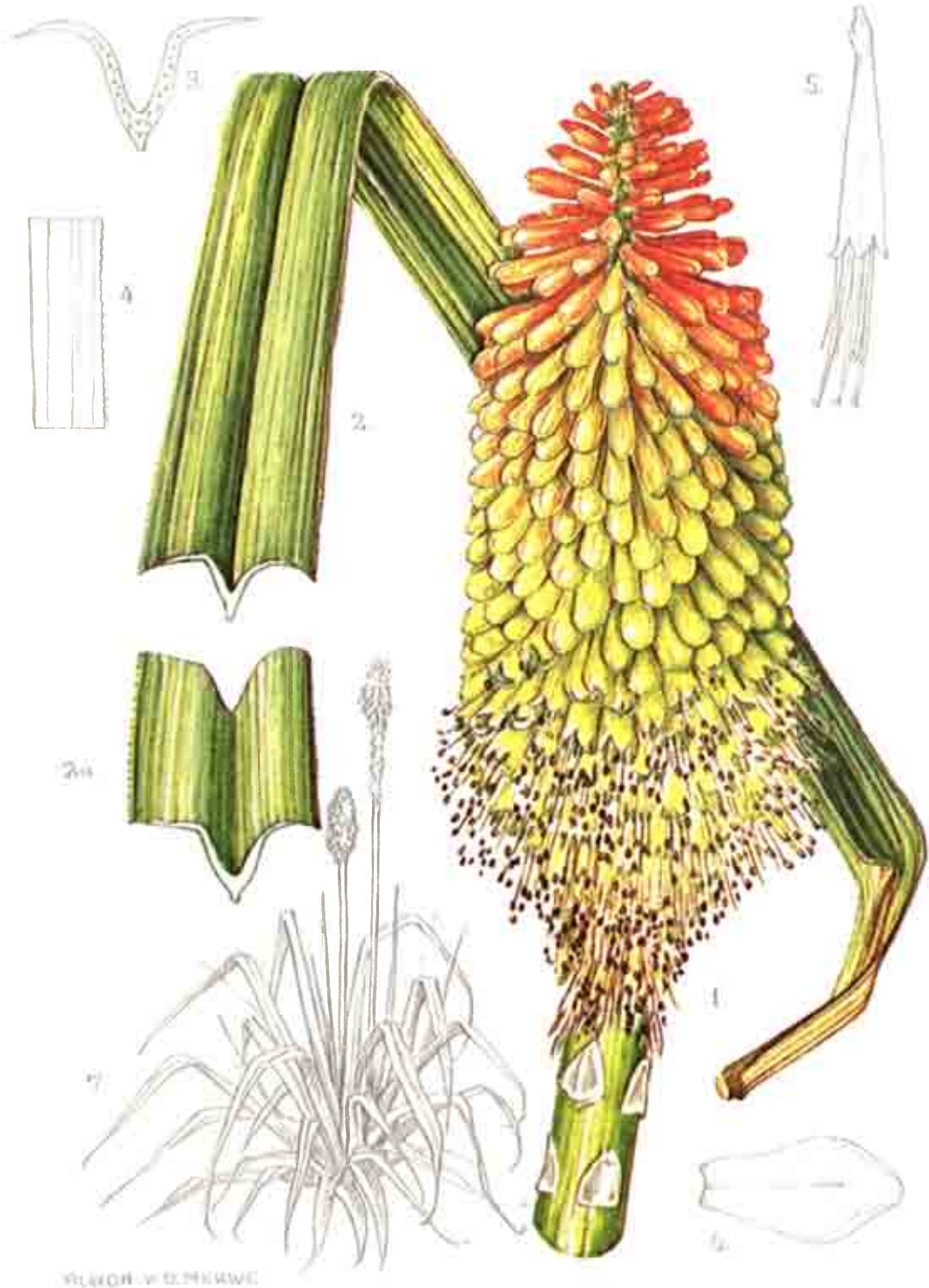
Recorded from East Griqualand in the Cape to Nkandla District in Natal, in dense tall grass on hillsides and at forest margins, from near sea level in the Port Shepstone District to over 4,000 ft in the Natal midlands.

CAPE.—District unknown: Zuurburg, *Tyson* 1709 (BOL, K, SAM). Umzimkulu: Kromhoek, *Marais* 839.

NATAL.—Alfred: near Staffords Post, *Marais* 842. Camperdown: Inchanga, *Eshuis* s.n. Entonjaneni: 2 miles S. of Melmoth, *Codd* 7003. Ixopo: 8 miles S.E. of Ixopo, *Codd* 8570. Lions River near Cedara, *Bruce* 158; The Dargle, *Letty* 272; *Marais* 816; Lidgetton, *Mogg* 3596. Ndwedwe Inanda, *Medley Wood* 1330 (K). Nkandla: 10 miles S. of Nkandla, *Codd* 6977; Nkandla Forest, *Codd* 6971; 9693; Qudeni, *Codd* 6990; 6998; 7000. Nqutu: 2½ miles E. of Nqutu, *Codd* 6790. Pietermaritzburg: *Wilms* 2309 (K); Town Hill, *Dyer* 5325; near Pietermaritzburg, *Codd* 6792; 14 miles S. of Pietermaritzburg, *Marais* 838. Pinetown: Kranskloof Falls, *Bruce* 153. Polela: 3 miles W. of Donnybrook, *Gerstner* 7011. Port Shepstone: 5 miles S. of Port Shepstone, *Codd* 9353; Mehlomyama, *Codd* 9364. Richmond: Nels Rust, *Killick* 2106. Umvoti: 9 miles S. of Rietvlei, *Codd* 8589; between Sevenoaks and Mt. Alida, *Marais* 805. Umzinto: 4 miles E. of Dumisa, *Codd* 8572.

K. tysonii subsp. *tysonii* is closely related to *K. linearifolia* and intermediate specimens are encountered which may be difficult to allocate with certainty. The cultivated specimens *Codd* 9277 from near Umtata and *Bruce* 445 are examples of this, but here it must be remembered that plant organs, such as leaves and flowers, may be amplified or reduced by the effects of cultivation. In general, subsp. *tysonii* has more elongate inflorescences with shorter flowers and long-exserted stamens. The general colour is orange rather than bright red and, in this connection, a problem is posed by the specimens recorded from the Zululand districts of Melmoth, Nkandla and Nqutu. In these, the buds are pinkish-red, resembling *K. linearifolia*, while the individual flowers and pedicels are longer than in typical subsp. *tysonii*. Closer investigation may prove that they should be accorded separate taxonomic rank, and possibly be included in *K. linearifolia* rather than in *K. tysonii*. The other alternative, to merge *K. linearifolia* (1892) in *K. tysonii* (1889), does not commend itself at the present stage of our knowledge.

(b) subsp. *lebomboensis* *Codd*, subsp. nov., a subsp. *tysonii* foliis angustioribus, marginibus levibus, gemmis pendulis differt.



BLAKHOF, v. D. MEERWEE

PLATE 27.—*Kniphofia tysonii* Bak. subsp. *tysonii*

Type: Swaziland, Lebombo Mts., about 2 miles S.E. of Stegi, 6.3.51, Bruce 306 (PRE!, holo.).

Characterised by its narrower (1.2–2 cm) leaves which are distinctly flaccid, and mid-green to subglaucous with smooth margins, and the inflorescence which tapers to the apex with buds pendulous, imbricate, dull blood-red in colour, while the mature flowers are greenish. FIG. 83. MAP 14.

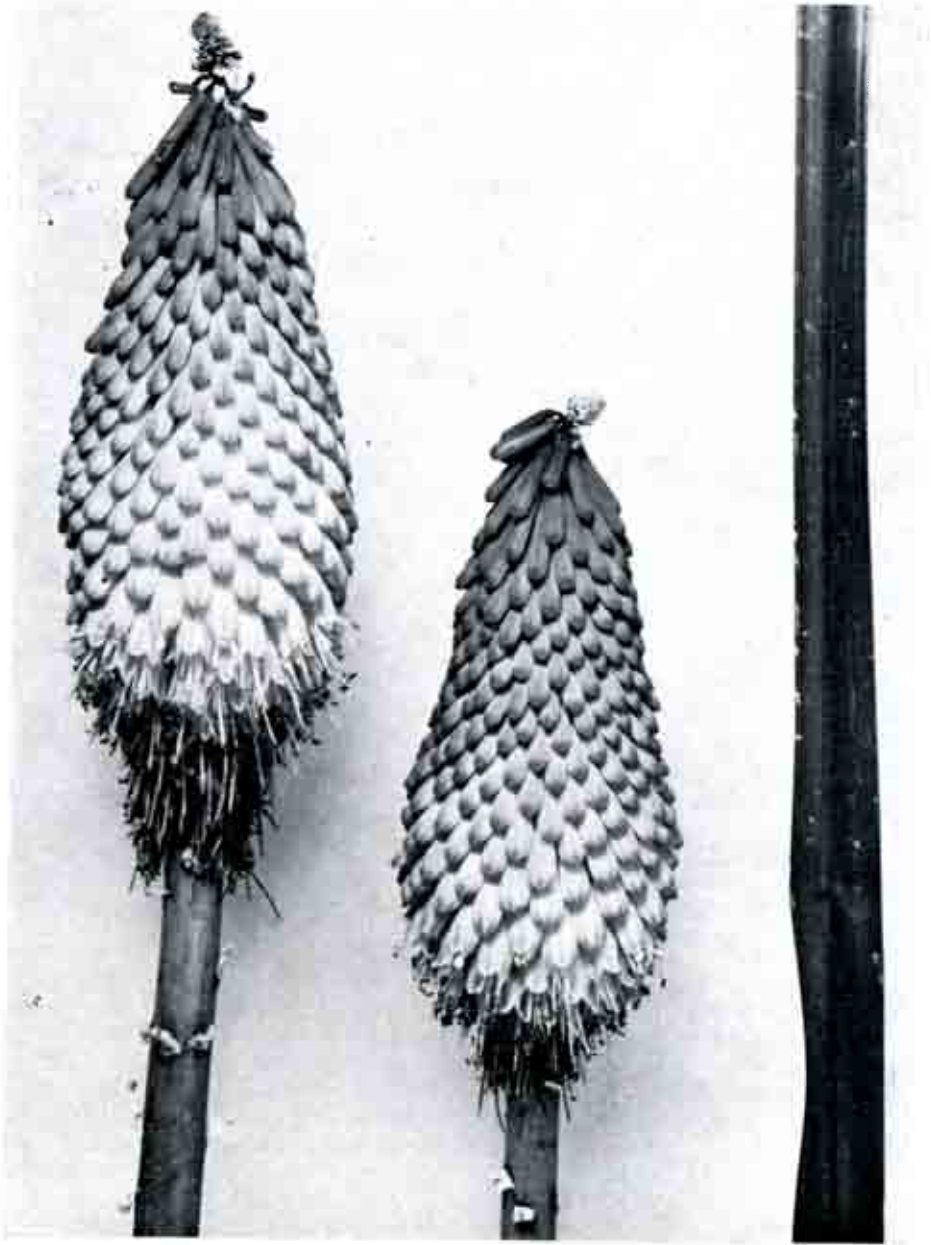


FIG. 83.—*K. tysonii* subsp. *lebomboensis*, from near Stegi, Swaziland (Erens & Dyer 2025).

Found in moist, grassy places or seepage areas on hillsides at altitudes of 1,500 to 2,500 ft. in Swaziland, where it occurs on the Lebombo Range, and northern Natal. The flowering period is February to early April with the peak in March.

NATAL.—Hlabisa: 3 miles S. of Hlabisa, *Codd* 7009; Hluhluwe Game Reserve, *Ward* 2189. Non-goma: 16 miles E. of Nongoma, *Codd* 7010.

SWAZILAND.—3 miles from Ravelston on road to Stegi, *Dyer & Erens* 2025; 2 miles S.E. of Stegi, *Bruce* 306; 3 miles S. of Stegi, *Nel* s.n.

Although the inflorescence shape and colour is distinctive and the leaves are on the average narrower, with usually smooth margins, subsp. *lebomboensis* is not easy to separate from subsp. *tysonii* in the herbarium. It is probable, however, that it was derived independantly from *K. linearifolia*, rather than from subsp. *tysonii*, because an occasional specimen intermediate in character with *K. linearifolia* is found in northern Natal in the Ngotshe District (near Louwsburg, *Bruce* 300; *Codd* 7022; near Ngome, *Codd* 7012), at altitudes of 4,000 to 4,500 ft.

Subsp. *lebomboensis* does not overlap in distribution with subsp. *tysonii* or with *K. linearifolia* but, because of its short flowers with well-exserted stamens, it is convenient to include this group in a broad circumscription of *K. tysonii*.

EXCLUDED SPECIES

The following names have been excluded from the treatment of South African species for the reasons stated after each.

Kniphofia carinata C. H. Wr. in Bot. Mag. t.8545 (1914). Type: Hort. Kew (K!, holo.). Although said to be a South African species of which seed was supposedly sent to Kew in 1892 by Miss Ayliff of Rose Cottage, Grahamstown, it is not matched by any South African material and is considered to be a synonym of the Ethiopian species, *K. leichtlinii* Bak. ex Hook.f. See *Codd* in J. S. Afr. Bot. 29: 149 (1963).

K. infundibularis Bak. in J. Bot. Lond. 23: 277 (1885); Fl. Cap. 6: 277 (1896); *Berger* in Pflanzenr. 4, 38: 44 (1908). Type: Hort. Kew about 1780, from the herbarium of Bishop Goodenough (K!, holo.). This is a synonym of *K. pumila* (Ait.) Kunth listed below, which is also considered to be an Ethiopian species.

K. primulina Bak. in Fl. Cap. 6: 533 (1897). Type: "Natal, Hort. Leichtlin, flowered in the Temperate House at Kew, January, 1897". No corresponding herbarium specimen with this date, or annotated by Baker as *K. primulina*, has been seen. The description mentions smooth-margined leaves; dense, oblong raceme, 3-4 in long; pedicels very short; bracts small, ovate; flowers all pale yellow; perianth an inch long. Although Baker aligns it to *K. natalensis* Bak. (which is a synonym of *K. laxiflora* Kunth), the description differs a good deal from the latter complex and there appears little possibility of ascertaining the correct identity of *K. primulina*.

It may be noted that the name *K. primulina* Bak. was linked, probably wrongly, by N. E. Brown with the plant illustrated in Bot. Mag. t.7623 (1898) as "*K. longicollis* Bak". The figured plant (from the garden of W. E. Gumbleton of Ireland), of which a herbarium specimen is preserved in Kew annotated in N. E. Brown's handwriting "this is *K. primulina* Baker", is quite distinct from true *K. longicollis* Bak. and also does not agree with the description of *K. primulina* Bak. except in the colour of the flowers. The specimen annotated by N. E. Brown may be accepted as the type of the Bot. Mag. plate 7623, having leaves with serrulate margins; subcylindrical inflorescence 6 inches long; long pedicels; long-acuminate bracts; and perianth an inch and a quarter long. This can now be interpreted as a colour form of *K. praecox* Bak. (see also p. 449, where a specimen ex hort. Gumbleton, originally from Max Leichtlin under the name "*K. nobilis*", was included in *K. praecox*). *Berger*, in Pflanzenr. 4,

38: 60 (1908), apparently accepted N. E. Brown's annotation because his description of *K. primulina* corresponds with Bot. Mag. t.7623 and the Gumbleton specimen, and thus differs from the type description of *K. primulina* Bak.

K. pumila (Ait.) Kunth, Enum. Pl. 4: 552 (1843). Type: a specimen in BM labelled "Hort. Kew 1781, *Aletris pumila*" (BM!, holo.). See Codd in J. S. Afr. Bot. 29: 145 (1963) for synonymy where reasons are given for concluding that this is an Ethiopian species. Regarding synonymy, it should be noted that *Veltheimia abyssinica* Redouté should be included.

K. saundersii (Carr.) Nicholson, Dict. Gard. Suppl. 459 (1901). See *Tritoma saundersii* Carr.

Notosceptrum aloides (Bol.) Benth. This proves to be a species of *Aloe* and the combination *A. alooides* (Bol.) Van Druten was published in *Bothalia* 6: 544 (1956).

Tritoma. On pp. 387, 449, and 502 reference is made to certain semi-horticultural names applied to various robust Redhot Pokers that have been introduced to gardens from time to time. The majority of them are inadequately described and, even when an illustration is presented, the botanical details necessary for correct identification are lacking. The following names, taken up mainly from Index Kewensis may, therefore, be excluded: *T. glauca* Hort., *T. recurva* Hort., *T. recurvata* Hort. (1863), *T. grandis* Hort. (1865), *T. saundersii* Carr. (1882), *T. nobilis* Guill. (1882, 1885).

Veltheimia speciosa Roth: see p. 380 for a discussion of this name and reasons for discarding it.

OPSOMMING

Die Suid-Afrikaanse *Kniphofia* soorte is hersien en 'n sleutel is opgestel vir die 45 erkende spesies en 4 subspesies. Die nuwe spesies, subspesies en kombinasies is: *K. ensifolia* Bak. subsp. **autumnalis**, *K. praecox* Bak. subsp. **bruceae**, *K. triangularis* Kunth subsp. **obtusiloba** (Diels ex Berger) (*K. obtusiloba* Diels ex Berger), *K. littoralis*, *K. elegans*, *K. latifolia*, *K. tysonii* Bak. subsp. **lebomboensis**.

INDEX TO COLLECTORS' NUMBERS

Included in the list below are collectors whose specimens are represented normally in several herbaria. No attempt has been made to list every collector cited in the text. The species number is given in a bracket after the collector's number and may readily be identified by reference to the table of contents in the Introduction (p. 000).

ACOCKS, J. P. H., 11217; 11218; 11219 (15); 13362 (2); 13879 (7); 16843; 18982 (23); 21984 (2); 22014 (7).

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