Preface

Anyone may become impatient if asked, too often, to explain that bird's nest fungi have never been found in bird's nests and have nothing at all to do with bird's nest soup.

In the laboratory, surrounded by preserved specimens, living cultures, photographs, and drawings of the intriguing little bird's nests, not much time and energy are needed to tell the story briefly. A convert to Nidulariology may not be made on the spot, but at least it is possible to offer some reasons for one's eccentric taste: to explain that the bird's nests in question are fungi is not difficult, for everyone has some acquaintance with mushrooms, bread moulds, and cheese moulds, all of which are fungi; to explain that the small fungus cups are the 'nests,' that the 'eggs' are masses of spores to serve for propagation, that the eggs are propelled from their nests by the force of falling raindrops, and that the entire fungus structure is a marvellous adaptation for accomplishing reproduction and dispersal – all this is not difficult. And, if time is a consideration, one tries to justify one's own interest in the bird's nest fungi by pointing out that when these organisms are grown in laboratory culture they produce, by their mysterious chemistry, a whole battery of chemical compounds that have not been known to chemists before and that may eventually be shown to have value as drugs to combat disease.

But to tell more than this in sufficient detail to imbue the reader or observer with pleasure and satisfaction requires time and patience.

Over thirty years ago, my interest was aroused in a group of small goblet-shaped fungi which, except for the classic study of Tulasne in 1844, had remained in obscurity although botanists had been aware of their existence since bird's nest fungi were first described as long ago as 1601.

The fungi assigned by mycologists to the family Nidulariaceae produce disseminules or propagating units large enough to have been mistaken, in the past, for seeds. Even when the controversy as to whether the Nidulariaceae are seed-plants or not ended, there still remained unsolved the problem of how the spores are dispersed and of how they escape from within the enclosing disseminules or peridioles. Tulasne demonstrated that each peridiole is firmly attached to the inner surface of the vase-like fruiting body by a very elegant and complex piece of mycelial apparatus which later became known as the funiculus. The very complexity of this umbilical attachment seemed to suggest some unique mechanism of spore dispersal, but the true operation of the funiculus long remained a mystery.

Not until 1941 was it possible to fit together the numerous pieces of an intriguing jig-saw puzzle. It was finally apparent that the fruit body of the Nidulariaceae is an apparatus not only developed for the production of the prop-

agating spores but beautifully constructed and modified to serve as a means of utilizing the important natural force of falling raindrops to bring about the ejection of the seed-size disseminules to a distance of several feet.

Recognition of the importance of rain in the dispersal of spores in the Nidulariaceae constitutes what is doubtless the most significant contribution that has been made by studies of these fungi to biological knowledge as a whole; for, from it, came the realization that rain-splash is a very important aspect of the plant dispersal mechanism, it having been evolved in one form or another in the majority of plant phyla.

But if the Nidulariaceae have taught us mainly about rain-splash dispersal in plants, it is nevertheless true that studies of these fungi have also been rich in interest in other directions: the development of their fruit bodies displays interesting and unique features; the interactions of their mycelia provide an example of an unexplained phenomenon of nuclear migration; study of their nuclei has provided some facts that may help to solve the problem of whether or not fungal nuclei are different in behaviour and structure from those of other plants; study of their taxonomy has revealed previously unrecognized species; and, most recently, mycelia of some species have been shown to produce a series of hitherto unrecognized chemical substances having antimicrobial properties and possible therapeutic value.

Beyond this, there is much delight and satisfaction in contemplation of bird's nest fungi in their own right and it is in an effort to share such pleasure with others that this account of their forms and lives has been written. The intention has not been to deal exhaustively with all that has been written about the Nidulariaceae, or to establish with finality the true status of those species which are as yet imperfectly known. Rather, the aim has been to describe the chief aspects of the biology of the Nidulariaceae with which the author has had the greatest amount of first-hand experience, in the hope that others may be tempted to probe whatever secrets may still be hidden in nature's fairy goblets.

Another intention, which generally has been secondary to the first (in places it may even have been uppermost), has been to point out, wherever possible and as explicitly as possible, those dark corners of our knowledge about bird's nest fungi into which the torch of research should still be made to shine; and if the impression is produced, here and there, that at present more is unknown than is actually known, no apology is offered.

The world association of scientists (may it never be given a name!) confers upon each of its members complete and unstinting co-operation and mutual assistance and expects no acknowledgment. I have been no less fortunate than my fellows in this regard; and thus this book is possible because of a multitude of helping hands, including those of small smiling boys in the jungles of Guadeloupe who were eager to look for bird's nest fungi, as well as those of directors of museums and herbaria who never refused all possible assistance. All helpers should recognize themselves somewhere in these pages. Where copyright and special circumstances required it, specific acknowledgment is made.

The major acknowledgment I wish to make is of my debt to the late Professor A.H.R. Buller, who first aroused my interest in the Nidulariaceae late in 1941, and bequeathed to me about a hundred pages of notes recording the early stages of the first modern investigation of the bird's nest fungi. Buller did not live to see into press more than one small note concerning his observations and ideas. I have been privileged to carry the torch but it was lighted by another.

Special thanks are due to Dr D.B.O. Savile of the Plant Research Institute (Canada Department of Agriculture) who generously devoted much time and energy to a meticulous reading of the manuscript and made numerous suggestions for its improvement. Dr R.W.G. Dennis (Herbarium, Kew Gardens) has frequently given unstinting assistance in such matters as

rechecking details regarding type material and literature references not readily available to me. Dr Dennis's help has been of the utmost value to me and is gratefully acknowledged. Mr J.T. Palmer of Liverpool has generously given the benefit of his advice and criticism concerning what has been recorded herein about species of the genera *Nidularia* and *Mycocalia*.

Illustrations have come from many sources. Most photographers who encountered bird's nest fungi for the first time begged to be allowed to take a shot and many of their shots are included.

'True' scientists who deplore the inclusion in this book of a bit of leaven labelled 'Nidulariana' can easily eliminate it by means of scissors. These notes are included to record, in part, the pleasures encountered as the scientist gropes his way towards new discoveries.

In dedicating this work to my teacher, critic and long-time friend, the late Dr A.H.R. Buller, I am deeply conscious of what he would have said if I had asked him to examine the manuscript – 'Are you sure?'

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