

film. The appearance of interference colors by the comparatively thick plates in fluorescent light is due, not to the intermittent flashing, but to the discontinuity of the spectral quality of the components of the light. The latter, *viz.*, that of the mercury discharge and of the various "phosphors" have individually fairly limited spectral ranges. The patterns are comparable to those which would be produced by the mixture of a few essentially monochromatic lights. It is apparent that illumination by fluorescent lamps provides a convenient means for estimating the relative thickness and the optical regularity of the reflecting surfaces of thin plates. It is further evident that such lamps provide a readily available source of light for interferometric devices.

C. WESLER SCULL

ABINGTON MEMORIAL HOSPITAL,  
ABINGTON, PA.

#### EXISTENCE OF ONLY ONE VARIETY OF CULTIVATED MANGOSTEEN EX- PLAINED BY ASEXUALLY FORMED "SEED"

THE luxurious flavor, beauty and texture of the fruit of the mangosteen, *Garcinia mangostana*, makes it, in the opinion of most people who know it, the best of the tropical fruits. A great deal has been published about this Asiatic species, especially concerning the difficulty which in general is attributable to poor root growth of growing plants through the juvenile stage.

Examination of the normal shriveled anthers in many flowers from two 37-year-old trees at the Puerto Rico Experiment Station of the United States Department of Agriculture has shown no pollen to be present. These female trees are reproduced through "seed" without the presence of the functional male flowers that are borne on separate trees, none of which exist in Puerto Rico. Backer<sup>1</sup> in 1911 stated that male flowers of the mangosteen had nowhere been found during the last hundred years. Descriptions of the male flowers that were, nevertheless, dated during that one-hundred-year period<sup>2,3</sup> or more recently<sup>4</sup> have been studied. Backer's description<sup>3</sup> is admittedly based upon Roxburgh's, and that of Ochse also corresponds closely to Roxburgh's. Thus it appears that all are based upon Roxburgh's description. Whether that was made from living or herbarium specimens is not indicated. Backer's statement that male flowers had

not been found within one hundred years leads, therefore, to the assumption that Roxburgh's description was probably based upon herbarium, not living, specimens. Study of these descriptions leaves no doubt about the male flowers being distinct from the female flowers of the Puerto Rican trees.

About half of the fruits produced by these trees have well-developed "seeds," each fruit rarely having more than one. A longitudinal section of this "seed" shows a structure much different from that of the normal dicotyledonous seed. The "seed" formation in the cultivated mangosteen is asexual. Sprecher<sup>5</sup> explained this freakish asexual reproduction mechanism in the mangosteen and called it apomixie. As he describes it, the adventitious embryo that develops to form the "seed" originates from a cell in the epithelium of the ovary inner integument. The reproduction is thus distinguished from nucellar budding that occurs in the apogamic reproduction in the mango and in Citrus. As the cell of the inner integument develops into a papilla and further to form the seed the nucellus and the embryo sac become nonfunctional. Similar adventitious embryony has been observed by Hegelmaier in *Allium odorum*.<sup>6</sup> Sprecher called the "seed" a hypocotyl-tubercle. According to him and Pierre<sup>7</sup> no traces of radicle, stem or cotyledons are present in the "seed." A similar structure has been observed at the Puerto Rico Experiment station in "seeds" of *Rheedia brasiliensis* and *R. macrophylla*.

Descriptions of mangosteen fruits from Java, Malaya, Trinidad and elsewhere conform precisely to the fruits produced in Puerto Rico. It would therefore seem that different varieties of the cultivated mangosteen do not exist. Fairchild,<sup>8</sup> traveling extensively in the Tropics studying the mangosteen, has stated that there are apparently no varieties of this fruit tree; seedlings everywhere bear curiously uniform fruits. Burbidge<sup>9</sup> in 1887 saw in British North Borneo what he considered a native form of the mangosteen. Fruits of this differed from those of the cultivated form, being 4-carpellate, each carpel having a well-developed seed, while in the cultivated form there are from four to eight carpels, rarely more than one or two of which develop "seed." Wester<sup>10</sup> describes the Jolo mangosteen as being rather larger than those of Singapore and Saigon and as having a thicker rind. Its flesh, too, is more acid and has more character than the milder flavored fruit of the Malay Peninsula

<sup>5</sup> M. Andreas Sprecher, *Rev. Gen. Bot.*, 31: 513-531. 1919.

<sup>6</sup> F. Hagelmaier, *Bot. Zeitung*, 55: 133-140. 1897.

<sup>7</sup> M. E. Pierre, *Bul. Mensual Soc. Linn. de Paris*, 1: 350. 1882.

<sup>8</sup> David Fairchild, "Exploring for Plants," p. 392. New York: The Macmillan Company. 1930.

<sup>9</sup> F. W. Burbidge, *Gardeners' Chronicle*, n. s., 21: 23, 1884.

<sup>10</sup> P. J. Wester, *Philipp. Agr. Rev.*, 13: 50, 1920.

<sup>1</sup> C. A. Backer, "Schooflora voor Java," p. 91. Batavia: N. V. Boekhandel Visser and Company. 1911.

<sup>2</sup> William Roxburgh, "Flora Indica," 2: 618-620. London: Parbury, Allen and Company. 1832.

<sup>3</sup> C. A. Backer, "Flora van Batavia," pp. 84-85. Batavia: G. Kolff and Company. 1907.

<sup>4</sup> J. J. Ochse, "Fruits and Fruitculture in the Dutch East Indies," pp. 53-54. Batavia: G. Kolff and Company. 1931.

and Java. Its seeds are said to be larger. Such differences might be due to environment.

Aside from these two notes, no mention of other mangosteen variations has been found in the literature.

This unusual asexual reproduction in the cultivated mangosteen accounts for the curious uniformity in its fruits wherever grown, and this famous fruit seems to be of one variety only.

Further anatomical studies of the mangosteen flower, fruit and "seed" are being continued at the Puerto Rico Experiment Station of the U. S. Department of Agriculture.

CLAUD L. HORN

PUERTO RICO EXPERIMENT STATION  
OF THE U. S. DEPARTMENT OF AGRICULTURE,  
MAYAGUEZ

### AND/OR OR ANDOR

THE use of the form "and/or" in legal practice is well established. In recent years I have noticed an increasing tendency for writers of scientific papers to make use of it. The question of the need for such a form of expression I do not wish to raise here, but the presence of a symbol of this kind upon the printed page gives to it an untidy, unfinished and objectionable appearance as though it were marked copy subject to revision.

The thought has long plagued me that in view of the apparent absence of any word in the English language of "andor" such a word might well be introduced and defined to convey the precise meaning of "and/or" and thus clear the page of the unnecessary and unsightly virgule which mutilates the typed line.

This subject may be enlarged upon to great length and an extensive review made of numerous past diatribes against the use of "and/or." My purpose here is to bring to attention a suggestion for such consideration as it may merit.

WALTER B. LANG

WASHINGTON, D. C.

### WHAT IS SUMMER?

At this time of year one often reads among scientific notices that the summer solstice occurred at 2:35 P.M. on June 21, or at some other time as the case may have been, and that this event marked the beginning of summer. The local paper enlarges on this news item, leaving out the solstice idea, the editor not being quite sure what the term means, but announcing, in language borrowed from the births column, that summer arrived yesterday afternoon at 2:35. Sometimes the paper says that summer then began "officially," and attributes the determination of the time somewhat vaguely to "the astronomers." Analogous notices appear about December 21, when we are told that winter "came in" at 7 A.M., mildly

or violently as the weather may have determined. The same oracle announces at the equinoxes the "official" beginnings of spring and fall. With this idea, that summer and winter begin at the solstices, and spring and fall at the equinoxes, I absolutely disagree, and, as Chesterton says, with a peculiar ferocity.

Certainly the equinoxes occur about March 21 and September 21, and at those moments the center of the sun is in the plane of the earth's equator. Then the nearest day and night are equal (except for a possible difference too small to be noticed) all over the earth, except at the poles, where the sun may be seen on the horizon. Certainly at the summer solstice we have the longest day of the year, and the sun at noon is higher in the sky than at noon on any other day. Certainly, then, land and sea and air, in our latitudes, are gaining heat most rapidly. But I do not think that summer begins then. June 21 is not the beginning of summer, and no one, by calling it the beginning officially, can make it so.

In the first place, our government can not determine what a common word is to mean. Also there is no "official" whose duty it is to define the names of the seasons, and if there were such an official he could not perform that function. A government astronomer, I suppose, determines the time of the solstice. His work ends when that is done. Writers, editors and calendar makers, wishing to dramatize the event, announce it as the birth of the season, which it is not.

Summer in the Saxon English which we speak by inheritance means the warm season. A dictionary definition is "the hottest or warmest season of the year, including June, July and August in the northern hemisphere." For convenience we make it correspond to whole rather than fractional months. In these latitudes this is reasonable, too, because about July 20, near the middle of these three months, is the hottest time of the year. Further north, of course, the peak of summer is earlier, and it is still more absurd to say that it begins on the longest day. June 24 is Midsummer Day in old English custom, the Feast of St. John the Baptist. You could not tell a farmer that the longest day is the beginning of summer. He would know better. Moreover, so people have written English in poetry and prose. "No price is set on the lavish summer, June may be had by the poorest comer." June, not just June 21 to 30. The period from summer solstice to autumnal equinox is obviously not summer.

It might indeed be convenient to have a term for that period. Such a term should not do violence to nature and the common meaning of useful words. We could call it the third quarter. Then the second quarter would be the time from the vernal equinox to the summer solstice. In this way the first quarter of this year would take in a few days—December 21 to December