

p-nitrophenylcarbonate, hydrazinolysis of which leads to the desired carbazate. The overall yield here is less than 30%.

In a search for a more convenient method of preparing tert.-butyloxycarbonylhydrazine, we investigated the possibility of its synthesis directly by hydrazinolysis of tert.-butyloxycarbonyl chloride, which can be obtained in 33% yield from phosgene and potassium tert.-butylate³. It proved feasible not to isolate the chloride in the pure form, but after removal of excess phosgene to treat it directly with hydrazine, thus allowing the reaction to be carried out in a single stage. It was, moreover, found possible to use not only potassium tert.-butylate but also the crystal solvate of the composition $C_4H_9OK \cdot C_4H_9OH$, readily prepared by dissolving metallic potassium in tert.-butyl alcohol followed by distillation of the excess tert.-butanol and drying the residue to constant weight at 100° (10 mm). Although the overall yield is not high (about 30%), the simplicity and rapidity of the method (6–8 h), and the low cost and availability of the starting materials make it preferable to the earlier methods.

tert.-Butylcarbazate. To a solution of 495 g (5 moles) of phosgene in 1 l of dry ether is added portionwise, with vigorous stirring and cooling to -60° , crystal solvate $tert.-C_4H_9OK \cdot tert.-C_4H_9OH$ prepared as described above from 78 g (2 moles) of metallic potassium. The mixture is stirred for 3 h at -30° and the ether and excess phosgene are distilled off at temperatures not exceeding 0° . The residue is suspended in 500 ml of ether and is added to a mixture of 300 g (6 moles) of anhydrous hydrazine and 1.5 l of dry ether on stirring (30 min, -60°). The cooling bath is removed and the reaction mixture is warmed with continued stirring until room temperature is reached, following which it is washed with water

(1 × 600 ml, 2 × 100 ml). The ether solution is dried over $MgSO_4$ and evaporated. After distillation of the residue in vacuum 85 g (32%) of tert.-butylcarbazate is obtained, b.p. 120–122° (15 mm), m.p. 41–42°.

Zusammenfassung. Es wird eine neue einfache Methode für die Darstellung von tert.-Butylcarbazate beschrieben.

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- ¹ R. A. BOISSONNAS, *Advances in Organic Chemistry: Methods and Results* (J. Wiley, 1963), vol. 3, p. 159.
- ² A. R. CHOPPIN and J. W. ROGERS, *J. Am. chem. Soc.* **70**, 2967 (1948).
- ³ C. J. MICHIEJDA and D. S. TARBELL, *J. org. Chem.* **29**, 1168 (1964).
- ⁴ G. W. ANDERSON and A. C. MCGREGOR, *J. Am. chem. Soc.* **79**, 6180 (1957).
- ⁵ F. C. MCKAY and N. F. ALBERTSON, *J. Am. chem. Soc.* **79**, 4686 (1957).
- ⁶ ST. GUTTMANN and R. A. BOISSONNAS, *Helv. chim. Acta* **41**, 1852 (1958).
- ⁷ R. SCHWYZER, P. SIEBER, and H. KAPPELER, *Helv. chim. Acta* **42**, 2692 (1959).
- ⁸ L. A. CARPINO, *J. Am. chem. Soc.* **82**, 2725 (1960).
- ⁹ L. A. CARPINO, *J. Am. chem. Soc.* **79**, 4427 (1957).
- ¹⁰ L. A. CARPINO, C. A. GIZA, and B. A. CARPINO, *J. Am. chem. Soc.* **81**, 955 (1959).
- ¹¹ G. W. ANDERSON, *Ann. N.Y. Acad. Sci.* **88**, 676 (1960).
- ¹² L. A. CARPINO, *J. org. Chem.* **28**, 1909 (1963).
- ¹³ L. A. CARPINO, *J. Am. chem. Soc.* **79**, 98 (1957).

Separation of Rabbit Marrow Myeloid Cells¹

The study of the biochemical features of the myeloid cells of normal marrow may contribute to the understanding of the biochemistry of the white cells. The methods of separation of these cells recently described by ARCHDEACON et al.² are unsatisfactory for biochemical investigations. We report a rapid (40 min) procedure for separating rabbit marrow myeloid cells. This procedure is similar to the methods used in this laboratory for isolating granulocytes³ and lymphocytes⁴.

Bone marrow obtained from the femurs of one rabbit was suspended in Tyrode's solution (saturated with a 95% O_2 and 5% CO_2 gas mixture) and 30 ml were poured through a gauze in a 120 ml siliconized tube. In order to eliminate the erythroid cells, the tube was filled through the gauze with 90 ml of a 0.83% NH_4Cl solution. After a few minutes the marrow cells were centrifuged at 120 g for 10 min in a refrigerated centrifuge at $4^\circ C$. The supernatant was filtered again through the same gauze into another tube and centrifuged at 120 g for 10 min. Both sediments were suspended and washed twice in 10 ml of Tyrode's solution.

The myeloid cells were not clumped and could therefore be counted easily; the recovery, however, is not determinable. The cells are viable and if elimination of mature granulocytes is required this could be done by the

method previously published⁴. These preparations are virtually free from erythroid cells and platelets.

Riassunto. Viene descritto un metodo per la separazione delle cellule mieloidi dal midollo osseo di coniglio. Questo metodo ha il vantaggio di essere molto rapido e consente di ottenere preparazioni di cellule mieloidi non ammassate, vitali e prive di elementi eritroidi e di piastrine.

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- ¹ This study was aided by a grant from the Lady Tata Memorial Trust.
- ² J. W. ARCHDEACON, G. W. GLAZEBROOK, and W. C. WISE, *Nature* **204**, 996 (1964).
- ³ N. DIOGUARDI, A. AGOSTONI, G. FIORELLI, and B. LOMANTO, *J. lab. clin. Med.* **67**, 713 (1963).
- ⁴ A. AGOSTONI and G. IDÉO, *Exper.* **21**, 82 (1965).