many technical societies; the Joint Army-Navy-Air Documents Foreign Index, a card file on some 55,000 captured German and Japanese reports, together with two million feet of film covering the original documents and several thousand of the translated reports. The library issues a semiweekly checklist of magazine articles arranged by subject and a weekly magazine index on cards, covering material of particular interest to the aircraft industry and material not indexed by the *Industrial Arts Index*. A catalogue service covering all reports received is provided. These are available to any qualified person through subscription, at cost.

The information services and libraries, which have been described briefly, are making every effort to ensure that administrators, scientists, and contractors of the agencies they serve are provided with the technical information they need. Thus, they are all making important contributions toward the success of current research and development programs. The exchange of reports between the document-handling agencies is in many cases nearly adequate, yet more channels of communication between them should be established. It is hoped that the Armed Services Technical Information Agency will try to solve many of the communication problems. A precise description of the holdings of the various agencies would also be of assistance. They do not have all the personnel and equipment that might be desired in order to perform their tasks as effectively as possible. As time goes on, it is hoped that improved methods and techniques for organizing and disseminating technical information will permit these agencies to provide better and more prompt service with the present facilities. A thorough analysis of the users' needs for various types of information services is urgently needed. The science of technical information management offers a virgin field for research on basic principles of information organization. The development of new and more effective methods and techniques of dissemination and control would make it possible for the country to realize even greater returns from the hundreds of millions of dollars spent yearly for research and development.

Technical Papers

Does the Mangrove Really Plant Its Seedlings?

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The old story of the manner in which the viviparous embryos of the mangrove germinate on the parent plant, grow to a length of 35 cm or more, and eventually break loose and plunge their root tips into the mud below, thus successfully planting themselves, has been called in question by Egler (*1*) and Lawrence (*2*), who reported that seedlings that fell flat in the mud could curve so that their stems grew upright, and that very few were naturally planted upright.

The authors have had an excellent opportunity to study the seedlings of *Rhizophora mangle* L., the black mangrove, and have tried to find out whether the old story is true. In three areas of a typical mangrove swamp, counts were made of straight seedlings that had planted themselves in the mud and of those that had fallen flat in the mud and had bent so as to bring the stem tip into a vertical position. The results are shown in Table 1.

TABLE 1

STRAIGHT AND CURVED SEEDLINGS OF BLACK MANGROVE

Lot	Straight	Curved	Total	Curved (%)
A	96	4	100	4.0
B	48	2	50	4.0
C	131	7	138	5.1

It appears that the percentage of seedlings planted vertically in the mud is very high. Tidal action was not very strong, and little washing around of seedlings was observed during frequent visits over a period of more than 3 months. Very few embryos were found lying in the ground or entangled among the interwoven roots of the mangrove plants. The greater number are undoubtedly planted directly upon falling from the tree.

Seedlings were dropped into the tidal mud to see whether they would thus be planted deep enough to resist being floated free by the tide (Table 2). Each of the test drops drove the root tip deeply enough into the mud to offer sufficient resistance to withdrawal to prevent floating away even by fairly high

TABLE 2

DEPTH OF PLANTING OF MANGROVE SEEDLINGS

Distance of drop (meters)	Wt of seedling (grams)	No. trials	Depth of planting (cm)		
			Least	Greatest	Av
1	27.9	10	3.0	4.4	3.8
2	26.8	6	3.8	7.3	4.9
2	24.0	12	3.8	5.7	4.3
2	29.1	5	4.2	5.8	5.0
2	24.8	15	3.9	6.5	5.2

tides. Only a heavy storm would produce wave action strong enough to tear seedlings loose from their anchorage within the swamp.

Naturally planted seedlings were pulled up, and although the growth of lateral roots prevented accurate measurement such approximations as could be made showed that they had averaged 4.0 cm penetration into the mud. The major portion of a seedling is made up of the long hypocotyl with a short radicle at the lower tip. Practically all the lateral roots, which are formed long before the seedling drops, come out within 3 cm of the tip and these, accordingly, penetrate into the mud. Adventitious roots emerge later, sometimes from the hypocotyl, but usually from the upper stem, sometimes several meters above the water level.

It was observed that seedlings naturally planted in the mud show emergence of lateral roots earlier than those that fall flat on the mud, and that they remain plump and healthy, whereas those flat on the mud often appear withered and battered. After the latter develop roots and curve upward until their stem tips reach the vertical, they usually improve greatly in appearance.

It is obvious that the seedlings that plunge from the tree are by far the most effective in colonization around the parent, but that they cannot be planted beyond the outermost branches of the parent. Some extension of range will be made by these seedlings, each extending only a little beyond its parent. Those that fall flat may be floated away and are the most important means of spread to more distant sites.

References

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Manuscript received July 27, 1951.

Inhalation of Sulfur Hexafluoride

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In the course of some studies on breath velocity patterns (*1, 2*) it was found that density changes of the inhaled air cause recognizable alterations in such patterns. It was feasible at that time only to decrease the density of inspired gases because the expedient of using compression involved the subsequent hazard of bends. In searching for a heavy diluent for oxygen it was suggested to us that sulfur hexafluoride (*3*), which was claimed to be physiologically inert in animals (*4, 5*), should be an ideal agent. Its density at 0° C 760 mm Hg is 5.486 g, and that of a 80–20% mixture with oxygen is 4.24; air by comparison is 1.2929 g. Since in our experience a density decrease to about one third was effective in altering breath velocity patterns either by decompression to altitude or by dilution with helium, it was expected that the density change effected by SF_6 would be more than sufficient to cause recognizable changes in breath velocity patterns.

Purchases of SF_6 were made from two sources.[1] The first lot of gas was tested for inertness on 17 adult white rats in a 6-hr exposure to a recirculated mixture of SF_6 in oxygen, in which the latter was continuously replaced and was found to be 28.0% by repeated Haldane analysis. Forty days later 8 of the rats, chosen at random, were again exposed for 6 hr to an SF_6-oxygen mixture in which the oxygen concentration averaged 22%. No acute manifestations of toxicity were observed in either exposure. Daily weight changes were observed to be consistent and indicated a normal rate of gain. Six animals, comprising both singly and doubly exposed, were sacrificed at 77 days after the first exposure and 5 at 135 days. Gross and histopathologic examinations showed no evidence of effects attributable to the exposures, confirming the references cited.

With this background the authors subjected themselves to short bouts of breathing a similar oxygen-SF_6 mixture from the second source. Data furnished with the two lots of gases gave identical analyses. The immediate subjective effects were not unlike those of inspiring a helium-oxygen mixture in that a certain coolness and a sense of pervasion of the upper respiratory tract were experienced. The most dramatic effect noted was on the speech. The formation of sounds was definitely impaired, mainly by a marked inability to produce the higher-pitched sounds. A sensation of "speaking under water" or "gargling" was noted, and listeners reported that the effect was of a markedly "sepulchral" tone. Actually, records of the microphone impulses induced by attempting to count or pronounce the vowels and consonants were not readily differentiable from the normal. It seems, however, that the resonance of sounds is greater for low pitch than high, and undoubtedly the overtones are suppressed. The sounds enunciated have a quality somewhat like that in helium-oxygen, but not as high-pitched or harsh. Subjectively, a vibration or resonance in the chest and sinuses was felt.

After several trials, but before an experiment was set up for breath velocity studies, it was consistently found that after a bout of some 20–30 breaths at normal rate and volume a slight to marked vertigo was experienced. This sensation passed in a few minutes on breathing air, but its intensity could be considerably augmented by hyperventilation for a few breaths with air.

The possibility of the presence of small amounts of other fluorine compounds which are highly toxic caused us to suspend operations. Attempts to "detoxify" the gas by washing or by aging in a latex reservoir were not successful. W. C. Schumb[2] has been kind enough to indicate proper methods of puri-

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