where $k = 1,2 \ldots$ and $\Delta\nu = 272$ cm.$^{-1}$. The maximal divergence is observed for the last difference $-\Delta\nu_6$. The deepest term of Tb^{+++} is a ^7F inverted term[3]; equation (1) should thus hold for the differences between the frequencies of its components also. It may be expected, therefore, that the luminescence bands would be emitted when transitions from a single upper state on all the components of the multiplet of the deepest term take place. This assumption is confirmed by the fairly good agreement which exists between the wave-lengths of one of the luminescence bands (possessing the shortest wave-length) and an absorption band observed in the solutions of terbium salts ($\lambda \sim 488$ mμ). Since the frequencies of the emission bands are considerably smaller than the frequency of the exciting light, it seems that besides the transitions on the deepest term, transitions between excited levels not accompanied by the emission in the visible and ultra-violet regions occur also. It is to be noted that the transitions on the components of the multiplet ^7F presume the breaking of the selection rule[4] for the quantum number j. The length of the afterglow (longer than 0·001 sec.) shows that the level at the transitions on which emission takes place, belongs to the well-screened $4f$ shell; the level at the transition on which absorption takes place belongs probably to the $5d$ shell.

λ mμ	I	ν (cm.$^{-1}$)	$\Delta\nu_k$ (cm.$^{-1}$)	K
681	1	14684		
			241	1
670	1	14925		
			507	2
648	1	15432		
			697	3
620	3	16129		
			965	4
585	6	17094		
			1255	5
545	10	18349		
			2058	6
490	10	20408		

The investigation of the luminescence spectrum of terbium solutions with a spectrograph with a higher dispersion has shown that the bands of the luminescence spectrum have a well-defined structure, depending on the nature of the anion, monovalent and bivalent acids having been investigated.

A similar luminescence is observed with the optical excitation of terbium oxide solutions in concentrated sulphuric acid. A detailed account will be published elsewhere.

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Enzymic Properties of Natural Papain

ACCORDING to the generally accepted view, papain is an enzyme which converts proteins (true ovalbumin excepted) into peptones, and is without effect on the latter. Hydrolytic power towards peptones and true ovalbumin is only acquired after treatment with certain reagents ('activators'), especially hydrogen cyanide[1].

We found that freshly tapped latex (milk juice) obtained from fruits of *Carica papaya* at different stages of development and size, grown under natural conditions, splits both gelatin and Witte's peptone and need not be previously activated by hydrogen cyanide. (Ambros and Harteneck[2], investigating latex of fruits grown in a hot-house, sometimes found activity also towards peptones. The differences between their results and ours will be discussed elsewhere.) The degree of hydrolysis of gelatin falls short of that of peptone. On keeping, the activity of the latex towards gelatin is increased and that towards peptone diminished.

The preparations obtained by us from the natural latex by different methods showed different quantitative, and in some cases different qualitative, enzymic properties. Thus, for example, after extraction of the ether-soluble part of the latex, a solid fraction (I) was obtained which showed all the enzymic features of the fresh latex; several such preparations showed 'full activity' towards peptone and almost the same towards gelatin. 'Full activity' connotes that hydrogen cyanide does not enhance the activity of the preparation. Ether-extracted latex yields by centrifuging two fractions: (i) the supernatant fluid showing the hydrolytic properties of the sap; and (ii) the centrifugate, presenting the enzymic features generally attributed to papain, namely, splitting of gelatin, but no action on Witte's peptone; peptone cleavage and enhanced hydrolysis of gelatin after treatment with hydrogen cyanide. On boiling, the supernatant fluid (i) loses its hydrolytic properties, but it can serve as a specific activator of peptone cleavage. On adding boiled supernatant fluid to the centrifugate (ii), the system becomes effective also towards peptone, whilst its activity towards gelatin is diminished.

Contrary to the literature, true ovalbumin is split directly by a latex preparation.

It appears that the activation (or inhibition) by latex bodies of protein cleavage or peptone cleavage respectively are not identical processes. To account for this, it may be assumed (i) that two different enzymes with different specific activators and inhibitors are present in the latex; or (2) that the natural latex constitutes a complex enzymic system resembling the known 'mixed catalysts'. In these catalysts, certain components, which are themselves not necessarily active, induce new qualitative catalysing properties in the system as a whole. The natural latex, on this assumption, constitutes a complete enzyme system, and is therefore able to perform both hydrolytic functions. On partial or total removal of one or the other of these components—by natural accident, instability or storage, or technique of preparation—differences in quantitative effectiveness or even in specificity are produced.

The results presented above show that the accepted definition of the enzymic effectiveness and specificity of the natural papain requires correction. The accepted view is based on experiments which had, out of technical necessity, to be conducted, in the main, with preparations not fully representative of natural conditions.

A detailed report will be given elsewhere.

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