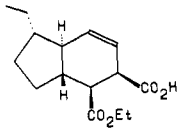
assigned the stereostructure 7 in 85% yield.[19,22] Examination of the crude reaction mixture by high field (300 MHz) NMR indicated that the mixture contained less than 1% of stereoisomeric adducts. We were unable to isolate any minor cycloadducts if they were present. *Thus, the stereoselectivity for the cyclization of 6 is ≥100:1, a 20-fold enhancement over 1.* We confirmed the stereostructure of 7 by conversion to acid 8. Removal of the Me_3Si group occurred smoothly, concomitant with cleavage of the *tert*-butyl ester, upon treatment of 7 with anhydrous HF(g) in CH_2Cl_2/(room temperature/15 min), affording 8 in 92% yield, identical with that prepared by cyclization of 1.[19,23]



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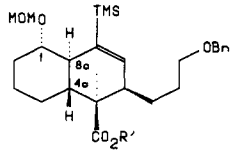
Encouraged by this result, we prepared triene 9, a much more demanding test, by the route outlined in Scheme II.[19] Introduction of the Me_3Si group and development of the required olefin geometry at an early stage were important elements of this successful approach.[24]

As expected, 9 proved to be significantly less reactive than the system 4 studied by Roush. Thermolysis of 9 at 180 °C for 24 h (concentration $\sim 10^{-4}$ M) afforded cleanly *a single cycloadduct* (>100:1) in 89% yield. If the reaction is conducted at higher concentrations (e.g. $\sim 10^{-2}$ M), significant amounts of bimolecular dimer form. The stereostructure of the adduct was tentatively assigned as 10 on the basis of difference decoupling experiments which established that the coupling constants $J_{1,8_a} = 10.4$ Hz and $J_{4_a,8_a} = 10.5$ Hz were consistent with a trans diaxial relationship between H_{8_a} and both H_1 and H_{4_a}.[19] Therefore in the cyclization of 9, a very demanding case, *stereocontrol resulting from introduction of the Me_3Si group provided an ~600-fold increase in stereoselectivity over 4.*

To confirm the structural assignments unequivocally, we converted 10 to diol ester 11, previously prepared and



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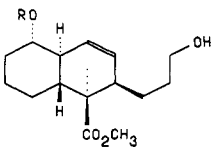

11, R = H
12, R = MOM

correlated with a degradation product of chlorothricolide by Roush.[13] Treatment of 10 with BF_3–Et_2O (6 equiv/EtSH (12 equiv) for 24 h at room temperature resulted in concomitant cleavage of the benzyl and methoxymethyl ethers, as well as cleavage of the trimethylsilyl group to afford 11 in 84% yield.[19,25] This material was identical in all respects with a sample of 11 prepared from acid 12 by esterification (CH_2N_2/Et_2O) and cleavage of the methoxymethyl ether (BF_3–Et_2O/PhSH).[13,26]

Thus, use of strategically positioned stereochemical control elements constitutes a powerful protocol applicable to the preparation of hydrindene and octalin systems with essentially complete stereocontrol (≥100:1). The only apparent restriction is the currently limited number of general synthetic methods which permit ready introduction of the required trimethylsilyl group with high geometrical control.

Further studies extending this concept to other substitution patterns and to applications to natural products synthesis are currently in progress.

Acknowledgment. We gratefully acknowledge financial support for this investigation through grants from the National Science Foundation (CHE-81-19823) and the National Institute for General Medical Sciences of the NIH (GM-29290).

(20) For examples of the use of bis TMS esters in the Peterson reaction and the effects of counterion on geometry, see: Hartzell, S. L.; Rathke, M. W. *Tetrahedron Lett.* **1976**, 2737. Larcheveque, M.; Debal, A. *J. Chem. Soc., Chem. Commun.* **1981**, 877.

(21) The results of our studies on the origin of the observed geometric selectivity in the process will be reported elsewhere: Boeckman, R. K., Jr.; Chinn, R. L. *Tetrahedron Lett.*, in press.

(22) The rate of cyclization of 6 is ~10× slower than 1 ($t_{1/2} \simeq 3$ h (165 °C) vs. ≃0.33 h (150 °C)).

(23) Comparison was made with acid 8 obtained by cleavage of the *tert*-butyl ester of the major cycloadduct derived from 1 (150 °C, 3 h) with trifluoroacetic acid in CH_2Cl_2 at room temperature (0.5 h).

(24) The nature of the substrates in this case prevents introduction of the TMS group at a late stage by silylation of a carbanion. A kinetic method must be utilized to access the required trisubstituted TMS olefin since the *Z* isomer is much less stable than the related *E* isomer.

(25) Kieczykowski, G. R.; Schlessinger, R. H. *J. Am. Chem. Soc.* **1980**, *102*, 782.

(26) We thank Professor Roush for providing a generous sample of authentic acid 12 to permit the structural correlation.

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Alkylation of Pyridine in Free Radical Chain Reactions Utilizing Alkylmercurials[1]

Summary: Pyridines or *N,N,N′,N′*-tetramethyl-*p*-phenylenediamine will undergo a photostimulated free radical chain reaction with alkylmercury halides or carboxylates, yielding ring alkylated substitution products. Alkene mercuration products ($R^1CH(Y)CH(R^2)HgX$ with Y = HO, RO, CH_3CONH; X = Cl, CH_3CO_2, CF_3CO_2) can be used without isolation for the alkylation reaction.

Sir: Alkylmercury halides are convenient sources of free alkyl radicals in chain reactions.[2-4] Among the reactions which will regenerate R· from RHgX (Scheme I) are S_H2 attack at X (X = $PhCH_2$, H),[3,5] electron transfer (X = halogen, carboxylate),[2] and S_H2 substitution at Hg (X = alkyl, halogen).[3,4] Chain reactions involving electron transfer ($S_{RN}1$) have been observed in which primary, secondary, or tertiary alkyl radicals have been added to anions such as NO_2^-, N_3^-, $R^1R^2C{=}NO_2^-$, $R^1R^2C{=}C(O^-)Ph$, $Ph_2C{=}C{=}N^-$, $PhC(CO_2Et)_2^-$, or phthalimide$^-$ to generate $RA^{-}\cdot$ of Scheme I.[2] Neutral radicalphiles (πH) which can generate an easily oxidized adduct ($R\dot{\pi}H$), or an adduct readily converted to $R\pi^{-}\cdot$, can also participate in chain reactions of the $S_{RN}1$ type (Scheme II). Pyridines, quin-

(1) Electron Transfer Processes. 38. This work was supported by grants from the National Science Foundation (CHE-8119343) and Petroleum Research Fund (14784-AC4).

(2) Russell, G. A.; Hershberger, J.; Owens, K. *J. Am. Chem. Soc.* **1979**, *101*, 1312; *J. Organomet. Chem.* **1982**, *224*, 43. Russell, G. A.; Khanna, R. K. *J. Am. Chem. Soc.* **1985**, *107*, 1450.

(3) Russell, G. A.; Tashtoush, H. *J. Am. Chem. Soc.* **1983**, *105*, 1398.

(4) Russell, G. A.; Tashtoush, H.; Ngoviwatchai, P. *J. Am. Chem. Soc.* **1984**, *106*, 4622.

(5) Whitesides, G. M.; San Filippo, J. *J. Am. Chem. Soc.* **1970**, *92*, 6611. Hill, C. L.; Whitesides, G. M. *Ibid.* **1974**, *96*, 980. Russell, G. A.; Guo, D. *Tetrahedron Lett.* **1984**, *25*, 5239.

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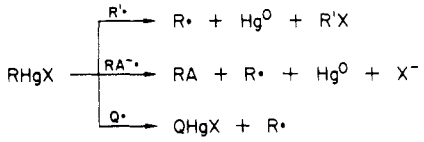
Scheme I



Scheme II

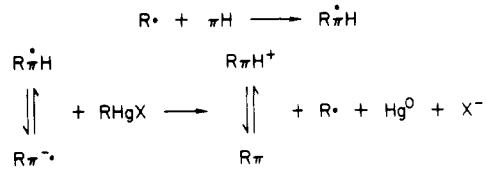


Table I. Photostimulated Reactions of RHgCl with Pyridine[a]

R	% Hg	% RC_5H_4N[b]	o/p
n-C_2H_5	66	64 (N)	2.0
n-C_4H_9	82	66 (I), 73 (GC)	2.4
n-C_4H_9[c]		85 (GC)	1.9
n-C_6H_{13}	83	50 (N)	
$Me_3CCH_2CH_2$		64 (N)	2.5
Me_3CCH_2		54 (N)	1.9
c-$C_5H_9CH_2$	93	77 (N)	1.9
i-C_3H_7		72 (N)	1.6
i-C_3H_7[c]		89 (GC)	3.1
c-C_6H_{11}	90	69 (I)	3.1
2-norbornyl	95	90 (I)	4.1
Me_3C	98	94 (N)	1.4
Me_3C[d]		98 (GC)	6.0

[a] Reaction of 1 mmol of RHgCl in 10 mL of pyridine for 20 h at 40 °C; irradiation by a 275-W sunlamp ~20 cm from Pyrex reaction flask. [b] N, by ^1H NMR; I, isolate, GC by GLC. [c] In the presence of 0.2–0.5 M Dabco, 12 h irradiation. [d] In the presence of 0.1–0.5 M Dabco, 5 h irradiation.

olines, benzothiazole, pyrazine, *N,N,N',N'*-tetramethyl-*p*-phenylenediamine (TMPDA), or *N,N*-dialkylanilines will undergo photostimulated ring substitution with a variety of alkylmercury halides (reaction 1). As summarized in Table I, yields in the presence of excess C_5H_5N decrease from R = *t*-Bu to secondary alkyl to primary alkyl.[6]

$$C_5H_5N + RHgCl \xrightarrow{h\nu} RC_5H_4NH^+Cl^- + Hg^\circ \quad (1)$$

Reactions of RHgCl with C_5H_5N in a 1:1 or 1:4 molar ratio in Me_2SO were complicated by the formation of dialkylated pyridines, a product not observed using C_5H_5N as solvent. The reactions do not occur in the dark at 25–40 °C although a thermally initiated chain reaction of Me_3CHgCl occurred at 60–80 °C. The photostimulated reactions are initially inhibited by 10 mol % of $(t\text{-Bu})_2NO\cdot$ or *m*-dinitrobenzene (1–2 h) and are severely retarded by radical traps such as anthracene. The alkylation reactions did not occur in the presence of O_2 or when R_2Hg was used instead of RHgCl.[7] Reaction of 5-hexenylmercury chloride with C_5H_5N produced essentially all cyclized product (*o*- and *p*-cyclopentylcarbinylpyridines) as expected for a chain reaction involving R·. The high ortho/para ratios observed (Table I) are consistent with attack of R· mainly upon pyridine and not PyH^+ since radical attack upon PyH^+ is known to occur mainly at the para position.[8] However, the reactions may involve significant attack of R· at PyH^+ or Py---Hg(R)Cl as well as C_5H_5N. The reactions were thus examined in the presence of 1,4-diazabicyclo[2.2.2]octane (Dabco) and $Me_2C{=}NO_2^-$ to avoid reactions of PyH^+ including the electrophilic cleavage of RHgCl by PyH^+. It was also expected that Dabco would preferentially complex RHgCl and significantly reduce the concentration of $^{\delta+}$Py---$Hg^{\delta-}$(R)Cl. The presence of Dabco increased the yield of the *n*-butylation reaction without an increase in the ortho/para ratio indicating that for *n*-Bu· alkylation of PyH^+ was not occurring. Competitive reaction of $Me_2C{=}NO_2^-$ (0.10 M) and C_5H_5N (12 M) with *n*-BuHgCl gave the same relative reactivity with 0.01 or 0.03 M *n*-BuHgCl.[9] In the presence of 0.1 M Dabco, $Me_2C{=}NO_2^-$ was 2500 times more reactive than C_5H_5N. Since the observed relative reactivity is independent of [*n*-BuHgCl], it appears that the reacting species is mainly C_5H_5N and not C_5H_5N---Hg(R)Cl. Addition of 5-hexenyl radical to $Me_2C{=}NO_2^-$ has a rate constant of 2.5×10^5 M^{-1} s^{-1} (Me_2SO, 40 °C)[5] which leads to a rate constant for the attack of *n*-Bu· upon C_5H_5N of 100 M^{-1} s^{-1}.[10] Reaction of 0.1 M Me_3CHgCl with 12 M C_5H_5N gave an ortho/para ratio of 1.4 which in the presence of 0.1–0.5 M Dabco or 0.3 M Me_2NH increased to 6 (Table I). With the more nucleophilic *tert*-butyl radical, competition between attack upon PyH^+ or Py---Hg(R)Cl and C_5H_5N is a more serious problem than for *n*-Bu·. The relative reactivity of $C_5H_5N/Me_2C{=}NO_2^-$ determined in the presence of Dabco was 6.6×10^{-5} toward $Me_3C\cdot$.[9]

TMPDA was much more reactive than Py toward *n*-Bu· and in competition with $Me_2C{=}NO_2^-$ gave a relative reactivity of 0.11, i.e., $k_{add} = 2.8 \times 10^4$ M^{-1} s^{-1}. With Me_3CHgCl substituted pyridines gave the following products (substituent, product, %); 4-Me, 2-*t*-Bu, 87; 3-Me,

Table II. Alkylpyridines Formed by the Reaction of an Alkene with $Hg(O_2CCF_3)_2$/MeOH Followed by Reaction with C_5H_5N with Sunlamp Irradiation[a]

Alkene	% Hg	R	% RC_5H_4N	o/p
C_2H_4	92	$CH_2CH_2OCH_3$	73	2.0
$CH_3C_2H_3$	87	$CH_2CH(CH_3)OCH_3$	76	2.5
$C_2H_5C_2H_3$	92	$CH_2CH(C_2H_5)OCH_3$	78	2.5
n-$C_4H_9C_2H_3$	91	$CH_2CH(n\text{-}C_4H_9)OCH_3$	80	2.7
t-$C_4H_9C_2H_3$	80	$CH_2CH(t\text{-}C_4H_9)OCH_3$	67	2.8
$CH_3CH{=}CHCH_3$	90	$CH(CH_3)CH(CH_3)OCH_3$	81	1.9
c-C_6H_{10}	97	2-methoxycyclohexyl	86	2.2
norbornene	91	*exo*-3-methoxy-2-norbornyl	78	3.0

[a] Reaction of 10 mmol of alkene and 10 mmol of $Hg(O_2CCF_3)_2$ in 10 mL of MeOH. After 10 min, 8 mL of C_5H_5N was added and the mixture irradiated with a sunlamp for 8 h. Yields by GLC.

(6) By competitive reactions we have found that the rate of electron transfer to RHgCl or S_H2 substitution at Hg by PhS· or PhSe· increases from R = *n*-Bu to R = *i*-Pr to R = *t*-Bu. Electrophilic cleavage reactions of RHgX by PyH^+ (formed in reaction 1) would be more important for R = primary alkyl.

(7) Bass and Nababsing [Bass, K. C.; Nababsing, P. *J. Chem. Soc. C* **1969**, 388] have observed that a large acceleration in the rate of the thermal reaction between $(PhCH_2)_2Hg$ and quinoline occurs upon the addition of HOAc and attributed the rate increase to an increase in reactivity of quinoline upon protonation. Although this may be a factor,[8] it appears as if the primary effect of HOAc is to electrophilically cleave $(PhCH_2)_2Hg$ to $PhCH_2HgOAc$ which can now participate in the chain sequence of Scheme II.

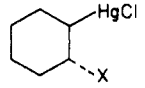
(8) Minisci, F.; Bernadi, R.; Bertini, F.; Galli, R.; Perchinommo, M. *Tetrahedron* **1971**, *27*, 3575.

(9) In the presence of $Me_2C{=}NO_2^-$, the ortho/para ratios were higher than those listed in Table I and decreased with a decrease in [$Me_2C{=}NO_2^-$]. We interpret this result as indicative of a competition between the radical attack of Scheme I and a photochemical reaction yielding only *o*-RC_5H_4N (e.g., Py---RHgCl $\xrightarrow{h\nu}$ *o*-$RC_5H_5NH^+Cl^-$ + Hg°). Unusually high ortho/para ratios were also observed in reactions retarded by the presence of $(t\text{-Bu})_2NO\cdot$, *m*-dinitrobenzene, or anthracene. Competitive reactions of $Me_2C{=}NO_2^-$ and C_5H_5N with RHgCl in the presence of Dabco gave the ortho/para ratios of Table I.

(10) Addition of Me· to C_5H_5N at 65 °C (isooctane) has a rate constant of 150 M^{-1} s^{-1}: Ingold, K. U. In "Free Radicals"; Kochi, J. Ed.; John Wiley and Sons: new York, 1973; Vol. 1, Chapter 2, p 93. Attack of *n*-Bu· and *t*-Bu· upon PyH^+ at 57 °C occurs with rate constants of 4.4×10^4 and 3.3×10^4 M^{-1} s^{-1}, respectively: Citterio, A.; Minisci, F.; Franchi, V. *J. Org. Chem.* **1980**, *45*, 4752. Toward *n*-Bu·, *p*-$MeC_5H_4NH^+$ and *p*-MeC_5H_4N have $k_{add} = 1.1 \times 10^5$ and 1.6×10^3 M^{-1} s^{-1}, respectively; Citterio, A.; Minisci, F.; Porta, O.; Sesana, G. *J. Am. Chem. Soc.* **1977**, *99*, 7960.

6-*t*-Bu, 90; 2-Me, mixture of 4 and 6-*t*-Bu, 90; 4-Ph, 2-*t*-Bu, 60; 3-Ph, 6-*t*-Bu, 60; 2-Ph, 2.2:1 mixture 6-*t*-Bu and 4-*t*-Bu, 69; 2-Cl, 1.3:1 mixture of 6-*t*-Bu and 4-*t*-Bu, 85; 3-MeO_2C, 6-*t*-Bu, 74; 3-MeNHCO, 6-*t*-Bu, 87; 4-methylquinoline, 2-*tert*-butyl-4-methylquinoline, 93; benzothiazole, 2-*tert*-butylbenzothiazole, 70. Reactions were not observed with 4-benzyl-, 4-acetyl-, 4-cyano-, 4-(dimethylamino)-, 2-methoxy-, or 2- or 3-fluoropyridines or with acridine, thiophene, furan, pyrrole, *N*-benzylpyrrole, or imidazole.

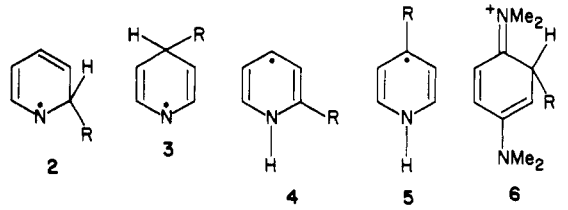
Olefin mercuration products such as **1** reacted with photostimulation to produce the expected mixtures or alkylated pyridines, e.g., X = $NHCOCH_3$, 69%, o/p = 2.3.



1, X = $NHCOCH_3$; OCH_3; OH

The olefin mercuration product need not be isolated and a one-pot reaction can be achieved by first reacting an olefin with $Hg(O_2CCF_3)_2$ in MeOH[11] followed by the addition of excess pyridine and sunlamp irradiation to initiate the chain process. Table II summarizes typical yields.

The initial attack of R· upon pyridine leads to the azacyclohexadienyl radicals **2** and **3**. These may lose H^+ to



pyridine to form the radical anion ($R\pi^{-}$· in Scheme II) or undergo isomerization (presumably via reaction with PyH^+ and Py) to yield the easily oxidized radicals **4** and **5** ($R\pi H$ in Scheme II). There is a consistent trend in the ortho/para ratios (*n*-Bu· = 1.9; *i*-Pr = 3.1; 2-norbornyl = 4.1; *t*-Bu = 6.0), indicating that radicals which are better electron donors yield a higher fraction of the ortho substitution product. In the case of TMPDA, the initially formed adduct can undergo electron transfer without hydrogen migration to form **6** which may aromatize in a subsequent step. Reaction of TMPDA failed with R = *t*-Bu but occurred readily with R = cyclohexyl or benzyl to give only the monoalkylated products.[12]

Typical Procedures. *exo*-2-Norbornylmercury chloride (3 g) in 10 mL of pyridine at 30–35 °C was deoxygenated by a helium stream and irradiated by a 275-W sunlamp ~20 cm from the Pyrex tube. Mercury metal precipitated from the solution after an induction period of 5–10 min. After 24 h, the pyridine solution was added to 10 mL 0.1 M KOH, and extracted with Et_2O, and the ether solution was washed twice with 10 mL of H_2O. The dried ether solution was evaporated and Kugelrohr distilled to give 1.40 g (90%) of a 4.1:1 mixture (by GLC) of 2- and 4-*exo*-2-norbornylpyridines, bp 125–145 °C (0.1 torr). The 2- and 4-alkylpyridines are readily distinguished by GCMS since the 2-alkyl derivatives have a pronounced $M^+ - H$ peak while 4-alkyl derivatives give mainly M^+.[13]

Cyclohexene (1.64 g) was added to a stirred solution of 6.36 g of $Hg(OAc)_2$ in 20 mL of MeOH. After 10 min, 8 mL of C_5H_5N was added and the solution irradiated 40 h with the sunlamp to yield 3.0 g of Hg and 2.1 g of a mixture of *o*- and *p*-(2-methoxycyclohexyl)pyridine, bp 95–115 °C (2 torr). A more rapid reaction and higher yield was observed using $Hg(O_2CCF_3)_2$.

TMPDA (1.09 g, 6.6 mmol) and 2.15 g of $PhCH_2HgCl$ (6.5 mmol) in 40 mL Me_2SO were irradiated by sunlamp for 40 h. Workup provided 1.19 g (70%) of the benzyl derivative, bp 125–145 °C (0.01 torr).

(11) Brown, H. C.; Rei, M.-H. *J. Am. Chem. Soc.* **1969**, *91*, 5646.

(12) Reaction of 5-hexenylmercury chloride with 1 equiv of TMPDA formed a mixture of 5-hexenyl- and cyclopentylcarbinyl products. Although reaction of $PhCH_2HgCl$ with C_5H_5N forms mainly $PhCH_2CH_2Ph$ from the reaction $PhCH_2\cdot + PhCH_2HgCl \rightarrow PhCH_2CH_2Ph + HgCl$,[2] with the more reactive TMPDA (1 equiv), the benzylated product (80%) and $PhCH_2CH_2Ph$ (7%) were formed (GC yields). Toward $PhCH_2\cdot$, TMPDA was 6 times as reactive as $Me_2C{=}NO_2^-$, giving a reactivity series toward $PhCH_2\cdot$ of $Me_2C{=}NO_2^-$(1) > TMPDA(0.16) > $PhCH_2HgCl$(<0.01) > C_5H_5N(<10^{-4}).

(13) McDonald, F. R.; Widecora, A.; Cook, G. L. *Appl. Spectrosc.* **1968**, *22*, 325, 329.

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Thermal, Four-Carbon + Three-Carbon Cycloaddition Reaction of Cyclopropenone Ketals. Total Synthesis of Deacetamidocolchiceine: Formal Total Synthesis of Colchicine

Summary: A total synthesis of deacetamidocolchiceine, constituting a formal total synthesis of colchicine, is described and is based on the implementation of a thermal, four-carbon + three-carbon cycloaddition of α-pyrone **4** with the cyclopropenone ketal **3** in a process proceeding by way of the reversible, thermal generation of a three-carbon 1,3-dipole best represented as a nucleophilic and delocalized singlet vinylcarbene.

Sir: Colchicine (**1**), a potent mitotic inhibitor exhibiting a characteristic and specific binding with tubulin which prevents microtubule assembly and spindle formation, has been the subject of extensive synthetic,[2] biosynthetic,[3] and biochemical investigations.[3] Most recent efforts have focused on defining the complete spectrum of colchicine's

(1) (a) Searle Scholar Recipient, 1981–1985. National Institutes of Health research career development award recipient, 1983–1988 (CA 00898/01134). Alfred P. Sloan research fellow, 1985–1989. Correspondence regarding this work should be addressed to this author at the following address: Department of Chemistry, Purdue University, West Lafayette, IN 47907. (b) National Institutes of Health predoctoral fellow, 1981–1984 (GM 07775).

(2) Structure determination: (a) Dewar, M. J. S. *Nature (London)* **1945**, *155*, 141. Total synthesis: (b) Schreiber, J.; Leimgruber, W.; Pesaro, M.; Schudel, P.; Threlfall, T.; Eschenmoser, A. *Helv. Chim. Acta* **1961**, *44*, 540. (c) van Tamelen, E. E.; Spencer, F. A.; Allen, O. S.; Orvis, R. L. *Tetrahedron* **1961**, *14*, 8. (d) Sunagawa, G.; Nakamura, T.; Nakazawa, J. *Chem. Pharm. Bull.* **1962**, *10*, 291. Nakamura, T. *Ibid.* **1962**, *10*, 299. (e) Scott, A. I.; McCapra, F.; Buchanan, R. L.; Day, A. C.; Young, D. W. *Tetrahedron* **1965**, *21*, 3605. Scott, A. I.; McCapra, E.; Nabney, J.; Young, D. W.; Day, A. C.; Baker, A. J.; Davidson, T. A. *J. Am. Chem. Soc.* **1963**, *85*, 3040. (f) Woodward, R. B. *Harvey Lect.* **1963**, 31. (g) Martel, J.; Toromanoff, E.; Huynh, C. *J. Org. Chem.* **1965**, *30*, 1752. (h) Matsui, M.; Yamashita, K.; Mori, K.; Kaneko, S. *Agric. Biol. Chem.* **1967**, *31*, 675. Kaneko, S.; Matsui, M. *Ibid.* **1968**, *32*, 995. (i) Kato, M.; Kido, F.; Wu, M. D.; Yoshikoshi, A. *Bull. Chem. Soc. Jpn.* **1974**, *47*, 1516. (j) Kotani, E.; Miyazak, F.; Tobinaga, S. *J. Chem. Soc., Chem. Commun.* **1974**, 300. Tobinaga, S. *Bioorg. Chem.* **1975**, *4*, 110. (k) Evans, D. A.; Hart, D. J.; Koelsch, P. M. *J. Am. Chem. Soc.* **1978**, *100*, 4593. Evans, D. A.; Tanis, S. P.; Hart, D. J. *Ibid.* **1981**, *103*, 5813. (l) For resolution methods in the conversion of deacetamidocolchiceine (**2b**) to colchicine with resolution of deacetylcolchiceine; see: Corrodi, H.; Hardegger, E. *Helv. Chim. Acta* **1957**, *40*, 193.

(3) For a recent review, see: Capraro, H.-G. "Alkaloids"; Academic Press: Orlando, Florida, 1984; Vol. 23, pp 1–70.

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