$R\text{CH}_2\text{ONO} \rightarrow R\text{CH}_2\text{O} + \text{NO} \quad E_{act} \sim 37$ k.cal. (1)

and ends with the formation of aldehyde, alcohol and nitric oxide :

$R\text{CH}_2\text{ONO} \rightarrow 0{\cdot}5\ R\text{CH}_2\text{OH} + 0{\cdot}5\ R\text{CHO} + \text{NO} \quad \Delta H \sim 0$ k.cal. (2)

Neither this reaction (2), which is almost thermoneutral, nor any in which there is complete conversion to nitric oxide, can account for a decomposition flame. For the release of the necessary heat some of the nitric oxide must be reduced and nitrous oxide or nitrogen formed :

$\text{CH}_3\text{ONO} \rightarrow 0{\cdot}5\ \text{N}_2\text{O} + 0{\cdot}5\ \text{H}_2\text{O} + \text{CH}_2\text{O}$ (or $\text{CO} + \text{H}_2$) $\Delta H = -30$ k.cal. (3)

$\text{CH}_3\text{ONO} \rightarrow 0{\cdot}25\ \text{N}_2 + 0{\cdot}5\ \text{H}_2\text{O} + \text{CH}_2\text{O}$ (or $\text{CO} + \text{H}_2$) $+ 0{\cdot}5\ \text{NO} \quad \Delta H = -29$ k.cal. (4)

In practice, decomposition may be expected to lie between the last three extremes.

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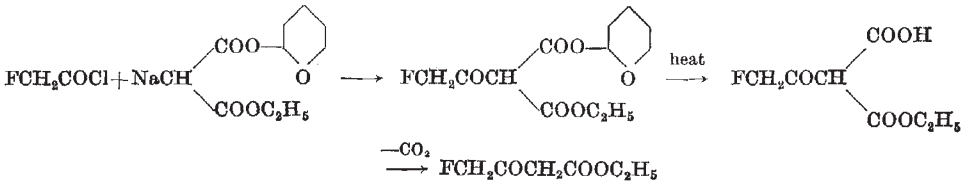
Ethyl ω-Fluoroacetoacetate

Acetoacetic acid is an important and widespread intermediary metabolite, being formed in the oxidative degradation of fatty acids and of certain amino-acids. For comparison with acetoacetic acid, we have prepared[1] the compound ethyl ω-fluoroacetoacetate, $\text{FCH}_2\text{COCH}_2\text{COOC}_2\text{H}_5$. From a consideration of its structural similarity to 4-fluorobutyric acid[2] and of its probable interference with the mechanism of fatty acid metabolism, we predicted that it would produce toxic symptoms.

The unequivocal synthesis, outlined below, was adapted from a previously described method[3] :



Ethyl ω-fluoroacetoacetate was obtained in 35 per cent overall yield as a colourless liquid with an odour almost indistinguishable from that of ethyl acetoacetate (b.p. 78–80° C./12 mm., and n_D^{25} 1·4180; found : C, 48·64; H, 6·26; $\text{C}_6\text{H}_9\text{O}_3\text{F}$ requires C, 48·64; H, 6·08 per cent). It readily formed a 2,4-dinitrophenylhydrazone derivative (m.p. 91–91·5°; found : C, 43·71; H, 4·16; N, 17·19. $\text{C}_{12}\text{H}_{13}\text{O}_6\text{N}_4\text{F}$ requires : C, 43·90; H, 3·99; N, 17·07 per cent).

It proved to be toxic to mice (L.D. 50, c. 2·5 mgm./kgm.). Its pharmacological and biochemical properties are being examined, and may be reported at a later date.

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Characterization and Total Recovery of the Component Proteins of a Deoxyribonucleoprotein

Recent developments suggest that the normal nuclei of all somatic cells of an organism contain the same quantity[1] and kind[2] of deoxyribonucleic acid, but that the different cell types within the organism may differ[3] in regard to the proteins associated with deoxyribonucleic acid : deoxyribonucleic acid appears to be specific for species and the associated proteins specific for cell type. The deoxyribonucleic acid of a species has been shown[4] to be multiple with regard to nucleobase ratios and may consist of as many chemical individuals as there are genes, while at the same time among different species the deoxyribonucleic acid-associated proteins of similar organs may be similar. Classical genetics postulates that each cell type is, through its chromosomes, *endowed* with all the potentialities of the species, but *expresses* only those potentialities which make up its own specific character. If the deoxyribonucleic acids are the physical correlate of the genetic potentialities, the implication arises that cellular differentiation may be mediated through attachment of cell-specific proteins (histones, etc.) to species-specific deoxyribonucleic acids. Indeed, the hypothesis that the former function as gene conditioners was advanced by Stedman[5] long before the emergence of chemical proof for the multiplicity of deoxyribonucleic acid, and has recently been reasserted[6] on the basis of experimental evidence for the cell-type specificity of certain preparations of deoxyribonucleic acid-associated proteins.

In view of these developments, the comprehensive chemical characterization of the proteins associated with deoxyribonucleic acid of different tissues (which began eighty years ago with the work of Miescher) has attained new importance. Along with others, we have in recent years been studying the protein moiety of calf thymus nucleoprotein. We have developed a working procedure which yields essentially