spectrum was taken 30 min after addition of the Hex_3B; in no case was there a signal corresponding to a vinylborane or a vinylborate complex. To effect protonolysis, the flask was warmed to 0 °C after 30 min or kept at 0 °C for 30 min, and 1 equiv of HOAc was added. The contents were analyzed by GC, and no 2-methyl-2-nonene was detected.

Competitive Reaction. *cis*-1-Chloro-1-butene and 1-pentyne (10.0 mmol each) were added via syringe to a round-bottom flask containing *n*-nonane (4 mmol) and THF (10 mL) and equipped with a magnetic stirring bar. The flask was then cooled to −110 °C, and *sec*-BuLi (10.0 mmol) was slowly added via syringe. After 30 min of stirring at low temperature, the reaction mixture at −110 °C was quenched with MeI. The contents of the flask were then warmed to room temperature and analyzed by GC for residual reactants. The relative reactivities were calculated by using the Ingold–Shaw equation.[15]

Instrumentation. All products were identified by GC coinjection with an authentic sample using a variety of columns and by GC/MS. GC data was obtained by using a Varian 1200 instrument equipped with a $^1/_8$ in column. Columns used were as follows: 6 ft 10% SP2100 on 100/120 Supelcoport, 18 ft 30% adiponitrile on 60/80 mesh Firebrick, 6 ft 0.15% picric acid on 80/100 Carbopack in series with 9 ft 30% adiponitrile on 60/80 mesh Firebrick. Mass spectra data were obtained with a Finnigan 4000 GC/MS equipped with a 6 ft × $^1/_4$ in. 3% OV-1 on 80/100 mesh Chromosorb W or an 18 ft × $^1/_8$ in. 30% adiponitrile column. ^{11}B NMR spectra were obtained with a Varian FT80A.

Acknowledgement is made to the donors of the Petroleum Research Fund, administered by the American Chemical Society, for the support of this research.

Registry No. 1, 513-37-1; **2a**, 16136-85-9; **2b**, 7611-87-2; **3a**, 16136-84-8; **3b**, 7611-86-1; *n*-BuLi, 109-72-8; *sec*-BuLi, 598-30-1; 2-methyl-2-heptene, 627-97-4; 2-butyne, 503-17-3; 2-pentyne, 627-21-4.

(15) Ingold, C. K.; Shaw, F. R. *J. Chem. Soc.* **1927**, 2918.

Preparation of Oxygenated Phenylacetic Acids

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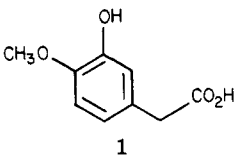
Received November 1, 1983

Oxygen-substituted phenylacetic acids have been employed in the synthesis of a wide variety of natural products, embracing such diverse species as flavonoids and alkaloids.[1,2] One especially important area is their use in the synthesis of the opiate alkaloids.[3,4] Rice has employed (3-hydroxy-4-methoxyphenyl)acetic acid (**1**, homoisovanillic acid) in a concise synthesis of the opiate precursor dihydrothebainone.[3a,d] In a related approach to the synthesis of the opiate skeleton, Beyerman employed [3,5-bis(benzyloxy)-4-methoxyphenyl]acetic acid (**2b**).[4a-c]



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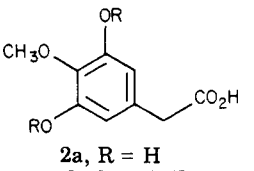
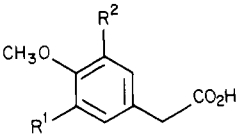


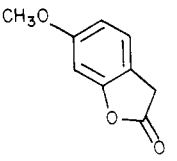
2a, R = H
b, R = C_7H_7

Finally, Schwartz demonstrated the utility of **2b** for the synthesis of thebaine using the phenolic oxidative coupling approach.[5] Due to the importance of **1** and **2a** as codeine precursors, much attention has been given to their preparation.[6] In general, the synthesis of these compounds involves the one-carbon homologation of a benzyl derivative and then manipulation of the aromatic functionality. The most convenient preparations of **1** use isovanillin as the starting material. This strategy was demonstrated by Grewe and Fischer[6f] wherein isovanillin was converted to the cyanohydrin, which was then successively hydrolyzed and reductively dehydroxylated to give **1** in greater than 80% yield. This preparation of **1**, while affording a good yield of material, suffers in that it is experimentally tedious and involves procedures during which hydrogen cyanide is evolved. To date, only one synthesis of an analogue of **2a** has been reported.[7] Gallic acid was esterified and then selectively methylated in poor yield at the 4-hydroxyl group. Benzylation of the remaining free phenols and homologation by the Arndt–Eistert procedure[8] gave **2b**.

The disadvantages noted above prompted us to devise a general method of preparation of **1** and **2a** from a common starting material. An excellent candidate for the initiation of this strategy is the relatively inexpensive and readily available (4-methoxyphenyl)acetic acid **3**.[9] Our proposed synthesis of **1** and **2a** required bromination of **3a** to **3b** and **3c** followed by displacement of the halides by hydroxide in a copper-catalyzed reaction. A previous attempt to employ this general strategy for the synthesis of **1** was performed by Hrothama.[10] In that report, the necessary ipso substitution of the halogen atom in **3d** was not observed. This compound was found to be relatively unreactive to reagents such as aqueous barium hydroxide at 170 °C and reacted via aryne mechanisms (**3d** → **4**) at higher temperatures. However the recent report of the facile substitution of 4-bromoanisole by methoxide using cuprous oxide catalysis[11] and our own success in the synthesis of catechols from *o*-bromophenols prompted us to explore the applicability of **3b** and **3c**.[12]



3a, $R^1 = R^2 = H$
b, $R^1 = H$; $R^2 = Br$
c, $R^1 = R^2 = Br$
d, $R^1 = H$; $R^2 = Cl$
e, $R^1 = Br$; $R^2 = OH$



4

(1) Kurosawa, K.; Ollis, W. D.; Sutherland, I. O.; Gottleib, O. R.; De Oliveria, A. B. *Phytochemistry* **1978**, *17*, 1405.
(2) For an example of the use of (3-hydroxy-4-methoxyphenyl)acetic acid (1) in simple alkaloid synthesis, see: Kametani, T.; Takemura, M.; Ogasawara, K.; Fukumoto, K. *J. Heterocycl. Chem.* **1974**, *11*, 179.
(3) (a) Rice, K. C. *J. Org. Chem.* **1980**, *45*, 3135. (b) Grewe, R.; Friedricksen, W. *Chem. Ber.* **1967**, *100*, 1550. (c) Morrison, G. C.; Waite, R. R.; Shavel, J., Jr. *Tetrahedron Lett.* **1967**, 4055. (d) Rice, K. C.; Brossi, A. *J. Org. Chem.* **1980**, *45*, 592.
(4) (a) Beyerman, H. C.; Lie, T. S.; Maat, L.; Bosman, H. H.; Buurman, E.; Bijsterveld, E. J. M.; Sinnige, H. J. M. *Recl. Trav. Chim. Pays-Bas.* **1976**, *95*, 24. (b) Beyerman, H. C.; van Berkel, J.; Kie, T. S.; Maat, L.; Wessels, J. C. M.; Bosman, H. H.; Buurman, E.; Bijsterveld, E. J. M.; Sinnige, H. J. M. *Ibid.* **1978**, *97*, 127. (c) Lie, T. S.; Maat, L.; Beyerman, H. C. *Ibid.* **1979**, *98*, 419.
(5) Schwartz, M. A.; Zoda, M. F. *J. Org. Chem.* **1981**, *46*, 4623.
(6) (a) Spath, E.; Lang, N. *Monatsh. Chem.* **1921**, *42*, 273. (b) Hahn, G.; Schulz, H. *J. Chem. Ber.* **1939**, *72*, 1302. (c) Bersch, H. W. *Arch. Pharm. Ber. Dtsch. Pharm. Ges.* **1939**, *277*, 271. (d) Kindler, K.; Metzendorf, W.; Dschi-yin-kwok *Chem. Ber.* **1943**, *76*, 308. (e) Fischer, H. E.; Hibbert, H. *J. Am. Chem. Soc.* **1947**, *69*, 1208. (f) Grewe, R.; Fischer, H. *Chem. Ber.* **1963**, *96*, 1520.
(7) Schopf, C.; Winterhalder, L. *Ann. Chem.* **1940**, *599*, 1.
(8) Bachmann, W. E.; Struve, W. S. *Org. React. (N.Y.)* **1942**, *1*, 38.
(9) Isovanillin: $29/100 g; **14**: $13/100 g. Aldrich Catalog, 1983 price listings.
(10) Hrothama, O. *Chem. Ber.* **1942**, *75*, 123.
(11) (a) Bacon, R. G. R.; Rennison, S. C. *J. Chem. Soc. C* **1969**, 312. (b) Bacon, R. G. R.; Stewart, O. J. *Ibid.* **1969**, 301.
(12) Weller, D. D.; Stirchak, E. P. *J. Org. Chem.* **1983**, *48*, 4873.

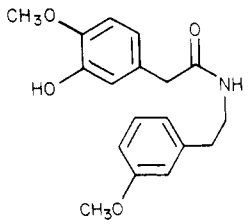
0022-3263/84/1949-2061$01.50/0

Table I. Dehalohydroxylation of 3c

run	scale (%)[a]	temp, °C	time, days	% yield	product, % 1/ % 2a[b]
1	1.47 (1)	150	2.5	80	10/90
2	3.0 (3)	160	2	81	10/80
3	5.0 (5)	160	2	100	38/62
4	3.0 (4)	110	7	86.5	25/75
5	2.6 (4)	110	5	78	15/85
6	20.0 (5)	110	9	90	35/65

[a] Scale is in grams. Concentration (g/100 mL of H_2O) is given in parentheses. [b] Determined by ^1H NMR.

The preparation of **3b** was easily accomplished in greater than 95% yield by monobromination of **3a** with bromine in either chloroform or glacial acetic acid.[13] Dibromination of **3a** in chloroform or 1,2-dichloroethane to give **3c** required a large excess of bromine and the presence of ferric bromide catalyst. While in the former reaction there was no trace of dibrominated products even when a large excess of bromine was used, the latter preparation required careful monitoring to insure that no trace of monohalogenated product remained. The dehalohydroxylations were performed in a stainless steel Parr reaction vessel. Before each run the bomb was cleaned by filling the vessel with 6 M nitric acid, rinsing, and then filling again with concentrated ammonia. Without this cleansing, the reaction results were extremely variable, especially for the reaction of **3c**. The reactions were performed at 1–5% concentrations of the halide in deaerated 10% aqueous sodium hydroxide containing a catalytic amount of cupric sulfate. Heating **3b** for 36 h at 150 °C gave excellent yields of **1**. Small-scale reactions (5 g) usually provided material having a narrow melting point range. A large-scale reaction of **3b** (25 g) afforded a 97% yield of **1** but with a slightly lower purity. The reaction product showed essentially one spot that moved by silica gel TLC, with the presence of some very polar material that remained at the origin. In contrast, Rice reported that the homoisovanillic acid prepared via the cyanohydrin contained several impurities that were removed with difficulty.[3d] In order to determine the viability of using **1** directly without further purification, the crude product was reacted with *m*-methoxyphenethylamine to afford amide **5**.[3a] The yield of **5** was comparable to that obtained by Rice using rigorously purified **1**.[14]



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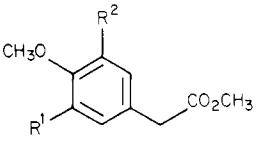
Dehalohydroxylation of the dibromo compound **3c** gave variable results (Table I). The desired product **2a** was the major component of the reaction mixture, but an additional component (10–40%) was also found. After esterification of the crude reaction product,[15] the minor component was identified as the methyl ester of **1**,[6f] which resulted from a reductive removal of bromine. In order to determine at what step the reduction had occurred, a dehalohydroxylation reaction was interrupted prior to completion. ^1H NMR analysis showed the presence of **3c**, **1**, and **2a** in minor amounts and an additional component which was identified as (3-bromo-5-hydroxy-4-methoxyphenyl)acetic acid (**3e**). No monobromo derivative **3b** was detected. When **3e** was resubjected to the reaction conditions for the conversion of **3c** to **2a**, similar product compositions were obtained as from the complete reaction of **3c**.[16]

Several attempts at modification of reaction conditions to limit the amount of reduction failed to afford any results consistently superior to our initial conditions (Table I). All attempts to fractionally recrystallize **2a** failed, as did trituration to remove **1**. Due to their carboxyl moieties, **1** and **2a** exhibited poor chromatographic behavior. The combined extracts from the hydroxylation reaction (run 6) were esterified,[15] and chromatography of the mixture on silica gel afforded **6a** in 18% and **6b** in 40% yields.



6a, $R^1 = H$; $R^2 = OH$
b, $R^1 = R^2 = OH$

Saponification of **6b** gave the free acid **2a**. After two recrystallizations from chloroform, **2a** possessed a melting point of 181–182 °C. The reported value for the melting point of (3,5-dihydroxy-4-methoxyphenyl)acetic acid, however, was 130 °C.[17b] The ^1H NMR and ^{13}C NMR spectra of our **2a** were found to be consistent for the symmetrical structure. The cause of this discrepancy is unknown.

In conclusion, the preparation of **1** from **3a** using a bromination, dehalohydroxylation sequence, is rapid, gives a product of high purity, and is amenable to large-scale preparations. While less attractive for the preparation of **2a**, this method does rival the known method in yield and is a much shorter procedure.

Experimental Section[18]

(3-Bromo-4-methoxyphenyl)acetic Acid (3b). This was prepared by direct bromination of **3a** in ethanol-free chloroform or acetic acid as per the literature.[13] The crude product (98% yield) was used directly. The recrystallized material had mp

(13) Coutts, I. G. C.; Durbin, A. K.; Schofield, K. *Aust. J. Chem.* **1970**, *23*, 791.

(14) Rice obtained the purified free acid **1** in 67% yield from isovanillin and converted this into amide **5** in 95% yield[3a] (64% overall). Our yield for **5** from **1** is 81% (80% overall from **3a**).

(15) Durham, L. J.; McLeod, D. J.; Cason, J. "Organic Syntheses"; Wiley: New York, 1963; Collect. Vol. IV, p 635.

(16) The presence of a meta or para hydroxy substituent in the aryl bromide has been previously noted to lower the yields of substitution of products.[11a] The mechanism of reduction as proposed by Bacon[11b] involves hydrogen atom donation from a phenol to an aryl radical (formed from the halide and the copper catalyst). Bacon, while stating that phenols were generally converted into resins (as in our case), isolated several oxidatively coupled phenolic products to support his claim.[11b] Additionally the direct conversion of **3c** into **2b** fails due to the facile reduction of aryl halides by benzylic alkoxide under the conditions required for substitution.[11a]

(17) (a) Karnal, A.; Qureshi, A. A.; Richards, R. W. *Tetrahedron* **1965**, *21*, 1411 and references contained therein. (b) Recrystallization from ether[17a] also gave mp 181–182 °C.

(18) Low-resolution mass spectrometry was performed on a Varian MAT CH-7 or a Finnigan 3500 instrument. Infrared Spectra were recorded on Perkin-Elmer spectrophotometers, Models 727B and 137. Melting points were determined on a Büchi capillary melting point apparatus and are uncorrected. ^1H NMR analyses were performed on Varian spectrometers, Model FT-80 or Model EM-360. Chemical shifts (δ) are reported as parts per million downfield from tetramethylsilane as internal standard. High-resolution mass spectra were obtained on a CEC-1038 mass spectrometer by Richard Wielesek at the University of Oregon Micro-Analytical Lab. Combustion analyses were performed by MicAnal, Tucson, AZ.

113–115 °C (lit.[13] mp 112–115 °C).

(3-Hydroxy-4-methoxyphenyl)acetic Acid (1). Into a stainless steel bomb was placed 5.05 g (20.6 mmol) of **3b**. A degassed[19] solution of 45 g (1.1 mol) of NaOH in 450 mL of H_2O containing a catalytic amount of $CuSO_4$ (1 g) was then added. The bomb was sealed, heated to 150 °C for 1.5 days, and cooled. The solution was acidified and extracted manually with ether and then continuously extracted overnight with ether.[20] The combined ethereal solutions were evaporated to dryness to afford 3.72 g (99%) of 1, mp 127–129 °C (lit.[3d] mp 128.5–130.5 °C). Further purification was effected by recrystallization of the crude product with 20% 2-propanol/$CHCl_3$:[3d] mp 128–130 °C; ^1H NMR ($CDCl_3$) δ 6.87 (2 H, br s), 6.79 (1 H, br s), 3.87 (3 H, s), 3.55 (2 H, s).

***N*-[2-(3-Methoxyphenyl)ethyl](3-hydroxy-4-methoxyphenyl)acetamide (5).** Bromide **3b** (25 g, 102 mmol) was converted into crude 1 (16.42 g, 97%) by the method above. The melting point of the crude acid was 123–127 °C. A round-bottom flask containing 0.394 g (2.16 mmol) of this acid was reacted with *m*-methoxyphenethylamine by thoroughly mixing the components at 80 °C and then heating at 200 °C for 2 h. The resultant glass was dissolved in benzene and precipitated with hexane, and the crude product was recrystallized from toluene, mp 100–101 °C (lit.[6b] mp 101 °C). The yield of **5** was 0.576 g (84%).

(3,5-Dibromo-4-methoxyphenyl)acetic Acid (3c). To a solution of 20.09 g (120 mmol) of **3a** in 220 mL of anhydrous $CHCl_3$ (P_2O_5) was added 4.28 g (14.4 mmol) of $FeBr_2$. A solution of 18.5 mL (360 mmol) of Br_2 in 30 mL of $CHCl_3$ was added dropwise to the reaction vessel. After the mixture was stirred for 42 h at room temperature, an additional 10 mL of Br_2 (190 mmol) and 1.04 g (4.8 mmol) of $FeBr_2$ were added. The solution was stirred for 18 h, then poured carefully into an excess of 5% aqueous $NaHSO_3$, and extracted with ether. The combined ethereal extracts were washed with H_2O and brine and then dried (Na_2SO_4). Removal of the solvent afforded 37.76 g (96%) of dibromo **3c**, in greater than 98% purity, as determined by ^1H NMR. The crude solid was routinely used directly. Recrystallization from toluene/hexane gave **3c** with the following: mp 132–134 °C; MS, *m/z* (relative intensity) 322 (M^+, 48), 324 (91), 326 (44), 281, 279 (100), 277; IR (KBr) 3200–2600, 1710 cm^{-1}; ^1H NMR (acetone-d_6) δ 8.85 (COOH, br s), 7.47 (2 H, s), 3.77 (3 H, s), 3.58 (2 H, s); ^{13}C NMR (acetone-d_6) δ 171, 152, 133, 116, 59, 38.

Anal. Calcd for $C_9H_8Br_2O_3$: C, 33.37; H, 2.49. Found: C, 33.24; H, 2.47.

(3,5-Dihydroxy-4-methoxyphenyl)acetic Acid (2a). Into a stainless steel bomb was placed 20.00 g (61.6 mmol) of **3c**. A degassed[19] solution of 47.0 g (1.18 mol) of NaOH in 470 mL of H_2O containing a catalytic amount of $CuSO_4$ (1.0 g) was added to the bomb. The bomb was sealed, heated to 110 °C for 9 days, cooled, and then worked up as for 1 to give 9.55 g (78%, based on conversion of **3c** to **2a**) of a 1.7/1 mixture of **2a** and 1. The continuous extraction afforded 1.50 g (12%) of a 3/1 mixture of **2a** and 1. Following the method of Cason,[15] the mixture of 1 and **2a** from the dehalohydroxylation reaction (10.89 g) was esterified with methanol and sulfuric acid to give 9.31 g of a 1.6/1 mixture of **6b** and **6a**. A portion of this product (1.58 g) was column chromatographed on silica gel, eluting with 20% acetone in $CHCl_3$. This returned 0.39 g (18.7% from **3c**) of **6a** as an oil[6f] and 0.90 g (40.0% from **3c**) of **6b** as a solid. Recrystallization from toluene gave **6b**, mp 116–117 °C. An analytical sample of **6b** was prepared by sublimation (0.1 torr, 100 °C): MS, *m/z* (relative intensity) 212 (M^+), 153 (100); IR (KBr) 3300, 1720, 1200, 1160, 1040 cm^{-1}; ^1H NMR ($CDCl_3$) δ 7.45 (2 H, s), 6.32 (2 H, s), 3.84 (3 H, s), 3.56 (3 H, s), 3.40 (2 H, s).

Anal. Calcd for $C_{10}H_{12}O_5$: C, 56.60; H, 5.70. Found: C, 56.61; H, 5.66.

To 0.106 g (0.50 mmol) of the methyl ester **6b** was added 1.1 mL of 10% aqueous NaOH. The solution was stirred for 30 min at room temperature and then acidified with 4 N HCl. The resulting aqueous solution was extracted with EtOAc. The combined organic extracts were washed with brine and then dried over Na_2SO_4. Evaporation afforded 0.10 g (100%) of **2a** as a solid, which was recrystallized from $CHCl_3$: mp 181–182 °C; MS, *m/z* (relative intensity) 198 (M^+), 197 (100), 153; IR (KBr) 3490, 3300–2700, 1705, 1600, 1505 cm^{-1}; ^1H NMR (acetone-d_6) δ 8.40 (CO_2H, OH, br s), 6.36 (2 H, s), 3.76 (3 H, s), 3.42 (2 H, s); ^{13}C NMR (acetone-d_6) δ 174, 157, 135, 131, 109, 60, 41.

Anal. Calcd for $C_9H_{10}O_5$: C, 54.55; H, 5.09. Found: C, 54.11; H, 4.94. Calcd M_r = 198.053. Found M_r = 198.053.

(3-Bromo-5-hydroxy-4-methoxyphenyl)acetic Acid (3e). Via the above methods, **3e** was obtained by interruption of the dehalohydroxylation of **3c** prior to completion. Subsequent esterification, chromatography, and saponification afforded **3e**, which was recrystallized from toluene: mp 159.5–160.5 °C; MS, *m/z* (relative intensity) 260 (M^+, 100), 262 (99), 247, 245, 217, 215; IR (KBr) 3500–2800, 1715, 1570, 1490 cm^{-1}; ^1H NMR ($CDCl_3$) δ 7.58 (1 H, d, J = 2 Hz), 7.21 (1 H, d, J = 2 Hz), 3.75 (3 H, s), 3.34 (2 H, s).

Anal. Calcd for $C_9H_9BrO_4$: C, 41.41; H, 3.48. Found: C, 41.43; H, 3.34.

Acknowledgment. We thank the NIH (DA-02708) for support of this research.

Registry No. 1, 1131-94-8; **2a**, 34021-73-3; **3a**, 104-01-8; **3b**, 774-81-2; **3c**, 89936-29-8; **3e**, 89936-30-1; **5**, 74007-21-9; **6a**, 15964-81-5; **6b**, 89936-31-2; *m*-$MeOC_6H_4CH_2CH_2NH_2$, 2039-67-0; $CuSO_4$, 7758-98-7.

(19) Degassing was performed by stirring the aqueous solution under aspirator vacuum for 2 h.

(20) Four hand extractions with ether, in the preparation of 1, generally recovered greater than 90% of the hydroxylated product. In the case of **2a**, these were much less efficient. In the latter case, ethyl acetate is a much superior extraction solvent.

Cyclodehydration of *o*-Vinyl Anilides. A General Synthesis of Substituted Quinolines

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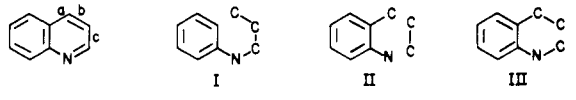
Received October 17, 1983

The quinoline ring system is usually synthesized from readily available aromatic amine derivatives.[2] The large number of reactions of this type can be classified according to the mode of final bond closure to form the heterocyclic ring. Important name reactions based on bond "a" formation include the Skraup and Doebner–von Miller synthesis of quinolines and the Combes, Conrad–Limpach, and Knorr synthesis of quinolones (see I). The Friedlander and Pfitzinger reactions are examples of final closure of bond "b" (see II). Most surprisingly, methods based on final closure of bond "c" are sparse[3] and usually highly specialized.[4,5] We now outline a general two-step preparation of substituted quinolines based on bond "c" formation via cyclization of in situ generated *o*-vinyl anilides (see III).



I II III

(1) Recipient of a Camille and Henry Dreyfus Grant for Newly Appointed Young Faculty in Chemistry.

(2) (a) Jones, G. "The Quinolines"; Wiley-Interscience: London, 1977; pp 93–318. (b) "Comprehensive Organic Chemistry"; Barton, D., Ollis, G., Eds.; Pergamon Press: New York, 1979; Vol. 4.

(3) For a related cyclization involving *o*-phenyl anilides, see: (a) Boyer, J. H.; Patel, J. R. *Synthesis* **1978**, 205. (b) *o*-Phenyl isocyanides. Boyer, J. H.; Patel, J. R. *J. Chem. Soc., Chem. Commun.* **1977**, 855.

(4) The Camps reaction forms quinolones via bond "c" closure. Mixtures of regioisomers are often possible. See: Camps, R. *Chem. Ber.* **1899**, *32*, 3228. Also see ref 2a, pp 191–197.

(5) For recent examples of bond c closure, see: DeMayo, P.; Sydnes, L. K.; Wenska, G. *J. Chem. Soc., Chem. Commun.* **1979**, 499. Hull, R. *J. Chem. Soc., Perkin Trans. 1* **1973**, 2911. Künzle, F.; Schmutz, J. *Helv. Chim. Acta* **1970**, *53*, 798. Yanagisawa, H.; Nakao, H.; Ando, A. *Chem. Pharm. Bull.* **1973**, *21*, 1080.

0022-3263/84/1949-2063$01.50/0