making linen. Chemical methods of delignification do not usually give a suitable product for making linen yarn because the cellulose fibres are either weakened or shortened[1] to such an extent that spinning cannot be accomplished. The delignification procedures used in the paper industry, for example, are much too drastic to produce the effect of natural retting, inasmuch as they usually result in partial or complete pulping of the bast fibres[2]. The method for the preparation of holo-cellulose which involves the use of chlorine dioxide[3-6] has, however, been applied with some success to the delignification of flax roving which has been freed from as much of the woody shives as possible[7]. More recently, we have found that one treatment of seed-flax straw or roving for two hours at 155° C. under pressure with an aqueous solution containing sodium hydrosulphite ($Na_2S_2O_4$) frequently called 'hydros' (2 per cent) and sodium hydroxide (2 per cent) results in complete extraction of the lignin. Furthermore, the residual cellulose fibres can readily be spun into yarn.

Apart from its possible industrial application in the linen industry and its potential use for the determination of 'holo-cellulose' and lignin, the alkaline hydrosulphite reagent enables the constituents of cellulosic materials to be separated and hence investigated. Thus, flax straw has afforded cellulose, lignin, hemicellulose or flax gum and a pectic acid[8]. The cellulose remains undissolved by the reagent. The lignin may be precipitated by acidification of the alkaline extract as a light-coloured amorphous powder. The flax pectic acid can be separated as a salt, and the flax gum or hemicellulose is recoverable from the mother liquors.

This alkaline hydrosulphite method can be used for the delignification of grains, leaves and straws, and preliminary experiments with various kinds of wood indicate that the reagent is capable of extracting lignin from these cellulose-containing products. Further details of this work will appear elsewhere.

E. Besser
R. E. Montonna
F. Smith

Division of Agricultural Biochemistry,
University of Minnesota,
St. Paul 1, Minnesota.
Feb. 16.

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Induced Vitamin-requiring Mutants of *Chlamydomonas*

A few instances of vitamin requirements among green algæ have been recorded. Since the isolation of algæ has usually involved an enrichment in a mineral solution, which would select against species with organic growth-substance requirements, our present knowledge of algal physiology is strongly biased in favour of completely autotrophic forms.

Chlamydomonas chlamydogama Bold has been recently shown to require, *inter alia*, vitamin B_{12} [1], while several other species of *Chlamydomonas* have been reported to require aneurin for rapid growth under heterotrophic conditions[2]. The aneurin requirements of some colourless counterparts of *Chlamydomonas* (*Polytoma* spp., etc.) have been extensively investigated by Lwoff and Dusi[3].

Following ultra-violet irradiation of the completely autotrophic *Chlamydomonas Moewusii* Gerloff, two mutant clones have been isolated which require exogenous vitamins for optimal growth. One, *M.*336, requires aneurin, responding to concentrations as low as 10^{-10} gm. per c.c. The complete molecule can be replaced by the pyrimidine moiety alone, indicating that the synthetic ability respecting thiazole is unimpaired. Another mutant, *M.*701, requires *para*-aminobenzoic acid, replaceable by aniline at a relative efficiency of the order of 1 per cent. (In this connexion, it may be mentioned that inhibition of wild-type cells by sulphanilamide can be reversed by *para*-aminobenzoic acid, but not by aniline.) *M.*701 has been crossed with wild-type: in the progeny of zygotes analysed, dependence on *para*-aminobenzoic acid appears to behave as a single Mendelian character, showing no linkage with mating-type.

The experimental induction of biochemical mutants in algæ provides a fruitful approach to the study of the comparative physiology of autotrophs, parallel with that now extensively investigated in heterotrophs such as *Neurospora* and *Bacterium coli*.

Ralph A. Lewin

Osborn Botanical Laboratory,
Yale University,
New Haven, Conn.
Feb. 7.

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Mango: its Allopolyploid Nature

The mango, a favourite tropical fruit, which is widely cultivated in India, belongs to the Malaysian genus *Mangifera* Linn. (fam. Anacardiaceæ). Taxonomic study[1] shows that it contains forty-one valid species, three of which, *M. indica* L. (wild and cultivated), *M. sylvatica* Roxb. (wild in the hilly forests of north-east India), and *M. khasiana* Pierre (a species of doubtful occurrence) have been reported from India. About a thousand cultivated varieties of mango occur in India, all of which are included in the single species, *M. indica* L. They differ from one another mainly in fruit characters, on the basis of which they have been classified into three groups: round-, ovate-oblong-, and long-fruited[2]. The morphology of the innumerable varieties shows a gradual, continuous change in their characters, intergrading in range.

Information on the cytogenetics of the species of Anacardiaceæ as a whole is very meagre, especially about *Mangifera* L., only the chromosome number of *M. indica* being known. Maheswari[3] first reported the number doubtfully as $n = 24$–26. Roy[4] reported the haploid number of four varieties as ranging between four and eight. Recently, Janaki Ammal[5] mentioned only the number as $2n = 40$. I have carried out cytogenetical studies on this important genus.

The three species investigated—*M. indica* L. (including twenty-three grafted varieties, and one wild race), *M. sylvatica* Roxb. and *M. caloneura* Kz.

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