discarded. A Craig countercurrent distribution in six tubes was performed between 1 N ammonia and a mixture of light petroleum and *n*-butanol (v/v 3:1) (after the fundamental distribution, all upper phases were withdrawn and combined, extract A) followed by a distribution in the same way with the solvent mixture 1 N ammonia — mixture of light petroleum and *n*-butanol (v/v 1:3) (extract B). Extract B yielded 40 mg of pratol (IR, m.p.) but no trifolirhizin could be isolated. Extract A was evaporated *in vacuo* and the residue again distributed between the former solvent system as before. The upper phase was evaporated *in vacuo*, the residue dissolved in 200 ml of methanol and 20 ml of water and the solution filtered. The filtrate was extracted with a small amount of light petroleum, which was discarded. Upon addition of 200 ml of water, an oil slowly separated out and after a time crystallised as tiny needles. The crystals were filtered, washed with aqueous methanol and water, and dried, yield 204 mg, m.p. 167–172°. Crystallisation from light petroleum gave a fine crystalline powder which sublimed at 150°/0.1 mm as long, fine needles, m.p. 179.5–180°, $[\alpha]_D^{20}$ –214° (ethanol, c 1 %). (Found C 66.84, H 4.11, O–CH₃ 0.00; Calc. for C₁₆H₁₂O₈ C 67.59, H 4.26.) The compound is sparingly soluble in light petroleum and readily soluble in methanol. Ultraviolet spectra: ethanol, $\lambda_{\max}$ 281, 287, 310 m μ (logs 3.58, 3.63, 3.83), $\lambda_{\min}$ 260, 283, 291 m μ (3.18, 3.575, 3.57); 0.1 N sodium hydroxide in 50 % ethanol, $\lambda_{\max}$ 249, 300–303 m μ (logs 4.11, 3.92), inflexion 309 m μ (3.89), $\lambda_{\min}$ 233, 270 m μ (3.93, 3.43). Infrared spectrum: KBr, 3 530, 3 330, 1 628, 1 598, 1 506 cm⁻¹. *Methylation*. The aglycone (20 mg) was methylated with an excess of diazomethane in dry ether for three days at + 4°. The excess of diazomethane was decomposed by a drop of acetic acid and the solution was extracted with 1 N sodium hydroxide solution. The extracted ether solution was evaporated and the residue (18 mg) crystallised from light petroleum and sublimed in a high vacuum. The sublimate, m.p. 162–163°, $[\alpha]_D^{20}$ –200° (ethanol, c 0.2 %) gave no depression with authentic pterocarpin, m.p. 163–164°, ($[\alpha]_D^{20}$ –207.5° (chloroform))⁶, kindly provided by Dr. W. B. Whalley, Liverpool. The ultraviolet and infrared spectra were identical. There was no change in the ultraviolet spectrum upon addition of alkali.

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A Qualitative Chemical Method for the Demonstration of "Pauly-positive" Bases in Rumen Contents

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Many methods have been described for the demonstration of physiologically active amines in biological material. Few methods have been applied to rumen contents¹. Since histamine and tyramine, so-called Pauly-positive bases, are among compounds of interest in ruminant metabolism², a relatively simple chemical method was developed for demonstrating these substances in rumen contents, care being taken to avoid secondary processes during the course of the analysis.

To one volume rumen contents, with and without added histamine, tyramine, and histidine, were momentarily added 4 volumes of a 99:1 (volume) mixture of ethanol and acetic acid³. The mixture was centrifuged at 2 000 *g* for 15 min, and the supernatant adjusted to pH 7.0 with sodium hydroxide. Any precipitate formed was removed by centrifugation. The clear solution was treated with 2.5 volumes Amberlite IRC 50 and the bases adsorbed were eluted with 0.1 N hydrochloric acid⁴. The eluate was evaporated to dryness in a water bath and the residue was washed

several times with an 80 %, v/v, ethanol-water mixture. The procedure of evaporation and washing with ethanol-water was repeated to free the solution from contaminants. The final alcohol solution was centrifuged, if cloudy, and the solution investigated by paper chromatography⁴. The so-called Pauly-reagent⁵ was used to visualize the bases.

Controls were performed with pure histamine, tyramine and histidine.

Fig. 1 represents a paper chromatogram for samples corresponding to 1.5 ml of rumen contents.

Fig. 1. Paper chromatographic separation of "Pauly-positive" bases. 1, Rumen contents; 2, Rumen contents + histamine, tyramine, and histidine; 3, histamine, sensitivity $0.5-1.0 \times 10^{-7}$ g; 4, tyramine, the same sensitivity; 5, histidine, the same sensitivity; r = red; o = orange.

The method thus affords the possibility of demonstrating "Pauly-positive" bases present in rumen contents without resorting to dialysis¹.

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Selena-hexanoic and Selenapentanoic Acids

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In recent years, organoselenium compounds have attracted attention from biochemical viewpoints^{1,2}. Earlier, selenium was regarded primarily as a toxic element; if present in soils, for example, it can be taken up by plants and cereals, thus causing injury to grazing animals. It is now known that it may also have a positive effect and that certain dietary diseases of sheep, cattle and rats may be cured by minute amounts of certain selenium compounds. At different times organoselenium compounds have also been tested for chemotherapeutical effects. Very little is known, however, about the metabolism of selenium and its compounds.

In the course of current investigations in selenium chemistry, we have started a programme to study long-chain fatty acids with a selenium atom incorporated in the chain. The biological and pharmacological properties of the acids are being investigated. In this connection the position of the selenium atom in the chain may be important. Long-chain acids with a heavy heteroatom may also be used as model substances in X-ray crystallographic investigations. Furthermore, their physico-chemical properties, *e.g.* their behaviour in monolayers, may be of interest.

The acids are easily obtained by reduction of ω -diseleno-di-alkanoic acids to ω -selenol acids (not isolated) and subsequent reaction of these compounds with alkyl bromides:

In our experiments the reduction has been performed with Rongalite in aqueous ammonia, but other reductants will be tested. As the selenol acid is easily oxidised, the solution must be protected against atmospheric oxygen. The reaction is best performed in an ordinary flask, closed by a cork stopper, and opened only momentarily when the reactant is added. About