

Asian MEDICAL JOURNAL

Vol. 3 No. 4

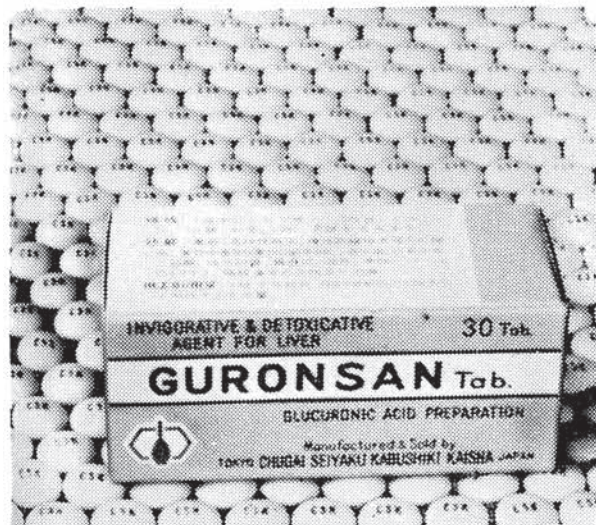
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Editor's Note

Sadataka Tasaka, M.D.

Professor of Medicine University of Tokyo

Japan is favored with moderate climate in April, being neither hot nor cold, when plains and mountains are decorated with cherry blossom in full bloom, and youths are got rid of the worries of examination; all the world assumes a happy aspect in this season.

On the contrary, for physicians, the busiest season of year commences from April. Following the opening of annual meeting of Japan Anesthesia Society on 29th, March, spring meetings of various societies are to be held in Kyushu, Shikoku and other districts of Japan, particularly in Osaka. At these meetings not only constant stream of new achievements will be published by medical specialists, but also clinical results of new drugs from various pharmaceutical companies will be reported by them. We find the greatest satisfaction to have the reports of ever improving Japanese medical world. We are firmly convinced that this satisfaction should be shared with humanity of all over the world as well as with physicians and general majority of Japan, and that these events will constitute a moving factor for improvement of happiness and peace of the world.

In addition to this, the 13th Japan Congress of Pharmacology (the 80th Annual Meeting of Pharmaceutical Society of Japan) was recently held at 10 sites in the campus of Tokyo University and attended by about seven thousand members from all over the country, who participated in sincere discussions on results from their researches. Topics on the agenda amounted to 350 in number, and built up an active atmosphere in the Congress.

We expect that new achievements to be published at these medical and pharmaceutical societies will furnish physicians in foreign countries with some information, too.



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A Journal of Medical Sciences of Japan and Asian Countries

Vol. 3 No. 4

April 1960

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CONTENTS

Editor's Note	<i>Sadataka Tasaka</i>	1
Words to Asian Medical Journal!	<i>Taro Takemi</i>	4
Pharmacology of the Principles Isolated from Senso (Ch'an Su), the Dried Venom of the Chinese Toad (IV)	<i>Masahiro Okada and Teruya Ishihara</i>	5
Characteristics of the Scrotal Skin for the Infection of Trichophyton <i>Kentaro Higuchi et al</i>		12
Use of Mitomycin C in Malignant Tumor of Gynecologic Nature	<i>Yoshio Ashitaka et al</i>	23
Study on Metal Dental Materials in the Light of Dental Hygiene	<i>Kazuo Nagai</i>	29
A List of Congresses of Various Dental Society in 1960		32
Information Home & Abroad		33
Kobe Medical College		36
Sumitomo Chemical Co., Ltd.		43

JAPAN MEDICAL PUBLISHERS, INC.

1, 2-chome, Kanda-Nishiki-cho,
 Chiyoda-ku, Tokyo,
 Tel: (291) 8832

President: Takashi Okada

Directors: Toshio Itoh, Torao Asano

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Subscription Rates: Single issue, US \$1.00 £0-7-2; 12
 issues US \$12.00, £4-6-0 including postage

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Words to Asian Medical Journal

Japan Medical Association has an enormous membership containing 64,000 medical practitioners as well as 11,000 service physicians such as professors in universities, technical officials in governmental organs and service physicians in hospitals, who play an active part in such wide field of medicine.

Japanese Association of Medical Sciences, scientific department of Japan Medical Association, consists of 48 medical societies, and every research is given chances for publication at meetings of these societies or the general assembly of Japan Medical Association to be held once in four years. Every society has local assembly and publishes its own journal. Every medical research is published in this way in Japan.

The association has mobilized medical specialists to re-educate postgraduates on the basis of preceding studies published by various medical societies. Even in remote and secluded places among the mountains there are facilities for advanced medical treatment to be applied through semimonthly publication of Japan Medical Association Journal and postgraduate education.

The most important domestic problem confronting Japan Medical Association at present is that physicians are not only restricted in their volitional treatment with patients by governmental intervention between the both parties in connection with social insurance, but also for the purpose of forcing greatly depressed income upon them national or municipal hospitals are mobilized against the association under the name of Hospital Association to intend the apparent split of Japan Medical Association. However, 90% of physicians who serve in governmental hospitals do not belong to Hospital Association, but continue to adhere to Japan Medical Association.

Officials of Ministry of Health & Welfare have stuck to the totalitarian administration in controlling the medicine under the pretext of national compulsory insurance, depriving physicians of their freedom and subduing all physicians to cheap labour.



Taro Takemi, M.D.
President of Japan Medical Association

Japan Medical Association has fought with those officials for past three years, and finally has succeeded in suppressing their project.

Medical associations all over the world have demanded team work among themselves in order to develop their common activities. It is the right and duty of the medical association to connect physicians' activities with national welfare properly in response to various activities of WHO as well as of O. S. S. A.

One year has elapsed since Confederation of Medical Associations of Asia and Oceania was convened in Tokyo last year, and I have felt keenly the necessity of publication of Asian Medical Journal from the standpoint of Japan Medical Association. It is to the credit of Japan Medical Publishers, INC. that further numbers of the journal will be published under the responsible edition of Japan Medical Association, and will become the medium of exchange of friendships and informations among world medical associations including those in Asia and Oceania. It is greatly hoped that this journal will contribute much to common development in activities and researches of world physicians as well as in medical cure and social security.

Pharmacology of the Principles Isolated from Senso (Ch'an Su), the Dried Venom of the Chinese Toad (IV)

Masahiro Okada, Toshiro Suga, Heiichiro Takabori,
Teruya Ishihara, and Hideaki Ogura

*Department of Pharmacology, Tokyo Medical
and Dental University*

Comparison of the Action of Bufalin, Resibufogenin, and Allied Compounds on the Respiration, Blood Pressure, and Heart¹⁾

Pharmacological action of various fractions isolated from Senso, the dried toad venom, and of the various components isolated from it is being examined. The powerful nicotine-like action of the tryptamine derivative, bufotenidine, was reported in Part II²⁾ and local anesthetic action of the steroids was described in Parts I³⁾ and III⁴⁾ of this series. It was found that bufalin had the most powerful anesthetic activity.

In the present series of work, action on the respiration, blood pressure, and heart was compared in resibufogenin, bufalin, cinobufagin, cinobufotalin, and gamabufotalin, the steroidal components of the toad venom, and their derivatives. Resibufogenin used in this work was isolated by Prof. Setsuro Ohno of the Pharmaceutical Department, Toho University, and its physicochemical properties agreed with that isolated by K. Meyer.⁵⁾ Details of its isolation and identification will be reported elsewhere by Prof. S. Ohno.

The acute toxicity (LD₅₀) of these substances by intraperitoneal injection in mice was calculated by the Litchfield method and listed in Table I. The toxicity decreased in the order of bufalin, cinobufagin, and resibufogenin, while no mortality occurred by administration of 20

mg./kg. of Δ^{11} -anhydrogamabufotalin and tetrahydro Δ^{11} -anhydrogamabufotalin. In doses above this, toxicity of propylene glycol, used as the solvent, appears and determination of acute toxicity, LD₅₀, becomes impossible. Toxic symptoms are quiet state, then tremor, clonic and tonic convulsion, and death occurs after repeated spasms.

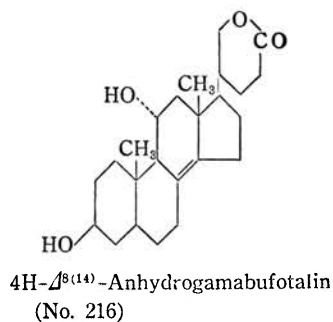
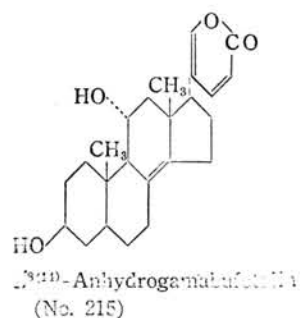
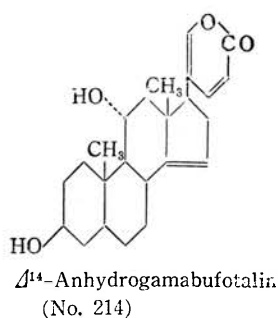
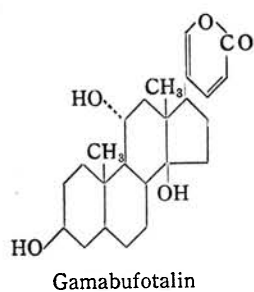
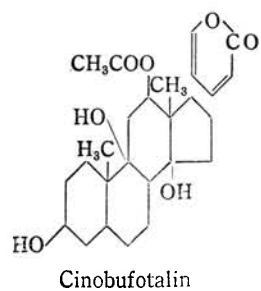
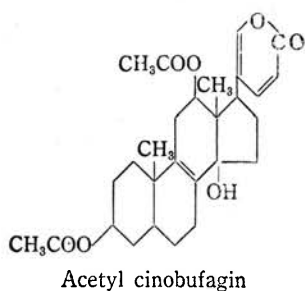
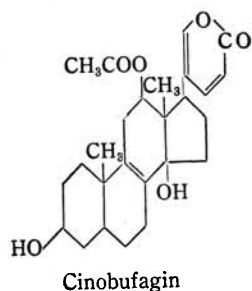
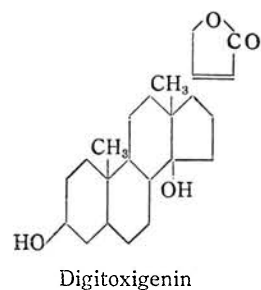
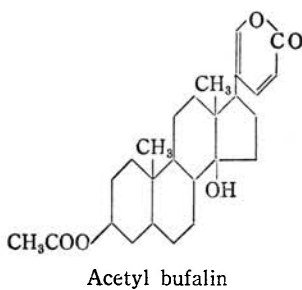
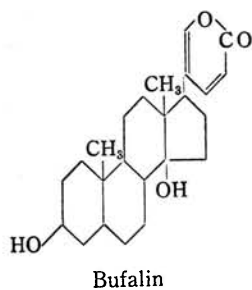
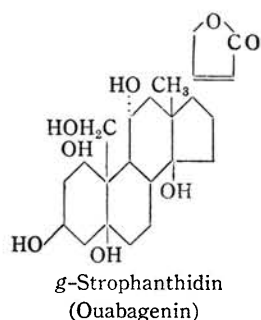
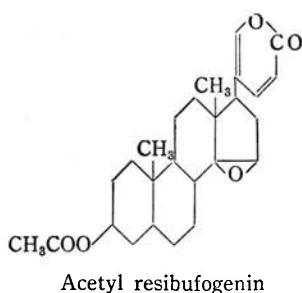
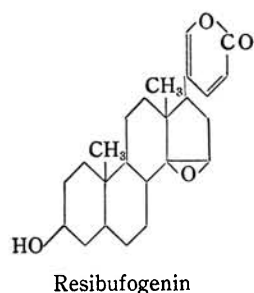
Action on the heart was tested chiefly by the Straub method on excised frog heart. In such a high concentration as 2×10^1 dilution, resibufogenin, gamabufotalin, and $\Delta^{8(11)}$ -anhydrogamabufotalin effected slowing of cardiac rate, increase of tonus, and decrease of amplitude, resulting in systolic arrest. These symptoms are very similar to those observed on administration of ouabain (g-strophanthin). Examinations made with various concentrations of the samples indicated, as shown in Table II, that the strength and mode of action were almost the same in resibufogenin and ouabain. In comparatively high concentration, these substances effect increased amplitude and slowing of cardiac rate followed by decreased amplitude, irregular contraction, and systolic standstill. At a lower concentration, there appears the so-called cardiotoxic action such as the lasting increase of amplitude and slowing of heart rate. The minimum effective concentration of these two substances is $1:8 \times 10^7$ to $1:10^8$, and toxic concentration is over $1:10^7$.

The action of cinobufagin is somewhat

Table 1. LD₅₀ of Some Active Principles isolated from Toad Venom (Senso)
as determined by Litchfield's Method

Substance	LD ₅₀ mg/kg	Confidence Limit of LD ₅₀ ($p=0.05$) mg/kg
Resibufogenin	11.5	11.05~11.95
Bufalin	2.20	1.80~ 2.68
Cinobufagin	4.38	4.23~ 4.55

Fig. 1.



K. Meyer, *et al.* (Helv. Chim. Acta, **41**, 2121 (1958)) has indicated that in the formula of cinobufagin the OH group of C. 14 forms an epoxide such as resibufogenin, no double bond exists at C. 8-9 and the acetoxy is not situated at C. 12 but probably at C. 16.

weaker and its minimum effective concentration is $1:10^7$, at which toxic symptoms already appear. The action of acetylresibufogenin is still weaker and the minimum effective concentration is $1:2 \times 10^6$. Gamabufotalin also has a similar activity and its anhydro derivative, $\Delta^{8(14)}$ -anhydrogamabufotalin has somewhat weaker activity, the minimum effective concentration being $1:5 \times 10^6$ in the former and $1:2 \times 10^6$ in the latter. It has long been believed that the presence of OH groups in 3- and 14-positions was a requisite in digitalis cardiotonics. In resibufogenin, there is no OH group in 14-position and there is an epoxide ring between 14-and 15-positions. In spite of this chemical structure, the compound has a marked cardiotoxic activity and this cannot be explained by present view. There is a possibility that the compound might be changed in the tissues to form an OH

group and exhibit cardiotoxic action, and the following experiment was carried out. A solution in the cannula after having exerted cardiotoxic action in the frog heart was used on another frog heart and the mode of appearance of cardiotoxic action was compared but there was practically no difference between the two actions. A similar experiment with ouabain also revealed no difference and these results seemed to indicate that resibufogenin is active *per se*, as is the case with ouabain. This fact is further endorsed by similarity in the mode of appearance and course of action of resibufogenin and ouabain of the same concentration. The fact that the strength of activity of $\Delta^{8(14)}$ -anhydrogamabufotalin is somewhat weaker than that of the parent gamabufotalin but still exhibits digitalis-like action seems to indicate that the OH group in 14-position is not necessarily inevitable.

Table II.

Cardiac Effect of Resibufogenin and Cinobufagin in Comparison with g-Strophanthin
as determined by the Straub's Method

Concentration	g-Strophanthin		Resibufogenin		Cinobufagin	
	Cardiotoxic Action	Toxic Action	Cardiotoxic Action	Toxic Action	Cardiotoxic Action	Toxic Action
$1:10^4$	○	○			○	○
$1:2 \times 10^4$	○	○	○	○		
$1:10^5$	○○○	○○○	○	○	○	○
$1:10^6$	○○○○○●	○○○○○●	○○○	○○○	○○○	○○○
$1:2 \times 10^6$						
$1:4 \times 10^6$			○	○	○	○
$1:6 \times 10^6$					○	○
$1:8 \times 10^6$					○○	○○
$1:10^7$	○○○○○○○ ○●	○○○○○●●	○○○○○	○●●●●	○○○○○●	○○●●●●
$1:2 \times 10^7$			○○○	○●●	●●	●●
$1:4 \times 10^7$	○○○○	●●●●	○○○○○●	○●●●●●		
$1:6 \times 10^7$	○○○○	●●●●	○○○●	○●●●		
$1:8 \times 10^7$	○○○○	●●●●	○○○	●●●		
$1:10^8$	○○●●●●● ●●●●●	●●●●●●● ●●●●●	○●●●	●●●●		
$1:2 \times 10^8$						
$1:10^9$	○●●●	●●●●				

○: positive

●: negative

Fig. 2
Electrocardiographic Changes caused by *g*-Strophanthin in Frog
Rana nigromaculata (♂ 30 g), Dose 10 μ g/10 g s.c.

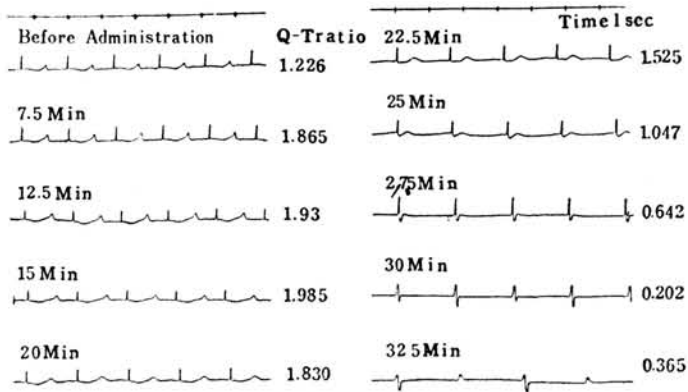
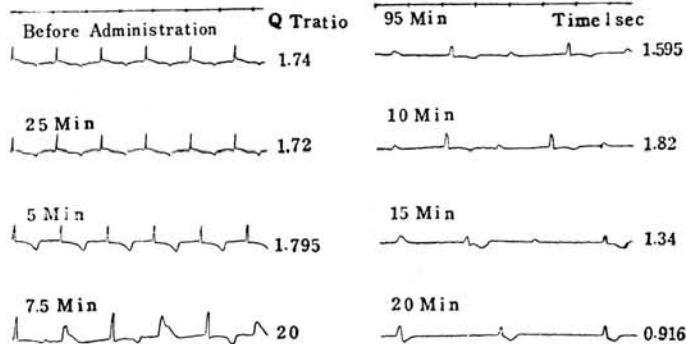


Fig. 3
Electrocardiographic Changes caused by Resibufogenin in Frog
Rana nigromaculata (♂ 30 g), Dose 10 μ g/10 g s.c.



The presence of a digitalis-like action in these substances is clearly observed by electrocardiogram of a frog. In urethanized frog, subcutaneous injection of 10 μ g./10g. of resibufogenin, bufalin, or cinobufagin by apico-basal lead of the heart after opening the breast gave the cardiogram shown in Fig. 2—3, with S-T depression and flattening or inversion of T wave, shortening of relative Q-T interval, prolongation of P-R interval, and widening of QRS complex. These changes are almost the same as those observed on the administration of ouabain.

Action on respiration and blood pressure was examined in urethanized rabbit; respiration by the Gaddum method using the tambour, and blood pressure by recording of carotid pressure by mercury manometer. Intravenous administration of re-

sibufogenin, bufalin, cinobufagin, cinobufotalin, or gamabufotalin caused elevation of blood pressure after a few seconds, accompanied by marked excitation of respiration. Intensity of this respiratory stimulating action at the same dose level (0.05 mg./Kg.) was the strongest in bufalin, followed by cinobufagin, resibufogenin, and cinobufotalin in that order, and the action of gamabufotalin was the weakest. When the dose administered was made proportional to the acute toxicity (LD_{50}) of each compound, resibufogenin had the most powerful activity in exciting respiration. Respiratory excitation action was examined in ouabain and digitoxin. Gradually increasing dose of ouabain by intravenous injection from 0.01 mg./kg. up to 0.04 mg./kg. showed almost no activity, and suppression or paralysis of respiration occurred at a dose level above 0.08

Fig. 4
Electrocardiographic Changes caused by Bufalin in Frog
Rana nigromaculata ($\hat{\sigma}$ 27 g), Dose 10 μ g/10 g s.c.

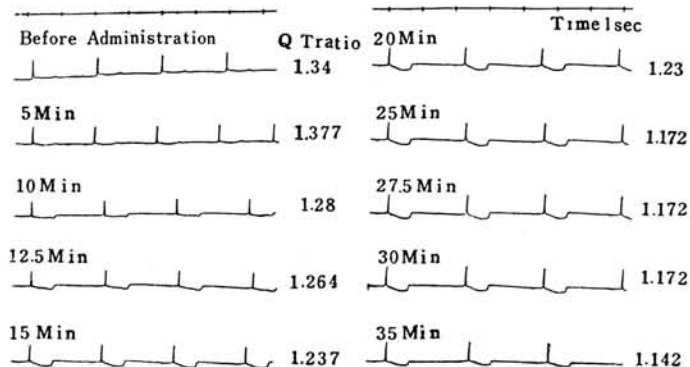
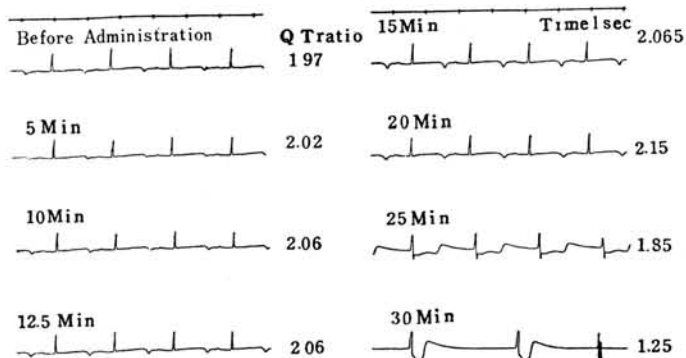


Fig. 5
Electrocardiographic Changes caused by Cinobufgin in Frog
Rana nigromaculata ($\hat{\sigma}$ 27 g), Dose 10 μ g/10 g s.c.



mg./kg. Intravenous injection of 0.06 mg./kg. of digitoxin had almost no effect of respiratory excitation and 0.2 mg./kg. dose cause respiratory paralysis. Digitoxin is a glycoside possessing the same aglycone as bufalin except for the lactone ring in 17-position being five-membered and yet digitoxin is entirely devoid of activity of exciting respiration, which is the most marked in bufalin. This difference of activity on respiration is rather interesting.

Acetylresibufogenin, acetylbufalin, and acetylcinobufagin, the derivatives acetylated in 3-position of the sterol ring, all showed activity weaker than that of parent compounds on blood pressure and respiration. Deacetylcinobufaginic acid, formed by cleavage of the lactone ring, has almost

no activity. The action on respiration and blood pressure of the anhydroderivatives of gamabufotalin, Δ^{11} -anhydrogamabufotalin and $\Delta^{8(11)}$ -anhydrogamabufotalin, is comparatively weak and tetrahydro $\Delta^{8(14)}$ -anhydrogamabufotalin, formed by saturation of lactone ring is almost without any activity. The respiratory excitation by resibufogenin can be observed even after severance of carotid sinus nerve, or vagus nerve, or suppression of chemoreceptor reflex by intravenous injection of 10 mg./kg. of procaine, and this suggests that the activity is due to direct stimulation of respiratory center. The activity of lobeline and nicotine almost completely disappears after such treatment.

The chemical structure of the foregoing substances may be considered on the basis

of bufalin. Compounds possessing OH groups in 3- and 14-positions and an unsaturated lactone show the strongest activity and toxicity in bufalin, and the weakest activity is found in gamabufotalin with α -OH group in 11-position. 3-acetylated compounds have weaker activity and the action is almost entirely lost by saturation or cleavage of the lactone ring. According to K. Meyer,⁶⁾ there is no hydroxyl in 14-position of resibufogenin and an epoxide ring is present between 14- and 15-positions. Experiment by K. K. Chen⁷⁾ with a cat has shown that resibufogenin causes spasm but almost no activity on the heart even in doses above 5 mg./kg. In the present series of experiments, resibufogenin was found to have cardiac action almost comparable to that of ouabain on frog heart, and a marked activity in respiratory excitation and elevation of blood pressure in rabbit. This fact, together with the fact that $\Delta^8(14)$ -anhydrogamabufotalin, the anhydro compound of an OH group in 14-position, possesses digitalis-like action on frog heart, seems to suggest that the OH group in 14-position is not indispensable for appearance of a cardiotonic action. In order to elucidate the relationship between chemical structure and pharmacological activity with regard to these cardiotonic activity and respiratory excitation, it is hoped that

comparative examinations will be made of a larger number of steroidal compounds and various drugs.

The authors express their deep gratitude to Dr. Heisaburo Kondo, the Director of ITSUU Laboratory, and to Professor S. Ohno and Assistant-Professor M. Komatsu of the Department of Pharmacy, Toho University, for having undertaken the extraction and purification of the components of toad venom used in this work. They are also indebted to the Pharmacological Research Foundation (Yakurikenkyu-kai) for donation of funds to cover expenses of this work.

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- 1) A gist of the present paper was reported at the 32nd Meeting of the Japanese Pharmacological Society (March 31, 1957).
 - 2) This Journal **III**, **I**, 9 (1960).
 - 3) This Journal, **III**, **I**, 5 (1960).
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 - 5) *Helv. Chim. Acta*, **35**, 2444 (1952), **40**, 1276 (1957).
 - 6) K. Meyer: *Experientia*, **14**, 238 (1958).
 - 7) K.K. Chen: *J. Pharmacol. Exptl. Therap.*, **III**, 365 (1954).
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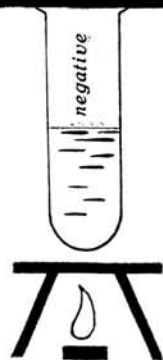
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Characteristics of the Scrotal Skin for the Infection of Trichophyton

Kentaro Higuchi, Harukuni Urabe, and Kenzo Takaki

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Kyushu University, Fukuoka, Japan*

Introduction

It is generally accepted that the predilection of tinea cruris is the genito-femoral fold and the inside of upper thigh. The disease often spreads from there to mons pubis and abdomen or to perineum and buttocks, never being crossed over their border lines to the scrotal skin. According to the references in Japan it can hardly be understood that the scrotal skin is definitely resistant to trichophyton infection. In 1952 Urabe and Tsuboi⁽¹⁰⁾ reported a case of scrotal trichophytia in a child and described its clinical symptoms as resembling to those of maculo-vesicular type of trichophytia. Takahashi⁽¹¹⁾ made a detailed description of a few cases of scrotal infection in patients suffering from a typical tinea cruris. He stated that the clinical picture was a kind of erythema, covered by pityroid desquamation with neither vesiculation and pustulation, nor tending to show central healing.

It is supposed that the scrotal skin is hardly affected by the trichophyton, and if affected, it shows characteristic symptoms. So we tried to study the special attitude of the scrotal skin against trichophyton infection.

I. Inoculation experiment of Trichophyton purpureum on human scrotal skin

We inoculated a trichophyton in the scrotal skin and observed the reaction of the scrotum to it.

From the lesion of tinea cruris Ota⁽⁷⁾⁽⁸⁾⁽⁹⁾ separated *Epidermophyton inguinale* and *Trichophyton gypseum* in 3 and 5 cases respectively, and *Trichophyton purpureum* in 56 cases, and stated that the latter occupied 87% of trichophyton infection. Takahashi,⁽¹¹⁾ after investigating 200 cases of tinea cruris, detected *Trichophyton purpureum* in 176 cases (88%), and Urabe⁽¹⁰⁾ cultured *Trichophyton purpureum* in 100% in 30 cases of the disease. As the causative fungus of tinea cruris in our country is almost all occupied by *Trichophyton purpureum*, we have chosen in this experiment this microbe as an inoculum.

Method of inoculation

Trichophyton purpureum we used was gained from the lesion of a outpatient complaining of tinea cruris. The inoculation place of about 2.0 cm square skin area was first anesthetized locally and then was rubbed slightly several times to and fro with the blade of knife, which was set upright on the surface of the skin. The culture of *Trichophyton purpureum* was rubbed with a finger tip into the above treated skin area, and the place was covered with a few sheets of gauze piece.

From the next day of inoculation the observation of the changes of clinical findings, the direct microscopic examination of scales, and the histological examination of the affected skin were made.

Experimental results

An inoculation was performed on the scrotum and on the controlled genito-

femoral region respectively in 5 cases with complete success.

Case 1. A 45-years-old man.

Scrotum: Twenty-four hours after inoculation a sharp demarcated circuloid erythema of about 3.0 cm in diameter, showing exsiccative tendency, was performed, and at the 3rd day the erythematous area was completely covered with small pityroid scales, losing a characteristic wetness of the scrotal skin. However there was no formation of vesicules and of pustules on the lesion. From about 5th day on erythema faded, while the light yellowish pityroid scales became distinctly apparent. Direct microscopic examination of scales showed a numerous fungous elements, but the culture by Sabouraud's dextrose agar was unsuccessful. At the 7th day the erythema disappeared and the pityroid desquamation began to extinguish from the lesion, and at the 10th day it disappeared almost completely, regaining the characteristic appearance of the scrotal skin.

Histological findings: (10th day). The horny layer of the epidermis held a normal thickness, showing a proliferation in part and a slight parakeratosis. In the granular and prickle cell layers no marked changes were observed, however, a small round cell infiltration was recognized in the upper layer of the corium and around the blood vessels. In the subcutaneous layer there were no marked changes. The hyphae were found only partly in the horny layer.

Genitofemoral region: Twenty-four hours after inoculation minute papules and two vesicules appeared on the margin. After 2-3 days they were newly formed on the erythematous patch and a formation of small crusts was seen. Then the papular formation extended toward periphery, forming a growing circle and showing a tendency to central healing. The border was elevated by the presence of

vesicules which were accompanied by a large quantity of scales. From about the 5th day on, apart from the original lesion, new lesions appeared in its vicinity. They extended centrifugally and at the 7th day a typical lesion of tinea cruris was formed. Both direct microscopic examination and the reverse culture were proved to be positive. There was a tendency for the lesion to extend toward the genitofemoral fold.

Histological findings: (10th day) The horny layer generally became thick and a parakeratosis was seen. A small round cell infiltration was found in a part of the prickle cell layer, corium and around blood vessels. The hyphae were found mainly in the proliferated horny layer, however in part also, where proliferation was not manifest. They were arranged in various directions such as either perpendicularly or horizontally to the horny layer. Hyphae were found also in the granular layer, but not below it.

Case 2. A 45-years-old man.

Scrotum: The course of infection was generally similar to that of case 1. At the 3rd day, light yellowish pityroid scales diffusely appeared on the erythema and desquamation became most pronounced at the 4th or 5th day. By direct microscopic examination numerous fungous elements were observed and the reverse culture was positive. At the 9th day the dryness of the scrotal skin was reduced to a certain extent, and the pityroid desquamation was also reduced.

Histologically the horny layer of the scrotal skin taken at the 10th day thickened with parakeratosis, and the prickle cell layer and a part of the granular layer were also proliferated. There was a vacuolar formation in the prickle cell layer, where a small round cell infiltration was recognized. The hyphae were found mainly in the

upper part of the horny layer and a grouping of them was found partly.

Genitofemoral region: The course was similar to that of case 1. At the 7th day a typical tinea cruris was formed. The fungous elements were recognized under a direct examination and a reverse culture was proved to be positive. At the 10th day an examination of an extirpated piece of the infected skin showed a hyperkeratosis, parakeratosis and a pronounced small round cell infiltration in the papillary layer and around the blood vessels. A cell infiltration was also recognized partly in the prickle cell layer and the hyphae were found mainly in the horny layer of the epidermis, sometimes in the granular layer too.

Case 3. A 51-years-old man.

Scrotum: The course of infection was about the same as that of the case 1 and 2. A pityroid desquamation which became most marked at the 5th day was reduced gradually until the skin recovered completely at the 9th day. Histological findings were almost the same as those of the case 1 and 2, while hyphae were sparsely recognized. **Genitofemoral region:** A typical tinea cruris was seen at the 7th day, and 1.5 cm apart from the original lesion toward genitofemoral fold new papules appeared. These two eruptions, original and new, gradually enlarged until they confluent together. Fungous elements were detected by a direct examination of scales, and a reverse culture was successful.

Histologically we found a hyperkeratosis, parakeratosis and the proliferation of the granular as well as the prickle cell layer. In the prickle cell layer a small round cell infiltration was observed partly. A cell infiltration was also seen in the upper layer of the corium and around blood vessels. Fungous elements were found in the horny layer.

Case 4. A 40-years-old man.

Scrotum: The course of the disease was almost the same as that of the case 3. At the 5th day numerous fungous elements were recognized under a direct examination, while a reverse culture was unsuccessful. After 10th day on, the lesion healed macroscopically almost completely. At the 20th day a small piece of the infected area was histologically examined. The epidermis was completely returned to its normal state and only a slight cell infiltration was found in the upper layer of the corium. Fungous elements were not to be found at all.

Genitofemoral region: The course of the development of the lesion was almost the same as that of the previous case. At the 10th day the initial lesion and the secondary one were confluent together to form a typical tinea cruris. By a direct examination not only the hyphae were detected but also by a reverse culture. *Trichophyton purpureum* was proved. At the 20th day a part of the lesion was extirpated for a histologic examination. Histologically a hyperkeratosis, parakeratosis, a proliferation in part of the granular as well as prickle cell layer, a pronounced small round cell infiltration in the upper layer of the corium and around blood vessels, and abundant fungous elements in the proliferated area of the horny layer were observed.

Case 5. A 23-years-old man.

Scrotum: The course of the disease was almost the same as that of the previous case. At the 5th day numerous fungous elements were recognized by a direct examination. At the 7th day the pityroid desquamation was reduced, hyphae were not detectable under a microscope, and the reverse culture was in vain. After 2 weeks no pathological changes were observed any more, and at the 20th day, by

a histological examination of an excised piece from the inoculated place a very slight inflammation was recognized, but no fungous elements.

Genitofemoral region: At the 7th day a walnut size lesion was formed and pustules, scales, and minute erosions were noted at the border. The direct examination of fungous elements was positive, while the reverse culture was not successful. Then it showed a typical form of tinea cruris. This eruption was enlarged by and by, and after 2 weeks the progress was arrested, the boundary elevation was reduced, and vesicles as well as pustules disappeared. At the 20th day a part was extirpated for a histological examination. A cell infiltration was slightly recognized in the upper layer of the corium and around blood vessels, and only a small number of hyphae was observed.

As we described above we inoculated *Trichophyton purpureum* in 5 cases of adult scrotal skin, and was able to get positive results. The followings are the summary of them.

1) Twenty-four hours after inoculation we recognized erythema with relatively distinct boundary.

2) From the 2nd and the 3rd day after inoculation a pityroid desquamation appeared almost all over the erythematous area, and the scrotal skin, by losing its genuine wet character, became glossy.

3) On the 5th day this pityroid desquamation became pronounced, however the lesion was free from a vesicle, abscess and erosion, showing neither sign of a central healing nor a boundary elevation. Then the symptoms gradually disappeared, and at the 7th to 10th day they disappeared completely, and natural healing followed.

4) In the genitofemoral region the papules appeared 24 hours after inoculation and then they developed gradually

until they showed a typical tinea cruris at the 7th day, and it showed a tendency to proceed toward the genitofemoral fold.

5) Histological examination of scrotal and genitofemoral lesions at the 10th day showed pronounced inflammatory changes, and the fungous elements were found mainly in the horny layer, and an invasion of them into the granular layer was also recognized. At the 20th day slight inflammatory findings were sometimes observed on the scrotal lesion, but not detectable in it. On the genitofemoral lesion, however, hyphae were sometimes detected.

In 1952 Takahashi⁽¹⁴⁾ described in detail 4 cases of scrotal trichophytia, which were found among the 78 typical tinea cruris patients. He observed an erythema on the scrotal skin, which was generally covered with pityroid scales, showing no sign of central healing. There was no elevation in the border line of the diseased area, accompanying no vesicles, pustules and erosions. They found by a direct microscopic examination numerous hyphae of *Trichophyton purpureum* in all 4 cases and they stated that such numerous fungous elements have not ever been recognized in trichophytia in other parts of the body at all. Our experimental results of *Trichophyton purpureum* inoculation quite agreed with the symptoms described by Takahashi. The abundance of hyphae under a direct microscopic examination was also found in the histological section of the 3rd case, in which we have found grouped numerous fungous elements in the horny layer.

In 1951 Urabe and Tsuboi⁽¹⁵⁾ reported the primary infection of scrotal trichophytia in an infant of 1 year 10 months old. It was caused by *Trichophyton purpureum* and was considered to belong to the maculo-vesicular type of trichophytia. In the center of the right scrotum the circular lesion of thumb-head size was observed

and its elevated border consisted of small vesicles and scales, while the center of which faded and no eruption was to be observed. Thus it is quite an interesting fact that although the trichophytia of scrotum of both adult and infant is similarly caused by *Trichophyton purpureum* the clinical symptoms are completely different from each other.

This fact seems to suggest that the symptom of scrotal trichophytia is influenced by the secondary sexual characteristics.

Moreover we recognized from our experiment that the trichophyton (*Trichophyton purpureum*) could cause trichophytia in adult scrotum, the duration of the disease was, however, short and the disease tended to show natural healing. So we may suppose that the adult scrotal skin is provided with somewhat very inadequate conditions for the development of trichophytia and that this fact has some relation with the change of the secondary sexual characteristics.

(Continued to Next Issue)

MEDICINE FOR WEAK-MINDEDNESS FOR IMPROVEMENT OF INTELLECT AND EMOTION

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- * *This drug has effect on nocturnal enuresis, traumatic aftermath of the head and senile dementia.*

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Drug Therapy for Feeble-minded Children, Study on Variations in their Bodily Conditions following the Oral Medication of Hydrolyzed Substance of Brains (IV)

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(Directed by Prof. Nobuyuki Miura, M.D.)

IV. Summary and consideration

Investigation is made on variations in the (1) bodily length, sitting length, bodily weight and grasping power, in the (2) millon reaction, and (3) in tyrosine and phenylalanine out of free amino acids in the serum and urine after administration of hydrolyzed substance of brains to feeble-minded children, and results obtained will be summarized as follows:

As to variations in the bodily length and sitting length, during half a year, the former increases by average 4.6 cm in males and average 3.0 cm in females respectively, while the latter increases by average 2.2 cm in males, and average 2.5 cm in females. On the other hand, the 1957th yearly average increases in bodily length and sitting length of the same aged children throughout Japan are respectively 5.1 cm in males and 5.1 cm in females, and 2.2 cm in males and 2.8 cm in females (Table 5).

These yearly national average increases correspond to 7-8 months' and 6 months' increases respectively in bodily length and sitting length of those administered with this drug. At any rate, these signify astonishing increases in the bodily length and sitting length.

Comparison of the increase in bodily weight with the national average increase reveals that the latter indicates respective 2.2 Kg and 8 Kg increase in males and

females in one year, while the former in those who have used this drug for 6 months indicates 2.93 Kg in males and 1.84 Kg in females. Much increase is not encountered in females, but the increase in males surpasses the yearly national average one, and is also a surprising development.

As to increase in the grasping power, the average increases indicate 5.3 in male right hand, 5.1 in male left hand, 2.6 in female right hand and 2.6 in female left hand respectively. These increases indicate that the comparative lack of physical strength in the feeble-minded children can be ameliorated by the use of this drug.

In addition, comparison of variations in the grasping power of those positive and negative to the millon reaction demonstrates no difference between their increases. They indicate more persistency in the work, and grow to have less feeling of fatigue than formerly, as the grasping power increases.

Improvement in the bodily strength is also found to appear together with variations in the mind (by investigation on the nature of work) and consideration on the effect of physical improvement on the mental work suggests that much emphasis should be placed upon the improvement in the bodily strength as well as in the I.Q.

As to the uroscopy (the millon reaction), the improvement in I.Q. is more infre-

quently made in those positive to the millon reaction than in those negative to the millon reaction, while as to the character test, comparison of those positive and negative to the millon reaction reveals that the former has a remarkable improvement in the character than the latter. Moreover, the former improves in social activities than the latter.

There is no difference between positive-ness and negativeness to the millon reaction as well as no discrimination between males and females according to causes of feeble-mindedness.

Some consideration will be given problems concerning the millon reaction. The most important problem is why a great number of those positive to the millon reaction are found among feeble-minded children, as indicated in this paper, and why the reaction is shifted to the negative by administration of hydrolyzed substance of brains. There is much doubt about connecting the substance positive to the millon reaction with disturbances in the hepatic function. In Japan this has been reported by Mizuguchi, Hashimoto et al, and as to the substance in urine positive to the millon reaction, Mizuguchi et al have pointed out a remarkable difference between patients of endogenous psychosis and ordinary persons in the course of catabolism of tyrosine, phenol, p-cresol and p-hydroxyphenylacetic acid from protein. And Mizuguchi et al have attributed this fact neither to the food nor the intestinal fermentation, but to the endogenous factor. The present author is on the whole of the same opinion on this point. At any rate, it is considered that a great quantity of tyrosine catabolin excreted into the urine have much to do with the physical strength or the intelligence. This therapy brings about an un-negligible result in reducing excretion of tyrosine or tyrosine catabolin, that is to

say, in making the millon reaction negative. Less increases in the bodily length and weight are found in those positive to the millon reaction than in those negative to the reaction, which means an un-comparatively more increased bodily length in case of the negative reaction than in case of the positive one. Moreover, as indicated in the foregoing, less increase in the I.Q. is encountered in those positive to the millon reaction than in those negative to the reaction, which means that it is much difficult to improve the I.Q. in the course of positive reaction; in short, the I.Q. is only improved after the former has turned to be the latter. These facts demonstrate that substances conducive to the appearance of millon reaction are responsible for the physical and mental development. Then comparison of free tyrosine and phenylalanine in the serum with those excreted in the urine reveals that almost all cases entrusted in the treatment of the present author possess far more volume of the latter than that of the former before therapy, while they show an increase in the former and a remarkable decrease in the latter as month goes on after medication.

The present author has had a suspicion that more volume of tyrosine and phenylalanine should be excreted into the urine by the administration of hydrolyzed substance of brains (multiple amino acid), but the actual assessment has turned to be vice versa. The medication of hydrolyzed substance contributes to making the millon reaction negative, while it brings about not only a remarkable decrease in tyrosine and phenylalanine discharged in the urine, but also a marked increase in those contained in the serum. In short, the previously excreted tyrosine and phenylalanine has come to be accumulated in the body by this therapy. On the other hand, examination on increased tyrosine

and phenylalanine in the serum of males and females indicates those in males to be more quantitatively accumulated than those in females at any stage of medication. And it is shown that females discharge more volume of tyrosine and phenylalanine into the urine than males. The present author has had an idea that this phenomenon may be responsible for difference between physical strengths of the both sexes.

Comparison of tyrosine and phenylalanine discharged into the urine of those positive and negative to the millon reaction reveals far more discharged tyrosine and phenylalanine in the former. The transition from positivity to negativity due to this therapy means the reduced excretion of these substances, and it is presumed that the positivity of millon reaction may cause at least more than 7-8 mg of tyrosine to be excreted in 1 dl content. From the foregoing paragraph it is understood that tyrosine and phenylalanine contained in the serum and discharged in the urine are immediately related with fatigue, character and improved I.Q. When the present author thinks of it much emphasis must be placed upon much effect of positive or negative millon reaction on improved I.Q.

Then increased volume of tyrosine and phenylalanine is again excreted in the urine about 4 months after the therapy, while this content in serum trends to increase more and more rather than decrease. Thus, if amino acids contained in the serum are practically accumulated in various organs, where are they stored?

Experiment is conducted on rabbits for investigation on this point.

In connection with this investigation rabbits are divided into groups of respective three ones, which are given two intramuscular injections of hydrolyzed substance of brains every day. Examina-

tions are made on the volume of tyrosine contained in various organs of rabbits (brains, liver, striated muscle, spleen and serum) before injection, and at intervals of 10 days at the 10th, 20th, and 30th day after injection. The diazo reaction and 1-nitro-2-naphthol method are applied for determination of the results. Nearly the same results obtained by these methods are indicated in Table 15.

This table reveals considerable accumulation of tyrosine in various organs, particularly in brains, liver and striated muscle. Remarkable increase in the storage of tyrosine is especially encountered in the serum every ten days similarly as in human serum. However, this table induces the present writer to consider that tyrosine is increased in the serum to some extent, but more of the substance, as is limited in quantity, may be encountered in the organs than in the serum.

This animal experiment suggests that other amino acids may be also accumulated in the same manner as a great quantity of tyrosine increased in the serum are stored in various organs. The experiment demonstrates that among organs, a great volume of these substances are particularly accumulated in brains as well as in liver. There may be found the similar storage of these substances in human organs. The accumulation of amino acids in brains is related with the cerebral substance, and has much connection with improved I.Q. as cerebral nutrition. Moreover, it is supposed that amino acids stored in liver or striated muscle may give rise to an immediate improvement in the physical strength. However, further detailed research should be made on other amino acids.

V. Conclusion

The hydrolyzed substance of brains is administered to 112 feeble-minded children ranging from 8 to 16 years of age for 6

months, and following results are obtained from determination of variations (1) in the bodily length, sitting length, bodily weight and grasping power, (2) in the microscopy, and (3) in tyrosine and phenylalanine among free amino acids contained in the serum and urine.

(1) Marked increase is found in the bodily length, sitting length and bodily weight about 2-3 months after medication of this drug.

(2) Although an increase in the bodily length, sitting length and bodily weight is not influenced by feeble-mindedness, the reduced increase is rather encountered in children made positive on the millon reaction than in those made negative.

(3) As to the growth time of bodily weight, there is a considerable difference between those positive and negative to the millon reaction.

(4) Remarkable improvement is made in the grasping power. Especially there is no much difference between grasping power of both hands.

(5) The medication of this drug is found to result in the negativity of millon reaction. Particular effect of the medicine is manifest on children in the 3rd to 4th grade of elementary school.

(6) There is no difference between improved conditions of those positive and negative to the millon reaction according to sex.

(7) Unimaginably great quantity of amino acids, tyrosine and phenylalanine are discharged into the urine of feeble-minded children, but it is found that the medication of this drug causes a reduction in the discharged volume, while on the contrary, those substances are increased and accumulated in the serum.

(8) Transition of the serous content from tyrosine to phenylalanine is more marked in those positive to the millon reaction than in those negative to the

reaction, and becomes increasingly remarkable following the medication.

(9) At every stage of medication, tyrosine and phenylalanine in the serum are more quantitative in males, while those excreted in the urine are more voluminous in females.

(10) Experiment made on rabbits shows that great quantity of tyrosine are transferred and accumulated into brain, liver and striated muscle.

(11) The medication of this drug is presumed to bring in its train the accumulation of considerable volume of amino acids besides tyrosine in brains and liver.

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INDICATIONS

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Use of Mitomycin C in Malignant Tumor of Gynecologic Nature

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I Introduction

This report is the summary of our experience in the use of Carzinophilin and Mitomycin for uterine cervical cancer, external genital cancer, cancerous peritonitis, and chorionepithelioma.

II Drug Used and Manner of Administration

Mitomycin [Kyowa Hakko Kogyo Co., Ltd.] 2 mg ampules were used. MC was dissolved in 5 cc distilled water or 20% dextrose solution with tepid water bath, mixed with 22 cc, 20% dextrose solution, and given slowly through antecubital vein.

1-2 mg were given in a single dose, daily dose being 2 mg. It was given daily as much as permissible, and around 40 mg constituted one course.

The suppository contained 5 mg MC in cacao butter. 1-2 suppositories were placed in the vagina daily and kept in place with gauze or tampon until the next insertion.

III Laboratory Examinations in Connection with the Treatment

Intravenous MC produces leucopenia, so that WBC count and differential count were done before and after every 10 mg of the drug. RBC, Hb, Ht, bleeding time, coagulation time, total serum protein, albumin, globulin, A/G ratio, Gros reaction, Takata reaction, thymol turbidity test, cephalin-cholesterol flocculation test, cobalt reaction, and bromsulphthalein test were performed routinely before, during and after the administration. When WBC dropped to below 3000, WBC count was performed more frequently while continuing the drug; but below 2500, the drug was stopped and blood transfusion and supportive measures were given.

IV Supportive Measures

When there was tendency to leucopenia or from the start of MC administration, blood transfusion, Paniltin-forte, Cobalt greenpole and other blood-building or leucocytotic drugs were given as much as possible.

V Cases

1. Summary of Cases

In total, over forty cases are treated. Twenty two of these are shown in **Table 1**, including cervical cancer, stage III, 7 cases, recurrent cervical cancer 4 cases, vaginal cancer 2 cases, external genital cancer 5 cases, cancer peritonitis 2 cases, and chorionepithelioma 2 cases.

These cases were administered comparatively large doses of CP or MC, and most of them revealed curative effects of the drugs based on morphological studies.

Cases 1—3 were given Carzinophilin i.v. and MC suppository with fairly good therapeutic results. They have been reported elsewhere in detail, however, since Case 3 was given another course of similar treatment after an interval of 21 weeks, it will be shown diagrammatically in a subsequent section.

Cases 4—7 were cervical cancer, stage III, and were given i.v. MC. Except for Case 5, they were given more than 40 mg MC. Case 5 resulted in severe leucopenia which necessitated cessation of the drug.

Cases 8—11 were recurrent cervical cancer. Case 10 was treated with i.v. and local infiltration of MC with diminution of metastatic foci and lymph nodes, apparently producing marked effects, so that it will be described later.

Cases 12—13 were vaginal cancer, and cases 14—18 were external genital cancer.

Table 1

No.	Name	Age	Diagnosis	Routes admin.	Single dose	Total dose	Dose rate, mg/day	Irradiation	Blood building therapy			W B C			R B C		Liver funet		Effects	Final outcome
									Blood transf.	Panil-tin	Cobalt green-pole	Before	After	Recovery	Before	After	Before	After		
1	I.	47	Cervical cancer, stage II	C iv M sup	5,000U 1~2	140,000 U	24 25 35	During admin. X-ray 2,100r	200		7A	5,600	2,300	After 3wks 320 × 10 ⁴ 12.4 g/dl	340 × 10 ⁴ 12.5 g/dl	Normal	Normal	#	Death after 40 wks	
2	N.	56	Cervical cancer, stage III	C iv M sup	5,000U 1~2	105,000 U	26 26 30	Before admin. Ra 4,550 mg/h	700		50A	6,000	2,200	After 7wks 310 × 10 ⁴ 11.5 g/dl	340 × 10 ⁴ 12 g/dl	Normal	Normal	#	Unknown	
3	M.	66	Cervical cancer, stage III	C iv M sup	5,000U 1~2	135,000 U	32 56 50	—	900	14A	102A	12,300	2,600	After 3wks 420 × 10 ⁴ 9.9 g/dl	420 × 10 ⁴ 11 g/dl	Normal	Normal	#	Death after 8 wks	
4	K.	45	Cervical cancer, stage II	M iv	2 mg	40 mg	20	—	1,000			12,200	9,200	293 × 10 ⁴ 11 g/dl	412 × 10 ⁴ 11 g/dl	C.C.F. 24h + 48h	C.C.F. 24h + 48h	+	Death after 12 wks	
5	O.	61	Cervical cancer, stage II	M iv	2 mg	24 mg	13	—				6,200	3,600	476 × 10 ⁴ 7 g/dl	402 × 10 ⁴ 9 g/dl	Normal	Normal	+	Alive	
6	N.	64	Cervical cancer, stage III	M iv	2 mg	40 mg	20	Before admin. Ra 3,950 mg/h				10,000	3,000	240 × 10 ⁴ 7 g/dl	260 × 10 ⁴ 9 g/dl	Normal	Normal	+	Death after 20 wks	
7	S.	42	Cervical cancer, stage III	M iv	2 mg	44 mg	22	Before admin. Ra 3,950 mg/h	800			9,700	11,000	427 × 10 ⁴ 64%	338 × 10 ⁴ 67%	Normal	Normal	+	Unknown	
8	T.	33	Cervical cancer, post-op. recur.	M iv	2 mg	56 mg	29	Before admin. X-ray 3,000r				9,400	4,800	380 × 10 ⁴ 76%	415 × 10 ⁴ 73%			+	Under treatment	
9	M.	47	Cervical cancer, post-op. recur.	M iv	2 mg	32 mg	40	—				5,000	4,700	330 × 10 ⁴ 11 g/dl	450 × 10 ⁴ 13 g/dl	Normal	Normal	+	Alive	
10	T.	48	Cervical cancer, post-op. recur.	M iv M inflt	1-2 mg 1 mg	32 mg 6 mg	28	—	700	27A	27A	6,400	2,800	260 × 10 ⁴ 11 g/dl	266 × 10 ⁴ 13 g/dl	Normal	Normal	+	Death after 1 wks	
11	N.	50	Cervical cancer, post-op. recur.	M iv	2 mg	64 mg	32	—	1,800			9,800	4,500	380 × 10 ⁴ 11 g/dl	330 × 10 ⁴ 12 g/dl	Normal	Normal	+	Death after 11 wks	
12	I.	69	Vaginal cancer	I M iv II M iv	2 mg 2 mg	56 mg 42 mg	35 66	Before admin. X-ray 7,100r	200			5,300	4,000	410 × 10 ⁴ 12.1 g/dl	395 × 10 ⁴ 12.1 g/dl			+	Unknown	
13	O.	58	Vaginal cancer	I M iv II M iv	2 mg 2 mg	30 mg 44 mg	21 50	—				13,800	8,600	408 × 10 ⁴ 84%	460 × 10 ⁴ 76%			+	Alive	
14	T	73	Ext. genital cancer	M iv	1-2 mg	20 mg	12	Before admin. Ra 4,200 mg/h				9,700	5,000	321 × 10 ⁴ 72%	318 × 10 ⁴ 67%			+	Under treatment	
15	K.	45	Ext. genital cancer	I M iv II M inflt	2 mg 2 mg	26 mg 15 + 10 mg	15 + 10 22	After admin. X-ray 300r	400	29A	29A	7,000	2,500	After 3wks 380 × 10 ⁴ 15 g/dl	390 × 10 ⁴ 11.5 g/dl	Normal	Normal	+	Death after 9 wks	
16	N.	38	Ext. genital cancer	I M iv II M inflt	1 mg 1 mg	20 mg 10 mg	20 10	After admin. X ray 900r	800			12,000	3,100	After 4wks 390 × 10 ⁴ 13.5 g/dl	420 × 10 ⁴ 12.5 g/dl	Normal	Normal	+	Alive	
17	I.	62	Ext. genital cancer	I M iv II M inflt	1 mg 1 mg	12 mg 18 mg	14 18	After admin. X-ray 1,800r	600	20A	20A	6,900	5,100	350 × 10 ⁴ 10 g/dl	350 × 10 ⁴ 11 g/dl	Normal	Normal	+	Death after 12 wks	
18	I.	32	Ext. genital cancer	M iv	2 mg	36 mg	21	After admin. Ra 3,300 mg/h				7,700	7,200	324 × 10 ⁴ 62%	209 × 10 ⁴ 43%	Normal	Normal	+	Under treatment	
19	F.	38	Peritoneal dissemination, post-op., Kruckenberg's	M iv M perit	2 mg 1-2 mg	22 mg 32 mg	14 37	Before admin. X-ray 2,400r During admin. X-ray 1,200r	2,400			5,400	5,000	380 × 10 ⁴	430 × 10 ⁴			+	Death after 1 wk	
20	F.	30	Peritoneal dissemination, post-op., Ovarian cancer	I M perit II M pleur M iv	1-2 mg 2 mg 2 mg	41 mg 34 mg 26 mg	14 24 30	Before admin. X-ray 6,900r During admin. X-ray 1,100r	800	38A		4,200	4,300	350 × 10 ⁴ 70%	410 × 10 ⁴ 82%	Normal	Normal	+	Death	
21	N.	29	Chorionepithelioma	M iv	2 mg	60 mg	30	—	1,200	34A		7,300	2,400	442 × 10 ⁴ 10.2 g/dl	390 × 10 ⁴ 13.5 g/dl	Normal	Normal	+	Alive	
22	H.	22	Chorionepithelioma	M iv	2 mg	54 mg	27	During admin. Ra 3,000 mg/h				6,600	3,600	411 × 10 ⁴ 84%	430 × 10 ⁴ 78%	Normal	Normal	+	Alive	

Note: C: Carzinophilin, M: Mitomycin, iv: intravenous injection, sup: suppository, inflt: local injection, perit: intraperitoneal injection, pleur: intrapleural injection.

Cases 15—17 were given i.v. and local infiltration of MC before the radical operation and they demonstrated anti-tumor property of MC in the excised specimen. These have been reported previously but two of them will be shown later. Cases 19 & 20 were cancerous peritonitis and the latter will be described later because of its prolonged course of treatment. Cases 21 & 22 were chorionepithelioma. Details of these cases will be noted later.

The total amount of the drug used ranged between 60—24 mg for a single course of treatment while the maximum amount used in a patient was 101 mg (Case 16). Table 1 is arranged according to the routes of administration. Radiation

therapy in the table shows X-ray or radium therapy given immediately before, after or together with MC administration during hospitalization, and not those given before or after that period.

Blood transfusion, Panilitin, & Cobalt Greenpole indicate only the amounts used during MC administration. It should be noted that in many instances, especially in marked leucopenia, they were continued even after the cessation of MC.

It was difficult to evaluate therapeutic effects of MC, and no constant results were obtained even after analyses according to several categories. Some of the reasons for this difficulty were; most of the cases were in the terminal stages of cancer;

cases in early stages were operated radically; and some cases were given radiation therapy before, during, or after MC administration. However, we based our evaluation on repeated cytological and histological examinations, gross appearance of the tumor, and subjective complaints of the patient. We arbitrarily indicated the therapeutic effects as †, ‡, +.

Probably due to careful administration of MC and concurrent blood transfusion, leucopenia was not severe and there were only 2 cases that showed WBC below 3,000 after around 40 mg MC. WBC returned to normal levels in 3—4 weeks and also those cases given both Carzinophilin & MC returned to normal in 3—5 weeks.

RBC, Hb, Ht, and liver function tests did not show definite changes after MC administration. Cases 3 & 20 each showed abnormal CCF & BSP values and the latter also showed positive urobilinogen. However, they were considered to be manifestations of the terminal cancer, particularly in Case 20 which was accompanied by marked pleural and peritoneal fluid.

The final outcome of patients is shown in the last column of Table 1. The survivals are under observation with peri-

odic visits but without MC medication at the moment.

2. Description of Cases

Representative cases are described for each of the following methods of administration: (1) Carzinophilin i.v. with MC suppository. (2) MC i.v. with MC local infiltration (3) MC i.v. only (4) MC in a body cavity with MC i.v.

Case 3 (Fig. 1), Uterine Cervical Cancer, Stage III. 66 yrs. Para IX.

Bleeding at bowel movement since Feb., 1956. Large cauliflower tumor in the vaginal portion of cervix was found. Marked resistance was noted in the vesical neck and parametrium. Diagnosed as cervical cancer, stage III. Course after admission is shown diagrammatically in Fig. 1. MC suppository, 56 pieces, for 8 weeks and Carzinophilin, 135,000 units, for 5 weeks were given, with complete disappearance of the tumor, loss of the original contour of the vaginal cervix, the vaginal dome communicating directly with the cervical canal and the cervical canal becoming as wide as a pencil. Vaginal smear was negative for tumor cells. Course in

Fig. 1 S.M. 66 yrs. Cancer, Uterine Neck, Stage III, Inoperable.

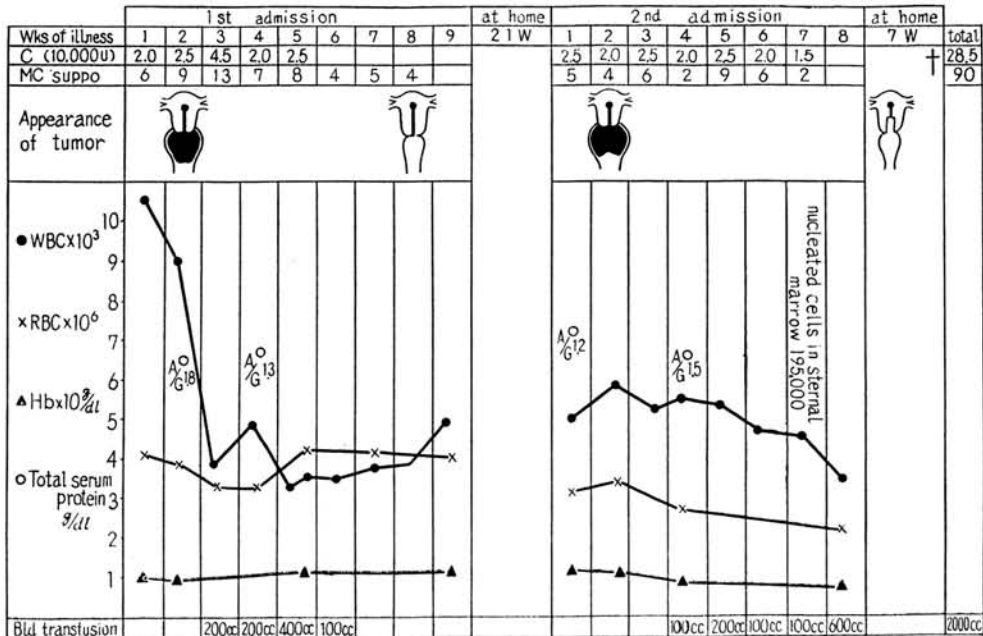


Table 2

Leucocytes	Myeloblast		0,8%	Reticulocytes	1,8%
	Neutrophilic	Promyelocytes	8,0%	Megalocytes	+
		Myelocytes	5,2%	Erythroblasts	0,4%
		Metamyelocytes	8,8%		
		Stab cells	11,6%	Megaloblasts	Total 3,4%
		Lobulated cells	11,2%		
			Polychromic		
	Eosinophiles	5,4%	Normochromic	Total 22,0%	
	Basophiles	0,2%	Normoblasts	Total 22,0%	
	Lymphocytes	7,4%			Basophilic
	Monocytes	3,8%	Polychromic		
	Plasma cells	4,0%	Normochromic		
	Free nuclei	4,8%	Mitoses	0%	
Mitoses	1,2%				

the hospital was very favorable, except for persistent urticaria in the 5th week, and she was discharged after 9 weeks. At her visit one month after discharge she remained essentially the same, but at her next visit 3 months after discharge she had a large cauliflower tumor in the vagina, a surprisingly rapid growth. She was readmitted and given the same treatment.

MC vaginal suppository and Carzino-philin 150,000 units i.v. were given in 7 weeks. At the end of the administration the tumor had disappeared but a large cavity was formed in the cervical canal with yellowish necrotic tissue on its surface. WBC at the time was 3,600 while sternal puncture gave the results as shown in Table 2. No important changes appeared in the bone marrow. However, the patient was more emaciated and anemic, compared to the first course of treatment, so that the drugs were stopped and general supportive measures including blood transfusion were given and she was discharged. For a short while she was in a fair condition but she

developed ascites and died 8 weeks after the end of the second course of treatment.

This case responded very well to the first course of treatment but the remaining tumor tissue rapidly redeveloped to a cauliflower-like growth. She apparently responded well also to the second course but the deep-lying tumor, particularly in the parametrium, was not completely subdued which finally led to cancerous peritonitis.

It might be argued that, if we had pushed the initial course of treatment a little further, the prognosis could have been better. It is possible that we were led to a false sense of security by the excellent outward improvement or in a way were affected also by the usual bad prognosis of terminal cancer.

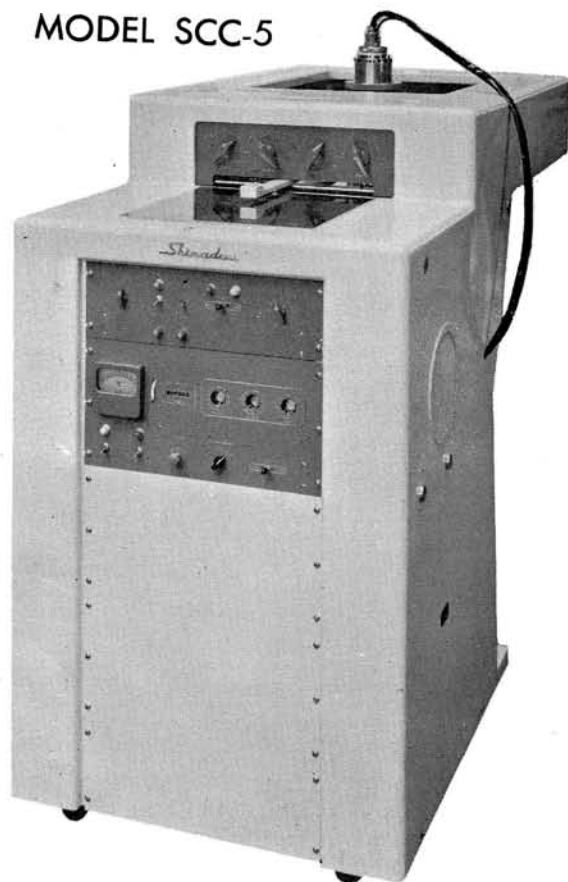
It should also be mentioned that the patient failed to visit us regularly because of the absence of symptoms and the tumor had developed beyond our control at her subsequent visit.

(Continued to Next Issue)

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STUDY ON METAL DENTAL MATERIALS IN THE LIGHT OF DENTAL HYGIENE

PART. 1

KAZUO NAGAI

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I Introduction

In Japan, the economic considerations do not permit the full use of gold alloy as dental material and instead many kinds of substitute alloys are in use for the dental fillings. Roughly classified from the metallurgical point, they are silver alloy, copper alloy, nickel and chrome alloy, German silver alloy, iron alloy, cobalt and chrome alloy, and amalgam alloy of silver and zinc etc. Although there are published many researches regarding the physical and mechanical properties of these various alloys, the present study has been undertaken in the light of dental hygiene in order to clarify such matters as corrosion and dissolution of these alloys in the oral cavity and their possible influence on the physical function, whether local or whole.

In this regard, Kawakami and Furu-kawa¹⁾, Kobayashi²⁾ and Ikeshita³⁾ among others have reported on the galvanic function between heterogeneous metals and Shida⁴⁾ published a very provocative and important monograph on the effect of nickel-chrome alloy and anti-corrosive function of saliva against metals. Friede and Weinkart⁵⁾ of Germany opposed to the use of copper alloy in the oral cavity but, on the other hand, Iwao⁶⁾ of this country published his findings that as the dissoluble amount of copper alloy in the oral cavity is negligible its use is beneficial rather than harmful to the living body.

Since the problems involved in this field are interesting hygienically and play an important part in the health of the people, the author has designed and conducted the following experiments.

To begin with, the various alloys mentioned above were subjected to the anti-corrosiveness test in immersion of chemicals and every-day drinks and foods. In

justification of this test, an observation was conducted to see how much teeth would be actually corroded by these chemicals and drinks and following this, the various corroding tendencies were measured in terms of electric curves electrochemically. Lastly, the various alloys which were prepared based on the results of tests were inserted in the oral cavity of dogs and the states of these alloys were investigated by changes in their weights with the aim of contributing towards dental hygiene.

II Anti-corrosiveness of Metal Dental Materials by Various Chemicals

Section 1. Experimental methods and materials

As materials for the experimental purpose, selection was made of 0.05% solution of HCl, 1 % solution of lactic acid, 1% solution of table salt, and, as every-day drinks and foods, apple juice, orange juice, Bireley's orange juice, miso soup, combination of miso and cooked rice (after mastication of five minutes), bread and butter (after mastication of five minutes) and pickles. Various alloys were immersed in 50 cc solution of each materials thus selected and their corrosions were measured in terms of one square centimeter during three days at the temperature of 37°C. The alloys used included nickel-chrome alloy, copper alloy, German silver alloys, silver alloy and amalgam alloy of silver and zinc.

Section 2. Result

The result of the above test in which five samples per alloy were used in conjunction with HCl, lactic acid and table salt is given on Table 1, the figures being indi-

Table 1

Kinds	Agents Hydrochloric acid	0.05%	1% Lactic acid	1% Table salt
Ni-Cr		-1.23	-0.94	-0.03
Cu-alloy		-1.36	-1.56	-0.05
Cu-alloy (casting)		-3.03	-2.05	-0.22
German silver alloy		-3.91	-2.39	-0.19
Silver alloy		-2.49	-1.49	+0.51
Silver-zinc-amalgam		-2.61	-2.49	-1.18

Table 2

Kinds	Agents	Apple juice (pH 4.11)	Orange juice (pH 2.65)	Bireley's juice (pH 2.76)	Miso soup (pH 4.67)	Rice and Miso	Bread and buttes	Bread, butter and miso	Pickle
Nickel-chrome alloy		0	0.05	0.03	0	0.01	0.01	0	0.01
Copper alloy (plate)		0.06	0.13	0.08	0	0.02	0.01	0	0.05
Copper alloy (mould)		0.02	0.11	0.20	0	0.01	0.01	0.02	0.02
Silver alloy		0.02	0.12	0.15	0	/	/	/	/
Silver-zinc-amalgam		/	/	/	/	0.01	0.01	0	0

cative of the average corroded amount per 1 cm².

The result of the above test dealing with every-day drinks and foods such as apple juice, orange juice, Bireley's juice, miso soup, rice and miso, bread and butter and pickles is given on Table 2 below, the figures being indicative of the average corroded amount per 1 cm².

Section 3. Consideration

As is attested by the figure above, it has been established that there are different alloys by various chemicals. However, it must be admitted that there does not exist in the mouth a sample whose concentration is so heavy as that used in the test and to this must also be added the fact that as three days elapsed there must have taken place certain modifications in the properties of given sample itself. Therefore, although these figures serve their purpose of comparison among different alloys as regards their corrosiveness, it is not feasible to regard them directly as values of the alloys for dental use.

As for the effects of every-day drinks and foods, corrosion in each has been very slight as is known from Table 2. In this connection, it is to be borne in mind

that since the experiment lasted for three consecutive days, there is much difference in the actual consumption of these foods in our daily life. For example, when orange is consumed by a person the time during which it stays in the mouth in contact with the oral metal is short in duration and certain amount of saliva is inevitably discharged as a vital reaction. This thought led the author to an experiment in regard to the reflex saliva as follows.

Section 4. Measurement of reflex saliva by foods

As is indicated on Fig. 1, a salivary suction-cup and a salivary measurement apparatus were used which were of Hayashi-Suhara devise.

The suction-cup was applied to the effluent duct of parotid gland by means of pressure and reflex saliva was measured by the manometer in which was filled water. As conditioned stimulants, 1 cc solution of each sample drink was infused over the tongue of examinees by a syringe by the use of assistants.^(1,2) Table 3 gives the result of this test which indicates that such drinks as orange juice or Bireley's orange juice having heavy pH occasion a large quantity of reflex saliva. The reason for

Fig. 1

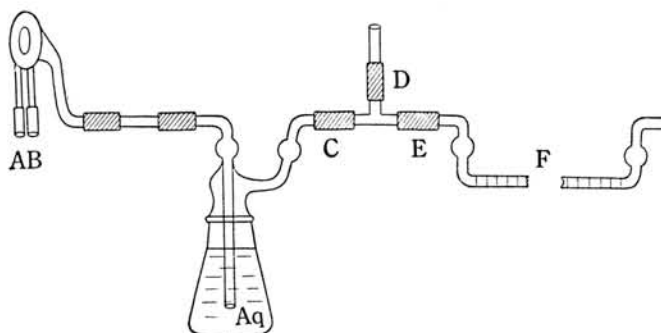


Table 3

Examinees	Date (At 7 Every Morning)	Normal time	Conditioned reflex	
		Resting saliv (mm) (For 3 Sec.)	Stimulants	Amount of saliva (mm) (For 3 Sec.)
A. 30 ys.	28. 5. 1	15.2	Alcoholic beverage	53
	28. 5. 2	16.1	Beer	35
	28. 5. 3	18.0	Milk	24
	28. 5. 4	18.0	Coffee	30
	28. 5. 5	18.0	Orange	102
	28. 5. 6	18.1	Miso soup	25
	28. 5. 7	18.2	Bireley's orange juice	92
	28. 5. 8	16.0	Tartaric acid	242
B. 38 ys.	28. 5.1	20.1	Alcoholic beverage	39
	28. 5. 2	20.0	Beer	35
	28. 5. 3	20.4	Milk	28
	28. 5. 4	20.0	Coffee	33
	28. 5. 5	20.0	Orange	148
	28. 5. 6	20.6	Miso soup	35
	28. 5. 7	20.0	Bireley's orange juice	97
	28. 5. 8	20.2	Tartaric acid	280

this phenomenon may be attributed to a vital reaction that tries to render neutral by secreting much saliva any extraneous matter whose pH is heavy.

Section 5. Conclusions

1) As has been established by the use of HCl, lactic acid and table salt it is possible to know the difference in corrosiveness of different alloys but it does not serve as a means directly judging the value of an alloy for the fitness as dental material.

2) Corrosions occasioned by drinks and foods are far less than those caused by chemicals.

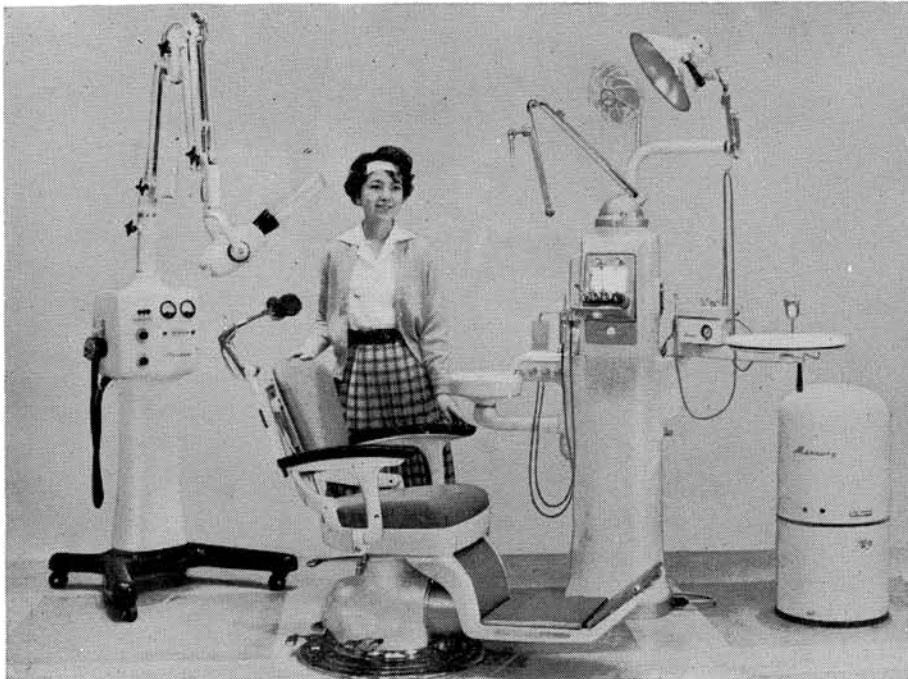
3) Amount of reflex saliva occasioned by foods differs considerably by the kinds.

4) From the fact that there exists a difference in the amount of reflex saliva by the kinds of foods, a conclusion is drawn that corrosion by foods is of such a degree as can be safely ignored.

(Continued to Next Issue)

A List of Congresses of Various Dental Society in 1960

Name of Congress	Date	Place
Congress on Oral Cavity Conservative Treatment	August 19	Sapporo Med. Col., Hokkaido
C. Fundamental Science of Dentistry	Middle of December	Tokyo
C. Oral Surgery	Scheduled in autumn	Undecided
J.. C. Orthodontics	October 7, 8	Okayama
J. C. Dental Materials & Machines	Scheduled in June	Tokyo
J. C. Dental Radiation	Scheduled in autumn	Tokyo
J. C. Prosthetic Dentistry	May 15 (Sun.) or 22 (Sun.)	Tokyo



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Information Home & Abroad

New Hypothesis on the Extension of Radioactivity

At a meeting for publication of researches on radioactive isotopes held at Shizuoka University on 19th, March, Masuo Yagi of Laboratory of Radioactive Chemistry of the University published a new hypothesis that among radioactive substances resulting from nuclear experiments, some of longer period of reduction by half in radioactivity and much effect on the human body might fly to the more distant area. It was decided that this research should be reported to the scientific commission of the United Nations. Professor Shiokawa, director of Laboratory of Radiant Rays of the University, commented on this theory that the young scholar gave a clear explanation about the ambiguous extension of radioactivity hitherto unsolved.

Japanese Corps of Doctors in Preventology Asked to Assist in the Prevention of Rabies in Thailand

Japanese corps of physicians in prophylactic are to be mobilized for assistance in the prevention of rabies in Thailand, and will be shortly sent to Bangkok. Professor Hirotsugu Shiraki of Cerebral Laboratory, Tokyo University and co-workers as the first detachment started for the destination by airline from Haneda airport on 20th night, March. This is one of international medical assistances asked by World Federation of Neurology situated in Antwerp, Belgium.

Success in Operation Under Low Temperature Anesthesia

Eight minutes have been considered to be the maximum time limit to the human allesthesia in cardiotomy. Professors Toshihide Yonezawa, Koichi Seda, and Assistant Professor Hiroshi Okamura have succeeded in suspending cardiac function of 11 patients under less than 25°C temperature for over 20 minutes and operating them. In these cases the minimum temperature is 21°C, and the maximum time 27 minutes 50 seconds. It is

said that there has been no similar example in foreign countries, and results were reported at a meeting of Japan Anesthesia Society held in Osaka on 29th, March, and will be also reported at the International Congress on Anesthesia to be convened in Tront, Canada, next September.

Another Success in Ultra-low Temperature Anesthesia

Experimental success has been obtained by Professor Akira Inamoto in ultra-low temperature anesthesia of dogs. The scholar has discovered the effect of previously administered fatty acids and vitamin E on the inhibition of side effects resulting from the anesthesia. The operation can be performed at 18°C lowered temperature and extended over about one hour under the preceding condition. Professor Ansei Aoyagi of Surgical Department, Kyoto University Medical School has hailed this achievement as a great contribution to the improvement of surgery.

A Japanese Woman Expected to Go to Lambarene Hospital by Invitation of Dr. Albert Schweitzer

Mrs. Takeko Takahashi, wife of a Japanese physician cooperating with Dr. Albert Schweitzer at Lambarene hospital in Equatorial Africa, has been recently invited there by the saint of Africa.

Dr. Tsutomu Takahashi, her husband, is one of co-workers who have served in the treatment of negro lepers there.

The Practical Application of Fetal Cardiophone Realized

A success in practical application of the fetal cardiophone was reported by Professor Takashi Kobayashi of Obstetric and Gynecological Department, Tokyo University Medical School at a meeting of Japan Obstetrics and Gynecology Society held in Tokyo, March 18. This machine was practically used at the birth of newly born imperial grandson Prince Hironomiya. It is said that this ap-

paratus will constitute a part of necessary preparations for the safe delivery in future.

Newly Elected Organization of Japan Dental Association

There has been an election for newly organized directorship of Japan Dental Association on March 13. Drs. Hiroshi Kawamura, and Hanzo Okumura and Tsuneo Hosaka have been respectively elected to posts of President and Vice Presidents.

The newly elected President aside after the nomination that Japan Dental Association was at present confronted with many difficult problems such as taxation and social insurance with the national compulsory insurance just ahead, so that he would do his best for improvement of the social status of the Association.

Newly Elected Directors of Japan Medical Association

There took place a renewal of the directorship of Japan Medical Association on April 1, and following persons were respectively elected to posts of the Association.

President: Taro Takemi

Vice Presidents: Seiichi Ota and Tetsuo Abe

Managing Directors: Shigeru Hasuda, Asahide Endo, Shinji Okabe, Shigesada Marumo, Iyui Miki, Kyoji Kase and Shinichiro Kikuchi

Dr. Taro Takemi, in his speech after the election, stressed that "a medical system should never be governed by anything else but medicine."

The Discovery of New Antibiotic

Successful discovery of a new antibiotic capable of killing some bacteria resistant to penicillin and streptomycin has been reported by three scientists at a meeting held at the Tokyo University Infection Disease Institute on March 25.

Three discoverers are Michitaka Inoue and two others of the Takeda Research Institute, and it is disclosed that the new antibiotic glutamycin has a high heat resistance and remains in the blood longer than antibiotics hitherto discovered.

They said that the new antibiotic has

particular effectiveness in combatting Gram-positive bacteria including Staphylococcus. It is less poisonous than any of the anti-Gram-positive bacteria biotics, they added.

Dr. Yukimasa Yagisawa, an executive of the Japan Antibiotic Council, paid the praise to the discovery of this rare new antibiotic, saying that this antibiotic could be injected into human bodies without any fear of poisoning.

Atomic Savants to be Invited to the 4th Japan Isotope Conference from Southeast Asian Countries

Officials of the Japan Atomic Energy Industrial Forum disclosed the possibility in addition to its long-term project that atomic scholars from Southeast Asia countries as well as domestic scientists are expected to be invited to the 4th Japan Isotope Conference to be held some time this year under JAEIF's sponsorship to discuss industrial utilization of isotopes.

J Japanese Doctor Invited to Attend the 48th Annual Session of F.D.I., Dublin, Ireland

The 48th Annual Session of F.D.I., an organization of dentists all over the world, is expected to be held in Dublin, Ireland from 20th to 25th coming June. This session will be attended by Dr. Kazuo Nagai, Professor of Nihon University Dental School.

New Evidence of Virus Behind Leukemia

Dr. Steven O. Schwartz, an American scientist, disclosed his conclusive proof that leukemia, a uniformly fatal blood cancer of human beings, is caused by a virus. His proof contained evidence that eventually it would be possible to make a serum which could halt the disease and a vaccine which could prevent it.

He obtained part of this proof from the body chemistry of prisoners of the Cook County (Chicago) Jail who volunteered to be guinea pigs.

**Dr. Taro Takemi Gained the Third
Nomination to the Presidency of
Japan Medical Association**

The 34th ordinary session of representatives of Japan Medical Association was held at Japan Medical Association Hall, Tokyo on April 1, when cherry blossoms were in full bloom, and there took place an election for the presidency.

Dr. Taro Takemi who had exerted his best effort toward every reform in favor of the association with all his justice and conviction during the past three years, gained the third nomination to the presidency with an absolute majority of supporters. Dr. T. Takemi, in his speech after the election, disclosed his ambitious project to the following effect.

"I think that the association is now confronted with important domestic problems such as improvement of the medical treatment system deserving a far-sighted national policy and study on the economic effectiveness of this system."

"And I think that from the standpoint of world peace there are a great number of international events to be done such as cooperation with World Physicians' Association, Confederation of Medical Associations of Asia and Oceania and International Medical Congresses, and exchange of medical knowledges, friendly exchange of greetings with foreign physicians and publication of medical journals in English and Chinese as well."

"Japanese medicine has recovered itself to the world highest level in about thirteen years after the war."

"It is hoped that 100,000 Japanese physicians and 46 medical colleges should continue to take an active part in the medical cure and research conducive to the happiness of humanity under the tightened solidarity."

**Exchange of Medical Literatures and
Informations with France and Germany**

For the purpose of improving links of cultural chain and mutual understanding

among foreign countries exchange of medical journals and literatures with France as well as that of medical literatures and informations with Germany had been carried on by Japan Medical Association, which reported that there had been also an exchange of considerable volume in the previous fiscal year ending on March 31. Those journals and literatures are available for the public in a library attached to the association.

**Scholarship by Taito Pfizer Co.
ended successfully**

Mr. John E. McKeen, President of Charles Pfizer Co. in America, had offered scholarship to Japan Medical Association to send Japanese medical student to America for further study. For the purpose of effectuating this offer Taito Pfizer Scholarship Commission was established by the association. Each scholarship student was selected from 46 medical colleges or medical department of universities throughout the country, and they were admitted to study on the annual allowance of ¥150,000 for one year. This scholarship destined to last for three years successfully ended in this March. Reports from those students were collected together and offered to the president.

**Japan Given Patent Rights to
New Pain-Killing Drug**

U.S. Ambassador Douglas MacArthur II presented to the Japanese Government the chemical formulas and the patent rights for a new synthetic pain-killing drug developed by the U.S. Public Health Service.

The new drug, phenazocine (NIH 7519), is 10 times more powerful than morphine in subduing pain. Tests also indicate it causes less respiratory depression than morphine and is less likely to induce addiction.

The new drug, which is made from coal tar products, was developed at the National Institutes of Health in Bethesda, Md., by Dr. Everette L. May, in collaboration with Dr. Nathan Eddy.

KOBE MEDICAL COLLEGE



Bird's-Eye-View of College

- | | |
|--|---|
| 1. College main building | 8. Mental ward |
| 2. Laboratory for fundamental sciences | 9. Dormitory for nurses |
| 3. Clinical main building | 10. Kawasaki Clinic & Uchida Clinic
(ward for internal medicine) |
| 4. Operation building | 11. Section of Clinical Investigation |
| 5. Konan ward (combined ward for pediatric
and internal diseases) | 12. Central auditorium |
| 6. Central ward (tuberculosis ward) | 13. Nursing school |
| 7. Quarantine ward | 14. Animal-breeding pen |

THE HISTORICAL FACTS

The history of the Kobe Medical College dates back to April 1869 when the Hyogo Prefecture Kobe Hospital was established which is the forerunner of the present Medical College Hospital. As an institution for Medical education, it was when the Hyogo Ken Igaku Senmon Gakko (Hyogo Prefecture Medical School) was organized and established in January 1944 that the hospital became the nucleus of the Kobe Medical College.

With the new reformation in Medical educational system, together with need of people of Hyogo Prefecture, the Hyogo Prefecture Medical School was elevated to meet newly postwar reformed status and reorganized as the Hyogo Prefecture Medical College in April 1946.

In June 1946, the preparatory college, that is, premedical school was established in the town of Sasayama, Takigun, and the first class of students were admitted. The full curriculum of medical school was initiated in April of the following year, 1947, by admitting for those who have completed two year course of preliminary premedical education upon passing entrance examination. The research and clinical facilities were enlarged and with additional equipments, the foundation of the Kobe Medical College was founded.

Later, the Nursing School was organized in April 1949 in the compound and it was affiliated with the Kobe Medical College.

In October 1950, Scientific Crime Detection Laboratory was established as an unit of the Medical College which was later reorganized as the Institute for Forensic Medicine.

In March 1951, both the Premedical Preparatory School for the Kobe Medical College and the preexisted Medical School were closed in accordance with the reformed medical educational system, and in February 1952, the name of Kobe Medical College was formally adopted in conjunction with the inauguration of the new system of University Education as stipulated in National School Education Law.

In January 1955, along with change in the Medical education system, premedical education course of the Kobe Medical College was established at the Hyogo Pre-

fecture Agricultural College in Sasayama and Hyogo Prefecture Engineering College in Himeji. At the same time, the college was permitted to bestow an advanced post-graduate medical degree upon evaluating the theses in the post-graduate research division under old graduate school system. However, the graduate school under new system was authorized in March 1958 and graduate students were admitted in June, realizing years of pending problem which faced the Medical College, and with completion of graduate school building equipped with full medical research facilities, the function of medical education was strengthened.

A medical educational institution to meet ever increasing knowledge in the progress of medical science to fulfill the objectives for training of medical professional men as well as a center for medicine research has been steadily met and effort is being made to contribute further to human welfare. The Kobe Medical College is now on the road of progress to realize an ideal of a most modern service center of medicine in the widest sense.

Undergraduate and Graduate Schools:

The Kobe Medical College offers full four year medical curriculum for the undergraduate and graduate school for Medical Research which is four year course to lead an advanced medical degree of 'Hakase'. The medical research division under former system is also attached.

The undergraduate medical course comprised of 13 Departments of Basic Sciences Division and 12 Departments of Clinical Medical Division, the graduate school for medical research is also organized and administered by the above departments.

Advanced Degree Conferred:

Since January 1955 when the privilege to confer advanced graduate degree was authorized, there have been 720 physicians who were conferred of 'Igaku Hakushi' or Doctor of Medical Science, by March 1958. The present existing old system of conferring D.M.S. will be eventually terminates by 1960, when only the new system of postgraduate school for medical research completely replaces the former one.

Main Administrative Officers

1. President
Chusetsu Endoh, M. D.
2. Hospital Director
Professor Minoru Jogetsu
3. Director, Administrative Office
Mr. Noboru Ikehara
4. Chief, Student Service
Professor Susumu Hotta
5. Acting Director, Research Institute..
Chusetsu Endoh, M. D.
6. Director, Medical Library
Professor Masao Ueda
7. Clinical Laboratory Director.
Professor Shozo Tsuji

Departments and Directors

- Anatomy, Division I
Professor Hajime Takeda
- Anatomy, Division II
(Will be appointed)
- Physiology, Division I
Professor Shosuke Okamoto
- Physiology, Division II
Professor Isamu Suda
- Biochemistry
Professor Hideo Mabuchi
- Pathology, Division I
Professor Takeo Yamori
- Pathology, Division II
Professor Sukehisa Hatano
- Pharmacology
Professor Hiroshi Matsumoto
- Microbiology
Professor Susumu Hotta

- Hygiene
Professor Shuzo Matsushima
- Public Health
(Will be appointed)
- Industrial Medicine
Professor Kazuo Furusawa
- Forensic Medicine
Professor Masao Ueda
- Internal Medicine, Division I
Professor Tatsuya Tomomatsu
- Internal Medicine, Division II
Professor Shozo Tsuji
- Surgery, Division I
Professor Noboru Fujita
- Surgery, Division II
Professor Zen-e Ishikawa
- Orthopedic Surgery
Professor Daiji Kashiwagi
- Pediatrics
Professor Yoshiho Hirata
- Otolaryngology
Professor Ryoza Asai
- Obstetrics and Cynecology
Professor Yasuo Ueda
- Dermato-Urology
Professor Minoru Jogetsu
- Ophthalmology
Professor Yuzuru Imachi
- Radiological Medicine
Professor Kazuyuki Narabayashi
- Neuropsychiatry
Professor Shoshiro Kuromaru

Undergraduate and Graduate Courses

- I. Undergraduate Course
Medical course: 4 years

Number of Students

	1st grade	2nd grade	3rd grade	4th grade	Total
Full number	80	80	80	80	320
Actual number	87	86	85	80	338
	(female 7)	(female 3)	(female 4)	(female 4)	

Qualifications for admission

(1) Those who have learned more than 2 years in the 4 year course medical department of university or college, or have completed more than 64 units as stipulated in National School Education Law.

(2) Those who have graduated from the Higher School in the science of senior class under the old Higher School Ordinance.

(3) Those who have completed the

premedical course of the medical college or the medical department of university other than this University.

(4) Those who have received elsewhere an education designated by Education Minister to be equivalent to the course ruled in (1).

Moreover, those who have completed the premedical course of this University (40 and 30 graduates from Hyogo Agricultural College and Himeji Engineering College re-

spectively) are eligible for admission without examination.

Graduation

Those who have completed the prescribed course and passed the graduation examination of all subjects are conferred the degree of "Igakushi" (equivalent to

Doctor of Medicine).

Graduate Course

Course: Postgraduate course for medical research granting the degree of "Igaku-hakushi" (equivalent to Doctor of Medical Science).

The course covers four years.

Number of students

	Full number	1st grade	2nd grade	3rd grade	4th grade	Total
Physiological science	24		15			25
Pathological science	12	1	1			1
Social medicine	8		3			4
Internal medicine	20	4	1			1
Surgery	28	5	3			7
Total	92	10	7			12

Qualifications for admission

(1) Those who have graduated from the medical college or the medical department of university.

(2) Those who have been designated by Education Minister to have received an education equivalent to or more than that acquired by graduates of the medical college or the medical department of university.

Conferment of the degree

Variety of degree: Igakuhakushi (equivalent of Doctor of Medical Science).

Those who have completed all prescribed units of the graduate school are conferred the degree.

Those who have been in the graduate school for Medical Research for more than 4 years, acquired the necessary units and passed the examination of thesis for Doctorate and the final examination will be conferred the degree of Igakuhakushi.

Moreover, those who have finished the Doctor's Course in the Graduate School, may be granted the degree of Doctor by means of submitting thesis for Doctorate.

(3) The medical research division under the former system.

This division was attached to the old system of college in conformity with the old University Ordinance, and has admitted for those who have acquired the degree of Igakushi, or have ability surpassing that of Igakushi. Those who have studied in the research division for more than 2 years may be allowed to submit the thesis for

Doctorate and ask for conferment of the degree. The old system of medical research division will be closed by the end of 1960.

The full number is not fixed.

The existing number of researchers is 93 (as of March 1, 1960)

(4) The old system of postgraduate course.

This course has admitted for graduates of the medical college, the medical department of university or the medical technical school who intend to major in the medical science. The course covers more than two years. (This system will be terminated by March 31, 1961, when the university education under the former system will be completely replaced by the new one.)

The full number of students is 300.

The existing number of students is 244 (as of March 1, 1960).

(5) The new system of postgraduate course.

The new system of postgraduate course was inaugurated to grant advanced medical degree of "Igaku-hakushi" with the opening of Graduate School for Medical Research. Those who have completed the full four year medical curriculum in the undergraduate school of the medical college or the medical department of university, or those who have been approved by this college to have ability surpassing that of the graduate of the above-mentioned school, are allowed to enter the Graduate School. The course covers more than one year. Those who have studied in

the Graduate School for the prescribed term are permitted to ask for an advanced graduate degree by submitting the thesis as to the special research.

The full number of students is 300.

The existing number of students is 38 (as of March 1, 1960).

Attached Hospital

The history of this hospital is traced back to April 1869 when the Hyogo Prefecture Kobe Hospital was established. With the subsequent establishment of an institution for medical education by Hyogo Prefecture, it was reorganized into attached hospital of this institution, and has been enlarged in facilities along with the development of this College. The hospital comprises following departments:

Medical Treatment Division: This is comprised of following 13 departments. Internal Medicine Division I, Internal Medicine Division II, Surgery Division I, Surgery Division II, Orthopedic Surgery, Obstetrics and Gynecology, Pediatrics, Ophthalmology, Neuropsychiatry, Dermato-urology, Otolaryngology, Radiological Medicine and Dentistry.

Beds: 1,004.

In-patients: Daily average 915 (recent three month average).

Out-patients: Daily average 1,075 (recent three month average).

Clinical Medical Division

This was inaugurated in September 1957, and at present consists of medicochemical, bacteriological and pathological departments.

Pharmacological Division

Nursing Division

Nurse-general and 304 nurses are disposed in every departments.

Attached Laboratory

This laboratory was attached to the college for synthetic researches on physics, chemistry and biology with priority given to medicine in September 1957, and comprises following three sections.

- (1) Section of Research on Radioactive Isotopes.

Research is made on medical application of radioactive isotopes.

- (2) Section to Electron-microscopic Research.

Electron microscopic study is made on the minute structure of microorganism and internal organ tissue.

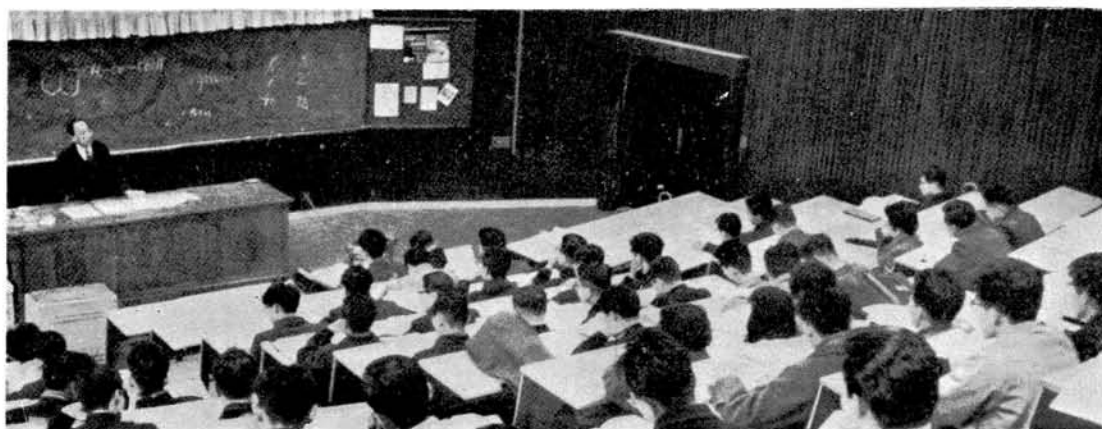
- (3) Section of Research on Fluorine Metabolism (temporarily established).

Study is made on action of fluorine on the human body.

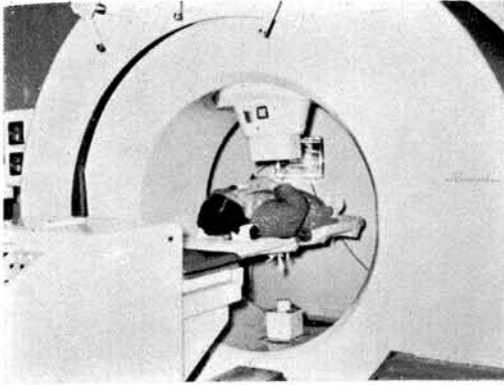
Library

Number of collected books (as of Oct. 1, 1959)

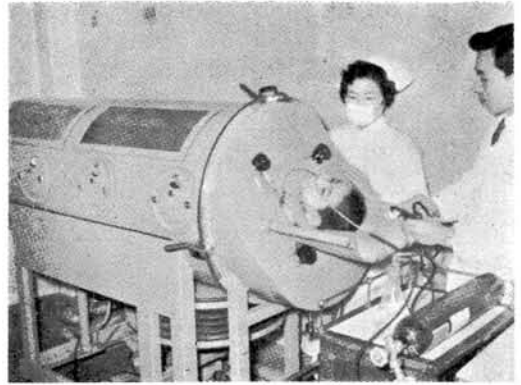
	Special	General	Total	Scientific magazines
Foreign books	12,540 copies	473 copies	13,013 copies	396 varieties
Japanese books	19,601 "	211 "	19,812 "	404 "
Total	32,141 "	684 "	32,825 "	800 "



The 1st Auditorium



Co-60 double rotating radiation apparatus



Iron lung (artificial respiratory organ)



Front view of attached hospital



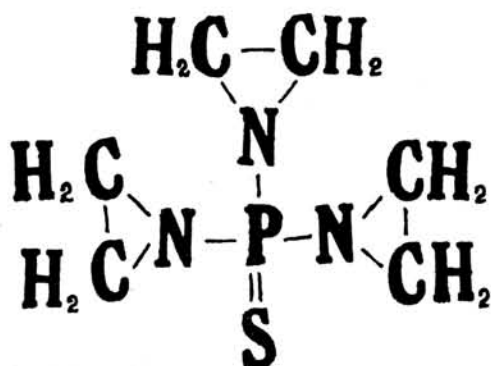
Operation room equipped with essences of the modern medicine



Students in the practical course

New Antitumor Agent—Biological Alkylating Type

Ethyleneimino Compound
TESPAMIN
(Thio-TEPA)



Characteristics

- ★ Broad antitumor spectrum
- ★ Less side effects
- ★ Every administration
- ★ High stability and uniformity

Packing

TESPAMIN Injection

5 mg × 5 ampoules

with 5 ampoules of sterile
distilled water for injection

Indications

Chronic myeloid leukemia,
Subacute myeloid leukemia,
Chronic lymphoid leukemia,
Polycythemia

Hodgkin's disease,
Lymphosarcoma,
Reticulosarcoma

Mammary carcinoma,
Lung carcinoma,
Ovarian carcinoma,
Uterine carcinoma,
Stomach carcinoma,
Pancreas carcinoma,
Cancerous peritonitis,
Malignant chorio-epithelioma,
Other carcinoma and their
metastasis

Subjective and objective palliation
of above disease



manufactured and sold by
SUMITOMO CHEMICAL CO., LTD.
22-5 chome, Kitahama, Higashi-ku, Osaka, Japan

SUMITOMO CHEMICAL CO., LTD.

History and Development

From Foundation Until End of The War

Like most of Sumitomo enterprises that branched out from the Besshi copper mining, our enterprise was also brought into being for the purpose of making best use of sulphuric acid processed from sulphur dioxide that was generated in the smelting process of Besshi copper ore, in September 1913 by the Sumitomo General Head Office with calcium superphosphate plant constructed in Niihama, Shikoku Island. Later in June 1925, it was reorganized into a new independent establishment named Sumitomo Fertilizer Works, Ltd.

The biggest problem that the chemical industry then faced was the fixation of atmospheric nitrogen on an industrial scale. The Company acquired in 1928 a patent license from Nitrogen Engineering Corporation of the U.S.A. for the production of ammonia and the construction of ammonia plant was completed in 1930. This project ushered the Company into a new epoch of chemical progress. The Company began to manufacture ammonium sulphate in 1931, nitric acid in 1934, sodium nitrite in 1935, methanol in 1937, formalin in 1938, and ammonium nitrate in 1941. In order to finance the expansion project of production facilities, the Company increased its capital to ten million yen and changed its name in 1934 to Sumitomo Chemical Company, Ltd.

While a research work was set about in 1933 for the production of aluminum from indigenous materials, and a process was developed to get alumina from alum which was put into full-scale operation in 1936 but switched over to Bayer process in 1938 to meet the greater requirement of aluminum. This alumina was supplied to the Sumitomo Aluminum Reduction Co., Ltd., situated on the adjoining site until the Company took over the former's entire facilities in 1949 to undertake an integrated alumina-to-aluminum production process. This is the present Kikumoto Works of the Company.

In 1944 the Company absorbed Japan Dyestuff Manufacturing Co., Limited with which it had for many years been closely interrelated as regards raw materials and manufacturing techniques. The Japan Dyestuff Manufacturing Company was founded in 1916 and had been a manufacturer of dyestuffs and pharmaceuticals and particularly the country's largest producer and exporter of dyestuffs.

In 1945, the Company acquired from the Ozaki Dyestuff Co., Limited in Okayama Prefecture their plant facilities. This is our Okayama Plant where certain items of dyestuffs

and industrial chemicals are manufactured. The present Osaka Works, the parent factory of Okayama Plant, Osaka Plant and Tsurusaki Plant in Kyushu, manufacture dyestuffs and pharmaceuticals with supply of sulphuric acid, nitric acid as well as by-products from coke furnace of the Niihama Works.

Post-War Rehabilitation

The Company had made progress in strides before and during the war and come to stand out among chemical enterprises in Japan. But toward the end of war the Company found its productive operation in a paralytic state due to heavy losses incurred to equipment by air raids and to the lack of proper maintenance during the later stage of war. However, rehabilitation program was soon set up and the greatest emphasis was placed on the restoration and expansion of ammonia and ammonium sulphate facilities. The reconstruction of dyestuff and aluminum plants was also successfully carried out.

In 1950 with investment of about seven hundred million yen a new urea fertilizer plant was constructed at the Niihama Works, while electrolytic caustic soda and polyvinyl chloride plants were erected in 1951 at the Kikumoto Works, and the production of Vat dyestuffs was resumed in 1953. Besides, the manufacture of melamine resins (1952), parathion (1953), PAS, antihistamines and other new medical agents (since 1949) were newly started in the Osaka Works. Thus, the production of the Company had surpassed the pre-war volume and variety by early 1950.

Current Development

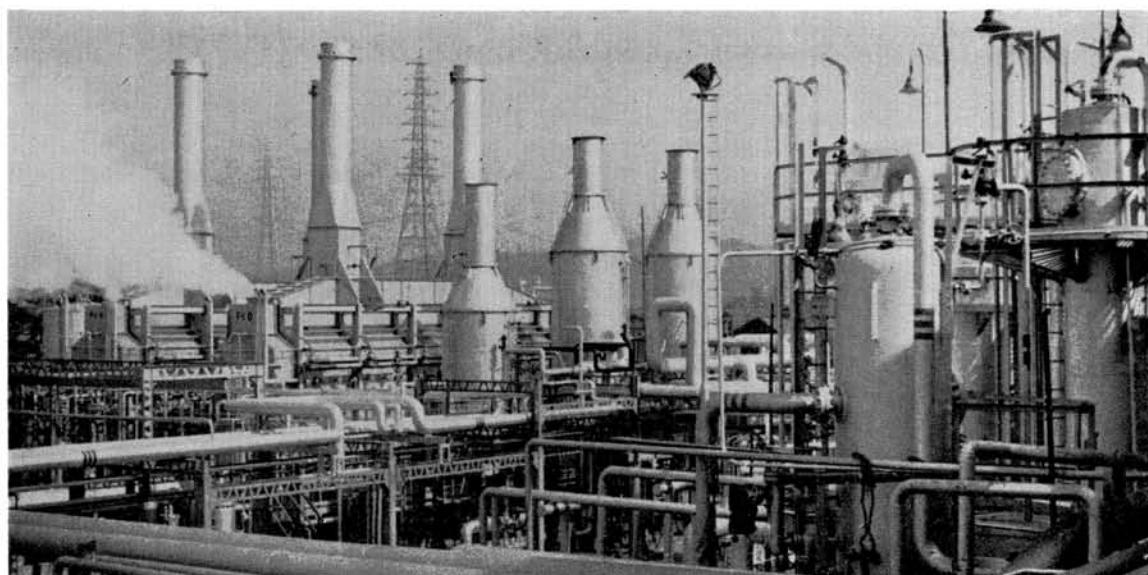
Sumitomo Chemical completed in 1958 the first polyethylene plant of 11,000 tons per year by high pressure process under technological arrangement made with Imperial Chemical Industries and thus it played the part of the torchbearer in the new era of petrochemical industries in Japan. Said capacity will be expanded up to 26,000 tons within the foreseeable future.

While the Company established Akita Petrochemicals Company as a joint venture with Teikoku Petroleum Co. which produces 34,000 tons of methanol from natural gas, and the scheme to produce other chemicals from natural gas is now under way.

Another ambitious achievement is the production of acrylic fiber, for which Sumitomo Chemical incorporated Japan Exlan Company jointly with Toyo Spinning Co. This new acrylic fiber is named "Exlan", the counterpart of Creslan of American Cyanamid Company, and our Niihama Works is supplying



Head Office in Osaka



Ohe Works

*For the good of mankind... we of the
chemical industry are dedicated to the
betterment of man's standard of living...
toward this goal, we strive.*

said company with acrylonitrile monomer, the major raw materials of "Exlan"

Business Activities

Our products range from chemical fertilizers, dyestuffs, aluminium, industrial chemicals, pharmaceuticals to petrochemical products. The current capacity of principal products is given below:

	Product	Current Capacity (metric ton per year)
	Ammonia	150,000
	Ammonium Sulphate	486,000
	Calcium Superphosphate	452,000
	Urea	65,000
Niihama Works	Compound Fertilizers	231,000
	Ammonium Nitrate	43,000
	Sulphuric Acid (98%)	340,000
	Nitric Acid (Conc.)	29,000
	Methanol	34,000
	Formalin	27,000
	Aluminum	20,000
Kikumoto Works	Polyvinyl Chloride	14,000
	Aluminium Sulphate	36,000
	Dyestuffs	6,751
Osaka Works	Synthetic Resins	11,844
	Parathion	1,080
	PAS	576
Ohe Works	Polyethylene	11,000

Export

Chemical product is steadily assuming the growing proportion in the national export value of this country, while about 12% of our total sales is what accrue from the export of our products to the customers abroad. Chemical fertilizer, our greatest export item, is shipped to most of all the neighboring countries in Asia as well as to Latin American countries.

Other major items among our products that are shipped across the sea are dyestuffs and intermediates bearing the popular N.S.K. trademark and with their high quality, they are introduced even to the European markets.

Thanks to the widening market for aluminium all over the world, more and more quantities of the same are shipped to the foreign market particularly to the South American countries.

Besides above, our polyethylene, P.V.C., industrial chemicals such as sulfuric acid, nitric acid and aluminium sulfate, as well as a number of new pharmaceuticals and agricultural chemicals are gaining a greater market abroad.

Fertilizer Division

Production of chemical fertilizers has been playing since the very beginning of our company, a pivotal role that has fostered our enterprise to a manufacturer of hundreds of chemical products as we see it today. The production capacity of fertilizers has grown up far above the pre-war level with modernization program energetically carried out. Thus we have now established ourselves as a leading producer and exporter of chemical fertilizers in Japan.

Having both nitrogenous and phosphatic fertilizer plants within the same works, various compound and blended fertilizers are efficiently and economically prepared.

Moreover, constant efforts are used for further reduction of production cost. The utilization of residual gas from polyethylene production for ammonia making is another contribution to the modernization of this division.

Ammonium Sulphate

Our ammonium sulphate is of the highest quality having large crystalline structure and is completely free from caking trouble.

Capacity is 486,000 tons/year.

Ammonium Nitrate

66% of the national output is covered by our ammonium nitrate prilled with a special anti-caking agent.

Recent studies have improved the quality of anti-caking agent with nitrogen content of 34.6% guaranteed. Our ammonium nitrate is pearly and snow-white granule and never gets caked even stored in humid place.

Capacity is now 43,000 tons/year.

Urea

With techniques acquired through years of intensive research, combined with the latest knowhow introduced from Chemical Construction Corporation, New York, ca. 65,000 metric tons of urea is yearly turned out. The product is prilled with anti-caking agent with 46% nitrogen content guaranteed, while our recent analysis shows 46.36%. We have also exported our urea production knowhow to the companies abroad.

Calcium Superphosphate

We have developed a unique patented continuous process that enables manufacture of the product of uniform quality and of less water content, whose soluble phosphoric acid ranges from 15% to 21.5%. The phosphatic fertilizer of 24-25% (soluble phosphoric acid) is also manufactured.

Our recent research has enlarged the range of our calcium superphosphate, and granular calcium superphosphate as well as Igeta-brand granular ammoniated calcium superphosphate have been newly added to our production list and are meeting with public approval because they are easy to handle while having high fertilizing effect.

Compound Fertilizers, Granulated

More farmers are using today more com-

pound fertilizers which are rapidly replacing all other kinds in view of the easier handling and higher farming yield attributable to them.

As manufacturers of nitrogenous and phosphatic fertilizers within the same plant site, we are in a position to manufacture with less cost, various kinds of compound fertilizers tailored for their specific needs.

The guaranteed components are as follows:

	T.N	A.N.	S.P.	W.P.	C.P.	W.K.
Ammonium Phosphate No. 16	16.0	16.0	20.0	17.0	—	—
Tokusei (Special) Ammonium Phosphate Potassium	12.0	12.0	12.0	11.0	—	10.0
Tomi (Wealth) " " "	13.0	13.0	13.0	11.5	—	13.0
Kin (Gold) " " "	15.0	15.0	8.0	7.0	—	8.0
Bessei (Special) " " "	12.0	12.0	8.0	6.0	—	7.0
Daikoku (God of wealth) Compound Fertilizer	14.0	14.0	8.0	7.0	—	12.0
Phoskaan Special	10.0	10.0	7.0	4.5	—	8.0
Kotobuki (Urea contained compound fertilizer)	10.0	1.0	—	5.0	10.0	10.0
Bessei Matsu (Special pine brand)	9.0	9.0	7.0	5.0	—	8.0
Bessei Ume (Special plum brand)	7.0	7.0	9.0	7.0	—	7.0
Sakura (Cherry brand)	8.0	8.0	8.0	6.0	—	5.0
Igeta-brand ammoniated Calcium Superphosphate	3.0	3.0	—	13.0	20.0	—

Sumileaf, Complete Fertilizer for

Leaf Application

Our research has realized this complete fertilizer for leaf application which is mainly composed of mono-ammonium phosphate plus potassium. Its high components of phosphate and potassium are characteristic. Its guaranteed components are T. N. 21%, S. P. 21%, W. K. 14% and we are the sole manufacturer of this type of fertilizer in Japan.

They are absorbed by plants directly through the surface of the leaf and this is the reason why it is much quicker in effect with few loss than any other fertilizers applied to the soil. Salient effects are seen when the plant is weakened or damaged at roots.

Industrial Chemicals Division

This division is handling major industrial chemicals produced on mass scale covering Sulphuric Acid, Ammonia, Methanol, Formalin, Nitric Acid, Urea for industrial use, Ammonium Nitrate, Paraform, Urotropin, Ammonium Bicarbonate, Sodium Nitrite as well as varieties of tar-derivative products, and "IBIT", our acid-cleaning corrosion controlling agent, etc.

Followings are the current percentage occupied by our products as against the total output of Japan:

Nitric acid, conc.	44.2%
Purified methanol	20.4%
Ammonium nitrate	55.5%
Ammonia	12.7%

Ammonium Bicarbonate

Our production capacity can cater for almost all the domestic requirement. The quality of the product with purity of 99% up is responded with favorable reaction in the foreign markets.

Nitric Acid

Monthly production capacity in terms of concentrated nitric acid is 2,200 metric tons which is composed of 98% (48° Bé), 67.5% (42° Bé) and 62% (40° Bé) acids of which diluted nitric acid is shipped out monthly in large lot to South East Asian countries.

Methanol

Our production capacity of methanol is 2,800 tons per month and its superior quality has good reputation both home and abroad.

Formalin

Our monthly production capacity of formalin is 2,200 tons and this is exported in large quantity to South East Asian territories.

Urea for Industrial Use

As raw material of urea plastic and other industrial uses this is exported to many countries of eastern hemisphere.

Electrochemicals Divisions

Electrochemicals Division of our company owes its growth to the exploitation of the potential hydropower abundant in Shikoku island. With electric power supplied from Shikoku Power Generation Company through Sumitomo Joint Electric Company, we are producing a series of electrochemical products; for instance, aluminum, carbide and caustic soda. The fact that all materials necessary for aluminum production such as alumina, cryolite, aluminum fluoride and caustic soda are prepared within the same plant site, makes our Kikumoto Works a unique plant.

Currently, our aluminum production capacity is 20,000 tons per year, however, we plan to expand gradually its capacity to meet the growing demand for aluminum. In addition to this, aluminum of super purity of as high as 99.995% with our special technique, aluminum sulphate, aluminum alum and activated alumina, etc. are produced.

These items are exported to almost all corners of the world for the application as listed below:

Super Purity Aluminum (99.995%)

Ornaments, reflex mirror, packing foil, chemical apparatus, electrolytic condenser, spray-plating, electric appliances, gauge parts.

Aluminum (99.5—99.8%)

Wrapping foil, electric cable, ship fittings, cars, building materials, electric appliances, home utensiles, machine parts, deoxidizing agent for steel manufacturing, chemical apparatus, aluminum powder, cable coating.

Aluminum Alloy (Lantal, Silmin, Hydronalium, etc.)

All kinds of casting, die cast.

Aluminum Sulphate

Paper sizing, water purifier, mordant dye, lake, pigments, bubble extinguishant, aluminum silicate, aluminum acetate.

Potassium Alum

Water purifier, burnt alum, pigments, dyes, pharmaceuticals, photograph materials, tanning, paper sizing.

Ammonium Alum

Water purifier, burnt alum, pigments, dyes, pharmaceuticals, photograph materials, paper sizing.

Aluminum Hydroxide

Ceramics, pigments, special glass, dyes, pharmaceuticals.

Alumina

Ceramics, refractory, abrasives, polishing

agent, welding rod, catalyst.

Activated Alumina (Desiccant)

Gas drying, drying packages, absorption agent for chromatograph, catalyst, absorption and refining.

Söder Paste

Söderberg self-baking type electrode furnace for electrolysis of Carbide, pig iron, titan-slag, etc.

Magnesium

Titanium manufacturing, alloy.

Synthetic Resins Division

The most spectacular progress taken place in the post-war chemical industry is undoubtedly found in the field of synthetic resins.

Our Resin Division started its activities with the completion of PVC Plant for the yearly capacity of 300 tons in 1952 which has rapidly expanded to the current production that exceeds over 10,000 tons per year.

In the meantime, since 1951 under a license arrangement with American Cyanamid Company, melamine resin for the treatment of textile, paper, leather etc. have been produced.

In 1958 the Company constructed polyethylene plant of 11,000 tons per year in Niihama using the high-pressure process of I. C. I.

Polyvinyl chloride

Our polyvinyl chlorides [Sumilit] are produced by unique process of our own and their excellent qualities are guaranteed for the respective uses described as follows:

- Hx Emulsion straight resin, and polymerization degree is 1,300.
For film, sheet, leather, tube and floor material.
- Ex Organozol paste.
For spread, sheet, leather and floor material.
- Px Plastizol paste.
For sheet, leather, sponge, toys, doll, and dipping.
- Sx Suspension straight resin, and polymerization degree is prepared mostly at 1,100 and partly 800 and 1,400 upon customer's request.
For film, sheet, leather, cable, rigid pipe, rigid plate and so forth.

Polyethylene

Our polyethylene with brand name of [Sumikathene] covers various grades as indicated below:

- Sumikathene F70 melt index 7
Film.
- Sumikathene G70 melt index 7
Lamination and moulding.
- Sumikathene G20 melt index 2

Lamination, moulding and pipe.
 Sumikathene GB20 melt index 2
 Pipe.
 Sumikathene GC70 melt index 7
 Colored moulding of various types.
 Sumikathene GC20 melt index 2
 Colored moulding of various types.
 Sumikathene E16 melt index 1.6
 Wire and cable coating.

Resins for Treatment of Textiles, Papers and Leathers

Ever increasing quantities of melamine formaldehyde and urea formaldehyde resins are demanded for the finishing treatment for textiles, papers and leathers to improve the quality of these articles. Our products cover textile resins for shrinkage control, wrinkle recovery, water repellency, paper resins to give the property of longer lasting wet-strength and leather resins to make pure white leather.

Resins for Textile Treatment

Sumitex Resin M3
 Melamine resin.
 For shrinkage control and antiwrinkle and glazed finishing.
 Sumitex Resin MW
 Melamine resin.
 For shrinkage control and antiwrinkle and glazed finishing.
 Sumitex Resin 501
 Melamine-Urea resin.
 For shrinkage control and antiwrinkle finishing.
 Sumitex Resin 450
 Urea resin.
 For shrinkage control and antiwrinkle
 Sumitex Resin 901
 Ethyleneurea resin.
 For shrinkage control antiwrinkle finishing and non-chlorine retention finishing.
 Sumitex Resin 850
 Sumitex Resin 880
 Modified urea resin.
 For shrinkage control, antiwrinkle finishing and non-chlorine retention finishing.
 Sumitex Resin F-5
 Cyclic urea resin.
 For superior shrinkage control and antiwrinkle finishing as well as for good light-fastness.
 Sumipel Resin N
 Water repellent agent of super quality.
 For water repellent, soft-touching and antiabrasive finishing.
 Sumitex Softener H
 Highest class softener.
 For soft-touching finishing.
 Sumitex Accelerator ACX Catalyst.
 Good stability and superior effect for all kinds of resin.
 Sumitex Accelerator MX
 Catalyst with good stability and superior effect for melamine and reactant type resins.

Sumitex Accelerator KX
 Catalyst for Sumitex resin 901, M3, MW and 850.

Resins for Paper Treatment

Sumirez Resin 605
 Melamine resin.
 For wet-strength of paper.
 Sumirez Resin 607
 For wet-strength of paper.
 Sumirez Resin 614 special
 Urea resin.
 For wet-strength of paper.

Resin for Leather Treatment

Sumitan MRX
 For the treatment of leather.

Dyestuffs Division

Our dyestuffs division was established in 1944 with merger of former Nippon Senryo Seizo K.K. (Japan Dyestuff Manufacturing Company), which was incorporated right after the outbreak of World War I, to meet the requirement of Japanese textile industry dependent, by then, upon the dyes imported from Germany.

This is the reason why our dyestuffs are still branded with popular trademark "N.S.K."

Being the oldest and largest manufacturer of synthetic dyestuffs in Japan, our output annually amount to about 6,800 tons whose value occupies nearly 24% of national production, and the territories where the customers of "N.S.K." dyes are found cover almost all countries in Asia as well as Latin America to say nothing of Japan.

The varieties of our dyestuffs are listed below:

1. Direct colours (including Sumilight and Sumilight Supra colours)
2. Acid colours (including Suminol, Suminol Fast, †Sumilan and ††Lanyl colours.)
 † 1:1 type premetalized dyes
 ††1:2 type premetalized dyes
3. Basic colours
4. Acid Mordant colours
5. Sulphur colours
6. Vat colours (powder and dispersed types)
7. Oxidation colours
8. Naphthol colours (Grounders & Developers)
9. Fluorescent White colours
10. Leather colours
11. Lake & Pigments

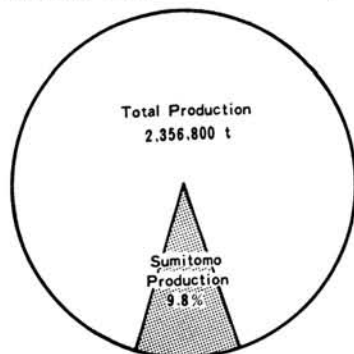
Besides above dyes intermediates, discharging agents and rubber chemicals (accelerators and antioxidants) are also produced and sold by the same Dyestuff Divisions.

For your reference the catalogues and pamphlets introducing the abovementioned products are always available.

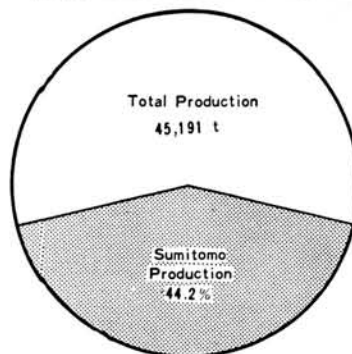
PRODUCTS	UNIT	1952	1953	1954	1955	1956	1957	1958	1959
Ammonium Sulphate	metric ton	236,212	195,487	178,791	164,813	206,885	230,651	226,063	218,548
Calcium Superphosphate	"	88,814	77,892	99,639	93,499	92,102	63,132	88,826	90,826
Urea	"	1,450	8,029	21,655	30,905	38,398	45,675	53,802	52,520
Contact Sulphuric Acid	"	206,470	225,933	234,636	260,893	306,274	316,867	307,795	325,243
Concentrated Nitric Acid	"	14,630	18,422	19,502	18,455	19,588	19,977	18,588	21,341
Liquid Ammonia	"	85,764	86,297	93,427	92,873	112,649	127,575	133,466	138,155
Ammonium Nitrate	"	15,341	21,434	24,899	21,902	24,834	24,231	25,171	28,133
Formalin	"	7,030	11,025	11,153	13,849	16,623	19,332	16,893	20,234
Polyethylene	"							6,447	11,635
Aluminum	"	8,386	9,662	11,048	11,439	13,982	16,345	18,615	21,926
Polyvinyl Chloride	"	162	614	1,460	2,450	4,070	9,398	7,369	14,227
Dyestuffs	"	2,840	3,745	3,399	3,831	4,182	4,029	3,672	4,662
Synthetic Resins	"	11	365	663	1,448	3,554	5,859	6,710	8,802
Insecticides	¥1,000.-	—	—	1,035,351	985,609	1,790,830	1,633,854	1,562,746	1,668,879
Pharmaceuticals	"	703,808	835,520	737,667	1,343,718	1,577,585	1,662,252	1,646,737	2,211,862

1958

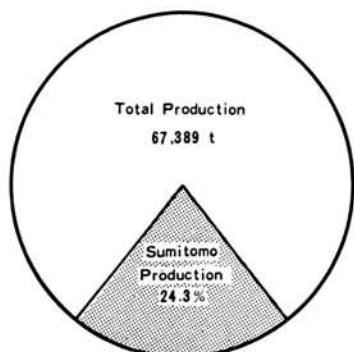
Ammonium Sulphate Production in Japan



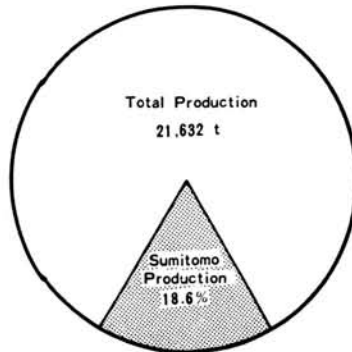
Nitric Acid Production in Japan



Aluminum Production in Japan



Dyestuffs Production in Japan



Pharmaceuticals Division

With supply of coal-tar derivatives from our Niihama Works and with full advantages of precise chemical technic fostered through the years of experience in dyestuff synthesis at our Osaka Works, the Pharmaceuticals Division is carrying out consistent operation from raw materials up to the great variety of finished products catering for the needs of medical circles both home and abroad.

In order to keep up with the amazing progress being made in the pharmaceutical world, our research laboratory staffed with a powerful force of competent scientists covering chemists, pharmacists and medical doctors is annually passing over many results of their resourceful studies onto the production lines. Recently through collaboration with the Upjohn Company, U.S.A., adreno-cortical hormones such as Cortisone, Hydro-Cortisone, Prednisolone, Medrol, etc. have been added to our long sale list of drugs.

For home medicines, Dan, a cold remedy with antihistamine, Dell for all round vermicide, U-Von, a geriatric drug and a tranquilizer called Erina have been popularly used for years throughout country.

Our major products are as follows:

Remedy for Liver Diseases

Methion (DL-Methionine, L-Methionine)

Antituberculous Agent

PAS "Sumitomo" (Calcium or Sodium para-aminosalicylate)
Sumifon (Isonicotinic acid hydrazide)

Antitumour Agent of Ethylenimine Derivatives

Thesepamine (Thio-TEPA)

Serodiagnostic Antigen for Syphilis

Cardiolipin "Sumitomo"

Toxicide against Organic

Phosphorous Poisoning

PAM (2-Pyridine aldoxime methiodide)

Antipyretic and Analgesic Drug

Aminopyrine, Sulpyrine, Phenacetin, Pyrabital, Migrenin

Antacid Drug

Dried Aluminum Hydroxide Gel

Antihistaminic Drug

Anergen (N-Dimethyl aminoethyl phenothiazine)

Oral Antidiabetics (Sulfamine)

Rovan (Sulfanilvl-butyl-carbamide)

Home Medicines

Geriatrics; U-Von tablets (methionin, inositol, rutin, vitamin B₁, B₂, etc.)
Cold Remedy; Dan tablets (anergen, aminopyrine, phenacetin, caffeine, etc.)
Anthelmintic; Dell (santonin, kainic acid, piperazin adipate)
Tranquilizer; Erina (Meprobamate)

Sweetening Agents

Dulcin
Saccharin soluble
Cycrogen (Sodium Cyclohexylsulfamate)

Insecticide Division

Chemical industry contributes in two ways towards the improvement of farming; the one through the supply of chemical fertilizers and the other pesticides. In order to perfect our services to agricultural industry we have also taken up manufacture of insecticides since 1954.

At present the following items are supplied to the farmers as well as for home use through our formulators as powerful ammunitions for their battle against harmful insects.

Pynamin, Technical Grade (Common Name: Allethrin)

This is our patented product which is the culmination of years of our research work for the synthesis of allethrin on commercial scale.

Pynamin is not only applied for agricultural purpose, but also is used in place of Pyrethrum as the effective ingredient in the preparation of mosquitocil as well as for home spraying to kill flies etc.

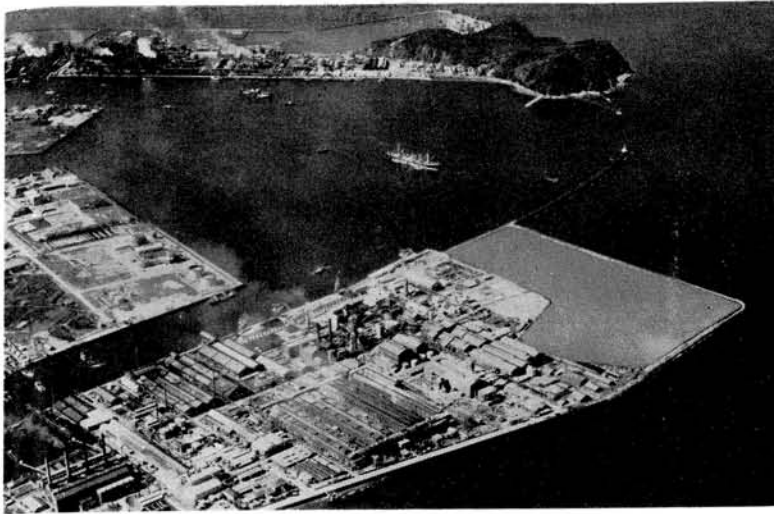
Parathion, Technical Grade (O, O-diethyl-O-p-nitrophenyl thiophosphate)

This is an entirely new type of insecticide developed and commercialized by American Cyanamid Company and Farbenfabriken Bayer that has brought about a revolution in the agricultural pest control. Parathion is the one that deals fatal blow to the dreadful rice stem-borers, the greatest menace to the harvest of rice.

Technical Parathion is supplied to the formulators who further process it to emulsifiable liquid for field application.

Methyl Parathion, Technical Grade (O, O-dimethyl-O-p-nitrophenyl thiophosphate)

This is methyl homologue of Parathion and is almost equally effective as latter with one fifth toxicity of Parathion. The technical grade is likewise supplied to the formulators who process it to either liquid or dust form for direct application to the field.



Kikumoto Works



Osaka Works



Niihama Works

Malathion, Technical Grade [S-(1,2-diethoxy-carbonylethyl)-O,O-dimethyl dithiophosphate]

This is a sister insecticide of Parathion developed by American Cyanamid whose common name is Malathion.

Though it belongs to the same organic phosphate compound, it has the least toxicity among all phosphorous insecticides now in practical use.

Malathion is therefore widely used for agricultural pest control in orchards, rice cultivation and green vegetables. It is thus expected to soon replace the conventional nicotin sulphate.

Premium Grade Malathion Technical

This is the product which is processed to have higher purity and less offensive odour than the ordinary Malathion technical grade. It is easily applied for household sanitation to stamp out such obnoxious insects as flies, mosquitos, cockroach etc. and for extermination of ectoparasites of animal such as lice, dog-tick and other harmful insects of stored grains and seeds. It can be directly sprayed to the cattle and poultry.

Parathion, Methyl Parathion and Malathion are produced at our Tsurusaki Plant in Kyushu Island.

Engineering and Construction Division

Engineering and Construction Division

was established in 1952 who offers full engineering, construction and operation services for chemical plant with the technique fostered through years of actual experiences and research works on the production of fertilizer, industrial chemicals, light metal, dyestuffs and pharmaceuticals. The division is ready to furnish the clients with either most up-to-date designs and specification for plant, or whole equipment.

Not only with our own techniques such as Sumitomo Continuous Calcium Superphosphate Manufacturing Process etc. but also by availing ourselves of the arrangements with Chemical Construction Corporation, New York, for Chemico Contact Sulphuric Acid Process, Urea Manufacturing Process etc., we are in a position to offer most reliable and modern technical knowhows, engineering and construction services.

Capital:	¥8,000,000,000
President:	Masaharu Doi
Established:	1913
Head Office:	22, 5-chome, Kitahama, Higashi-ku, Osaka Cable Address: "CHEMISUMIT OSAKA,"
Tokyo Branch:	8, 1-chome, Marunouchi Chiyoda-ku, Tokyo. Cable Address: "Chemisumit TOKYO"



