

position corresponding to an  $R_F$  of 0.65. The formation of brown pigmentation occurred only in traces elsewhere on these chromatograms, although the presence of large amounts of phenolic material of low  $R_F$  value was detected by the diazotized *p*-nitro-aniline reagent on the control chromatograms. Similar results were obtained when a 1 per cent aqueous hydrochloric acid extract of the beans was examined by this technique.

In a further series of experiments, in which two-dimensional chromatograms, developed first with water and secondly with butanol-acetic acid-water, were submitted to the enzymatic treatment, although essentially the same phenomena were observed, the greater degree of resolution of the polyphenols revealed slight browning in the position of the faster moving leucocyanidin ( $L_1$  leucocyanidin of Forsyth, 1955). Prolonged incubation did not result in any increase in the intensity of the spot, which remained weak. These observations indicate that the leucocyanidins are not an important substrate of browning in the cacao bean.

The two anthocyanins, which appeared on the untreated chromatograms as purple spots of  $R_F$  0.33 and 0.41, were observed on incubation of the enzymatically treated chromatograms to become slowly colourless and afterwards to give rise to faint brown colorations.

Since it appeared possible that further phenolic material might be rendered susceptible to polyphenol oxidase action in the course of the commercial fermentation process, to which the beans are subjected prior to drying, methanolic extracts of fermented beans were prepared and examined by the above technique. No additional substrates were, however, detected in fermented material and the only difference noted was a reduction in the amount of brown pigmentation in the epi-catechin position. This was however expected as Forsyth<sup>1</sup> has reported a loss of epi-catechin by exudation from the bean during fermentation.

It would thus appear that in the cacao bean (–)-epi-catechin is the major substrate of polyphenol oxidase and accordingly that the (–)-epi-catechin content of the cacao bean at the end of fermentation is a major factor in the subsequent enzymic browning of the bean. It is, moreover, evident that the leucocyanidins, which are present in the cacao bean in quantities comparable to those of the catechins (Forsyth, 1955), contribute to a very limited extent to the enzymic browning of the bean.

L. A. GRIFFITHS

Regional Research Centre,  
Imperial College of Tropical Agriculture,  
Trinidad.

<sup>1</sup> Forsyth, W. G. C., *Biochem. J.*, **51**, 511 (1952); **60**, 108 (1955).

<sup>2</sup> Bate-Smith, E. C., *Chem. and Ind.*, 1457 (1954).

<sup>3</sup> Barton, G. M., Evans, R. S., and Gardner, J. A. F., *Nature*, **170**, 249 (1952).

### *Sporendonema*

MY attention has been directed to a letter published in *Nature* of February 9, 1957, by F. C. Wood on *Sporendonema*, in which it is stated that the fungus known to mushroom growers as 'red *Geotrichum*' and 'lipstick mould' is invariably referred to as *Geotrichum* sp. The letter proceeds to report its identification by Mason and Hughes as *Sporendonema purpurascens*.

In fact this fungus was referred to in the report of the Mushroom Research Association, 1946–48, as 'Red *Geotrichum*', and in the report for 1949 as *Sporendonema* sp. (Red *Geotrichum*), as a result of studies by my former colleagues in the Association, Dr. C. J. La Touche and Miss C. W. Duncan.

The fungus is referred to as *Sporendonema* sp. (Red *Geotrichum*) in the 1950 and 1956 editions of "Mushroom Growing Today", by F. C. Atkins, and also in the Ministry of Agriculture Bulletin 34, "Mushroom Growing".

R. L. EDWARDS

Ratcliffe Lodge,  
South Luffenham, Oakham.

### Galileo on the Ptolemaic and Copernican Systems

IN my review of the Salusbury translation of Galileo's "Dialogue", revised by Giorgio de Santillana, in *Nature* of September 7, I wrote that this was the first modern edition of the work in the English language. Mr. J. B. Mack, librarian of Lehigh University, Bethlehem, Pennsylvania, has, however, directed my attention to an earlier English translation, which was published in 1953<sup>1</sup>. I hasten to repair the injustice involuntarily done to the author of the latter work.

Having been struck some two decades ago by the strange fact that a work ranking so high among the classics of science was not available in English, Mr. Stillman Drake, of Puerto Rico, undertook the task of repairing this breach in the literature of the history of science and fulfilled it after ten years strenuous labour, during which time he became a possibly unparalleled connoisseur of Galileo's life and work in general. He made his translation from the original text as published in Vol. 7 of the Edizione Nazionale, and, as a comparison will readily show, bestowed the utmost care on it.

This does not mean that he felt obliged to give a strictly literal rendering of the text. He rightly believed that the translation should make as easy and fascinating reading to a non-specialist of our times as the original must have made for cultivated and interested Italians of the seventeenth century. In this, I believe, he succeeded remarkably well. His work will certainly contribute in making a most important and influential classic accessible to the modern reader.

The value of the translation is enhanced by giving (between square brackets) the additions which Galileo made to the work after the first edition of 1632. It is a good thing also that his marginal notes, which often are omitted in modern editions, have been retained.

Only one critical remark should be made. The title of the "Dialogue" is reproduced in this translation in a convenient but highly abbreviated form. No objection can be made to this, but one regrets that the exact and complete rendering of its wording is nowhere to be found.

E. J. DIJKSTERHUIS

Wagnerlaan 27, Bilthoven,  
The Netherlands.

<sup>1</sup> "Galileo Galilei, Dialogue Concerning the Two Chief World Systems—Ptolemaic and Copernican". Translated by Stillman Drake. Foreword by Albert Einstein. Pp. xxvii+406. (University of California Press, Berkeley and Los Angeles, 1953.)