

Present State and Perspective of Traditional Chinese Medicine in Taiwan, 1975

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I. The present state of traditional chinese medicine in Taiwan:

Taiwan, an area a little smaller than Kyushu, has a population over 16 millions. There are 19,152 drug stores, 2,602 in Taipei City and 16,550 in Taiwan Province. Among the drug-stores, there are 6,918 traditional Chinese herb-drug stores: 549 in Taipei and 6,369 in the Province. The number of Chinese herb-drug factories is 289, 44 in Taipei and 245 in the Province. Regarding traditional Chinese physicians, 1,249 are practising in the Province and 402 in Taipei, totaling 1,651. Presently, the Chinese Physicians' Department of the China Medical College trains 50 traditional Chinese physicians each year in Taichung. Their graduates should pass the National Chinese Physicians' Qualification Examination held every two years and then the Chinese Physicians' Specialty Examination before they become practising traditional Chinese physicians licensed by the National Health Administration. 705 out of 6,089 passed the qualification examination, and only 54 succeeded in the specialty examination in the last instance. The subjects of the Chinese Physicians' Specialty Examination are as

follows:

- (1) Chinese
- (2) Physiology
- (3) Chinese Constitution
- (4) Pharmacology
- (5) Chinese Herb Formulas
- (6) Chinese Diagnoses
- (7) Internal Medicine
- (8) Other selected subjects

The sponsors of the research of Chinese medicine in Taiwan are as follows:

- (1) National Chinese Medicine Institute
- (2) National Health Administration Chinese Medicine Commission
- (3) Chinese Drug Institute, College of Chinese Culture
- (4) China Medical College Cancer Research Center
- (5) Cobolt Hall, Veterans' General Hospital
- (6) Chinese Medicine Research and Development Foundation
- (7) Brion Research Institute of Taiwan

In addition, some professors of pharmacy departments of the National Taiwan University, Taipei Medical College, China Medical College, Kaohsiung Medical College, and National Defense Medical Center also engage in the research of Chinese herbal drugs.

About 300 varieties of natural or cultivated herbs in Taiwan have been used by Chinese herb-drug stores. Besides, an annual import of approximately five million U.S. dollars of herbs have been purchased from Hong Kong, Japan, Korea, etc. Because of keen competition, traditional Chinese physicians and herb drug dealers in Taiwan are very strict in the treatment and pay special attention to the "original plants" and the "traditional preparations of Chinese herb formulas" that are a little different from Japan's.

II. General application of Chinese herbs in Taiwan

As stated above the original plants used in Taiwan are different from those in Japan, examples are given as Table I:

Table I. Several Original Plants Used in Taiwan.

Common Name	Species in Taiwan	Species in Japan
Angelica	<i>Angelica chinensis</i>	<i>A. acutiloba</i>
Cnidium	<i>Ligusticum wallichii</i>	<i>Cnidium officinale</i>
Atractylodes	<i>Atractylodes ovata</i>	<i>A. japonica</i>
Goldthread	<i>Coptis chinensis</i>	<i>C. japonica</i>

Chinese physicians in Taiwan believe that the quality of herbs affects their therapeutic results. Mitsubashi Hiroshi and others¹⁾ in Japan and T. Y. Lo and T.Y. Wu²⁾ in China Medical College in Taiwan studied the effects of Angelica, and discovered that the soluble oligosaccharide and iron of *Angelica chinensis* are double the amounts of those in *A. acutiloba* and has some sedative action to impregnated mice. However, that Angelica has good therapeutic results against stagnation of disordered blood has no pharmacology support so far. The pharmacological actions between *Ligusticum wallichii* and *Cnidium officinale*, according to the experiments of W.C. Ko and Y.T. Wang³⁾, is as Table II:

Table II. Spasmolytic Action.

Spasmolytic Action	<i>Ligusticum wallichii</i>	<i>Cnidium officinale</i>
Papaverine like Action	6	1
Atropine like Action	2	1
Histamine like Action	1	1

Both *Atractylodes ovata* and *A. lancea* have obvious diuretic action via oral administration (as Table III); however, *A. ovata* has been used in Taiwan for this purpose:

Table III. Diuretic Action.

Oral Dosage	<i>Atractylodes lancea</i>	<i>A. ovata</i>
2000mg/kg	6.3	2.4
1000mg/kg	3.0	1.5
500mg/kg	2.7	

Different species of herbs have been used under same name in Asia. According to the author's investigation⁴⁻⁷⁾ (see Table IV Dandelion, for example, *Taraxacum* species of Compositae family have been used in Chinese mainland and *Elephantopus* species have been used in Hong Kong. Knot Grass, a diuretic and insecticidal herb, having its original plant as *Polygonum aviculare* according to the *Chinese Herb Dictionary*; have been replaced by the whole plant of *Euphorbia thymifolia* of the Euphorbiaceae family in Taiwan and the rhizome of *Belamcanda chinensis* of the Iridaceae family in Hong Kong. Cow Herb, being the seed of *Vaccaria pyramidata* of the Caryophyllaceae family according to the *Chinese Herb Dictionary* have been replaced by the stem of *Melastoma candidum* var. *nobotan* of the Melastomaceae family in Taiwan and the peel of *Ficus pumila* of the Moraceae family in Hong Kong. Besides, three different species: *Pulsatilla chinensis* of the Ranunculaceae family, *Polyca-rpaea corymbosa* of the Caryophyllaceae family, and *Gnaphalium japonicum* of the Compositae family are under the same name Pai-Tou-Weng

Table IV. Herbs of Asia.

	Chinese Mainland, Others	Taiwan	Hong Kong
蒲 公 英	<i>Taraxacum officinale</i> (Compositae)	<i>Taraxacum formosanum</i> <i>Lactuca chinensis</i> (Compositae)	<i>Elephantopus scaber</i> (Compositae)
萹 蓄	<i>Polygonum aviculare</i> (Polygonaceae)	<i>Euphorbia thymifolia</i> <i>Euphorbia hirta</i> (Euphorbiaceae)	<i>Belamcanda chinensis</i> (Iridaceae)
王 不 留 行	<i>Vaccaria pyramidata</i> (Caryophyllaceae)	<i>Melastoma candidum</i> var. <i>nobotan</i> (Melastomaceae)	<i>Ficus pumila</i> (Moraceae)
白 頭 翁	<i>Pulsatilla chinensis</i> (Ranunculaceae)	<i>Polycarpaea corymbosa</i> (Caryophyllaceae) <i>Gnaphalium japonicum</i> (Compositae)	
杜 仲	<i>Eucommia ulmoides</i> (Eucommiaceae)	<i>Euonymus pellucidifolius</i> (Celastraceae) <i>Euonymus japonica</i> <i>Celastrus</i> sp.	
昆 布	<i>Ecklonia kurome</i> <i>Undaria pinnatifida</i> <i>Laminaria japonica</i> (Laminariaceae)	<i>Ulva lactuca</i> (Laminariaceae)	<i>Ulva lactuca</i> (Laminariaceae)
蛇 床 子	<i>Cnidium monnieri</i> (Umbelliferae)	<i>Cnidium formosanum</i> (Umbelliferae)	<i>Cnidium formosanum</i> (Umbelliferae)
狼 毒	<i>Euphorbia fischeriana</i> <i>E. sieboldiana</i> (Euphorbiaceae)	<i>Alocasia macrorrhiza</i> (Araceae)	<i>Alocasia macrorrhiza</i> (Araceae)
馬 兜 鈴	<i>Aristolochia contorta</i> (Aristolochiaceae)	<i>Lilium formosanum</i> <i>Lilium philippenasis</i> (Liliaceae)	<i>Aristolochia</i> sp. <i>A. Contorta</i> <i>A. Debilis</i> <i>Centella asiatica</i> (Umbelliferae)
透 骨 草	<i>Impatiens balsamina</i> (Balsaminaceae) <i>Speranskia tuberculata</i> (Euphorbiaceae)	<i>Speranskia tuberculata</i> (Euphorbiaceae)	
仙 鶴 草	<i>Agrimonia pilosa</i> (Rosaceae)	<i>Agrimonia pilosa</i> (Rosaceae)	<i>Agrimonia eupatoria</i> (Rosaceae)
絡 石 藤	<i>Ficus pumila</i> (Moraceae) <i>Trachelospermum jasminoides</i> (Apocynaceae)	<i>Trachelospermum jasminoides</i> (Apocynaceae)	<i>Psychotria serpeus</i> (Rubiaceae)
豨 薟 草	<i>Siegesbeckia orientalis</i> <i>S. pubescens</i> (Compositae)	<i>Anisomeles ovata</i> (Labiatae)	<i>Anisomeles indica</i> (Labiatae)
骨 碎 補	<i>Drynaria fortunei</i> (Polypodiaceae)	<i>Davallia divericata</i> (Polypodiaceae)	
畢 撥	<i>Piper longum</i> (Piperaceae)	<i>Piper futokadsura</i> (Piperaceae)	
狗 脊	<i>Cibotium barometz</i> (Dicksoniaceae)	<i>Cyathea</i> sp. (Cyatheaceae)	
山 豆 根	<i>Sophora subprostrata</i> (Leguminosae)	<i>Helicteres angustifolia</i> (Sterculiaceae)	
敗 醬 草	<i>Sonchus brachyotus</i> (Compositae) <i>Thlaspi arvense</i> (Cruciferae)	<i>Thlaspi arvense</i> (Cruciferae)	
旱 蓮 草	<i>Eclipta prostrata</i> (Compositae)	<i>Altheranthera sessilis</i> (Amaranthaceae) <i>Wedelia chinensis</i> (Compositae)	
板 藍 根	<i>Isatis tinctoria</i> (Cruciferae) <i>Baphicacanthus cusia</i> (Acanthaceae)	<i>Indigofera suffruticosa</i> (Leguminosae)	
青 蒿	<i>Artemisia apiacea</i> (Compositae) <i>Artemisia capillaris</i> (Compositae)	<i>Artemisia capillaris</i> (Compositae) <i>Origanum vulgare</i> var. <i>formosanum</i> (Labiatae)	
寄 生	<i>Viscum coloratum</i> (Loranthaceae)	<i>Scurrula ritozanensis</i> (Loranthaceae) <i>Viscum liquidambaricolus</i> (Loranthaceae) <i>V. coloratum</i> (Loranthaceae)	

	Chinese Mainland, Others	Taiwan	Hong Kong
沙苑子	<i>Astragalus complanatus</i> (Leguminosae)	<i>Crotolaria mucronata</i> (Leguminosae)	
枳殼	<i>Citrus sp.</i> (Rutaceae)	<i>Citrus kotokan</i> (Rutaceae)	
菊花	<i>Chrysanthemum morifolium</i> (Compositae)	<i>Chrysanthemum indicum</i> var. <i>procumtens</i> (Compositae)	
常山	<i>Dichroa febrifuga</i> (Saxifragaceae)	<i>Hydrangea chinensis</i> (Saxifragaceae)	
佩蘭	<i>Eupatorium fortunei</i> (Compositae)	<i>E. shimadai</i> (Compositae)	

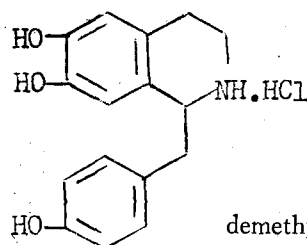
(Nodding Anemone); obviously, their effects are different. Tu-Chung, a noble of Yun-nan Province bordering Vietnam, has been replaced by more than 10 species of the Eucommiaceae family in its export to Japan and Hong Kong. Taiwan, too, produces good herbs, among them pharmacognosy studies have been done on Zingiber (Ginger), Dioscorea (Yam), Phellodendron (Amur Cork Tree), etc. It is hoped that pharmacognosy workers of various countries will study jointly herbs of their respective areas, in contrast with Pen Tsao (*Chinese Materia Medica*), in order to determine the accurate herbs and to uniform their original plants.

III. Study of chemical constituents

The author disclosed the study of chemical constituents of major Chinese herbs in Taiwan in the 5th Asian Congress of Pharmaceutical Sciences¹⁰⁾ and other abstracts concerned in Taiwan. From 1968 to 1974, workers of the Brion Research Institute of Taiwan studied jointly 28 varieties of Chinese herbs and 12 folk drugs, isolated 41 new constituents which have been reported in scientific journals home and abroad. Because of time limit, only a few pharmacological herbs will be introduced as follows:

(1) *Nelumbo nucifera* Constituents of all parts (leaf, leaf stalk, ovary, receptacle) have been long studied; 11 components, including

nuciferine, were isolated by scholars of various nations¹³⁾. The authors also isolated demethyl coclaurine, possessing a strong action of uterine relaxation, which chemical structure is as follows:



(2) *Lycopodium serratum* var. *longepetiolatus*¹⁵⁾ Being a genus of the Lycopodiinae family, its whole plant has been used for wounds due to wrestling etc. in Taiwan. Prof. Nakamishi Koji of the U.S. Columbia University and the author isolated from it new alkaloids Kimpukan A, B, and C. In the hot plate animal tests, Kimpukan A and B had strong sedative action on mice but with strong side effects as well.

(3) *Magnolia fargesii*¹⁶⁾ A genus of the Magnoliaceae family, the alcohol extract of its buds decreased the appetite. The author and others also isolated new magnolin and fargesin.

IV. Preparations of Chinese drugs¹⁷⁾

The method of preparation of Chinese drugs is highly regarded in China. The *Yellow Emperor's Classic of the Interior* recorded the method of roasting of Pinelliae Rhizoma. The notes of the

113 Formulas of *Shang Han Lun* (Chang Chung-Ching's Classic on Different Diseases and Fevers) also record methods of preparation. Chinese drug stores in Taiwan mainly adopt the Lei's Preparations. Preparations of Chinese drugs are also recorded in the following documents:

(1) *Chien Chin Yau Fang* (Golden Prescriptions) More than 100 herbs have been prepared by:

Physical processing (removing outer layer, joints, wings and legs, peel, and central part)

Water processing (washing and dipping,)

Fire processing (roasting, broiling, burning, and frying)

Water and Fire processing (boiling, steaming, etc.)

(2) *Ho Chi Chu Fang* (Experimental Prescriptions of Physicians)

186 herbs have been prepared by Physical, Water, and Fire processings.

(3) *Lei's Preparations*

6 Physical, 2 Water, and 9 Fire processings.

(4) *Pen Tsao Kang Mu* (General Catalog of Herbs)

Physical, Water, Fire, Water and Fire, Extracting, Frosting, and Brewing processings.

Five Basic Operations in Preparing Chinese Herb-drugs

- (1) Physical processing:
- (a) Selection
 - (b) Jogging
 - (c) Sifting
 - (d) Brushing
 - (e) Scraping
 - (f) Pounding
 - (g) Grinding
 - (h) Hammering
 - (i) Velveting.

- (2) Water processing:
- (a) Washing
 - (b) Dipping
 - (c) Moistening
 - (d) Bleaching

(e) Infusing.

- (3) Fire processing:
- (a) Roasting
 - (b) Roasting in ashes
 - (c) Stewing
 - (d) Heating
 - (e) Frying
 - (f) Moxibusting
 - (g) Mixing
 - (h) Grilling
 - (i) Melting.

- (4) Water and Fire processing:
- (a) Steaming
 - (b) Boiling
 - (c) Cooking

(5) Others

To study the scientific meaning of the preparation of Chinese herb-drugs, the author has conducted following experiments:

(1) **Preparation of Aconites**¹⁸⁾ Dr. Yakazu and Dr. Fujita of Japan have reported that processing of Aconites may decrease their toxicity. During the processings of Chuan-Wu (tubers of *Aconitum carmichaeli Debx*), Tsao-Wu (tubers of *Aconitum kusnezoffii Reichenbach*), etc. purchased in Taiwan's market, the author and others observed particularly the changes of total aconitine contents toward the central nervous system. Results showed that the aconitine contents of Chuan-Wu is 0.58% and of Tsao-Wu is 0.41%, and the contents decreased as the time of boiling went on until 4 hours. Besides, the pharmacological actions of oral intake (PO) and intraperitoneal injection (IP) of Aconites were mainly retarded auricular reflection, behavior inhibition, muscular relaxation, and irregularity of autonomous nerves.

The minimum effective dose (MED) and lethal dose of Aconites are very close, therefore their safety of application should be carefully considered.

(2) **Preparation of Zizyphus**¹⁹⁾ Zizyphus of China mainland, Taiwan, Korean, and Burmese

origins are sold in far different prices. Results of qualitative evaluation by thin layer chromatography have been same. *Ching Shih Chen Lei Pei Chi Pen Tsao* (Historical Classified Herb-Drugs for Emergency Diseases) records that raw *Zizyphus* are used for gall fever and sleepiness, and fried *Zizyphus* are used for weakness of the gall bladder and insomnia. *Pen Tsao Kang Mu* (General Catalog of Herbs) records its processings as mixing with rice, stewing slowing with leaven, simple frying (light frying and heavy frying), and compound frying (frying with vinegar, salt water, honey, or bran). The authors made processings of *Zizyphus* with a fore-mentioned methods, and tested their toxicity and CNS activities with laboratory mice. Both Swan-Chau-Ren (seeds of *Zizyphus sativa* var. *spinosa*) and Pen-Chau-Ren (seeds of *Z. jujuba* var. *spinosa*, cultivated in Taiwan) raw or fried, had CNS effects (hypnosis, sedation), but toxicities were less in their treated herb-drugs. The toxicity of Swan-Chau-Ren is 1.5 to 6.5 times less than that of Pen-Chau-Ren. And oral administration was safer than hypodermic injection. However, Pen-Chau-Ren has a stronger writhing phenomenon.

(3) **Preparation of Ephedra**²⁰⁾ According to Chinese herb classic, the plant of Ephedra (Herba Ephedrae), having been removed the roots and nodes, is boiled in water several times. Remove the upper layer of foam with a bamboo slip. The roots and nodes are anti-diaphoretic, as considered by Chinese herb-drug stores in Taiwan. In 1927, Read said that the relation between nodes and whole herb of Ephedra is Ephedrine and Pseudoephedrine. The author and others conducted the general alkaloid tests and pharmacology of the treated stem, nodes, and roots with the following conclusions:

(a) The preparation of frying Ephedrae Herba with *Zingiberis Rhizoma* and Glycyrrhi-

zae Radix, dipping in lukewarm water, or dipping in acetic acid made lower toxicity and decreased general alkaloid in the plant than in untreated Ephedra. The most desirable preparation was its frying with *Zingiberis Rhizoma* and *Glycyrrhizae Radix*. However, the root of Ephedra does not contain alkaloid.

(b) In the toxicity tests of mice with its nodes, stem, and part between two nodes respectively, the nodes had the highest toxicity with convulsion. Ephedrae Herba and the part between nodes did not show such phenomenon. Therefore, the node-removing preparation of Ephedra Herba since ancient times has been significant.

(4) **Preparation of Kan-Sui**²¹⁾ Kan-Sui, the dried roots of *Euphorbia horbia*, has been used for edema and abdominal distention in China. The author and others²²⁾ obtained four new diterpene derivatives from its roots. The herb-drug stores in Taiwan prepare Kan-Sui with vinegar, noodle, frying with earth, and steaming with *Glycyrrhizae Radix*. In pharmacological experiments on mice, the higher temperature Kan-Sui was prepared the lower toxicity, distress, diarrhea, and hair erecting were seen. The toxicity was high in its hypodermic injection, but was low in oral administration. Besides, its CNS inhibition was high, and toxicity was low when treated in a higher temperature.

(5) **Preparation of Strychnine**²³⁾ The herb-drug stores in Taiwan prescribed only treated *Strychnos nux-vomica*. The author and others compared untreated *Strychnos nux-vomica* with those treated with nine traditional preparations such as dipping in extract of *Glycyrrhizae Radix*, frying in sand, frying with peanut oil, etc., and have proved decrease of strychnine content, pharmacology, and toxicity accordingly.

V. Original plants (Quality evaluation)

To expect therapeutic effects, Chinese physicians in Taiwan regard highly the place where an herb was originally grown. Due to financial conditions, the author and others conducted, in addition to common physical and chemical tests, mainly thin layer chromatography for quality evaluation of the following herbs:

(1) **Lonicerae Flos**²⁴⁾ Because of different area, Lonicerae Flos in Taiwan's market has been divided into Jea-Yin-Hua (from Japan), Pen-Yin-Hua (from Taiwan), Hsien-Yin-Hua (from Korea), and Jih-Yin-Hua (from Shang-tung Province, China). Since their original plant is *Lonicera japonica*, quality evaluation by means of T.L.C. did not show great differences.

(2) **Magnolia Cortex**²⁵⁾ The root bark and trunk bark of Chinese *Magnolia officinalis* and Japanese *M. ovata* are available in Taiwan market. However, the two different original plants possessed almost same main components as shown in T.L.C. experiments except their fragrances. That whether their fragrances affect their effects should be further studied.

(3) **Alismatis Rhizoma**²⁶⁾ *Alisma orientalis* cultivated in Fu-Kien (province), Korea, and Taiwan are sold in Taiwan. (The original plants from Taiwan and Fukien belong to the same species except a slight difference in appearance.) The authors obtained their different extracts with hexane, chloroform, alcohol, and water respectively. However, the extracts gave similar component spots in the single and dual phase T.L.C.

(4) **Coptidis Rhizoma**²⁷⁾ Herb material *Coptis chinensis*, *C. japonica* and its roots, and *C. quinquefolia* are available in Taiwan. The acetone-berberine content is 7.79% in *Coptis chinensis*,

5.66% in *C. japonica* and 1.77% in its roots, and 5.16% in *C. quinquefolia*. Despite different acetone berberine contents, the extracts gave no great different component spots in the thin layer chromatography.

(5) **Rehmanniae Radix**²⁸⁾ Qualities of root diameters of Rehmanniae Radix over and below 0.3cm and the difference between raw and processed R. Radix were compared and reviewed. Although their different amounts were obtained with various solvents, the extracts did not have great different component spots in T. L.C.

(6) **Bupleuri Radix** *Bupleurum chinense*, *B. falcatum*, *Bupleurum* cultivated in Taiwan, and *B. kaoi* may be bought in Taiwan. Comparative tests did not show much component difference in the four. However, the so-called *Bupleurum* from Taiwan has been an imitation of unknown original plant.

Table V. Effects of Nelumbo Mel (mcg/ml).

	Antic-holine	Sm. Musc. Relax.	Antihist.	Uterine Relax.
Demethyl coclaurine	>10	10	>10	0.03
Papaverine	>10	10	>10	20
Atropine	1.0	0.1	>10	>20

VI. Pharmacology of Chinese drugs

The author has conducted a number of experiments on the pharmacology of Chinese drugs as follows:

1. Toxicity of Chinese drugs²⁹⁾

There have been several toxicity reports of Chinese herbs. Our institute selected about 200 commonly used Chinese herbs, extracted them with 50% alcohol, then administered them into ten (10) male mice by Litchfield & Wilcoxon Method in order to observe their LD₅₀ and especially CNS effects. Results indicated that the

Table VI. Toxicity and Pharmacology of Herbs (1).

Item	Sample	Coicis Semen	Forsythiae Fructus	Citri Reticulatae Pericarpium	Sileris Radix	Magnoliae Cortex	Cinnamomi Cassiae Ramulus	Cyperii Rhizoma	Notopterygii Rhizoma et Radix	Glehniae Radix	Agastochis Rugosae Herba
Reflex Dep.	Toxicity	Dose Resp	5000	5000	5000	5000	5000	5000	5000	5000	5000
	Pinna	5000mg	5000	5000	5000	5000	5000	5000	5000	5000	5000
	Placing										
	Righting IFR										
Behavior Dep.	Spont. Act.							5000			
	Startle Resp.							5000			
	Touch Response										
	Reactivity					2500					
Muscle Relax.	Testis Retrac.					2500					
	Motivation			5000							
	Exploration										
	Low Limb Post										
Motor Stim	Abdominal Tone	5000	5000	5000		2500	5000	5000	5000		5000
	Limb Tone										5000
	Grip Strength										5000
	Ataxia	5000									5000
Autonomics	Irritability										
	Inc. Plap. Size										
	Inc. Touch										
	Piloerection	5000							5000		
Autonomics	Skin Color										
	Respiration										
	Salivation										
	Lacrimation										
Autonomics	Diarrhea										
	Body Temp.										
	Writhing										
	Heart Rate										

Table IV. Toxicity and Pharmacology of Herbs (2).

Item	Sample	Platycodi Radix	Paoniae Lactiflorae Radix	Bupleuri Radix	Gardeniae Fructus	Zingiberis Recens Rhizoma	Ephedrae Herba	Atractylo- dis Alba Rhizoma	Alpiniae Oxphyllae Fructus	Astragali Radix	Phellod- endri Cortex
Reflex Dep.	Toxicity	Dose Resp 5000mg	5000	LD ₅₀ 5000	5000	5000	LD ₅₀ 2500	5000	LD ₅₀ 3700	5000	LD ₅₀ 1500
	Pinna	5000	5000	2500	5000		1000		2000		500
	Placing	5000		2500			1000				500
	Righting	5000		2500			1000				500
	IFR	5000		2500			1000				500
Behavior Dep.	Spont. Act.						1000				500
	Startle Resp.					5000					500
	Touch Response					5000					500
	Reactivity			2500		5000					500
	Testis Retrac.					5000					500
Motor Stim.	Motivation					5000					500
	Exploration					5000					500
	Low Limb Post.	5000	5000			5000				5000	500
	Abdominal Tone	5000	5000			5000				5000	500
	Limb Tone	5000	5000			5000				5000	500
Autonomics	Grip Strength			2500				5000			500
	Ataxia			2500							500
	Irritability										
	Inc. Flap. Size										
	Inc. Touch										
Autonomics	Piloerection										
	Skin Color										
	Respiration										
	Salivation										
	Lacrimation										
Autonomics	Diarrhea										
	Body Temp.										
	Writhing										
	Heart Rate										

Table VII. Toxicity and Pharmacology of Potent Herbs (1).

Item	Sample	Strychni Semen	Bufoinis Secretio	Calomelas	Mylabris	Realgar	Aconiti Agrestis Radix	Crotonis Semen	Chalcant-hitum	Bufoinis Secretio (Taiwan)	Genkwa Flos
		Dose Resp 15 LD ₅₀	75 LD ₅₀	75 LD ₅₀	85 LD ₅₀	85 LD ₅₀	90 LD ₅₀	180 LD ₅₀	370 LD ₅₀	380 LD ₅₀	500 LD ₅₀
Reflex Dep.	Toxicity										
	Pinna Placing Righting IFR									100	+
Behavior Dep.	Spont. Act.									100	+
	Startle Resp.					25	±	50	±	100	+
	Reactivity		25	+						100	+
	Testis Retrac. Exploration				25	±		50	±	100	±
Muscle Relax.	Low Limb Post.		25	+	25	+	25	±		100	+
	Abdominal Tone		25	+	25	+	25	±		100	+
	Limb Tone		25	±	25	+				100	±
	Grip Strength									100	+
	Ataxia		25	+			25	±		100	+
Motor Stim.	Inc. Palp. Size										
	Inc. Startle										
	Inc. Touch	5	+								
	Inc. Explor. Tremors	5	±								
Autonomics	Skin Color										
	Respiration										
	Salivation									100	D+
	Diarrhea Body Temp.			25	±	25	+	50	+		

Table VII. Toxicity and Pharmacology of Potent Herbs (2).

Item	Sample	Chidii Fructus	Carpesii Abrotanoidis Fructus	Arisaematis Rhizoma	Pimelliae Rhizoma	Eupolyphaga	Euphorbiae Lathyridis Semen	Scorpio	Knoxiae Radix	Aconiti Carmichaeli Praeparata Radix	Evodiae Fructus
		Dose Resp 5000 LD ₅₀	5000 LD ₅₀	5000	5000	5000	5000	5000	5000	5000	5000
Reflex Dep.	Toxicity										
	Pinna Placing Righting IFR										
Behavior Dep.	Spont. Act.										
	Startle Resp. Reactivity Testis Retrac. Exploration		2500 ±						5000 +	5000 +	
Muscle Relax.	Low Limb Post.		2500 +	5000 ±	5000 ±	5000 ±				5000 +	5000 ±
	Abdominal Tone	2500 +				5000 ±				5000 +	5000 +
	Limb Tone	2500 +		5000 ±	5000 ±	5000 ±			5000 ±	5000 +	5000 +
	Grip Strength										
	Ataxia	2500 +		5000 ±	5000 ±					5000 +	5000 +
Motor Stim.	Inc. Palp. Size										
	Inc. Startle										
	Inc. Touch										
	Inc. Explor.										
	Tremors										
Autonomics	Skin Color										
	Respiration										
	Salivation										
	Diarrhea						5000 ±				
	Body Temp.							5000 ±			
				5000 D ±	5000 D ±					5000 V ±	5000 S D ±
											5000 +

Table VII. Toxicity and Pharmacology of Potent Herbs (3).

Item	Sample	Aconiti Agrestis Radix	Aconiti Coreani Radix	Gleditsiae Sinensis Fructus	Xanthii Fructus	Aconiti Radix	Ricini Semen	Pharbitidis Semen	Euphorbiae Kansui Radix	Meliae Toosendan Fructus	Sinica Exsiccata Lacca
		Dose Resp 650 LD ₅₀	750 LD ₅₀	1500 LD ₅₀	1800 LD ₅₀	1800 LD ₅₀	1800 LD ₅₀	2100 LD ₅₀	3000 LD ₅₀	3200 LD ₅₀	5000 LD ₅₀
Reflex Dep.	Pinna										
	Placing										
	Righting										
	IFR										
Behavior Dep.	Spont. Act.										
	Startle Resp.										
	Reactivity	250	250	500		500					
	Testis Retrac.	250	250	250		250	+				
	Exploration	250	250	250		250	+				
Muscle Relax.	Low Limb Post.	250	250			500	+	1000	+	1000	±
	Abdominal Tone	250	250			500	+			2500	±
	Limb Tone		250							2500	±
	Grip Strength		250							2500	±
	Ataxia	250	250		500			1000	+	2500	±
Motor Stim.	Inc. Palp Size.				500						
	Inc. Startle										
	Inc. Touch										
	Inc. Explor.	250									
	Tremors				500						
Autonomics	Skin Color		250 R ±								
	Respiration	250 D +	250 D ±								
	Salivation	250 V +	250 V +								
	Diarrhea	250	250			500	±	1000	+		

Table VII. Toxicity and Pharmacology of Potent Herbs (4).

Item	Sample	Impatiens Semen	Belamcandae Rhizoma	Phytolaccae Radix	Hydnocarpus Semen	Ginkgo Semen	Inula Flos	Bovis Calculus
	Toxicity	Dose Resp. 5000 LD ₅₀	5000	5000	5000	5000	5000	5000
Reflex Dep.	Pinna Placing Righting IFR							
Behavior Dep.	Spont. Act. Startle Resp. Reactivity Testis Retrac. Exploration			5000 +	5000 ±			
Muscle Relax.	Low Limb Post. Abdominal Tone Limb Tone Grip Strength Ataxia	5000 +	5000 ±	5000 + 5000 + 5000 ±	5000 + 5000 +			
Motor Stim.	Inc. Palp. Size Inc. Startle Inc. Touch Inc. Explor. Tremors							5000 ±
Autonomics	Skin Color Respiration Salivation Diarrhea Body Temp.	5000 ± 5000 ±	5000 ± 5000 ±	5000 ± 5000 ±	5000 ± 5000 ±	5000 + 5000 +	5000 ± 5000 ±	

fatal rate of LD₅₀ of the majority of the herbs was 5 gm. per kilogram of mouse. The conversion LD₅₀ rate of a 50kg. individual is 250gm. The 5gm/kg administration of the following 32 herbs did not indicate marked CNS reaction: Ligustici Wallichii Rhizoma, Ligustici Japonica Rhizoma, Scutellariae Radix, Zizyphi Sativae Fructus, Cinnamomi Cortex, Rehmanniae Radix, Armeniacae Amarae Semen, Perillae Acutae, Citri Reticulatae Pericarpium, Angelicae Sinesis Radix, Mori Radicis Cortex, Angelicae Radix, Angelicae Acutiloba Radix, Aurantii Immaturus Fructus, Anemarrhenae Rhizoma, Alismatis Rhizoma, Dioscoreae Radix, Akebiae Caulis, Schizonepetae Herba, Ophiopogonis Radix, Eriobotryae Folium, Atractylodis Rhizoma, Lonicerae Flos, Elshotziae Herba, Dolichoris Semen, Codonopsis Pilosulae Radix, Artemisiae Capillaris Herba, Magnoliae Liliiflorae Flos, Lycii Radicis Cortex, and Poria. But Table VI. indicates that Coicis Semen and other 19 herbs have some effects on CNS; e.g. Cinnamomi Ramulus and Ephedrae Herba excite autonomies, and seem to belong to a diffusion theory of Chinese medicine. Aconiti Radix and Zingiberis Rhizoma had inhibitive action and seemed to do with inner chills. There were also cooling and detoxicating herbs, such as Gentianae Radix, Phellodendri Cortex, Rhei Rhizoma, and Lithospermi Radix. Most of the herbs reacted 1 hour following administration to mice: but Rhei Rhizoma began its diarrhea phenomenon after 3 hours. Besides, poisonous herbs as prescribed in the drug laws of Taiwan have been tested as Table VII.

2. Antibacterial action of Chinese drugs³¹⁾

Scholars of Japan and Taiwan⁴²⁻³⁶⁾ have reported the antibacterial action of various Chinese drugs ever since 1917. The author and others selected 655 commonly used herbs and folk

medicines, extracted them with hexane, chloroform, alcohol, and water; and conducted their respective minimum inhibition concentration (M.I.C.) tests on *Staphylococcus aureus*, *Escherichia coli*, *Mycobacterium ranae*, *Pseudomonas aeruginosa*, *Candida albicans*, *Proteus vulgaris*, and *Streptococcus fecalis*. Their results are in Table VIII, which tell of the broad antibacterial action of Alismatis Rhizoma, Gardeniae Fructus, Chrysanthemi Flos, Fraxini Cortex, Omphalis, Vitis Fructus, and Sophorae Frucus Atractylodis Rhizoma.

3. Pharmacological development of Chinese medicine³⁷⁾

Chinese medical theory divides the etiology into external and internal causes. The external causes such as geographical areas, weather, and environments are called the "six excesses" (wind, dryness, cold, fire, moisture, and heat). The internal causes are the "seven passions" (Pleasure, anger, worry, thought, sadness, fear, and scare). They affect each individual, that is also controlled by his own constitution, type, temperament, onset sites (upper, middle, lower) action of nutrition, and circulation system. According to *Shan Han Lun* (Chang Chung-Ching's Classic on Different Diseases and Fevers), disease proceeds in six stages, namely: Greater Yang (positive), Lesser Yang, Sunlight Yang, Greater Yin (negative), Lesser Yin, and Absolute Yin; and each stage requires its respective herb formulas. Chinese physicians in Taiwan and mainland have classified disease symptoms into eight categories: Yin, Yang, outside, inside, cold, heat, weak, and strong. Once its category is identified, corresponding herbs for treatment may be prescribed. Table IX illustrates various methods of treatment according to their pharmacological categories. However, the vomiting method is not included.

Table VIII. Anti-Bacterial Activity of Herbs.

Scientific Name	Part Used	Sa	Ec	Mr	Pa	Ca	Pv	Sf
<i>Omphalia lapidescens</i>	fungus	+	+	+	+	+	+	+
<i>Pinus tabulaeformis</i>	stem	##		##		###		
<i>Ephedra sp.</i>	root	+	+	+	+	+	+	+
<i>Morus alba</i>	stem	+	+	+	+	+	+	+
<i>Polygonum multiflorum</i>	root	+	+	+	+	+	+	+
<i>Stephania tetrandra</i>	root			+		+		
<i>Coptis teeta</i>	rhizome	##		##		+		
<i>Coptis japonica</i>	rhizome	##		##				
<i>Magnolia officinalis</i>	cortex radices	##		##		##		##
<i>Magnolia officinalis</i>	cortex	##		##				##
<i>Magnolia officinalis</i>	flower	###		##				##
<i>Cinnamomum cassia</i>	twig	+		+			##	
<i>Cinnamomum cassia</i>	cortex	+					##	
<i>Akebia trifoliata var. australis</i>	fruit					##		
<i>Thlaspi arvense</i>	whole herb	+	+	+	+	+	+	+
<i>Zanthoxylum bungei</i>	peel	+	+	+	+	+	+	+
<i>Brucea javanica</i>	fruit	+	+	+	+	+	+	+
<i>Zizyphus sativa var. spinosa</i>	seed	+	+	+	+	+	+	+
<i>Forsythia suspensa</i>	fruit	+	+	+	+	+	+	+
<i>Fraxinus bungeana</i>	cortex	+	+	+	+	+	+	+
<i>Ligustrum lucidum</i>	fruit	+	+	+	+	+	+	+
<i>Vitex rotundifolia</i>	fruit	+	+	+	##	+	+	+
<i>Dipsacus asper</i>	root	+	+	+	+	+	+	+
<i>Salvia miltiorrhiza</i>	root	##						
<i>Scutellaria baicalensis</i>	root	+	+	+	+	+	+	+
<i>Scrophularia oldhami</i>	root	+	+	+	+	+	+	+
<i>Orozylum indicum</i>	seed	+	+	+	+	+	+	+
<i>Caesalpinia sappan</i>	stem	##					+	##
<i>Cassia tora</i>	seed	+	+	+	+	+	+	+
<i>Psoralea corylifolia</i>	seed	##		##				
<i>Pueraria hirsuta</i>	flower	+	+	+	+	+	+	+
<i>Pueraria hirsuta</i>	root	+	+	+	+	+	+	+
<i>Sophora japonica</i>	fruit	+	+	+	+	+	+	+
<i>Agrimonia eupatorium</i>	whole herb	+		###				
<i>Rosa laevigata</i>	fruit	+	+	+	+	+	+	+
<i>Sanguisorba officinalis</i>	root	+	+	+	+	+	+	+
<i>Terminalia chebula</i>	fruit			+	+		+	
<i>Eugenia caryophyllata</i>	flower			+		+		
<i>Bupleurum chinense</i>	root	+	+	+	+	+	+	+
<i>Ligusticum sinense</i>	rhizome & root			##				
<i>Ligusticum wallichii</i>	rhizome					+		
<i>Notopterygium incisicum</i>	rhizome			###				
<i>Gradenia jasminoides</i>	fruit	+	+	##	+	+	+	+
<i>Arctium lappa</i>	fruit	+	+	+	+	+	+	+
<i>Artemisia capillaris</i>	leaf			+				

Scientific Name	Part Used	Sa	Ec	Mr	Pa	Pa	Pv	Sf
<i>Atractylodes lancea</i>	rhizome	+	+	+	+	+	+	+
<i>Chrysanthemum morifolium</i>	flower	+	+	+	+	+	+	+
<i>Saussurea lappa</i>	root			≡		≡		
<i>Siegesbeckia orientalis</i>	whole herb					+		
<i>Xanthium strumarium</i>	fruit			+		+		
<i>Alisma plantago var. parviflorum</i>	rhizome	+	+	≡	+	+	+	+
<i>Pinellia ternata</i>	rhizome	+	+	+	+	+	+	+
<i>Amomum xanthioides</i>	seed	+	+	+	+	+	+	+
<i>Kaempferia galanga</i>	rhizome					≡		
<i>Zingiber officinale</i>	rhizome					≡		
<i>Bletilla striata</i>	rhizome	+	+	+	+	+	+	+

Table IX.

Hearing Method	Principle	Herb Formula	Main Herb	Main Constituent
Perspiration	Perspiring	Ma-Huang-Tang Kuei-Chih-Tang	Ephedra Cinnamon	Ephedrine Cinnamic aldehyde
Purgation	Purgating	Ta-Chen-Chi-Tang	Rhubarb	Sennoside
Harmony	Harmonizing	Hsiao-Chai-Hu-Tang	Bupleurum	
Warming	Vigourity, Warming	Szu-Ni-Tang, Li-Chung-Tang	Aconite, Ginger	Aconitine, Shogaol
Removing	Removing heat	Huang-Lien-Chiai-Tu-Tang	Coptis	Berberine
Supplementing	Vitality, Nourishing	Szu-Chun-Tzu-Tang Szu-Wu-Tang	Ginseng Tang-Kuei	

The Chinese formula is a combination of "Imperial" (superior), "General" (ministerial), and "Assistant" (inferior) herbs. Generally speaking, "Imperial" drugs have greater effects to the human body; such as Ma-huang-tang (麻黃湯), Ephedrae Herba of Ma-hsing-kan-shih-tang (麻杏甘石湯), Szu-ni-tang (四逆湯), and Aconiti Radix of Weng-fu-tang (溫賦湯). It is quite difficult to apply pharmacology to the mechanism of individual components of herbs, not to mention herbs or even formulas. Since the formulas are actually prescribed to the human body, the pharmacological research on formulas in order to collect clinical data is imminent.

Our institute primarily selected 37 commonly used Chinese formulas, made their extracts with 50% alcohol, and administered to mice by mouth in order to observe toxicity at the central nerve

system. The 5gm/kg oral administration of 22 formulas: Kuei-chi-tang (桂枝湯) Ko-ken-tang (葛根湯), Shao-yao-kan-tsao-tang (芍藥甘草湯), Huang-lien-chiai-tu-tang (黃連解毒湯), Wu-ling-san (五苓散), Shih-wei-pai-tu-san (十味敗毒散), Hsiao-chai-hu-tang (小柴胡湯), Yin-chen-hao-tang (茵陳蒿湯), Hsiao-yao-san (逍遙散), Hsiao-ching-lung-tang (小青龍湯), Suan-tsao-jen-tang (酸棗仁湯), Ta-chai-hu-tang (大柴胡湯), Lung-tan-hsieh-kan-tang-(yi) (龍膽瀉肝湯), Pai-hu-chia-jen-sheng-tang (白虎加人參湯), San-huang-hsieh-hsin-tang (黃連瀉心湯), Szu-wu-tang (四物湯), Liu-chun-tzu-tang (六君子湯), Shih-chuan-ta-pu-tang (十全大補湯), Chai-hu-kuei-chi-tang (柴胡桂枝湯), I-yi-jen-tang (薏苡仁湯), Hsiao-chien-chung-tang (小建中湯), and Chai-hu-chia-lung-ku-mu-li-tang (柴胡加龍骨牡蠣湯), did not affect their CNS. However, follow-up observation of

Table X. Pharmacology of Chinese Formulas.

Item	Sample	Ling-Kuei-Chu-Kan-Tang [®]	Pa-Wei-Ti-Huang-Wan [®]	Tang-Kue-Shao-Yao-San [®]	Ma-Huang-Tang [®]	Ma-Hsing-Kan-Shih-Tang [®]	Kuei-Chih-Fu-Ling-Wan [®]	Pan-Hsia-Hou-Pu-Tang [®]	Wen-Fu-Tang [®]
Reflex Dep.	Toxicity	Dose Resp 5000 mg/kg	8000	7500	5000	2000	5000	8000	5000
	Pinna	5000	5000	5000	5000	1000	5000	5000	5000
	Placing	5000	5000	5000	5000	1000	5000	5000	5000
	Righting IFR								
Behavior Dep.	Spont. Act.								
	Startle Resp.								
	Touch Response		5000					5000	5000
	Reactivity Testis Retrac. Motivation Exploration								5000
Muscle Relax.	Low Limb Post.								
	Abdominal Tone		5000					5000	5000
	Limb Tone							5000	5000
	Grip Strength Ataxia		5000					5000	5000
Motor Stim.	Irritability								
	Inc. Plap. Size				5000	1000			
	Inc. Touch				5000				
	Piloerection								
Autonomics	Skin Color								
	Respiration	5000							5000
	Salivation			5000					5000
	Lacrimation Diarrhea Body Temp. Writhing Heart Rate								5000

① 苓桂求甘湯
 ② 八味地黃丸
 ③ 當歸芍藥散
 ④ 麻黃湯
 ⑤ 麻杏甘石湯
 ⑥ 桂枝茯苓丸
 ⑦ 半夏厚朴湯
 ⑧ 溫臑湯

Item	Sample	Ching-Pi-Tang Dose Resp 4000mg LD ₅₀ 2500 2500	Ma-Huang- Fu-Tzu-Hsi- Hsin-Tang [®] LD ₂₅ 4000 2500 2500	Chu-Ling-Tang [®] 5000	Chai-Hu-Kuei- Chih-Kan- Chiang-Tang [®] 5000	Yueh-Pi-Chia- Chu-Tang [®] 8000 LD ₅₀ 5000	Fang-Feng- Tung-Sheng- San [®] 5000	Tao-Ho- Chen-Chi- Tang [®] 5000
Reflex Dep.	Toxicity							
	Pinna Placing Righting IFR							
Behavior Dep.	Spont. Act.							
	Startle Resp.							
	Touch Response							
	Reactivity Testis Retrac Motivation Expiration				5000			5000 +
Muscle Relax.	Low Limb Post.							
	Abdominal Tone			5000	5000	5000		
	Limb Tone	2500		5000	5000			
	Grip Strength Ataxia		2500	5000	5000			
Motor Stim.	Irritability							
	Inc. Plap. Size					5000		
	Inc. Touch Piloerection							
Autonomics	Skin Color							
	Respiration							
	Salivation							
	Lacrimation							
	Diarrhea							
	Body Temp. Writhing Heart Rate		2500 +		5000		5000	5000 +

① 消臭湯
② 麻黃附子細辛湯
③ 猪苓湯
④ 柴胡桂枝乾薑湯
⑤ 越婢加朮湯
⑥ 附風通聖散
⑦ 桃核承氣湯

their effects should be done. In Table X, Ling-kuei-chu-kan-tang(苓桂朮甘湯), has some effect on CNS, and Wen-fu-tang(溫賦湯), and Pa-wei-ti-huang-wan(八味地黃丸), have behavior depression action; these actions are probably caused by Aconiti Radix. Like the pharmacological action of its aconitine, Aconiti Radix increased palp size and erected body hair. The effects of Mahuang-tang(麻黃湯), Ma-hsing-kan-shih-tang(麻杏甘石湯) at autonomics is probably caused by their main herb Ephedrae Herba. The pharmacological action of Ephedra is very similar to that of ephedrine, except that the former

reddens animal epidermis. The muscular relaxation of Chai-hu-kuei-chi-kan-chiang-tang(柴胡桂枝乾薑湯) is probably caused by shogaol contained in ginger. 3.12mcg/ml of shogaol causes uterine relaxation. See pharmacological actions of Weng-fu-tang(溫賦湯), Szu-ni-tang(四逆湯), and Li-chung-tang(理中湯) in Tables XI and XII. And see pharmacological actions of the hexane, chloroform, and alcohol extracts of various drugs in Table XIII XIII-1~13 which indicates that the actions vary according to the solvents used and herbs used individually or in formula. For instance, Table XIII-1 indicates

Table XI. The Relation of Chinese Formulas and Modern Pharmacology.

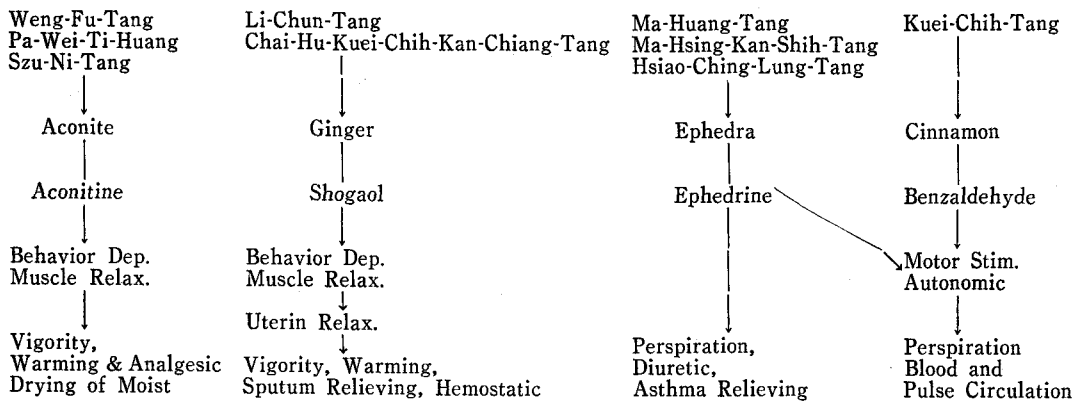


Table XII. Comparison of Strain (Swiss White Route: IP).

Symptoms	Weng-Fu-Tang				Szu-Ni-Tang				Li-Chung-Tang			
	5000 (ip)	2500 (ip)	1000 (ip)	500 (ip)	5000 (ip)	2500 (ip)	1000 (ip)	500 (ip)	5000 (ip)	2500 (ip)	1000 (ip)	500 (ip)
Death	5/5	4/5	0/5	0/5	5/5	4/5	0/5	5/5	5/5	0/5	0/5	0/5
Salivation	+	±	—	—	+	—	—	—	—	—	—	—
Palpebral Size	↑+	—	↓+	—	↑+	—	↓+	—	—	↓+	↓±	—
Respiration by Mouth	+	—	—	—	+	—	—	—	—	—	—	—
Diarrhea	++/+	+/+	+/-	+/-	—	±/±	+/+	+/-	—	—	—	+/-
Skin Red	—	+	—	—	—	+	—	—	—	—	—	—
Behavior Dep.	—	±	±	—	—	±	±	—	—	±	—	—
Muscle Relax.	—	+	—	—	—	±	—	—	—	—	—	—
Tremor	—	—	—	—	—	—	—	—	±	+	+	+
Irritability	+	—	—	—	+	+	—	—	—	—	—	—
Fighting	—	—	—	—	+	+	—	—	—	—	—	—

Note: ↑ = increase
↓ = decrease

Table XIII-1. Toxicity and Pharmacology of Chinese Formulas (1) Ma-Huang-Tang(麻黃湯)

Flu, Stuffy Nose, Childhood Cold, Measles Folk Use	Ma-Huang-Tang	Ephedra 27%	Cinnamon 19%	Apricot seed 27%	Licorice 27%
Experimental Effect					
Anti-inflammatory	A 1200 p.o.	A 250			
Anorexic	A 1200 p.o.	C 500 W 1000 A 500			
Uterine relaxation	A 20r				
Antipyretic			A 1000 s.c. H 500		A 500 s.c. 2000 p.o. W 1000 s.c.
Motor Stimulation		W 500 i.p. W 2500 p.o.			
LD ₅₀	A 7000 p.o.	A 500 i.p. W >10000 p.o.	A N.T.400s.c. C 700 i.p.		H 1200 i.p.

A: Alcohol, C: Chloroform, H: Hexane, W: Extract

Table XIII-2. Ma-Hsing-Kan-Shih-Tang(麻杏甘石湯)

Bronchial Asthma, Pertussis, Childhood Cold, Bronchitis Folk Use	Ma-Hsing-Kan-Shih-Tang	Ephedra 20%	Apricot Seed 20%	Licorice 10%	Gypsum 50%
Experimental Effect					
Antidepression	A 625 p.o. A 250 i.p. W 1000 i.p.				
Anti-inflammatory	A 625 p.o.	A 250			
Anorexic	A 600	A 500 C 500 H 1000			
Uterine relaxation	A 200 r W 200 r	A 50			
Hypotensive	C 1000 H 1000				
Antitussive				A 500 s.c. A 2000 p.o. W 1000 s.c.	←Antipyretic
Motor Stimulation		W 500 i.p. W 2500 p.o.			
LD ₅₀	A 2500 i.p. A 2500 i.p.	A 500 i.p. W >10000 p.o.			H 1200 i.p.

Table XIII-3. Pan-Hsia-Hou-Pu-Tang(半夏厚朴湯)

Neurasthenia, Angina, Asthma, Bronchitis, Gastroptosis Folk Use	Pan-Hsia-Hou-Pu-Tang	Pinellia 30%	Hoelen 25%	Magnolia 15%	Perilla 10%	Ginger 20%
Experimental Effect						
Behavior depression	C 200 p.o.	W 1000 i.p.	C 200 i.p.			
Muscle relaxation	C 200 p.o.	H 500 i.p. W 1000 i.p.				
Hypotensive	H 1000			H 300		
Anorexic	H 2500			C 2500		
Uterine relaxation	C 200 r					C 200 H 200

Staphylococcus Aureus	C 125mcg/cc H 125						
Candida Albicans	C 500 H 500						C 125 H 125
Streptococcus Fecalis	C 63 H 63				H 63		
Anti-Fungal	C 32 H 32						H 63
Mycobacterium Ranae					A 63 C 63 H 32		
LD ₅₀	C 1000 i.p.	A 2800 C 2800 i.p. W 4000	A 2800 C 1000 i.p. W 86	H 1600 i.p.			C 700 i.p. H 700 i.p.

Table XIII-4. Ko-Ken-Tang(葛根湯)

Flu, Tonsillitis, Tetanus, Eczema, Acute Colitis, Otitis Media, Suppuration Folk Use Experimental Effect	Ko-Ken-Tang	Pueraria 30%	Ephedra 15%	Cinnamon 10%	Paeonia 10%	Jujube 15%	Ginger 12%	Licorice 8%
Anorexic			A 500 C 500 W 1000	C 600 H 450				
Anti-inflammatory	C 2500		A 250					
Uterine relaxation	W 200 r						C 200 H 200	
Anti-depression	C 1000							
Hypotensive						A 1000		
Anti-pyretic								A 500 s.c. 2000 p.o. W1000 s.c.
Anti-anaphylaxis	W 1000							
LD ₅₀	H 700 i.p.	A 4000 i.p. W N.T. 4000	A 500 i.p. W >10000 p.o.	C 1300 i.p. H 900 i.p.			C 700 i.p. H 700 i.p.	H 1200 i.p.

Table XIII-5. Kuei-Chih-Tang(桂枝湯)

Colds, Headache, Fevers, Rhinitis Folk Use Experimental Effect	Kuei-Chih-Tang	Cinnamon 22%	Paeonia 22%	Jujube 22%	Ginger 22%	Licorice 12%	
Anti-pyretic	W 2500	A 1000 s.c. H 500				A 500 s.c. A 2000 p.o. W 1000 s.e.	
Hypertensive			A 2000	A 1000			
Anti-inflammatory			A 1000 W 500				
Analgesic	W 2500 p.o.						
CNS depression			A 2000				
LD ₅₀	C 800 i.p. H 1400 i.p.	A N.T. 4000 s.c. C 700 i.p.				C 700 i.p. H 700 i.p.	H 1200 i.p.

Table XIII-6. Wu-Ling-San(五苓散)

Enteritis, Nephritis, Pyelonephritis, Cystitis, Hepatitis, Heart Disease, Migraine Folk Use	Wu-Ling-San	Polyporus 16%	Hoelen 16%	Atractylodes 16%	Alisma 38%	Cinnamon 14%
Experimental Effect						
Hypocholesterol	A 250 C 50					
Anti-inflammatory	C 1000				A 1000 C 1000 W 1000	
Anorexic					C 100	
Muscle relaxation					C 1000	
Hypotensive					C 1000	
Behavior depression			C 200			
Anti-pyretic						A 1000 s.c. H 500
LD ₅₀	C 1000 i.p.		A 2800 i.p. C 1000 i.p. W 86 i.p.	C 2000 i.p. H 1500 i.p. W 750 i.p.		A N.T. 4000 s.c. C700i.p.

Table XIII-7. Shih-Wei-Pai-Tu-San(十味敗毒散)

Hypodermic Ulcer, Lymphadenitis, Eczema, Otitis Media, Mastitis, Boils, Rhinitis, Urticaria Folk Use	Shih-Wei-Pai-Tu-San	Bupleurum 10%	Platycodon 10%	Siler 10%	Cnidium 10%	Cherry Bark 10%
Experimental Effect						
Anti-inflammatory	C 2500					
Anti-pyretic						
Anorexic					C 1250 H 1250	
Behavior depression						
Uterus relax.						
Muscle relaxation		C 100				
LD ₅₀	H 700 i.p.	A 500 C 500 H 4000 W 2000			H 2200 i.p.	
Hypodermiculcer, Lymphadenitis, Eczema, Otitis Media, Mastitis, Boils, Rhinitis, Urticaria Folk use	Hoelen 10%	Ginger 16%	Tuhuo 6%	Schizon-epeta 6%	Licorice 6%	Forsythia 6%
Experimental Effect						
Anti-inflammatory						C 600
Anti-pyretic					A 500 s.c. 2000 p.o. W1000 s.c.	
Anorexic			H 360			
Behavior depression	C 200					
Uterus relax.		C 200 H 200				
Muscle relaxation						
LD ₅₀	A 2800 C 1000 i.p. W 86	C 700 H 700	C 600 H 720		H 1200 i.p.	C 7000 p.o.

Table XIII-8. Ching-Pi-Tang(清鼻湯)

Rhinitis, Suppuration Stuffy Nose	Ching-Pi- Tang	Pueravia 16%	Cnidium 4%	Ephedra 7%	Rhubarb 4%	Cinnamon 6%	Licorice 5%
Folk Use							
Experimental Effect							
Reflex depression							
Anorexic	C 800		C 1000 H 1000	A 500 C 500 W 1000	W 2500	C 600 H 450	
Uterine relaxation	A 200 C 200						
Behavior depression	H 1000						
Analgesic	H 1800						
Antiparkinsonism	H 900						
Muscle relaxation	H 1000				W 200		
Anti-depression	A 400						
Hypocholesterol							
Anti-inflammatory				A 250			
Hypotensive							
LD ₅₀	A 2000 C 1400 i.p. H 1800	A 4000 i.p.	H 2200 p.o.	A 500 i.p. W >1000 p.o.	A 220 i.p. C 2500 p.o.	C 1300 H 900	H 1200 i.p.

Rhinitis, Suppuration Stuffy Nose	Paeonia 7%	Coix 12%	Ginger 4%	Platycodon 11%	Gypsum 6%	Magnolia Flower 11%	Jujube 6%
Folk use							
Experimental Effect							
Reflex depression						H 1000	
Anorexic						A 600	
Uterine relaxation			C 200 H 200				
Behavior depression	A 2000					C 150	
Analgesic						H 1000 W 1000	
Antiparkinsonism							
Muscle relaxation						A 1000 C 150 H 1000	
Anti-depression							
Hypocholesterol						W 1000	
Anti-inflammatory	A 1000 W 500						
Hypotensive	A 2000						A 1000
LD ₅₀			C 700 H 700 i.p.	A 175 W 520		C 750	

Table XIII-9. Hsiao-Ching-Lung-Tang(小青龍湯)

Bronchitis, Asthma, Pneumonia, Pulmonary Emphysema, Sour Stomach, Nephralgia, Pertussis Folk Use	Hsiao-Ching-Lung-Tang	Ephedra 11%	Paeonia 11%	Asarum 11%	Ginger 11%	Licorice 11%	Cinnamon 11%	Schizandra 11%	Pinellia 23%
Experimental Effect									
CNS stimulation	A 1000								
Uterus relax.	A 200r C 200 H 200			A 200r C 200r	C 200 H 200				
Muscle relaxation			A 2000					C 1000	H 500 W 1000
Anorexic		A 500 C 500 W 1000						A 1000 C 1250	
Antipyretic						A 500 s.c. 2000 p.o. W1000 s.c.	A 1000 s.c. H 500		
Anti-inflammatory		A 250	A 1000 W 500					C 1200 H 600	
Hypotensive			A 2000						
Behavior depression			A 2000					H 1000	W 1000
LD ₅₀	C 500 i.p. H 1000 i.p.	A 500 i.p. W 10000 p.o.		A 80 C 60 H 60	C 700i.p. H 700i.p.		A N.T. 4000 s.c. C 700 i.p.	A 1000 C 4000i.p. H 3000 N 4800 p.o.	A 2800 C 2800i.p. W 4000

Table XIII-10. San-Huang-Hsieh-Hsin-Tang(三黃瀉心湯)

Hypertension, Arteriosclerosis, Blood Spitting, Hematuria, Uterine Bleeding, Gastro Ulcer, Neurasthenia Folk Use	San-Huang-Hsieh-Hsin-Tung	Rhubarb 33.3%	Scute 33.3%	Coptis 33.3%	
Experimental Effect					
Behavior depression			C 200		
Muscle relaxation		W 200	W 1000		
Smooth muscle relaxation			C 100 r		
Anti-inflammatory			A 2500 C 200		
Anorexic		W 2500		H 2500 C 90	
Hypotensive				H 1000	
Analgesic			A 2500		
Uterus			A 200 r		
LD ₅₀		A 700 i.p. C 1000 i.p.	A 220 i.p. C 2500 p.o.	A 1800 i.p. >10000 p.o. C 900 i.p.	A 65 i.p. C 180 i.p. W 140 i.p.

Table XIII-11. Tang-Kuei-Shao-Yao-San(當歸芍藥散)

Neurasthenia, Irregular Menstruation, Nephritis, Cystitis, Infertility, Tinnitus lumbago Folk Use	Tang-Kuei-Shao-Yao-San	Tang-Kei 15%	Paeonia 18%	Cnidium 14%	Atractylodes 18%	Hoelen 17%	Alisma 18%
Experimental Effect							
Behavior depression	C 1000						

Anti-inflammatory	H 2500		A 1000 W 500				A 1000 C 1000 W 1000
Anorexic	H 2500			C 1250 H 1250			C 100
Hypotensive			A 2000				C 1000
Uterine relaxation							
LD ₅₀				H 2200 i.p.	C 2000 i.p. H 1500 i.p. W 750 i.p.	A 2800 i.p. C 1000 i.p. W 86 i.p.	

Table XIII-12. Shao-Yao-Kan-Tsao-Tang

Arthritis in Leg's, Abdominal Ache, Sciatica, Lumbago, Stomach Spasm, Gall Stone, Kidney Stone Folk Use	Shao-Yao-Kan-Tsao-Tang		Paeonia 50%		Licorice 50%	
	Experimental Effect					
Anti-inflammatory			A 1000 W 500			
Hypotensive	H	1000	A 2000			
CNS depression			A 2000			
Anti-pyretic					A 500 s.c. A 2000 p.o. W 1000 s.c.	
Anti-Fungal	C	63				
LD ₅₀	A	1000 i.p.			H	1200 i.p.

Table XIII-13. Hsiao-Yao-San(逍遙散)

Menoxenia, Menorrhagia, Leucorrhea, Psychosis, Insomnia, Palpitation, Depression Folk Use	Hsiao-Yao-San	Tang-Kuei 15%	Paeonia 15%	Hoelen 15%	Atractylodes 15%	Bupleurum 15%	Ginger 15%	Mentha Leaves 4%	Licorice 6%	
										Experimental Effect
CNS depression	H 1000		A 2000	C 200						
Anti-inflammatory	C 2500		A 1000 W 500							
Anorexic	C 2500									
Muscle relaxation						C 100				
Anti-pyretic										A 500s.c. 2000p.o. W 1000s.c.
Hypotensive			A 2000							
Uterus							C 200 H 200			
LD ₅₀	H 2500i.p.			A 2800 C 1000i.p. W 86	C 2000 H 1500i.p. W 750	A 500 C 500. H 4000i.p. W 2000	C 700 i.p. H 700			H 1200i.p.

that alcohol extract of Ma-huang-tang(麻黃湯), causes uterine retraction, chloroform and hexane extracts of Ko-ken-tang(葛根湯) has anti-inhibition action, and water extract of Kuei-chih-tang(桂枝湯) has sedative action. These primary findings will be further reviewed with additional solvents, durations of extraction, proportions of formulas and solvents, intervals between two administrations, etc. before they can be administered clinically.

4. Armeniaceae Amarae Semen, Persicae Semen, and Prinsepiae Semen

Though being seeds of the Rosaceae plants and with the same main component: amygdalin,

these three herbs are used differently in Chinese medicine in Table XIII-14. Persicae Semen has been used for extravasated blood, but no pharmacological report is available. The author extracted the three herbs with 60°C and 100°C water respectively and observed their CNS actions in a mouse screening test. Results indicated that subcutaneous injection of Persicae Semen 3500mg/kg caused muscle relaxation, ataxia, and piloerection. The blood vessels of mouse, dilated and reddened by Persicae Semen, is probably called "extravasated blood" in Chinese medicine. However, Armeniaceae Amarae Semen and Prinsepiae Semen did not cause these phenomena. The experiments are being

Table XIII-14. Pharmacology of Armeniaceae Amarae Semen, Persicae Semen, Prinsepiae Nux.

Name of Herb	Temperat-ion of Extr-raction	Rate of Extrac-tion	Indications	Biology <Mouse> Screening test	
				LD ₅₀ mg/kg	Side Effect mg/kg
<Armeniaceae Amarae Semen>	60°C	5.8%	Floating Pulse and Rapid Breathing, Daytime Constipation, Bronchial Spasm, Asthma, Cough, Throat Sore	i.p. 2000	i.p. 1250 ataxia
				p.o. 20000	p.o. 20000 No side effect
<i>Prunus armeniaca</i> L.	100°C	13.1%		i.p. 10000	i.p. 5000 muscle relax. ataxia exploration ↓ testis retraction
				p.o. 20000	p.o. 20000 no side effect
<Persicae Semen>	60°C	10.9%	Sinking Pulse and Mania, Night Constipation, Suppuration, Postpartum Blood, Menopause Symptoms, Stagnation of Blood	i.p. 3500	i.p. 1250. muscle relax ataxia piloerection ear redness
				p.o. 17000	p.o. 10000 muscle relax. piloerection
<i>Prunus Persica</i> (L) Batsch	100°C	11.1%		i.p. 5000	i.p. 2500 ataxia muscle relax. piloerection
				p.o. 18000	p.o. 10000 piloerection
<Prinsepiae Nux>	60°C	2.5%	Trachoma, Light Phobia, Lacrimation	i.p. 1600	i.p. 1000 skin color redness
				p.o. 20000	p.o. 20000 diarrhea
<i>Prinsepia uniflora</i> Batal	100°C	3.7%		i.p. 1250	i.p. 625 no side effect
				p.o. 15000	p.o. 10000 diarrhea CNS stimulation

continued.

VII. Prospect of Chinese medicine

Japanese scholars³⁸⁻⁴²⁾ have disclosed their opinions on the prospect of Chinese medicine on the *Journals of the Japan Society for Oriental Medicine*. Chinese medicine has a 2000-year empiricism on human body and has established its therapeutic systems and published its diagnostic outlines. In the perspiration treatment, for example, Ephedra is used for warm perspiration, Sang-chu-yin(桑菊湯), for cool perspiration, Ma-huang-hsi-hsin-fu-tzu-tang(麻黃, 細辛, 附子湯) for perspiration of strong confirmation, Hsiao-ching-lung-tang(小青龍湯), for sputum perspiration, Shiang-su-san(香蘇散) for vitality perspiration, San-huang-shih-kaotang(三黃石膏湯) for perspiration and internal purification, and Fang-feng-tung-sheng-san(防風通聖散) for intoxication. In the future, Chinese therapeutic principles should be illustrated in scientific (pharmacological or clinical) patterns. Besides, although the symptoms of some Chinese diseases such as: "atrophy", "fainting", "numbness", and "convulsion" have been established since ancient times, a modern medical review on them is necessary. In Japan, characteristic syndromes of Chinese medicine have "blood course confirmation". We should try to study other syndromes.

As the unexpected side effects of modern synthetic drugs have been increasing, the demand of Chinese drugs will no doubt increase in the future. In order to supply inexpensive herbs for future treatment, we should research the therapeutic effects of those herbs with same names but of different species and the encouragement for development, cultivation, research, and tissue culture. Regarding the general Chinese scientific preparations, their prescribing

ratios of formulas, methods of extraction, low-pressure concentration, and essential oil recollection are not standard; therefore it is hoped that their quality evaluation should be established without delay.

For the exchange of developments and researches of Chinese medicine, we urge that an international Chinese medicine association be established as soon as possible. Studies on Pen-Tsao, pharmacognosy, herb components conducted by professors of the Taiwan University, Taipei Medical College, China Medical College, and Kaohsiung Medical College in Taiwan are omitted due to time element.

(Received June 15, 1978)

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