was separated into two parts, *i.e.* F-1 and F-2, through a Dia filter (G-10T) as described in Fig. 1. The antitumor activity of F-1 and F-2 was examined with DS Mie mice, inoculated intraperitoneally with Ehrlich ascites carcinoma 2×10^5 cells. As shown in Fig. 2, mice in the control group died in 14 days, while those in the group given F-1 at 10 mg/kg or 20 mg/kg, 4 out of 10 and 10 out of 10 mice survived more than 60 days, respectively. This indicate that, against Ehrlich ascites carcinoma, a large dose administration might be more effective than a small dose administration. In this experiment, the tumor-inhibiting effect of F-1 was seen during an early stage after ascites tumor inoculation. F-2 isolated the same origin was almost ineffective. When 25 mg/kg/day of F-2 was administrated intraperitoneally for 10 days, 5 out of 10 mice remained alive over 20 days and 1 out of 10 mice survived more than 60 days.

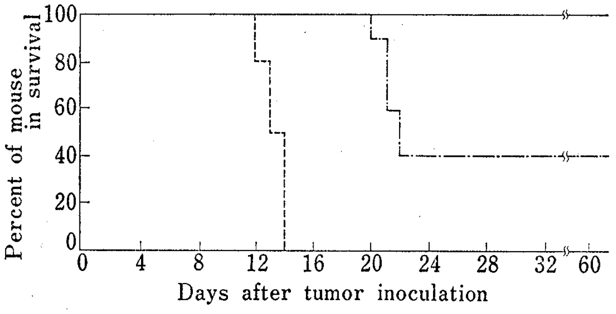

Fig. 2. Antitumor Effect of F-1 on DS Mie Mice Bearing Ehrlich Ascites Carcinoma

Treatment was initiated at 24 hr after *i.p.* inoculation with Ehrlich ascites 2×10^5 cells. Each groups was consisted of 10 mice.

--------, control; ———, treated with F-1, 20 mg/kg×10 daily;
-·-·-·-, treated with F-1, 10 mg/kg×10 daily

The active substances were suggested to be acid polysaccharides which mainly contained galactose, glucuronic acid, xylose, fucose, glucose, mannose and slightly contained sulfonic acid group by the analysis of sugar composition. Further studies on the chemical structure and biological properties of F-1 are now in progress.

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Dethioacetalization with Thallium (III) Nitrate

Thioacetals (**1**—**6**) have been dethioacetalized by the treatment with thallium (III) nitrate under mild conditions for a short time to recover the parent carbonyl compounds in good yields. The reaction mechanisms are also discussed.

Recently, we succeeded in the conversion of α-aryl-β-nitroethylthioalkanes into α-aryl-β-nitroethoxyalkanes by means of thallium (III) trinitrate (TTN) [$Tl(NO_3)_3 \cdot 3H_2O$] in alcohols[1] (see Chart 1).

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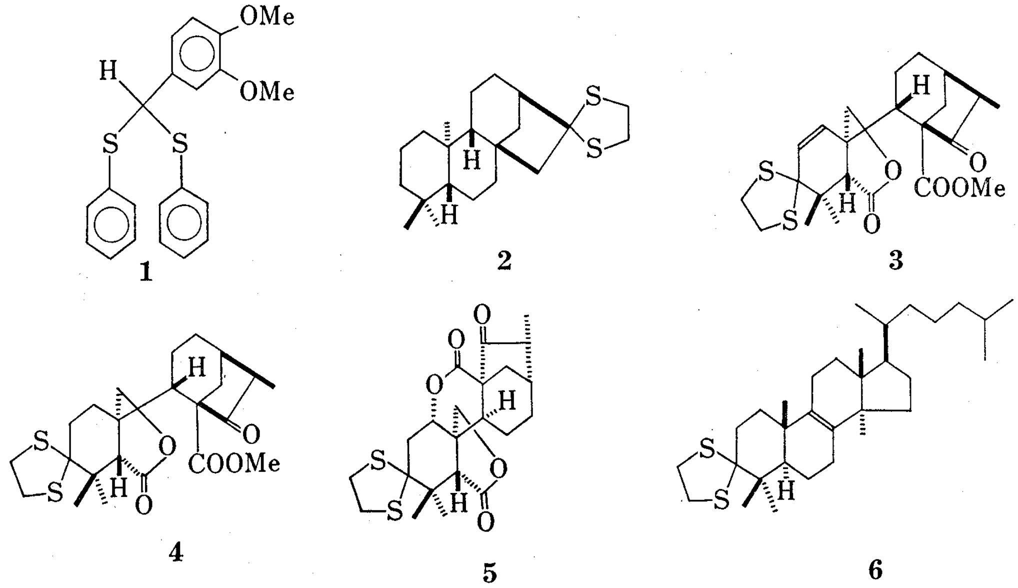
[1] Y. Nagao, K. Kaneko, M. Ochiai, and E. Fujita, *J. C. S. Chem. Comm.*, **1976**, 202.

Chart 1

We applied successfully this method to several dithioacetals, **1**—**6**, for their dethioacetalization. The results are shown in Table I.

In a typical experiment, a colorless solution[2] of TTN (238 mg) in methanol (2 ml) was added to a solution of **3**,[3] mp 191—192°, (100 mg) in methanol (8 ml)-tetrahydrofuran (1 ml), and the mixture was stirred. After 5 min, the white crystalline precipitate[6] was filtered off and the filtrate was evaporated off to leave a solid residue, which was extracted with chloroform. The extract was washed with water, dried over anhydrous magnesium sulfate, and evaporated *in vacuo* to give the parent ketone,[4] mp 251°, (82 mg; 99%) as colorless needles.



Formulae 1—6

Table I. Dethioacetalization with TTN

Thioacetal	Mol equivalent of TTN	Solvent	Reaction temp. (°C)	Reaction time (min)	Yield of parent carbonyl compound (%)
1	2.2	MeOH–ether (7 : 3)	25	5	77[a]
	1.1	MeOH–ether (7 : 3)	25	5	79[b]
2	2.2	MeOH–ether (2 : 1)	25	5	98
3[3]	2.4	MeOH–THF (10 : 1)	25	5	99
4[4]	2.8	MeOH–THF (5 : 1)	25	30	82
5[5]	7	MeOH–THF (8 : 1)	50	30	75
6	2.2	MeOH–THF (3 : 5)	25	30	73

a) Diphenyl disulfide was obtained in 43% yield.
b) Diphenyl disulfide was obtained in 87% yield.

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2) When methanol contains some water, a brownish solution is obtained, but there is no harm for reaction.

3) E. Fujita, T. Fujita, H. Katayama, and Y. Nagao, *Tetrahedron*, **25**, 1335 (1969).

4) E. Fujita, T. Fujita, K. Fuji, and N. Ito, *Tetrahedron*, **22**, 3423 (1966).

5) T. Kubota, T. Matsuura, T. Tsutsui, S. Uyeo, H. Irie, A. Numata, T. Fujita, and T. Suzuki, *Tetrahedron*, **22**, 1659 (1966).

6) This substance was confirmed to be thallium (I) nitrate ($TlONO_2$) by the following evidence: (i) mp 205—206°. (ii) The aqueous solution was negative for the iodostarch reaction. (iii) Addition of 35% HCl to the aqueous solution gave white precipitate of TlCl. (iv) *Anal.* Calcd. for $TlONO_2$: N 5.25%. Found: N 5.26%.

When this reaction is carried out between 1 mol equivalent of **3** and 1.1 mol equivalent of TTN, only about half reaction proceeds, but further addition of 1.1 mol equivalent of TTN results in the instant completion of the reaction.7) Thus, this reaction requires 2 mol equivalents of TTN for 1 mol equivalent of dithioacetal. We suggest the reaction mechanism shown in Chart 2.

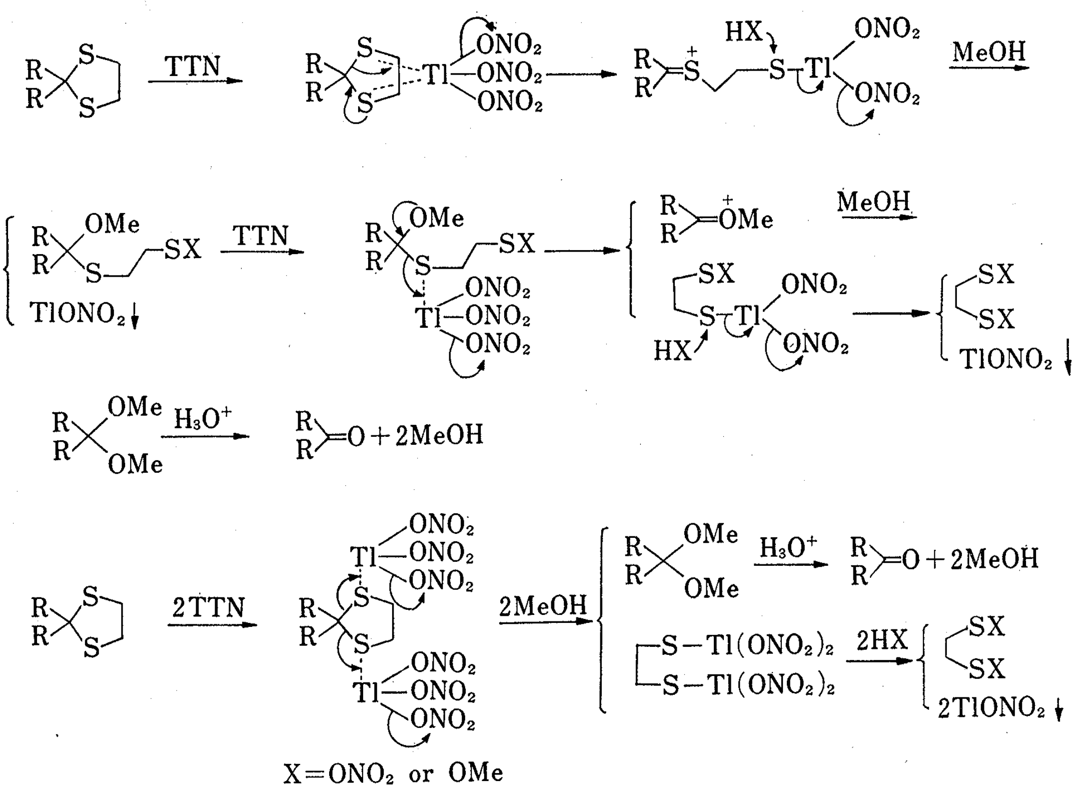

Chart 2

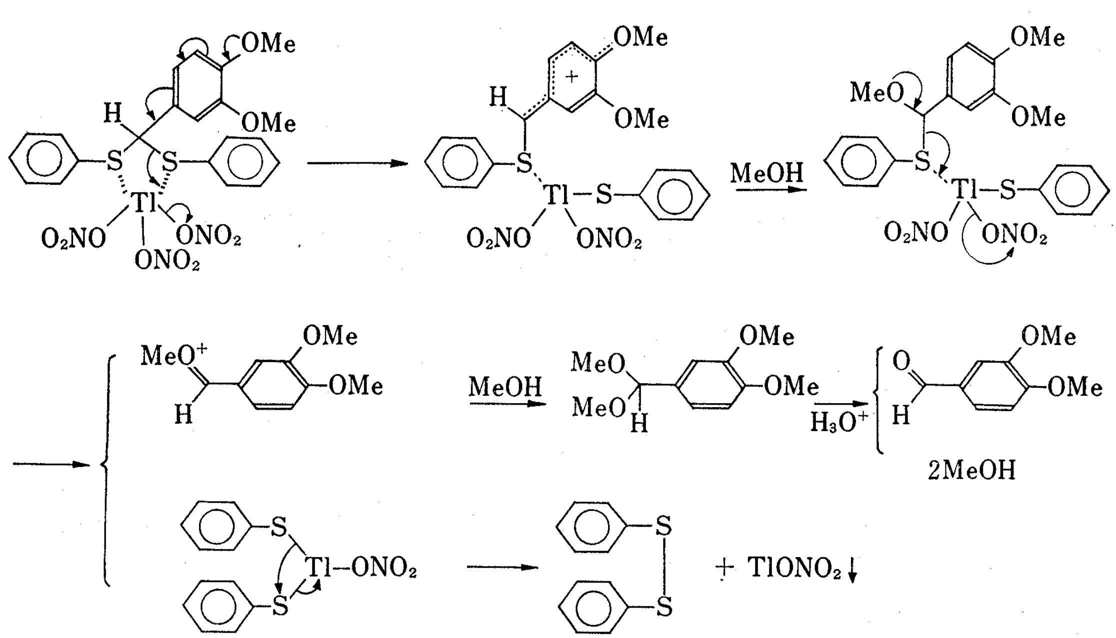

Chart 3

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7) The same experimental result was obtained also for the compound **6**.

In the reaction with compound **1**, however, only 1.1 mol equivalent of TTN was enough for the completion. The mechanism for this case is, therefore, suggested as shown in Chart 3. In the use of 2.2 mol equivalents of TTN, the reaction seems to proceed under competition of both mechanisms shown in Chart 2 and 3, because of about half yield of diphenyl disulfide (see footnotes of Table I).

Previously, Ho and Wong[8] published dethioacetalization of 1,3-dithiacyclopentanes and 1,3-dithiacyclohexanes derived from several aldehydes or ketones with thallium (III) trifluoroacetate. The reaction proceeded in mild conditions and gave good yields of the parent carbonyl compounds. Our method, however, has the following advantages: (i) Thallium (III) trinitrate is much cheaper and more easily available than thallium (III) trifluoroacetate. (ii) The reaction mixture is generally colorless and transparent in our case, while it is brownish in their case. Hence, the end point of the reaction is more easily and clearly judged by the white precipitation of $TlONO_2$ in our method, compared with their observation of the end point to be milky white. (iii) Our method can be used for the compounds having functional groups (especially an aliphatic double bond) by the use of the suitable mol equivalent of the reagent. In their case, only very simple ketones and aldehydes were tested. (iv) The water of crystallization of TTN is available for the hydrolysis of the methyl acetals in the final step of the reaction.

Thus, this novel method will promise the increasing value of the ethylenedithioacetal function for the protection of the carbonyl group especially in the field of the syntheses of the complex natural products.

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[8] T.-L. Ho and C.M. Wong, *Canad. J. Chem.*, **50**, 3740 (1972).

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Occurrence of Bufalitoxin, Cinobufotoxin and Their Homologs in Japanese Toad

The isolation and characterization of nine new bufotoxins from the skin of Japanese toad was described. They were efficiently separated and purified by high-speed liquid chromatography. The structures were elucidated to be bufalitoxin homologs (Ia—c), cinobufotoxin homologs (IIa—d), arenobufotoxin (III), and cinobufotalitoxin (IV) by degradative means.

In recent years three novel types of bufotoxins in which the succinoyl, adipoyl, and pimeloyl groups are displaced for the suberoyl residue of the so-called "bufotoxin,"[1-3] have been

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[1] H. Wieland and R. Alles, *Ber.*, **55**, 1789 (1922); H. Wieland, G. Hesse, and R. Hüttel, *Ann.*, **524**, 203 (1936); H. Wieland and H. Behringer, *ibid.*, **549**, 209 (1941).
[2] H.O. Linde-Tempel, *Helv. Chim. Acta*, **53**, 2188 (1970).
[3] K. Shimada, Y. Fujii, E. Mitsuishi, and T. Nambara, *Chem. Ind.* (London), **1974**, 342.