From the results of an x-ray structural analysis of free dictysine it has been established that dictysine is an alkaloid of the denudatine type with an α, β, γ-triol system at C15, C16, and C20. The structures of the acetonides of dictysine and dehydrodictysine formed from dictysine and dehydrodictysine, respectively, in the process of separating the combined alkaloids, have been shown.

The alkaloid dictysine C21H33NO3 has been isolated from the epigeal part of *Delphinium dictyocarpum* DC., collected in the upper reaches of the Koktal River (Dzhungarian Ala-Tau) [1]. On the basis of the spectra of dictysine and its trideutero analog, the 13C NMR spectrum, and the chemical transformation structure (I) with a songorine skeleton and a triol system at C15, C16, and C20 has been proposed for the alkaloid [2]. However, an x-ray structural analysis of free dictysine has shown that the alkaloid is based not upon a songorine but on a denudatine skeleton [6], and dictysine has the structure (II).

The geometry of the dictysine (II) molecule is shown in Fig. 1. The lengths of the bonds and the valence angles, and also the conformational parameters of dictysine agree well with those obtained for the related diterpene alkaloid denudatine [3] and its methiodide [4]. The conformations of the rings are as follows: A, E — chair; B, C, D — distorted boat (twist); the five-membered ring F has the envelope form. Linkages of the rings: A/B — trans; B/C — cis.
All three active hydrogens participate in the formation of inter- and intramolecular hydrogen bonds. The O(24)...O(25) distance (2.62 Å) shows the presence of a strong intramolecular H-bond.

On continuing the separation of the combined alkaloids of the epigeal part of D. dioctycarum, in addition to those obtained previously, we isolated two more bases: C_{24}H_{37}NO_{3} (III), mp 151-153°C (acetone), [α]_{D}^{20} -102 (c 3.3; CHCl₃), and C_{24}H_{39}NO_{3} with mp 143-145°C (acetone), [α]_{D}^{20} -58° (c 0.4; CHCl₃).

Base (III) dissolves readily in chloroform and less readily in ethanol and acetone. Its IR spectrum has absorption bands at 3550 cm⁻¹ (OH group) and 1090 cm⁻¹ (C=O ether bonds). The NMR spectrum shows three-proton singlets at (ppm) 0.63, 1.28, and 1.38 (3 C-CH₃) and 2.19 (N-CH₃), one-proton singlets at 3.24 and 3.92, and two one-proton doublets at 3.67 and 4.37 ppm (J = 10 Hz). The mass spectrum of (III), which contains the peaks of ions with m/z 387 (M⁺, 100%), 372, 358, 344, 312, 300, 256, and 172, is similar to that of dictysine. What has been said above, and also the difference by 40 a.m.u. in the molecular weights of (III) and (II) give grounds for assuming that (III) is dictysine acetonide. In actual fact, when (III) was treated with 20% H₂SO₄, dictysine was obtained. Compound (III) was apparently formed from (II) in the process of separating the combined alkaloids (see the Experimental part [1]), as is confirmed by the formation of (III) from dictysine and acetone in the presence of perchloric acid.

The formation of an acetonide grouping with the involvement of the hydroxy groups at C₁₅ and C₂₀ is confirmed by the following transformations. The oxidation of (III) with chromium trioxide gave a compound which, according to its IR and mass spectrum, was the ketone (IV) (νₓKBr 1735 cm⁻¹). The latter, on reaction with 20% H₂SO₄, was converted into dehydrodictysine (V). The acetylation of (V) with acetic anhydride in pyridine led to the monoacetate (VI), the further acetylation of which with acetyl chloride gave the diacetate (VII). The mass-spectrometric fragmentation of (VII) (see Scheme) took place similarly to that of songoridine (V) and dictysine [2] and their derivatives. The somewhat specific nature of the fragmentation of (VII) is due to the presence of the C₁₆ carbonyl group.

The base with mp 143-145°C readily dissolved in chloroform and less readily in acetone. Its IR spectrum contains a strong absorption band of a carbonyl group at 1735 cm⁻¹ and the absorption band of C-O ether bonds at 1090 cm⁻¹. The NMR spectrum contains three-proton singlets (ppm) at 0.64, 1.40, and 1.48 (3 C-CH₃) and 2.18 (N-CH₃), a one-proton singlet at 3.14 and two one-proton doublets at 3.75 and 3.91 with J = 10 Hz. The mass spectrum of the base contains the peaks of ions with m/z 385 (M⁺), 370, 357, 299 (100%), 256, and 172. The IR, NMR, and mass spectra of this compound and of dehydrodictysine acetonide (IV) were practically identical. A direct comparison also showed their identity. In view of the ease of formation of dictysine acetonide (III) from (II) under the conditions of separating the combined alkaloids, it may be assumed that dehydrodictysine acetonide is apparently a secondary product of the dehydrodictysine (V) present in the plant.