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**COLLECTED ANTHROPOMETRIC DATA ON THE
CHINESE.***

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As a result of the co-operative activity of various members of the China Medical Missionary Association during the ten year period intervening between 1915 and 1925, there are now collected in the files of the Research Committee of the Association records of physical measurements on over ten thousand individual Chinese representing all the provinces of China. The present report on this collection of anthropometric data will be divided into two sections: viz., (1) a brief and tabulated summary of the age, sex, and geographical distribution of the material, as well as the name of those co-operating in this work; and (2) an analysis of the heights and weights according to age, sex, and provincial distribution of the Chinese thus measured.

**I. A GENERAL SURVEY OF THE AMOUNT AND CHARACTER
OF THE DATA COLLECTED.**

Concerted interest on the part of the members of the China Medical Missionary Association in Physical Anthropometric measurements of the Chinese dates back to the year 1915. During the year just mentioned the Research Committee of the Association recognized the desirability of an investigation of normal physical and physiological standards among the Chinese. At that time this Committee felt that a final evaluation of much of its other work, especially along the line of the regional incidence of certain diseases and the varying effects of these diseases upon the different populations of the various regions of China, could not be made in the absence of some knowledge of the normal physical standard of the people of the different regions

*Being a report on the Anthropometric data collected by the Research Committee of the China Medical Missionary Association between the years 1915-1925; and an analysis of the Heights and Weights of the Chinese of North, Central, and South China based thereon.

concerned. Individual studies of this nature, notably those of Drs. Duncan Whyte and E. M. Merrins, had already demonstrated the great possibilities of such investigation, and in order to carry out a similar study on a much wider scale the Research Committee issued an appeal for an intensive investigation of the heights, weights, and chest circumferences of the Chinese of the various regions of China as a preliminary step toward the determination of the standards desired.

As mentioned above, the measurements first called for were those of height, weight, and chest circumference only. The distinctly limited scope of this initial program of measurements is greatly to be regretted. In centering its entire attention on the utilization of a particular combination of these three measurements ("Pignet's Factor"), as a comprehensive index of the relative physique of the Chinese, this early effort unfortunately not only overlooked other as important and as easily taken measurements but provided an inertia that has been difficult to overcome. Subsequent efforts to enlarge the scope of the work, and to put it upon a more adequate basis for constituting a real anthropometric study of the Chinese, were made in 1920 under the joint stimulus of the presence of Dr. Ales Hrdlicka at the Peking Conference of the C.M.M.A. and the newly aroused interest among the members of the Association in the anthropology of Asia as manifested in the creation of a section on Anatomy and Anthropology at this same conference. That these efforts to widen the general field of this particular line of investigation have not met with a greater degree of success has not been due to any want of interest or appreciation of the purposes in mind on the part of the medical men in China, but rather to the lack until the present of suitable equipment to be placed in the hands of interested workers throughout China. Steps are now under way to overcome this difficulty. Institutions or individuals already possessing the necessary equipment are already at work on the larger program. The columns indicated by a triple asterisk in Table I represent complete anthropometric studies of the number of individuals noted, involving between forty and fifty measurements and nearly as many different observations on each individual. Such intensive studies as these imply a special interest in the subject and certain facilities for its prosecution which, though not to be expected among a very wide circle of medical practitioners, should nevertheless some day be found in a larger number of more widely scattered centers than at present. The columns indicated by a double asterisk in Table I of this report include measurements of the span and sitting height in addition to those of the height, weight, and chest circumference of the individual

noted. With these exceptions, which affect in all considerably less than one-fourth of the total number of individuals measured, the data are restricted to the original measurements, namely, height, weight, and chest circumference.

Previous to the final compilation of this report—dealing as it does with over ten thousand individuals measured by more than thirty different investigators—much time and effort have been spent in standardizing the records. All measurements not so reported in the first place have been converted to their metric system equivalents, in conformity with modern anthropometric practice and to render the data readily comparable with that obtainable for other races. It has also been necessary to convert all Chinese ages to foreign calendar equivalents, to transfer all the data to forms facilitating statistical treatment, and finally to catalog and classify the material according to appropriate sex, age, and provincial groupings. In this preliminary treatment of the data all cases in which illegibility, ambiguous corrections of the original record, uncertain ageing, unknown nativity, or any other causes have made them of uncertain value, have been rigidly excluded. The collection as it stands after this preliminary treatment therefore is not only of known value but is also in a form readily usable for appropriate analysis of its included data.

Contributors.—Table I represents a tabulation of the whole of the material, giving credit to the individual contributors and showing the provincial and regional distribution of their material. From this table it is seen that altogether 32 different individuals have made substantial contributions to this collection of data. These are:

Baldwin, (Dr. J. H.), Changli, Chihli.	P.U.M.C. (1)—Dep. of Anatomy:
Cadbury, (Dr. W. W.), Canton.	Black, (Dr. Davidson)
Carleton, (Dr. Mary), Minsing, Fu.	Stevenson, (Dr. P. H.)
Cormack, (Dr. J. C.), Peking.	P.U.M.C. (2)—Pediatrics Clinic:
Davenport, (Dr. C. J.), Shanghai.	Hammond, (Dr. J. H.), and assistants.
Downs, (Dr. C. A.), Changsha.	Pai, (Dr. T. M.), Peking.
Foster, (Dr. J. H.), Changsha.	Lockley, (Mr. A.), Tientsin.
Hadden, (Dr. G.), Changsha.	Thacker, (Dr. Louisa G.), Chuangchow,
Hutcheson, (Dr. A. C.), Nanking.	Fu.
Nash, (Mr. W. L.), Soochow.	Tootell, (Dr. G. T.), Changteh.
Nieble, (Dr. B. H.), Li Ling, Hun.	Witt, (Dr. E.), Hungkiang, Hunan.
	Whyte, (Dr. Duncan), Swatow.

It should be mentioned that the material listed in Table I under Whyte represents the data collected through the joint efforts of the following individuals (v. Whyte, Report of Research Committee of C.M.M.A. for 1917, C. M. J., 32, p. 210, 1918):—

Dr. C. H. Barlow, Shaoshing, Che.	Dr. J. F. Kelly, Kachek, Kwangtung.
Dr. H. Bay, Kaying, Kwant.	Dr. J. L. Maxwell, Yunchun.
Dr. W. H. Dobson, Yeunkong, Kwant.	Dr. Mitchell, Tingchowfu.
Dr. G. F. Eich, Tungkun, Kwant.	Dr. Phillips, Kaifeng.
Dr. Martha Hackett, Canton.	Dr. E. M. Polk, Soochow.
Dr. Hanington, Ningteh.	Dr. A. Shoemaker, Peking.

Geographical Distribution.—Table I shows also the geographical distribution of the individuals measured. For the purpose of analysis and comparison of the heights and weights of the population of the Northern, Central and Southern China, an arbitrary division of the provinces into groups representing these respective regions has been made. Although the strictly political as opposed to the ethnical nature of the boundaries gives rise to certain objections yet no alternative presents itself in the case of the material under treatment. These arbitrarily selected regions of China are as follows: North China, comprising Chihli, Honan, Shansi, Shantung, Shensi, and Kansu; Central China, consisting of Anhwei, Kiangsu, Chekiang, Kiangsi, Hupeh, Hunan, and Szechuan; and South China, including Fukien, Kwangtung, Kwangsi, Yunnan, and Kweichow. In general the disposition and relations of the chief water-ways of a province to the larger river systems of its respective region have been the determining factors in the grouping of provinces of doubtful regional affiliation.*

A glance at the right hand column of the totals in this first table shows that all the provinces of China proper, and in addition Manchuria and Mongolia, are represented in the distribution of the subjects measured. The unevenness of the distribution of measured individuals for the country as a whole, however, is very marked. In North China only Chihli, in the Central group of provinces only Kiangsu, and in the South only Kwangtung are really adequately represented. Furthermore a little closer study of the respective figures shows that with the exception of Honan in the Northern, and Chekiang and Hunan in the Central group, the remaining provinces have as yet hardly been touched. This means that of the total eighteen provinces of China we are still practically without data from twelve (Kansu, Shansi, Shantung, Shensi, Anhwei, Hupeh, Kiangsi, Szechuan, Fukien, Kwang-

* Since the completion of this report my attention has been called by Dr. Davidson Black to certain factors which seem to make it more logical to place Kweichow with the Central rather than with the Southern group of Provinces. As a matter of fact the composite populations of Kweichow, Szechuan, and Yunnan make the question of the ethnographic relations of these provinces a most complicated problem. Much more data must be accumulated on the Chinese populations of these regions than is now in hand before anything more than a tentative alignment of these provinces to the other regions of China can be made. In the meantime, the small number of individuals reported from the provinces in question in the present study do not materially influence the averages of the sections to which they are at present assigned.

si, Kweichow, Yunnan). Viewed in this light, the study has barely been begun.

Age and Sex.—Table II represents a tabulation according to sex, age, and province of all of the material for which sufficiently accurate information on these points is available. Material contributed in the form of computed averages of a number of individuals (e.g., 207 Kiangsu men: average age, $24\frac{2}{3}$ years; average height, 5 ft. $5\frac{1}{4}$ inches; average weight, $125\frac{2}{3}$ lbs.), or, on the other hand, individuals reported in age groups (e.g., 16 to 20 years so many, 20 to 30 years so many, etc.), could not be recorded in Table II. There results, therefore, a loss of data from practically 1,500 individuals in Table II as compared with the total number tabulated in Table I.

The range of the age of the individuals measured extends from 2 years on the one hand (two individuals included in the records of Dr. Cadbury of Canton), to between sixty and seventy years on the other (six individuals so reported by Dr. Hadden). The best idea of the percentage distribution of the remaining cases in the intervening age periods is to be obtained by examining the accompanying graph (Fig. 1) in which the height of the lines indicates in each case the percentage ratio of the number within that particular group to the total number of cases reported. It is interesting to note in this graph that middle school students have furnished a disproportionately large number of the total measurements on growing subjects. The need of attention to the primary school age groups is particularly apparent from the figures in hand. These earlier ages represent a most important phase in the growth process of any people and will well repay in interest and value of results all the attention that can be paid them.

On the basis of sex, the tabulated material comprises 8,137 males and 1,233 females, or roughly a 7:1 ratio for the entire country. It will be noted from the regional sex totals in the right hand column of Table II that a considerably larger number of males have been measured in Central than in either North or South China. A glance at Figure 1 gives an idea, in terms of percent, of the age distribution of the two sexes. The relatively greater abundance of subjects of middle school ages over that of other early and adolescent ages is again to be noted. This implies a relatively greater ease in securing individuals of middle school age than of earlier age groups, and indicates a corresponding danger of failure to secure a sufficient number of individuals of the younger age periods to establish the growth curve for these earlier years, unless particular attention is paid to the importance of securing measurements of these younger children.

The provincial and age distribution of the females requires some comment. Over one half of the total number of females comes from

South China (v. Table II). The male to female ratio for this section of China is a little less than 4:1, an evidence of the active interest of several women missionary physicians of this part of China in the relative physical standards of the Chinese women and girls of their respective regions. The ratio of males to females reported from North China is approximately 8:1, while that from Central China is over 12:1. The particular need of an increased interest in this problem on the part of women physicians and educators of these regions is thus evident. Closer examination of the distribution of the data on females shows that except for a few scattered cases in only three of the eighteen provinces of China, namely, Chihli, Fukien, and Kwantung, has there been a real start made at studying the physical characters of the female population. The few cases for other provinces represent for the most part girls measured in schools and orphanages in provinces other than those of their birth—e.g., all of the females credited to the six provinces of North China were measured in the institutions of Peking. A still closer scrutiny of the age distribution of these females shows a marked concentration of cases in the 11—12—13 year periods. The complete absence of measurements on adult females in all but one of the provinces is a commentary on the great need of further observation upon this particular group. In fact the study of the physical characters and standards of Chinese women remains as yet practically an untouched field of endeavor and is one which should immediately challenge the interest and energies of those in contact with this section of the population of China.

SUMMARY.

The foregoing survey of the collection of anthropometric data under discussion may be summarized briefly as follows:—

The collected data consist of physical measurements on 10,863 Chinese (9,630 males and 1,233 females), ranging in age from 2 to 70 years, and representing all the different provinces of China. Although presenting a certain unevenness in both age and geographical distribution, this collection of data nevertheless constitutes what is undoubtedly the most important source of information in existence regarding at least two of the cardinal measurements, stature and weight, of the Chinese. The most urgent need is for a better balancing or rounding out of the collection from the standpoint of the geographical representation of the data, and an enlargement of the scope of the investigation to include other important measurements. The collection as it now stands constitutes a creditable beginning of a comprehensive study of Chinese physical characteristics. Its greatest value, however, lies in the initial interest and experience that it represents, the demon-

stration of the feasibility of cooperative effort in such an investigation provided such effort is properly standardized and correlated, and most of all in pointing the way toward the formulation and execution of a more adequate program of anthropometric study of the Chinese in the future.*

II. AN ANALYSIS OF THE HEIGHTS AND WEIGHTS OF THE CHINESE OF NORTH, CENTRAL, AND SOUTH CHINA.

As to height, the stature is one of the most significant of all human dimensions. As a basal measurement for percentage comparison of various body segments, the total body length is naturally of outstanding importance. Owing to the comparative ease with which this measurement can be taken, and hence the large number of different racial groups for which it is fairly well known, stature also constitutes a time honored means of classifying various divisions of mankind. It is quite fitting, therefore, that one of the first racial characteristics of the Chinese people to be quantitatively determined by a study of the data thus far collected should be that of stature. The data in hand provide adequate material for a study of this cardinal measurement in the case of the adults of the various regions of China: and in addition, by virtue of the recorded heights of immature individuals representing successive age periods from 5 years upwards, a study of the upper two-thirds of the growth curve of the Chinese of the various regions of China is also made possible.

AVERAGE OF HUMAN STATURE GENERALLY.

Before considering the statures of the adult Chinese it may be well to note the average and the range of human statures in general. Martin (*Lehrbuch der Anthropologie*, p. 208) conveniently tabulates the normal range of adult human statures, and indicates in addition a useful though purely arbitrary designation of the various divisions of this range, as follows:

	Males	Females
Average	165 cm. †	154 cm.
Giants	200 and over	187 and over
Very large	180.0—199.0	168.0—186.9
Large	170.0—179.0	159.0—167.9

* Such a program will be presented in an article which is to appear in a forthcoming number of the Journal.

† Throughout this report all measurements will be expressed in terms of centimeters and kilograms. To convert these into inches or pounds, the figures here given may be divided by 2.54 or multiplied by 2.20 respectively.

Above average	..	..	..	167.0—169.9	156.0—158.9
Average	..	..	..	164.0—166.9	153.0—155.9
Below average	..	..	..	160.0—163.9	149.0—152.9
Small	..	..	..	150.0—159.9	140.0—148.9
Very small	..	..	..	130.0—149.9	121.0—139.9
Dwarfs	..	..	..	Under 129.9	Under 120.9

Variously scattered along this scale of human heights, from the Akka Negrilloes of Africa whose average stature is only 137.8 cm., to the tall Scotch agriculturists of Galloway, averaging 179.2 cm. in height, are to be found the chief ethnic groups of mankind (Deniker, *The Races of Man*, p. 577 *et seq.*).

As related to Martin's range of human stature, the regional average of the statures of Chinese adult may be summarized as follows (cf. Tables III to VIII):

	Males	Females
North China	169.2 cm. (above average)	158.0 cm. (above average)*
Central China	165.1 cm. (average)	154.0 cm. (average)*
South China	163.0 cm. (below average)	151.4 cm. (below average)

(*Estimated)

It is to be noted that the Chinese, in spite of regional differences, fall well within the range of Martin's medium or average size for human stature.

REGIONAL DIFFERENCES IN HEIGHT.

The difference in height between the Chinese of the north and those of the south, and the intermediate position in this respect of the people of the central provinces of China, is well brought out by the data at hand. These figures allow us to confirm and place on a quantitative basis what has long been a matter of common observation. The absolute regional differences in question (estimated in the case of the north and central adult females) may be tabulated as follows:

Regions	Males			Females		
	North	Central	South	North	Central	South
North	—	4.2 cm.	6.3 cm.	—	3.8 cm.	5.9 cm.
Central	—	—	2.0 cm.	—	—	2.1 cm.

In considering these regional variations in height it must not be lost sight of that we are dealing with total regional averages. The measurements of particular groups within these respective regions fluctuate to a greater or less degree around these averages, and in each of the three main divisions of China a considerable range of variation is to be found. Especially in the South do we find extreme differences

in body size occurring among individuals from one and the same area (cf. provincial averages, Tables III to VIII). In the central and northern divisions on the other hand we note a much smaller degree of variation among the component groups. Although it does not fall within the province of this report to discuss the probable factors underlying these regional differences, yet it may be remarked at this point that we are undoubtedly dealing here principally with primary variations in different original racial stocks, rather than with geographical factors as might at first thought be supposed. Human stature, we have every reason to believe, is an inherited characteristic, and is modified by external factors only to a very limited degree. The extreme variation among the different populations of the various southern provinces (e.g., Kwantung, Kwangsi, and Yunnan) as contrasted with the greater homogeneity of the people of the northern and central regions illustrates an absence in the South of any such general admixture or blending of the various ethnic groups represented as has taken place in the case of the populations of North and Central China.

COMPARISON OF MALE AND FEMALE STATURE.

The sexual differences in size among the adult Chinese appears to be about the same as that reported for other races (cf. Martin, *l.c.*, p. 208). Thus in the case of the Chinese of the south, from which region we have a sufficient amount of data on the stature of the adult females to make such a comparison possible, the adult female stature is 92.8 per cent of that of the male. It is to be regretted that the records thus far collected do not include adequate data for a similarly definite determination of this measurement for North and Central China. Approximations of these heights, however, can be obtained from a theoretical projection of the upper end of the nearly complete growth curves for these respective regions, as well as by a computation based upon the percentage of the male stature of these same regions. Such an approximation gives us roughly 157-160 cm. for the most probable limits of the adult female stature of the North and 153-155 cm. for a similar approximation of this measurement for the central region of China. As stated in the first section of this report it is very desirable that actual data on the adult females of North and Central China be obtained. The regional differences just reported in the statures of the adult Chinese are graphically shown in the right hand frames of Figs. 9 and 10.

Briefly summarizing our findings on the statures of the adult Chinese of the various regions in China we may state that, with

the possible exception of certain more or less isolated and as yet unstudied groups of "tall" peoples in South China, there is in general an actual decrease in body height among the Chinese as one passes from the north to the south. The average stature of the Chinese of the north, for example, is higher than that of the population of Central China, while this latter population is in turn on an average taller than that of South China. These differences, in the order named, obtain for the females as well as for the males.

HEIGHT AND WEIGHT OF CHINESE DURING PERIOD OF GROWTH.

We pass now to a consideration of the relative statures (and corresponding weights) of the Chinese in the respective regions during corresponding periods of growth. The data for such a study is assembled in Tables III to XIV. Here in the case of both males and females, and for the various provinces and regions of China, are tabulated for each successive age period from 5 years through the growth period. (1) provincial average heights or weights, (2) the total regional averages, (3) the "moving averages"* of the same.

* A few words as to the significance and method of calculation of the "moving average" may not be out of place at this point. The expression of any continuous variable (height, weight, etc.) as a function of age introduces certain difficulties inherent in the arbitrary division of human age into units of one year. Experience proves that when subjectively applied to age this apparently simple unit of time attaches to itself a certain amount of indefiniteness. When an individual gives his age as eighteen, for instance, and we have no record of the actual date of birth, we know that his precise age may be anywhere from seventeen years and six months to nineteen years lacking one day, depending entirely on the individual's own method of calculation. Our unit of time, therefore, instead of being exactly one year, approaches eighteen months as a rather indefinite limit. This fact provides an overlap with the previous year on the one hand and permits an escape of a certain number of individuals into the next age period on the other. Furthermore, in addition to the common mistake in age of one year in either direction to be expected more or less frequently from the careless or indifferent of any group, the problem in China is still further complicated by the Chinese system of age calculation and the necessary conversion of Chinese ages into foreign age equivalents. Therefore, it must be evident that by taking the average of the measurements of any variable for its total appearance throughout any three year period we shall arrive at a relatively safe approximation of the actual mean value of that variable for the center of the three year period in question. Such an average—weighted as it is by a consideration of the conditions of both the preceding and succeeding age periods—minimizes the fortuitous fluctuations of the resultant growth curve that would otherwise occur on account of the marked individual variations in the case of small series. Curves plotted on the basis of such averages, as are the curves presented in this report, are, therefore, much truer expressions of the actual trend of the growth process than had they been plotted on the actual averages of small groups. For fuller accounts of this particular average and its advantages the reader is referred to Professor T. Wingate Todd's numerous studies on age changes in the human body published in the *American Journal of Physical Anthropology*. The writer freely acknowledges his personal indebtedness to Professor Todd for suggestions and help given him in the course of his own studies of age changes in the human body.

(4) the actual yearly increments, and (5) the percentage increments of heights or weights as the case may be.

As our chief interest in this study is in a comparison of the relative rather than the absolute values concerned we avail ourselves of graphic methods, as these are best adapted to bring out the significant facts involved. From the moving averages we plot our respective curves of growth (Figs. 2, 3, and 4). The characteristic form of such curves (consisting of a series of *curvatures* rather than a straight line) shows us that the rate of growth is not constant throughout but exhibits definite phases of relatively rapid and slower growth which tend to alternate with each other. These alternating phases of growth are called "growth cycles."* Studies on sufficiently large groups of different species show that these cycles of growth appear constantly at the same place on the total growth curve of any species; but it has also been shown by studies on appropriate sub-groups of a species that both sex and race exert a definite influence in the relative time of appearance of these fluctuations. It is chiefly upon this latter point that the data in hand affords valuable evidence as far as the Chinese are concerned. Although these fluctuations in the rate of growth can be seen more or less distinctly in the ordinary growth curve, yet the exact age at which these changes in rate occur is most easily seen when the successive annual increments are plotted against the corresponding yearly periods. This we have done in Figs. 7 and 8 for heights and weights respectively, utilizing for this purpose the percentage increments tabulated in Tables III to XIV. Such curves are technically known as "acceleration curves."

* In the total growth period there are to be recognized three such cycles of growth. Thus *in utero* during the first half of gestation the rate of growth is exceedingly slow, with a subsequent period during which a markedly rapid accretion of tissue characterizes the development of the individual in the months immediately preceding delivery. This accelerated rate of growth is maintained until nearly the end of the first year of extra-uterine life when a "plateau" in the curve of growth is reached. This resting period is followed by another period of relatively rapid growth which terminates only at the time of the pre-adolescent retardation at about the 10-14 year period. This latter phase is succeeded in turn by a marked adolescent acceleration which ends in a gradual cessation of growth as the individual reaches maturity. Each of these growth cycles, when plotted against its respective duration of time, appears as an opened out S-shaped curve; and we have therefore, when the entire curve of growth from the beginning of gestation to maturity is plotted, three such S-shaped curves following one after another. The data at present under consideration allow us in the case of the Chinese to begin at a little before the middle of the second of these three cycles of growth, to note the position of the juncture of the second and third phases, and to study the last of these growth periods in its entirety.

The reader who is interested in the problem of growth in its larger aspects will find the subject most comprehensively treated in two recent works: (1) Robertson, T. Brailsford: *The Chemical Basis of Growth and Senescence*, Monographs on Experimental Biology. Lippincott, 1923. (2) Thompson, D'Arcy W.: *Growth and Form*. Cambridge University Press, 1917.

FURTHER OBSERVATIONS ON GROWTH OF CHINESE.

From this preliminary consideration of relevant facts about human growth in general we turn now to some observations of interest in connection with the growth of the Chinese. We consider first the superimposed curves for the males and females of the different regions of China, Figs. 2, 3, and 4. In these the discrepancy in the heights of the pre-adolescent girls and boys in favor of the former in the northern and central Chinese groups immediately arouses our interest. This observation is apparently at distinct variance with the facts established through extensive observations on other races. We should expect, as indeed we do find in the case of our Southern material, that the boys would be both taller and heavier than the girls, until the relatively earlier pubescent acceleration in growth characteristic of the female produces a distinct crossing of the curves at approximately the 9—12 year period and results in a brief period of time (usually between the 10th and 14th years) during which the girls may equal or even exceed the boys of corresponding ages in height and weight. After this brief period the difference in size between the two sexes in favor of the males gradually increases until the usual adult proportions are reached. Returning to the pre-adolescent portions of the northern and central Chinese growth curves and the unusual discrepancy noted therein between the two sexes, a careful survey of the amount and character of data available for the plotting of this portion of these particular curves is in order before accepting this apparent anomaly as a possible significant racial variation. The disproportionately small number of female individuals measured in the early age periods (cf. Tables II to XIV) has already been commented on in the first section of this report. Since in the curves for South China, where the number of girls is more than twice that in either of the other two sections, this unexpected condition does not obtain, we are led to believe that measurements of a more nearly adequate number of girls of the other regions of China will substantially alter the discrepancy in question. Another pertinent factor is to be found in the fact that most of the data on Chinese girls have been obtained on students in Mission boarding schools where nutritional standards are better than the average, while a considerable amount of the data on the heights and weights of the boys, of North China at least, was gathered in day schools and orphanages conducted by Chinese. A combination of these two factors—relatively scanty data on the girls in question and a fortuitous selection of oppositely weighted material from the standpoint of the nutrition—may account for the apparent discrepancy here observed. On the other hand, a large percentage of the writer's

Chinese students and others whom he has questioned on this point declare that Chinese girls of the age under discussion are as a rule actually larger than Chinese boys of the same age. The need of more data, especially on the girls, is clearly emphasized by the point in question and it is hoped that subsequent additions to the existing data on the pre-adolescents of North and Central China will soon be forthcoming.

We find a much greater degree of certainty and significance in the regional differences in the various curves of growth. These differences are of two types; one has to do with the absolute lengths of the growing periods, and the other with the relative time of appearance on the respective curves of the points of inflection in the growth rate in the different regions.

The regional differences in the duration of the growth period are most strikingly shown in the superimposed curves in Figs. 5 and 6. Here the most conspicuous feature related to the point in question is the flattening out of the upper end of the curve for South China in the 18th and 19th year periods. This definite falling off in the rate of growth in South China in the 17th, 18th and 19th years, as contrasted with the more gradual retardation during this same period in the case of the central Chinese, for instance, is also well shown in the acceleration curves in Figs. 7 and 8. This means that the southern Chinese have reached the end of their growing period in approximately the 19th year of life. Contrasted to this, the growth curves for both the central and northern Chinese still show a definite though gradually decreasing upward trend in the 22nd year period, beyond which they are not carried in this present study.* Inasmuch as the general slope of the growth curve for South China as well as the relative height of the increment curve for this region shows no special compensatory increase in the rate of growth during this shortened growth period, one might on first thought attribute the shorter stature of these people to this relatively shorter duration of the growing period. It is doubtful, however, whether this conclusion is justified. The actual stature finally arrived at is, as mentioned above, most probably determined in the main by racial inheritance. The shortening of the actual period of development of that stature, on the other hand, as noted here in the case of the Chinese of the south, may with some degree of assurance be attributed to climatic factors.

Along with the earlier appearance of maturity just noted in the southern section of the Chinese population are to be observed the

* Ample data are now at hand to determine with a considerable degree of definiteness the upper limit of the growth curve in the case of the northern and central Chinese, and such a study is projected for the near future.

similarly early occurrences of the cyclic changes in growth rate mentioned above as characteristic of the growth process. Particularly is this true of the adolescent or pubescent acceleration of the growth rate which is associated, though by no means synonymous, with the phenomenon vaguely spoken of as "puberty." This particular acceleration of growth is a conspicuous feature of the adolescent period of life and is commonly called the "growing period" on account of the suddenness with which children of this period seem to "shoot up" in height. Although this phenomenon is expressed in a definite steepening of the growth curves just before the final flattening out yet the exact time at which this change occurs in the different regions of China is shown best in the acceleration curves (Figs. 7 and 8). In these figures the stippled areas represent the time of occurrence of this "pubescent acceleration." The definite shifting of these stippled areas from left to right, or from earlier to later year periods, as one passes from the south to the north is graphically shown. The 11-13 year period in South China, 12-14 year in the case of Central China, and 14-16 in the north are (for the males) the years of most marked increase in the growth rate. Although active growth continues for several years after these periods, yet it is with an ever diminishing rate of yearly increase. The same regional variations in time of appearance of growth rate changes hold true for the females as are noted for the males. In addition it is to be noted that within any one of the various groups, the changes in velocity of growth in the case of the female invariably occur earlier than in the male. The difference between the two sexes in this respect rarely exceeds one year in time.

The factors just discussed, producing differential growth rates in the different regions of China, account for the conspicuous regional differences in heights seen in children of corresponding age. These differences are well shown in the 5, 10, and 15 year frames of Figs. 9 and 10. We will consider briefly the case of the males. Assuming the birth size to have been practically the same in the case of the three regions of China, it appears from the average condition found at the five year growth stage that a considerably more rapid growth rate obtains in the South in the 1-5 year period of life than in either of the other two regions of China. Unfortunately our data on body size previous to the 5 year period are too inadequate to justify our plotting the actual curve of growth for this earlier period. We must start therefore with conditions as we find them in the 5 year period. During the 5-10 year period, although the male from South China retains his early advantage in absolute height, yet the difference between him and his central and northern brothers has become less. In fact, a glance at the acceleration curves for the different regions (Fig. 7)

for this period shows that the rate of growth of the children of the south during this time falls appreciably below that of the other two regions. The highest average rate of growth for this and the succeeding period is to be found in the case of the central Chinese. This fact is reflected alike in the relative steepness of the growth curves during this period, the general levels of the respective acceleration curves, and the fact that whereas in the 5 year age period the central Chinese boys are of the same average size as their northern brothers yet at 10 years they have outgrown their former equals, and in the 15th year period they surpass both northern and southern males in height. This advantage in height of the central over the southern Chinese is retained throughout life. The relatively slower growth and consequent disadvantage in height of the northern Chinese in the earlier phases of the growth period are finally more than compensated for by their late pubescent acceleration which, although delayed in time, is both greater in degree and longer in duration than in the case of either of the other two regions of China.

THE FACTOR OF BODY WEIGHT.

As to weight, certain minor differences become at once apparent on comparing the weight curves with the corresponding curves of heights. The weight curves show a tendency in the pre-adolescent period toward concavity rather than toward convexity as in the case of the height curves. Furthermore, the adolescent accelerations in the case of growth in weight tend to occur a little earlier than the corresponding accelerations in growth of height. The slight difference in weight between the two sexes in favor of the females is on the whole more to be expected than the coincident discrepancy in heights mentioned above. The fluctuations in relative weights between the different sections of the population of China are practically the same as those of the corresponding statures, and need no particular comment. For purposes of ready comparison between the weights in the various age and sectional groups, Tables IX to XIV have been compiled.

Except as a basis for the determination of relative food requirements or in some instances of relative drug dosages absolute body weight alone is of only limited significance. When related to some other body measurement, however, such as stature, trunk length, or chest circumference, then the factor of body weight contributes to a general idea of build, relative robustness, or other similar constitutional standard. Various combinations of the height and weight factors have been proposed, a simple division of the latter by the former to arrive at a "height-weight index" being commonly used. Inasmuch as weight,

however is really a measure of mass, which in turn is always a tridimensional function of the linear dimensions of the body, it has been thought more logical by most anthropologists to relate the cube root of the weight to the stature or other selected linear measurement, rather than the simple weight measurement itself. The index thus derived ($\frac{\text{cube root of the weight} \times 100}{\text{stature}}$) is known as the "ponderal index," and is widely used as an expression of the relation of body weight to body height. This index has been calculated for the average heights and weights of the Chinese in the different age and regional groups represented in this report, and the results are tabulated in comparison with average heights and weights in Tables XV and XVI. For purposes of racial comparison similar data for English, Russian, Italian, and Japanese males and females are compiled in Tables XVII and XVIII.

PLOTTING OF PONDERAL INDICES.

The plotting of the ponderal indices over the growth period, as is done in Fig. 11, is not without interest. We first consider the curve for males. Here, in what may at first appear to be a meaningless medley of lines, there is disclosed upon further inspection a certain orderliness in the changing ratios of weight to height over the period of years under discussion. There is a marked downward trend of the curves in the early period of childhood in spite of the rather wide swing of curves before the 7th year (10th in the curve for South China). This means that during this particular phase of growth the increase in weight fails to keep pace with the increase in height. Here again we are dealing with a quantitative measurement of a common qualitative observation, for it is during this period (5 to 10 year period) that children are commonly observed to lose the characteristic rotundity of infancy and early childhood. The succeeding period (from 10 to 18 years) finds a consistent though much less marked downward trend of this same curve, an expression of the fact that during these years also the growth in height takes a slight precedence over the concurrent gains in weight. From the 18th year onward the ratio of weight to height begins to increase; a quantitative expression of the commonly observed "filling out" of early maturity. The earlier beginning of this prematurity rise in the weight-height ratio in the case of the southern Chinese is in keeping with the correspondingly earlier onset of maturity in this section of the population as noted above in connection with the discussion of the relatively early cessation of growth on their part. The slightly higher ratio of weight to height in the case of the northern

Chinese is of interest, though it must not be considered as necessarily dependent upon the coincident superiority in height of these same people.

A glance at the curves of ponderal indices for the Chinese female shows the same early fall and later rise in ratios of weights and heights as seen in the case of the males. The slightly higher general average of these ratios in the case of the females on the one hand, as well as the slightly earlier occurrence of the pubescent acceleration on the other, are most probably the expression of fundamental sexual characters. The final quantitative measurement of these differences between the two sexes in the case of the Chinese must wait upon the accession of more adequate numbers of measurements of Chinese women and children.

SUMMARY.

Avoiding conclusions unwarranted by the nature or amount of the data in hand, we may briefly summarize the foregoing preliminary analysis of the heights and weights of the Chinese of different regions of China as follows:—

1. The adult Chinese of North China are taller and heavier than those of Central China; these latter being similarly, though to a slightly less degree, taller and heavier than the adults of South China.

2. The Chinese of the south have a definitely shorter growing period and an earlier appearance of the characteristic growth phases, pubescent acceleration in particular, than do the Chinese of Central or North China. Conversely, the Chinese of the north have a relatively prolonged period of growth and a delayed appearance of the growth acceleration characteristic of adolescence.

3. The ratio of weight to height seems to be slightly higher (certainly in adults) in the case of the northern Chinese. The relative changes in this ratio during the various phases of the growth period, however, seem to be the same in the different regions of China.

4. The absolute value of this ratio of weight to height appears to be slightly higher in females than in males. This conclusion must await confirmation in a further analysis of more representative data as far as the females are concerned.

(For Tables and Charts see pages 872-898.)

TABLE I. TABULATION OF TOTAL COLLECTED MATERIAL, SHOWING CONTRIBUTORS, AND PROVINCIAL AND REGIONAL DISTRIBUTION.

Region	Provinces	Baldwin	Cadbury	Carleton	Cornack	Davenport	Downs	Poster	Hadden	Hutchesson	Nash	Nieble	P. U. M. C. (1)	P. U. M. C. (2)	Pai (Dr. T. M.)	Lockley	Thacker	Tootell	Whyte*	Witt	Provinces	Totals
North China	Chihli ...	...	2	...	...	5	...	...	...	7	8	...	151†	865†	69	...	...	...	86	...	Chihli ...	1,133
	Honan ...	...	...	...	...	...	...	...	...	...	...	...	516	14	1	...	...	...	...	...	Honan ...	548
	Kansu ...	...	...	...	...	11	...	...	...	7	...	...	5	3	...	...	...	...	...	...	Kansu ...	26
	Shansi ...	...	...	...	...	1	...	...	...	...	...	...	198	3	4	...	...	...	...	...	Shansi ...	198
	Shantung ...	...	...	...	...	5	...	...	...	5	11	...	181	21	23	...	...	...	...	...	Shantung ...	253
	Shensi ...	...	...	...	...	...	...	...	...	...	...	...	17	1	...	...	...	...	...	...	Shensi ...	25
	Undesignated	81	...	...	183	...	...	...	...	...	...	...	...	59	3	110	...	...	413	...	Undesignated	849
Total (North) ...	(81)	(2)	...	(183)	(24)	...	...	...	(22)	(38)	...	(1,050)	(916)	(97)	(110)	...	...	(499)	...	Total (North)	3,693	
Central China	Anhui ...	...	...	...	...	14	...	2	...	32	...	...	128	10	5	...	...	...	...	1	Anhui ...	182
	Chekiang ...	...	...	...	...	245	...	3	...	21	420	...	25	28	5	...	...	...	...	...	Chekiang ...	749
	Hunan ...	...	...	...	...	2	106	189	102	4	...	82	14	58	5	...	...	313	...	83	Hunan ...	958
	Hupei ...	...	...	...	...	1	8	13	...	4	22	...	21	18	2	...	...	...	...	...	Hupei ...	92
	Kiangsi ...	...	...	...	...	1	11	9	...	3	...	9	7	3	4	...	...	...	...	...	Kiangsi ...	65
	Kiangsu ...	...	...	...	...	665	4	7	...	46	1,517	1	62	65	7	...	...	...	...	...	Kiangsu ...	2,374
	Szechuan ...	...	...	...	...	1	...	6	...	5	11	...	33	2	3	...	...	...	...	...	Szechuan ...	61
Undesignated	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	195	...	Undesignated	195	
Total (Central) ...	...	...	...	(929)	(131)	(229)	(102)	(115)	(1,978)	(94)	(280)	(184)	(31)	...	...	(313)	(195)	(95)	...	Total (Central)	4,676	
Sou. China	Fukien ...	...	2	66	...	5	1	3	...	7	14	...	21	15	...	...	81	...	...	...	Fukien ...	215
	Kwangsi ...	...	10	...	...	...	...	...	...	...	6	...	3	2	...	...	...	10	...	...	Kwangsi ...	22
	Kwangtung ...	...	773	...	...	3	2	11	...	7	156	1	35	45	...	...	...	...	56	...	Kwangtung ...	1,089
	Kweichow ...	...	...	...	...	...	...	...	...	...	6	...	6	2	...	...	...	...	...	...	Kweichow ...	22
	Yunnan ...	...	...	...	...	1	...	...	...	...	...	...	2	1	...	...	...	...	...	...	Yunnan ...	4
Undesignated	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1,793	...	Undesignated	1,793	
Total (South) ...	(785)	(66)	...	(9)	(3)	(14)	...	(14)	(182)	(1)	(67)	(66)	...	...	(81)	(10)	(1,849)	(8)	...	Total (South)	3,155	
Manchuria ...	...	...	...	...	...	...	...	...	2	1	...	12	4	...	...	...	...	...	...	Manchuria ...	19	
Mongolia ...	...	...	...	...	...	...	...	...	...	...	...	81	...	...	...	...	...	...	...	Mongolia ...	81	
Contributor's Total ..	81	787	66	183	962	134	243†	102	153	2,199	95	1,500†	1,170†	128†	110	81	323	2,543*	103	Grand Total ...	10,963	

* Material here listed under Whyte represents a compilation of material contributed by the following individuals: Drs. Barlow, Bay, Dobson, Eich, Hackett, Haughton, Kelly, Maxwell, Mitchell, Phillips, Polk, Shoemaker. (v. Whyte Report of Research Committee of C.M.M.A. for 1917; C.M.J., Vol. 32, p. 210 1918).

† (v. Text.)

PROVINCES		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	& over	Provinces	♂	Totals	
NORTH CHINA	Chihli	M			3	2	7	24	26	31	37	72	88	94	91	61	43	40	29	45	37	29	122	Chihli	M	878	
		F				6	10	19	18	27	28	31	38	21	25	17	15	4							F	255	
	Honan	M																						Honan	M	541	
		F																							F	23	
	Kansu	M				1							2							1	3	6	10	Kansu	M	186	
		F												1											F	23	
	Shansi	M												1		1	1				1	3	40	111	Shansi	M	186
		F																								F	23
	Shantung	M					1	3		1	1	1	1	3	3	1	3	3	6	14	26	37	116	Shantung	M	219	
		F						1				2	2	6	3	1	3								F	17	
Shensi	M																		1	1	4	2	6	10	Shensi	M	24
	F																								F	1	
Undesignated	M				1	4	10	9	12	4	6	7	7	3	11	21	12	12	37	25	24	122	Undesignated	M	327		
	F																								F		
Total (North)	M			(3)	(3)	(12)	(37)	(35)	(44)	(44)	(82)	(96)	(107)	(101)	(78)	(69)	(59)	(52)	(141)	(164)	(238)	(838)	Totals (North)	M	(2,200)		
	F				(6)	(11)	(20)	(18)	(28)	(28)	(34)	(46)	(74)	(24)	(20)	(13)	(4)							F	(279)		
CENTRAL CHINA	Anhui	M									1		2		3	13	15	24	26	30	24	99	Anhui	M	247		
		F											1		1	1								F	4		
	Chekiang	M				2	1	2	3	8	12	20	27	47	57	50	61	56	52	38	46			Chekiang	M	492	
		F					2	7	2	3	3	1	1											F	19		
	Hunan	M					4	4	1	2	11	21	24	43	58	91	127	115	105	64	50	217			Hunan	M	934
		F				1																			F	7	
	Hupeh	M					4		1	1	2	2	1	1	3	9	7	4	7	9	10	3	11	Hupeh	M	70	
		F				1		1		1	1	1	1	2	1										F	10	
	Kiangsi	M							1	1	1	1	1	3	1	6	4	7	3	11	10	3	13	Kiangsi	M	62	
		F																							F	6	
Kiangsu	M			1	1	1	3	4	5	4	18	44	69	141	191	244	228	188	168	124	144	104	Kiangsu	M	1,682		
	F					5	3	4	3	3	8	7	5	6		2	2						F	48			
Szechuan	M															1	3	3	5	5	4	3	7	Szechuan	M	32	
	F																							F			
Undesignated	M										16	12	19	8	16	23	19	20	18	44			Undesignated	M	195		
	F																							F			
Total (Cen.)	M			(1)	(1)	(3)	(6)	(10)	(9)	(9)	(40)	(81)	(117)	(215)	(315)	(418)	(434)	(380)	(294)	(276)	(497)	Totals (Cen.)	M	(3,509)			
	F					(5)	(10)	(11)	(7)	(9)	(28)	(22)	(28)	(15)	(16)	(26)	(21)	(22)	(18)	(44)			F	(283)			
SOUTH CHINA	Fukien	M					1	7	3	6	14	16	24	19	21	17	3	9	11	6	15			Fukien	M	61	
		F																						F	160		
	Kwangsi	M									1		2	1	1	6				3	3	1		Kwangsi	M	20	
		F																						F			
	Kwangtung	M	1	3	1	2	5	15	23	28	34	54	46	56	68	84	103	102	94	83	54	28	47	Kwangtung	M	931	
		F	1	1		1	3	2	3	3	5	8	12	3	5	9	6	3	4	5				F	91		
	Kweichow	M					1	1									1	2	2	1		2	8	Kweichow	M	16	
		F																						F	2		
	Yunnan	M																				1	1	2	Yunnan	M	5
		F																							F		
Undesignated	M										5	9	25	79	114	125	89	105	91	12	4	773	Undesignated	M	1,431		
	F										26	32	39	27	25	29	37	30	16			157	F	418			
Total (South)	M	(1)	(3)	(1)	(2)	(5)	(15)	(23)	(28)	(34)	(61)	(55)	(84)	(148)	(200)	(240)	(203)	(206)	(188)	(80)	(41)	(846)	Totals (South)	M	(2,464)		
	F	(1)	(1)		(1)	(4)	(4)	(10)	(6)	(11)	(48)	(60)	(66)	(51)	(58)	(56)	(57)	(41)	(21)		(1)	(174)	F	(671)			
Sex-age Totals	M	1	3	2	6	20	58	68	81	87	183	232	308	464	593	727	696	651	799	538	554	2,181	Sex Totals	M	8,137		
	F	1	1	4	8	20	34	39	41	48	110	128	118	90	94	95	82	63	39	44	1	174	F	1,233			
Age Totals		2	4	6	14	40	92	107	122	135	293	360	425	554	687	822	778	724	748	582	555	2,355	Tabulated Total		9,406		
																								Unclassified *		1,457	
																								Grand Totals		10,863	

(* Age not indicated.)

TABLE III. AVERAGE HEIGHTS OF CHINESE MALES OF NORTH CHINA.

Age	Chihli		Honan		Kansu		Shansi		Shantung		Shensi		Undesignated		Regional Total	Regional Average	Moving Average	Increment	Percent. Increment	Age
	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.						
5	2	106.7	..	.....	...	.....	...	.....	...	.....	...	.....	1	96.4	3	103.3	103.3	...	...	5
6	7	107.2	...	.....	...	.....	...	.....	1	105.6	...	.....	4	102.4	12	105.5	111.3	8.0	7.7	6
7	24	114.9	...	.....	...	.....	...	.....	3	111.3	...	.....	10	112.2	37	113.9	114.6	3.3	3.0	7
8	26	119.5	...	.....	...	.....	...	.....	...	.....	...	.....	9	116.1	35	118.6	118.2	3.6	3.1	8
9	31	122.5	...	.....	...	.....	...	.....	1	119.1	...	.....	12	119.4	44	121.6	122.2	4.0	3.4	9
10	37	124.3	2	136.0	...	.....	...	.....	1	128.8	...	.....	4	128.9	44	125.7	126.8	4.6	3.8	10
11	72	130.0	3	129.2	...	.....	...	.....	1	121.3	...	.....	6	133.8	82	130.1	130.7	3.9	3.1	11
12	88	133.7	1	127.8	...	.....	...	.....	...	.....	...	.....	7	133.1	96	133.6	134.5	3.8	2.9	12
13	94	138.2	3	130.5	...	.....	...	.....	3	135.4	...	.....	7	148.9	107	138.7	138.4	3.9	2.9	13
14	91	143.3	3	149.6	...	.....	1	143.7	3	145.3	...	.....	3	165.1	101	142.8	143.7	5.3	3.8	14
15	61	152.1	4	150.6	...	.....	1	135.3	1	152.0	...	.....	11	165.0	78	151.9	150.2	6.5	4.5	15
16	43	158.9	1	153.7	...	.....	1	165.5	3	161.8	...	.....	21	166.3	69	159.0	157.8	7.6	5.0	16
17	40	163.9	3	161.6	...	.....	...	.....	3	160.4	1	162.1	12	167.9	59	164.4	162.4	4.6	2.9	17
18	29	168.7	2	163.5	1	166.1	1	166.1	6	165.7	1	151.2	12	168.6	52	164.6	166.3	3.9	2.4	18
19	45	167.9	35	166.9	3	158.0	3	165.4	14	165.8	4	165.7	37	170.5	141	167.8	167.5	1.2	.7	19
20	37	168.0	41	167.8	3	168.6	30	169.5	26	167.1	2	161.7	25	169.3	164	168.2	168.5	1.0	.6	20
21	29	169.3	96	168.5	6	166.6	40	170.4	37	169.7	6	169.6	24	169.2	238	169.1	169.0	.5	.3	21
22	122	170.5	347	169.5	10	169.4	111	168.1	116	169.1	10	165.5	122	170.0	838	169.2	169.2	.2	.1	22

TABLE IV. AVERAGE HEIGHTS OF CHINESE MALES OF CENTRAL CHINA.

Age	Anhwei		Chekiang		Hunan		Hupei		Kiangs		Kiangsu		Szechuan		Regional Total	Regional Average	Moving Average	Increment	Percent. Increment	Age
	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.						
5	...	.....	...	.....	...	.....	...	.....	...	.....	1	102.0	...	.....	1	102.0	102.6	12.6	14.0	5
6	...	.....	2	107.0	...	.....	...	.....	...	.....	1	107.2	...	.....	3	107.1	107.9	5.3	5.2	6
7	...	.....	1	118.3	...	.....	1	110.0	...	.....	3	108.3	1	103.3	6	109.4	112.3	4.4	4.1	7
8	...	.....	2	115.2	4	115.0	...	.....	...	.....	4	116.5	...	.....	10	115.7	117.6	5.3	4.7	8
9	...	.....	3	121.6	1	124.0	...	.....	...	.....	5	127.6	1	.....	9	125.2	121.7	4.1	3.5	9
10	...	.....	...	.....	2	125.3	2	119.1	...	.....	4	128.2	1	123.3	9	125.0	127.9	6.2	5.1	10
11	1	132.2	8	131.2	11	130.1	2	113.5	...	.....	18	129.3	...	.....	40	129.2	133.3	5.4	4.2	11
12	...	.....	12	138.9	21	130.5	1	135.1	3	136.5	44	138.4	...	.....	81	136.3	137.8	4.5	3.4	12
13	2	146.9	20	144.0	24	140.4	1	131.2	1	141.3	69	141.6	...	.....	117	141.7	144.3	6.5	4.7	13
14	...	.....	27	150.5	43	149.0	3	144.7	1	144.0	141	149.8	...	.....	215	149.7	150.6	6.3	4.4	14
15	3	159.7	47	155.5	58	156.9	9	152.8	6	160.0	191	154.7	1	147.5	315	155.3	154.8	4.2	2.8	15
16	13	159.9	57	158.9	91	161.6	7	157.3	4	163.9	244	158.3	2	155.0	418	157.6	158.3	3.1	2.0	16
17	15	162.7	50	160.5	127	162.4	4	159.6	7	163.9	288	160.6	3	158.6	434	161.2	160.4	2.1	1.3	17
18	24	162.5	61	162.0	115	164.7	7	162.1	3	166.1	188	161.3	5	170.8	403	162.4	162.1	1.7	1.1	18
19	26	163.8	56	162.7	105	163.7	9	164.7	11	165.0	168	162.3	5	169.2	380	163.0	163.1	1.0	.6	19
20	30	166.7	52	165.1	64	165.1	10	165.7	10	162.2	124	163.2	4	163.9	291	164.3	163.7	.6	.4	20
21	24	168.2	38	164.2	50	163.6	3	164.7	3	166.0	144	163.0	3	163.6	276	163.9	164.6	.9	.5	21
22	99	168.9	46	164.7	217	164.0	11	166.3	13	164.4	104	164.5	7	160.5	497	165.1	165.1	.5	.3	22

TABLE V. AVERAGE HEIGHTS OF CHINESE MALES OF SOUTH CHINA.

Age	Fukien'		Kwangsi		Kwangtung		Kweichow		Yunnan		Undesignated		Regional Totals	Regional Averages	Moving Averages	Increments	Per cent. Increments	Age
	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.						
5	...	.....	...	.....	2	102.9	...	.....	...	.....	...	.....	2	102.9	111.1	12.5	12.6	5
6	...	.....	...	.....	5	117.3	...	.....	...	.....	...	.....	5	117.3	118.3	7.2	6.5	6
7	...	.....	...	.....	15	120.7	...	.....	...	.....	...	.....	15	120.7	122.0	3.7	3.1	7
8	...	.....	...	.....	23	123.8	...	.....	...	.....	...	.....	23	123.8	123.3	1.3	1.1	8
9	...	.....	...	.....	28	124.3	...	.....	...	.....	...	.....	28	124.3	126.4	3.1	2.5	9
10	1	.....	...	.....	34	130.0	...	.....	...	.....	...	.....	34	130.0	131.1	4.7	3.7	10
11	1	124.0	1	121.9	54	135.6	...	.....	...	.....	5	131.3	61	134.8	135.2	4.1	3.1	11
12	...	.....	...	.....	46	140.0	...	.....	...	.....	9	134.0	55	139.0	139.4	4.2	3.1	12
13	...	.....	2	139.2	56	146.4	...	.....	1	136.3	25	136.4	84	143.1	145.2	6.3	4.5	13
14	...	.....	1	145.7	68	155.1	...	.....	...	.....	79	145.1	148	149.7	149.0	3.3	2.3	14
15	1	157.4	1	162.7	84	160.6	...	.....	...	.....	114	143.6	200	150.9	153.6	4.6	3.1	15
16	5	162.5	6	167.4	103	164.0	1	155.0	...	.....	125	153.1	240	158.3	157.1	3.5	2.3	16
17	10	160.8	...	.....	102	165.1	2	161.8	...	.....	89	157.9	203	161.7	160.7	3.6	2.3	17
18	3	162.3	2	170.6	94	166.2	2	162.5	...	.....	105	159.0	206	162.5	162.8	2.1	1.3	18
19	9	166.9	3	167.5	83	165.5	1	162.5	1	157.0	91	162.5	188	164.2	163.5	.7	.4	19
20	11	163.7	3	166.1	54	165.1	...	.....	...	.....	12	162.6	80	164.6	164.4	.9	.5	20
21	6	164.6	...	.....	28	165.4	2	164.5	1	167.0	4	162.4	41	165.1	163.2	...	...	21
22	15	167.6	1	167.6	47	164.6	8	164.5	2	173.6	773	163.0	846	163.0	163.2	...	...	22

TABLE VI. AVERAGE HEIGHTS OF CHINESE FEMALES OF NORTH CHINA.

Age	Chihli		Honan		Kansu		Shansi		Shantung		Szechsi		Undesignated		Regional Totals	Regional Averages	Moving Averages	Increments	Percent. Increments	Age
	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.	No.	Average Height.						
5	6	107.6	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	6	107.6	111.4	10.2	10.3	5
6	10	116.0	...	.....	1	120.0	...	.....	...	.....	...	.....	...	.....	11	116.4	115.4	4.0	3.6	6
7	19	116.2	...	.....	...	.....	...	.....	1	128.2	...	.....	...	.....	20	116.6	118.7	3.3	2.9	7
8	18	122.3	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	18	122.3	122.3	3.6	3.0	8
9	27	126.1	...	.....	...	.....	...	.....	1	127.5	...	.....	...	.....	28	126.2	127.3	5.0	4.1	9
10	28	131.7	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	28	131.7	132.1	4.8	3.8	10
11	31	136.8	1	144.8	...	.....	...	.....	2	141.6	...	.....	...	.....	34	137.4	138.8	6.7	5.1	11
12	35	144.5	1	143.2	2	143.2	1	147.0	6	142.7	1	136.5	...	.....	46	144.1	143.1	4.3	3.1	12
13	21	148.4	...	.....	...	.....	...	.....	3	154.8	...	.....	...	.....	24	149.2	147.8	4.7	3.3	13
14	23	153.8	...	.....	...	.....	...	.....	1	151.0	...	.....	...	.....	24	153.7	152.4	4.6	3.1	14
15	17	154.6	...	.....	...	.....	...	.....	3	156.4	...	.....	...	.....	20	154.8	154.4	2.0	1.3	15
16	13	155.4	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	13	155.4	155.6	1.2	.8	16
17	4	160.5	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	4	160.5	160.5	4.9	3.2	17

Collected Anthropometric Data on the Chinese.

TABLE VII. AVERAGE HEIGHTS OF CHINESE FEMALES OF CENTRAL CHINA.

Age	Anhwei		Chekiang		Hunan		Hupeh		Kiangsi		Kiangsu		Undesignated		Regional Totals		Regional Averages		Moving Averages		Increments		Percent. Increments		Age
	No.	Average Heights	No.	Average Heights	No.	Average Heights	No.	Average Heights	No.	Average Heights	No.	Average Heights	No.	Average Heights	No.	Regional Averages	No.	Regional Averages	No.	Moving Averages	No.	Increments	Percent. Increments	Age	
5	...	.....	...	.....	1	112.0	...	.....	...	.....	...	.....	...	.....	1	112.0	109.3	8.3	8.2	5				5
6	...	.....	...	.....	...	.....	...	.....	...	.....	5	110.4	...	.....	5	110.4	114.2	4.9	4.5	6				6
7	...	.....	2	119.5	4	118.5	1	109.2	...	.....	3	113.7	...	.....	10	116.3	118.4	4.2	3.7	7				7
8	...	.....	7	123.9	...	.....	...	.....	...	.....	4	124.1	...	.....	11	123.9	122.1	3.7	3.1	8				8
9	...	.....	2	133.7	1	122.0	1	128.0	...	.....	3	125.0	...	.....	7	127.5	128.6	6.5	5.3	9				9
10	1	140.0	3	135.8	1	129.5	1	129.6	...	.....	3	131.3	16	129.7	25	131.0	132.8	4.2	3.3	10				10
11	...	.....	3	141.7	...	.....	1	143.0	...	.....	8	136.6	12	134.3	24	136.3	136.2	3.4	2.6	11				11
12	...	.....	1	152.0	1	151.0	1	139.1	...	.....	7	148.7	19	136.4	29	140.5	140.4	4.2	3.1	12				12
13	1	150.0	1	152.8	...	.....	2	149.5	...	.....	5	150.3	8	141.4	17	146.1	143.7	3.3	2.3	13				13
14	...	.....	...	.....	...	.....	1	155.0	...	.....	6	145.1	16	146.0	23	146.1	145.5	1.8	1.3	14				14
15	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	23	144.5	23	144.5	146.6	1.1	.8	15				15
16	1	155.0	...	.....	...	.....	...	.....	...	.....	2	153.1	19	148.8	22	149.5	147.8	1.2	.8	16				16
17	...	.....	...	.....	...	.....	...	.....	...	.....	2	152.6	20	149.8	22	150.0	149.8	1.0	.7	17				17
18	1	160.0	...	.....	...	.....	1	158.2	...	.....	...	.....	18	149.6	20	150.5	150.5	.7	.5	18				18

TABLE VIII. AVERAGE HEIGHTS OF CHINESE FEMALES OF SOUTH CHINA.

Age	Fukien		Kwangsi		Kwangtung		Kweichow		Yunnan		Undesignated		Regional Totals	Regional Averages	Moving Averages	Increments	Percent. Increments	Age
	No.	Average Heights	No.	Average Heights	No.	Average Heights	No.	Average Heights	No.	Average Heights	No.	Average Heights						
5	...	.....	...	.....	1	104.5	...	.....	...	.....	...	.....	1	101.5	110.0	11.3	11.5	5
6	...	.....	...	.....	3	112.7	1	119.3	...	.....	...	.....	4	114.3	115.0	5.0	4.5	6
7	1	119.3	...	.....	2	112.3	1	120.5	...	.....	...	.....	4	118.4	119.0	4.0	3.5	7
8	7	122.4	...	.....	3	118.2	...	.....	...	.....	...	.....	10	121.1	122.1	3.1	2.6	8
9	3	127.0	...	.....	3	125.2	...	.....	...	.....	...	.....	6	126.2	129.2	7.1	5.7	9
10	6	125.0	...	.....	5	134.2	...	.....	...	.....	...	.....	11	138.2	132.9	3.7	2.9	10
11	14	132.2	...	.....	8	138.8	...	.....	...	.....	26	130.8	48	132.6	135.2	2.3	1.7	11
12	16	136.3	...	.....	12	145.2	...	.....	...	.....	32	137.9	60	136.8	137.5	2.3	1.7	12
13	24	141.7	...	.....	3	156.7	...	.....	...	.....	39	140.7	65	141.8	140.9	3.4	2.5	13
14	19	147.1	...	.....	5	151.6	...	.....	...	.....	27	141.4	51	141.5	145.6	4.7	3.3	14
15	24	151.4	...	.....	9	155.2	...	.....	...	.....	25	148.6	58	150.8	147.8	2.2	1.5	15
16	21	145.1	...	.....	6	151.5	...	.....	...	.....	29	149.1	56	147.8	150.1	2.7	1.8	16
17	17	155.7	...	.....	3	154.7	...	.....	...	.....	37	150.8	57	152.4	150.5	.1	...	17
18	7	151.3	...	.....	4	157.7	...	.....	...	.....	30	150.8	41	151.6	152.0	1.5	1.0	18
19	...	.....	...	.....	5	157.1	...	.....	...	.....	16	150.5	21	152.0	151.8	...	...	19
20	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	.....	...	...	20
21	1	156.0	...	.....	...	.....	...	.....	...	.....	...	.....	1	156.0	151.4	...	...	21
22	...	.....	...	.....	17	153.0	...	.....	...	.....	157	151.2	174	151.4	151.4	...	...	22

TABLE IX. AVERAGE WEIGHTS OF CHINESE MALES OF NORTH CHINA.

Age	Chihli		Honan		Kansu		Shansi		Shantung		Shensi		Undesignated		Regional Totals	Regional Averages	Moving Averages	Increments	Percent. Increments	Age	
	No.	Average	No.	Average	No.	Average	No.	Average	No.	Average	No.	Average	No.	Average							
5	2	15.6	...	...	...	...	...	...	...	...	...	...	1	13.4	3	14.9	14.9	...	...	5
6	7	17.3	...	...	...	...	...	...	1	18.3	...	...	4	16.2	12	17.0	18.4	3.5	23.4	6
7	24	15.0	...	...	...	...	...	...	3	19.4	...	...	10	18.6	37	19.1	19.5	1.1	6.0	7
8	26	21.1	...	...	...	...	...	...	...	...	...	...	9	19.6	35	20.7	20.5	1.0	5.1	8
9	31	22.2	...	...	...	...	...	...	1	20.6	...	...	12	20.4	44	21.6	22.2	1.7	8.3	9
10	37	23.6	2	29.2	...	...	...	...	1	24.6	...	...	4	25.4	44	24.0	24.5	2.3	10.3	10
11	72	26.6	3	24.2	...	...	...	...	1	26.5	...	...	6	25.4	82	26.4	26.7	2.2	9.0	11
12	88	28.4	1	25.0	...	...	...	...	...	...	...	...	7	27.2	96	28.3	28.8	2.1	7.8	12
13	94	30.9	3	37.8	...	...	...	...	3	29.2	...	...	7	34.1	107	31.2	31.2	2.4	8.3	13
14	91	33.5	3	38.1	...	...	...	1	33.3	3	33.7	...	3	45.7	101	34.0	35.3	4.1	13.2	14
15	61	41.3	4	41.6	...	...	...	1	35.0	1	41.3	...	11	50.3	73	42.5	40.2	4.9	14.0	15
16	43	48.3	1	43.1	...	...	...	1	62.5	3	41.1	...	21	49.1	69	46.7	48.4	8.2	20.4	16
17	40	49.8	3	48.6	...	...	...	...	3	45.1	1	42.6	12	53.2	59	50.1	49.8	1.4	2.8	17
18	29	54.3	2	53.2	1	58.1	6	52.6	1	46.8	12	53.5	51	53.8	54.0	4.2	8.4	18
19	45	56.1	29	48.7	3	39.5	3	53.4	13	57.1	4	52.4	36	53.8	133	55.8	56.2	2.2	4.1	19	
20	37	58.3	41	60.1	3	49.5	30	54.5	24	55.4	2	51.9	26	54.7	103	57.4	57.9	1.7	3.0	20	
21	29	59.9	96	61.2	6	54.7	39	55.8	39	61.2	6	54.1	22	57.1	237	59.1	59.4	1.5	2.6	21	
22	122	60.0	347	62.4	10	50.9	110	54.3	115	60.3	9	45.9	118	58.3	831	59.8	59.8	.4	.7	22	

TABLE X. AVERAGE WEIGHTS OF CHINESE MALES OF CENTRAL CHINA.

Age	Anhwei		Chekiang		Hunan		Hupeh		Kiangsi		Kiangsu		Szechuan		Regional Totals	Regional Averages	Moving Averages	Increments	Percent. Increments	Age
	No.	Average Weights	No.	Average Weights	No.	Average Weights	No.	Average Weights	No.	Average Weights	No.	Average Weights	No.	Average Weights						
5	...	.....	...	.....	...	.....	...	.....	...	.....	1	14.9	...	.....	1	14.9	18.1	5.2(40.5)	5	
6	...	.....	2	17.8	...	.....	...	.....	...	.....	1	27.3	...	.....	3	20.9	18.1	...	6	
7	...	.....	1	20.0	...	.....	1	17.3	...	.....	3	16.8	1	15.7	6	17.3	20.0	1.9	10.5	7
8	...	.....	2	20.8	4	23.1	...	.....	...	.....	4	20.1	...	.....	10	21.4	20.9	.9	4.5	8
9	...	.....	3	22.1	1	22.3	...	.....	...	.....	5	23.1	...	.....	9	22.7	22.7	1.8	8.2	9
10	...	.....	...	.....	2	23.1	2	26.6	...	.....	4	23.4	1	24.3	9	24.1	25.7	3.0	13.4	10
11	1	29.8	8	27.9	11	26.2	2	22.5	...	.....	18	26.4	...	.....	40	26.7	29.0	3.3	12.8	11
12	...	.....	12	33.6	21	26.8	1	31.8	3	27.0	44	30.7	...	.....	81	30.7	31.3	2.3	7.9	12
13	2	34.6	19	33.9	24	32.3	2	29.7	1	31.3	69	33.6	...	.....	117	33.4	36.4	5.1	16.0	13
14	...	.....	27	38.1	43	37.7	2	36.9	1	34.0	141	38.9	...	.....	214	38.5	39.6	3.2	8.8	14
15	3	45.6	47	42.5	57	42.4	9	40.5	6	44.8	192	42.7	1	43.6	315	42.6	42.9	3.3	8.3	15
16	13	47.5	57	44.7	90	45.7	7	43.6	4	43.9	245	45.5	2	45.3	418	45.4	45.5	2.6	6.1	16
17	15	50.4	50	46.7	126	48.0	4	41.0	7	49.0	228	47.6	3	49.4	433	47.7	47.1	1.6	3.5	17
18	23	51.0	61	48.3	115	46.8	7	46.6	3	48.4	189	48.6	5	54.5	403	48.2	48.4	1.3	2.8	18
19	26	52.1	56	49.5	104	48.5	9	51.6	11	50.7	168	49.1	5	51.0	379	49.3	49.2	.8	.6	19
20	30	55.0	51	49.2	64	50.5	10	51.5	10	49.5	124	49.5	4	49.2	293	50.1	50.1	.9	1.8	20
21	34	56.8	34	49.9	50	50.1	3	51.0	3	51.7	95	49.9	3	52.4	226	51.0	51.6	1.5	3.0	21
22	99	57.6	46	49.6	217	51.4	11	52.0	13	50.5	102	52.4	7	49.4	495	52.6	52.6	1.0	1.9	22

Collected Anthropometric Data on the Chinese.

TABLE XI. AVERAGE WEIGHTS OF CHINESE MALES OF SOUTH CHINA.

Age	Fukien		Kwangsi		Kwangtung		Kweichow		Yunnan		Undesignated		Regional Totals	Regional Averages	Moving Averages	Increments	Percent. Increments	Age
	No.	Average Weights	No.	Average Weights	No.	Average Weights	No.	Average Weights	No.	Average Weights	No.	Average Weights						
5	...	.....	...	.....	2	14.9	...	.....	...	.....	...	.....	2	14.9	18.3	3.8	26.1	5
6	...	.....	...	.....	5	20.0	...	.....	...	.....	...	.....	5	20.0	18.8	.5	2.7	6
7	...	.....	...	.....	15	18.9	...	.....	...	.....	...	.....	15	18.9	20.8	2.0	10.6	7
8	...	.....	...	.....	23	22.2	...	.....	...	.....	...	.....	23	22.2	21.5	.7	3.4	8
9	...	.....	...	.....	29	22.3	...	.....	...	.....	...	.....	29	22.3	23.1	1.6	7.4	9
10	...	.....	...	.....	34	24.4	...	.....	...	.....	...	.....	34	24.4	25.0	1.9	8.2	10
11	1	26.6	1	20.9	54	27.2	...	.....	...	.....	12	24.5	68	26.5	27.0	2.0	8.0	11
12	...	.....	...	.....	46	30.0	...	.....	...	.....	12	26.4	58	29.1	29.5	2.5	9.3	12
13	...	.....	2	28.8	56	34.0	...	.....	1	29.5	26	28.9	85	32.3	33.2	3.7	12.5	13
14	...	.....	1	34.1	68	40.0	...	.....	...	.....	69	30.9	138	35.5	36.9	3.7	11.1	14
15	1	42.7	1	45.5	84	45.6	...	.....	...	.....	101	35.4	187	40.1	40.0	3.1	8.0	15
16	5	45.7	6	49.6	103	47.1	1	43.4	...	.....	107	40.8	222	42.7	43.4	3.4	8.5	16
17	10	49.2	...	.....	102	48.8	2	46.6	...	.....	95	45.0	209	47.1	45.9	2.5	5.7	17
18	3	48.6	2	56.9	95	50.1	2	51.7	...	.....	96	46.1	198	48.2	48.6	2.7	5.9	18
19	9	50.4	3	51.7	83	52.0	1	48.1	1	49.4	82	48.5	179	50.7	49.6	1.0	2.1	19
20	11	52.3	3	56.9	54	50.2	...	.....	...	.....	12	51.3	80	50.9	50.8	1.2	2.4	20
21	6	51.9	...	.....	30	50.6	2	50.8	1	49.0	4	50.4	43	51.1	50.5	...	...	21
22	14	52.1	1	48.3	47	49.8	8	59.0	2	59.4	775	50.4	847	50.4	50.4	...	...	22

TABLE XII AVERAGE WEIGHTS OF CHINESE FEMALES OF NORTH CHINA.

Age	Chihli		Honan		Kansu		Shansi		Shantung		Shensi		Undesignated		Regional Totals	Regional Average	Moving Average	Increment	Percent. Increments	Age
	No.	Average Weights.	No.	Average Weights.	No.	Average Weights.	No.	Average Weights.	No.	Average Weights.	No.	Average Weights.	No.	Average Weights.						
5	6	16.9	...	...	...	...	...	...	...	...	...	...	...	...	6	16.9	17.5	3.7	28.0	5
6	10	19.1	...	...	1	19.6	...	...	...	...	...	...	...	...	11	19.1	18.8	1.3	7.4	6
7	19	19.0	...	...	...	...	...	...	1	24.5	...	...	...	...	20	19.3	20.1	1.3	6.9	7
8	18	21.6	...	...	...	...	...	...	...	...	...	...	...	...	18	21.6	21.9	1.8	8.9	8
9	27	24.1	...	...	...	...	...	...	1	20.4	...	...	...	...	28	23.9	23.9	2.0	9.1	9
10	27	25.4	...	...	...	...	...	...	...	...	...	...	...	...	27	25.4	26.5	2.6	10.9	10
11	31	29.1	1	33.6	...	...	...	...	2	35.2	...	...	...	...	34	29.6	30.5	4.0	15.1	11
12	35	34.0	1	37.5	2	28.8	1	42.0	6	36.8	1	31.2	...	...	46	34.3	33.8	3.3	10.8	12
13	21	37.1	...	...	...	...	...	...	3	49.0	...	...	...	...	24	38.9	37.4	3.6	10.9	13
14	23	41.8	...	...	...	...	...	...	1	38.4	...	...	...	...	24	41.8	44.4	7.0	18.7	14
15	17	54.3	...	...	...	...	...	...	3	52.7	...	...	...	...	20	54.1	47.5	3.1	7.0	15
16	13	47.8	...	...	...	...	...	...	...	...	...	...	...	...	13	47.8	51.5	4.0	8.4	16
17	4	50.2	...	...	...	...	...	...	...	...	...	...	...	...	4	50.2	50.2	...	...	17

Collected Anthropometric Data on the Chinese.

TABLE XIII. AVERAGE WEIGHTS OF CHINESE FEMALES OF CENTRAL CHINA.

Age	Anhwei		Chekiang		Hunan		Hupeh		Kiangsi		Kiangsu		Undesignated		Regional Totals	Regional Averages	Moving Averages	Increments	Percent. Increments	Age
	No.	Average Weights	No.	Average Weights	No.	Average Weights	No.	Average Weights	No.	Average Weights	No.	Average Weights	No.	Average Weights						
5	...	.....	...	.....	1	18.0	...	.....	...	.....	...	.....	...	.....	1	18.0	18.4	3.9	21.0	5
6	...	.....	...	.....	...	.....	...	.....	...	.....	5	19.3	...	.....	5	19.3	18.9	.5	2.6	6
7	...	.....	2	20.9	4	20.4	1	15.0	...	.....	3	16.7	...	.....	10	18.8	20.0	1.1	5.4	7
8	...	.....	7	22.0	...	.....	...	.....	...	.....	4	22.0	...	.....	11	22.0	21.9	1.9	8.6	8
9	..	.....	2	28.5	1	21.0	1	22.8	...	.....	3	23.5	...	.....	7	24.4	25.1	3.2	12.7	9
10	1	30.6	3	28.0	1	23.2	1	27.6	...	.....	3	26.2	15	26.9	24	27.0	28.0	2.9	10.2	10
11	...	.....	3	28.5	...	.....	1	31.8	...	.....	8	28.8	11	31.1	23	30.0	30.3	2.3	7.6	11
12	1	31.6	1	35.0	1	35.5	1	27.9	...	.....	7	35.6	19	32.5	30	33.2	33.5	3.2	9.5	12
13	1	43.1	1	42.8	...	.....	2	33.2	...	.....	5	42.6	8	36.6	17	38.7	36.7	3.2	8.7	13
14	...	.....	...	.....	...	.....	1	44.5	...	.....	6	36.6	16	40.6	23	39.7	39.8	3.1	7.7	14
15	...	.....	...	.....	...	.....	...	.....	...	.....	...	.....	23	40.6	23	40.6	41.1	1.3	3.1	15
16	...	.....	...	.....	...	.....	...	.....	...	.....	3	45.3	19	42.6	22	43.0	43.9	2.8	6.3	16
17	...	.....	...	.....	...	.....	...	.....	...	.....	2	46.5	20	48.5	22	48.3	46.1	2.2	4.6	17
18	1	53.3	...	.....	...	.....	1	46.6	...	.....	...	.....	18	46.9	20	47.2	47.2	1.1	2.2	18

TABLE XIV. AVERAGE WEIGHTS OF CHINESE FEMALES OF SOUTH CHINA.

Age	Fukien		Kwangsi		Kwangtung		Kweichow		Yunnan		Undesignated		Regional Totals	Regional Average	Moving Average	Increments	Percent Increments	Age
	Average No. Weights.	Average	Average No. Weights.															
5	...	...	...	...	1	16.6	...	...	...	...	...	...	1	16.6	16.8	1.4	9.1	5
6	...	...	...	...	3	16.3	1	20.0	...	...	...	...	4	17.2	17.2	2.6	15.3	6
7	1	24.5	...	...	2	21.4	1	21.8	...	...	...	...	4	22.3	22.3	.6	3.1	7
8	7	21.2	...	...	3	18.8	...	...	...	...	...	...	10	20.4	20.4	1.3	6.5	8
9	3	23.3	...	...	3	20.6	...	...	...	...	...	...	6	22.0	22.0	1.3	6.1	9
10	6	23.0	...	...	5	27.2	...	...	...	...	...	...	11	24.9	25.9	3.3	14.6	10
11	14	26.5	...	...	8	29.8	...	...	...	...	26	25.7	48	26.6	28.5	2.6	10.0	11
12	16	31.5	...	...	12	34.3	...	...	...	...	31	28.0	59	30.2	32.3	3.8	12.9	12
13	24	32.9	...	...	3	44.5	...	...	...	...	39	33.0	66	33.5	33.3	1.0	3.1	13
14	19	36.9	...	...	5	40.1	...	...	...	...	27	33.9	51	36.6	36.7	3.4	10.2	14
15	24	40.9	...	...	8	44.1	...	...	...	...	25	38.7	57	40.4	39.4	2.7	7.4	15
16	20	42.2	...	...	6	44.0	...	...	...	...	29	39.9	55	41.1	41.9	2.5	6.3	16
17	17	46.1	...	...	3	47.0	...	...	...	...	37	43.0	57	44.2	43.3	1.4	3.3	17
18	7	45.4	...	...	4	44.3	...	...	...	...	30	45.2	41	45.2	44.6	1.3	3.0	18
19	...	...	...	...	5	44.5	...	...	...	...	15	44.4	20	44.4	44.9	.3	.7	19
20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	20
21	1	49.0	...	...	...	...	...	...	...	...	...	...	1	49.0	46.0	1.4	3.1	21
22	...	...	...	...	17	45.3	...	...	...	...	139	46.1	156	46.0	46.0	...	...	22

Table XV.—COMPARISON OF AVERAGE HEIGHTS, AVERAGE WEIGHTS, AND PONDERAL INDICES OF CHINESE MALES OF NORTH, CENTRAL, AND SOUTH CHINA.

Age in Years	NORTH CHINA				CENTRAL CHINA				SOUTH CHINA			
	Number Measured	Average Height	Average Weight	W x 100	Number Measured	Average Height	Average Weight	W x 100	Number Measured	Average Height	Average Weight	W x 100
5	3	103.3	14.9	2.381	2	107.0	14.9	2.298	2	102.9	14.9	2.390
6	12	105.5	17.0	2.568	3	107.0	20.9	2.573	5	117.3	20.0	2.313
7	37	113.9	19.1	2.670	6	109.4	17.3	2.363	15	120.7	18.9	2.206
8	35	118.6	20.7	2.221	10	115.7	21.4	2.399	23	123.8	22.2	2.269
9	44	121.6	21.6	2.290	9	125.2	22.7	2.261	28	124.3	22.3	2.263
10	44	125.7	24.0	2.298	9	125.0	24.1	2.310	34	130.0	24.0	2.230
11	82	130.1	26.4	2.290	40	129.2	26.7	2.318	61	134.8	26.5	2.211
12	96	133.6	28.3	2.285	81	136.3	30.7	2.297	55	139.0	29.1	2.212
13	107	138.7	31.2	2.272	117	141.7	33.4	2.272	84	143.1	32.3	2.222
14	101	142.8	34.0	2.268	215	149.7	38.5	2.255	148	149.7	35.5	2.195
15	78	151.9	42.5	2.297	315	155.3	42.6	2.248	200	150.9	40.1	2.267
16	69	159.0	46.7	2.265	418	157.6	45.4	2.263	240	158.3	42.7	2.207
17	59	164.4	50.1	2.241	434	161.2	47.7	2.249	203	161.7	47.1	2.233
18	52	164.6	53.8	2.292	403	162.4	48.2	2.240	206	162.5	48.2	2.238
19	141	167.8	55.8	2.280	380	163.0	49.3	2.249	188	164.2	50.7	2.253
20	164	168.2	57.4	2.288	294	164.3	50.4	2.247	80	164.6	50.9	2.250
21	238	169.1	59.4	2.306	275	163.9	51.0	2.262	41	165.1	51.1	2.247
22	838	169.2	59.8	2.310	497	165.1	52.6	2.268	846	163.0	50.4	2.265

Table XVI.—COMPARISON OF AVERAGE HEIGHTS, AVERAGE WEIGHTS, AND PONDERAL INDICES OF CHINESE FEMALES OF NORTH, CENTRAL, AND SOUTH CHINA.

Age in Years	NORTH CHINA				CENTRAL CHINA				SOUTH CHINA			
	Number Measured	Average Height	Average Weight	W x 100	Number Measured	Average Height	Average Weight	W x 100	Number Measured	Average Height	Average Weight	W x 100
5	6	107.5	17.4	2.409	1	112.0	18.0	2.33	1	104.5	16.6	2.440
6	11	116.4	19.1	2.296	5	110.4	19.3	2.43	4	114.3	17.2	2.258
7	20	116.8	19.3	2.296	10	116.3	18.8	2.29	4	118.4	22.3	2.376
8	18	122.3	21.6	2.276	11	123.9	21.4	2.24	10	121.1	20.4	2.255
9	28	126.2	23.9	2.282	7	127.5	24.4	2.27	6	126.2	22.0	2.220
10	28	131.7	25.4	2.231	25	131.0	27.0	2.29	11	138.2	24.9	2.112
11	34	137.4	29.6	2.246	24	136.3	30.0	2.27	48	132.6	26.6	2.250
12	46	144.1	34.3	2.254	29	140.5	33.2	2.29	60	136.8	30.2	2.276
13	24	149.2	38.9	2.270	17	146.1	38.7	2.31	66	141.8	33.5	2.273
14	24	153.7	41.8	2.257	23	146.1	39.7	2.33	51	144.5	36.6	2.297
15	20	154.8	54.1	2.444	23	144.5	40.6	2.38	58	150.8	40.4	2.275
16	13	155.4	47.8	2.335	22	149.5	43.0	2.34	56	147.8	41.1	2.335
17	4	160.5	50.2	2.297	22	150.0	48.3	2.43	57	152.4	44.2	2.289
18	..	..	..	..	20	150.5	47.2	2.40	41	151.6	45.2	2.349
19	..	..	..	..	..	..	..	..	21	152.0	44.4	2.328
20	..	..	..	..	..	..	..	..	..	..	..	..
21	..	..	..	..	..	..	..	..	1	156.0	49.0	2.345
22	..	..	..	..	..	..	..	..	174	151.4	46.0	2.366

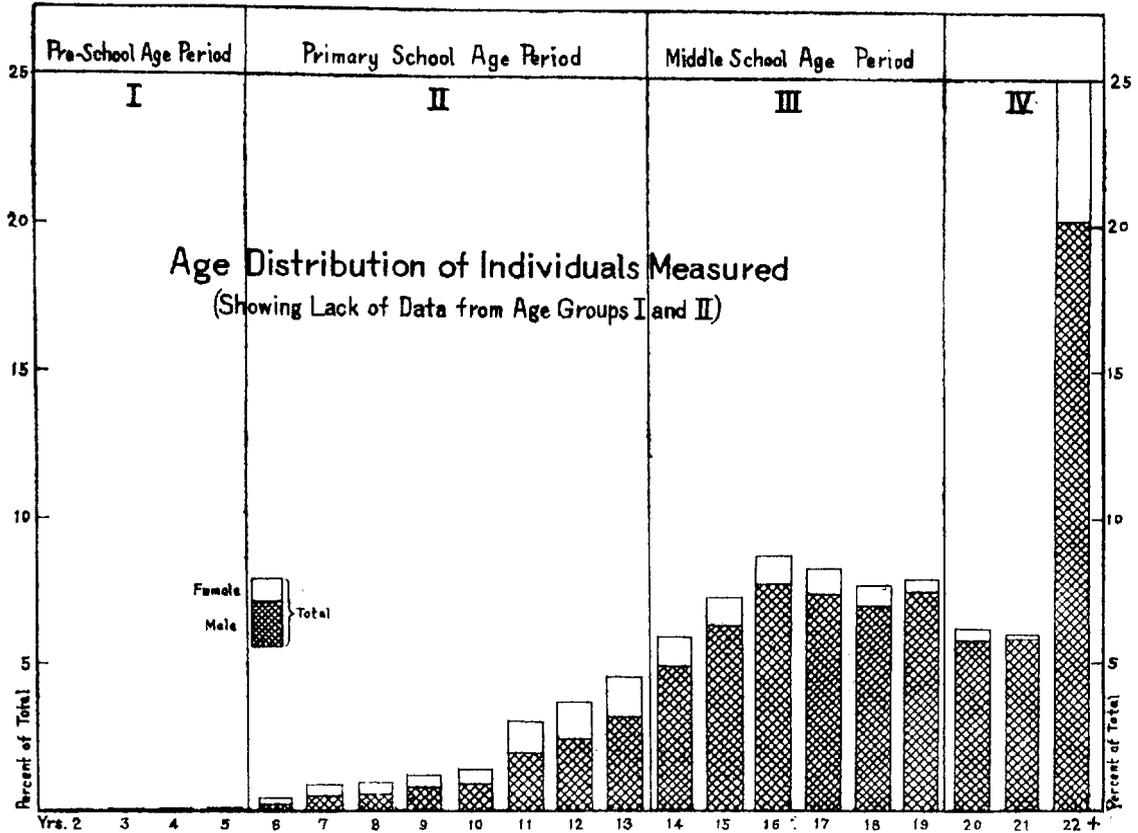


FIG. 1. The age distribution of the individuals, measured in terms of percentage of the total.

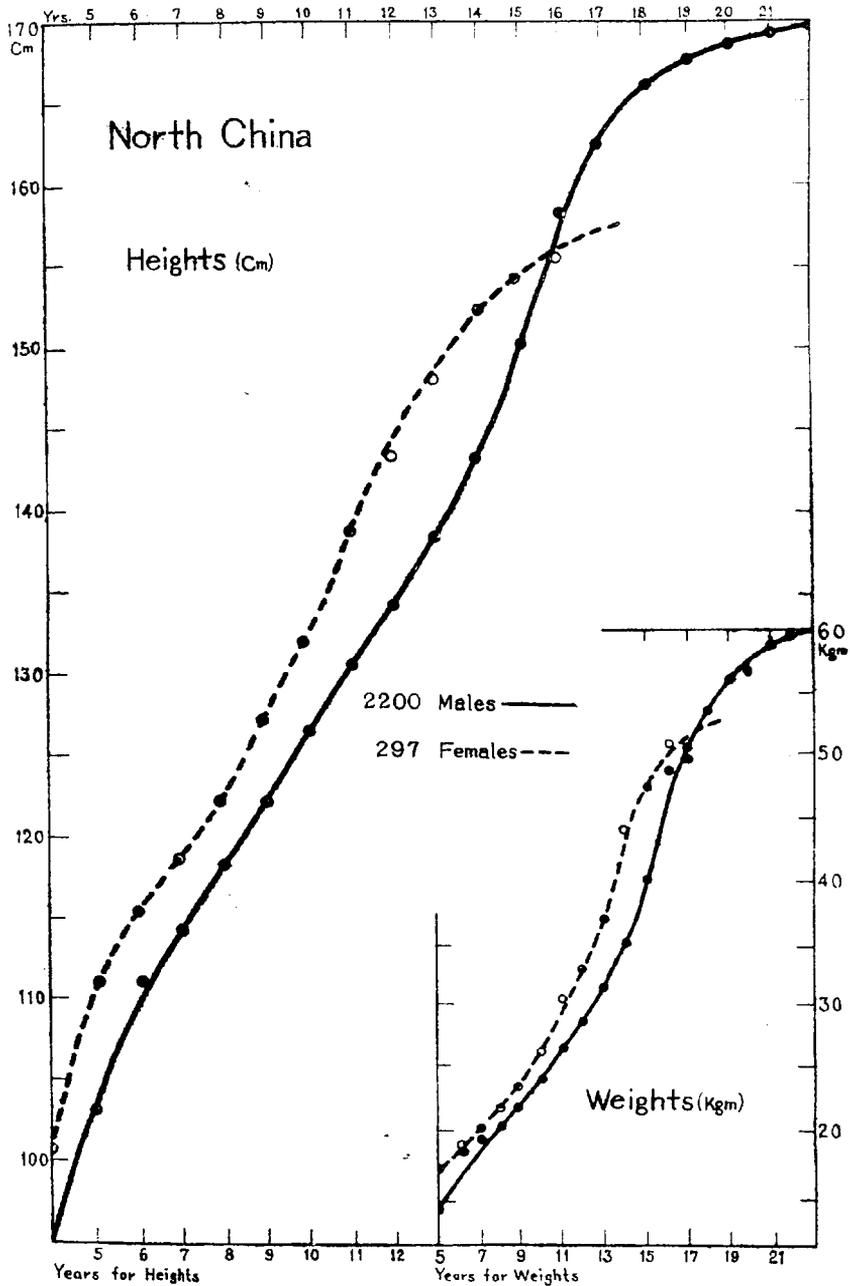


FIG. 2. Growth curves for the Chinese of North China.

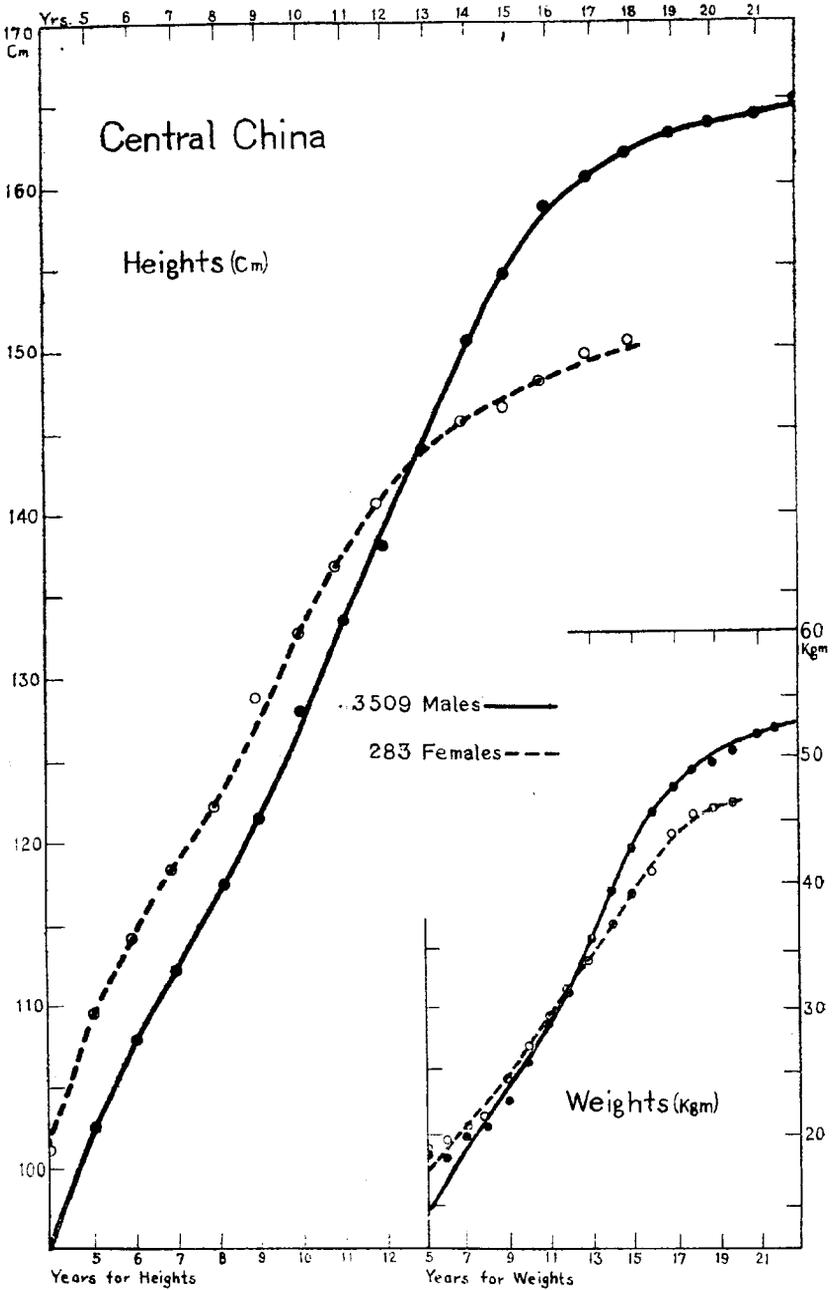


FIG. 3. Growth curves for the Chinese of Central China.

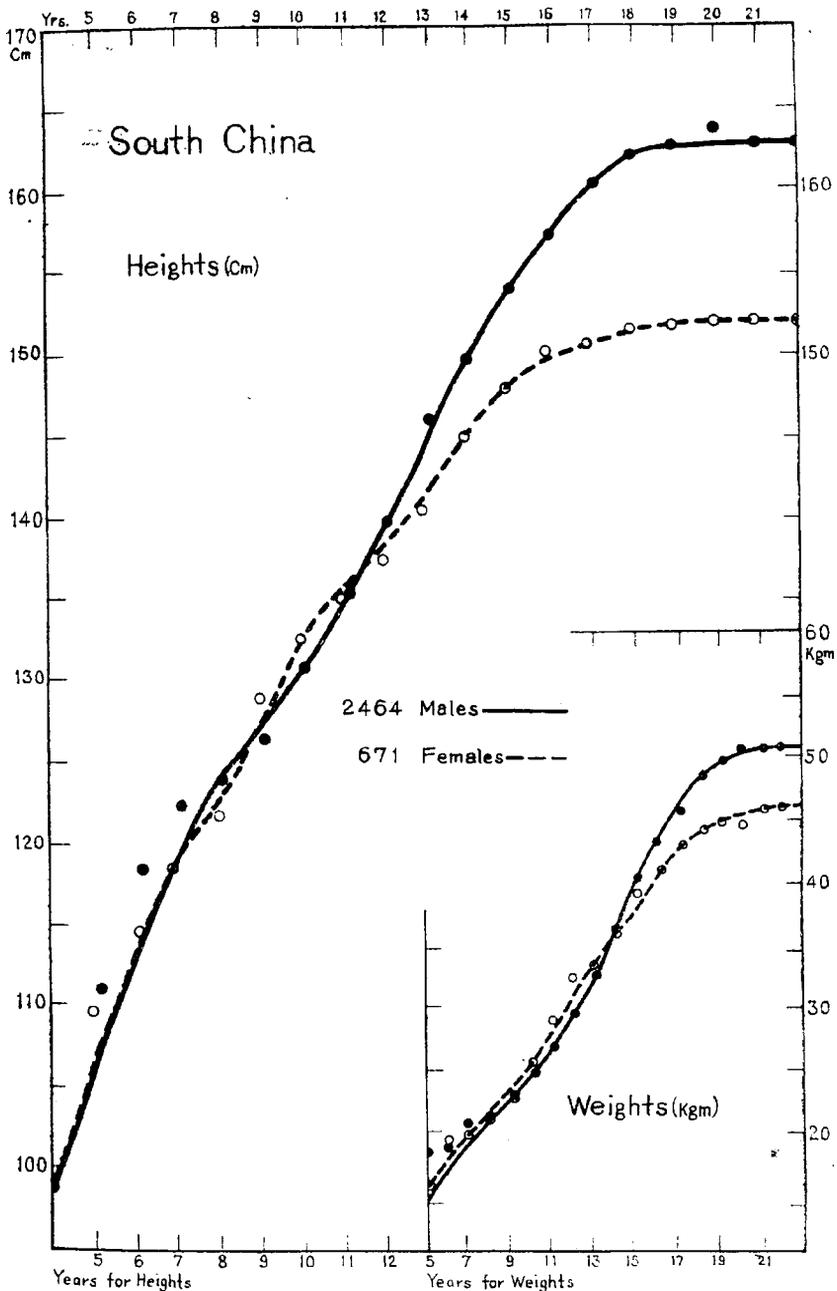


FIG. 4. Growth curves for the Chinese of South China.

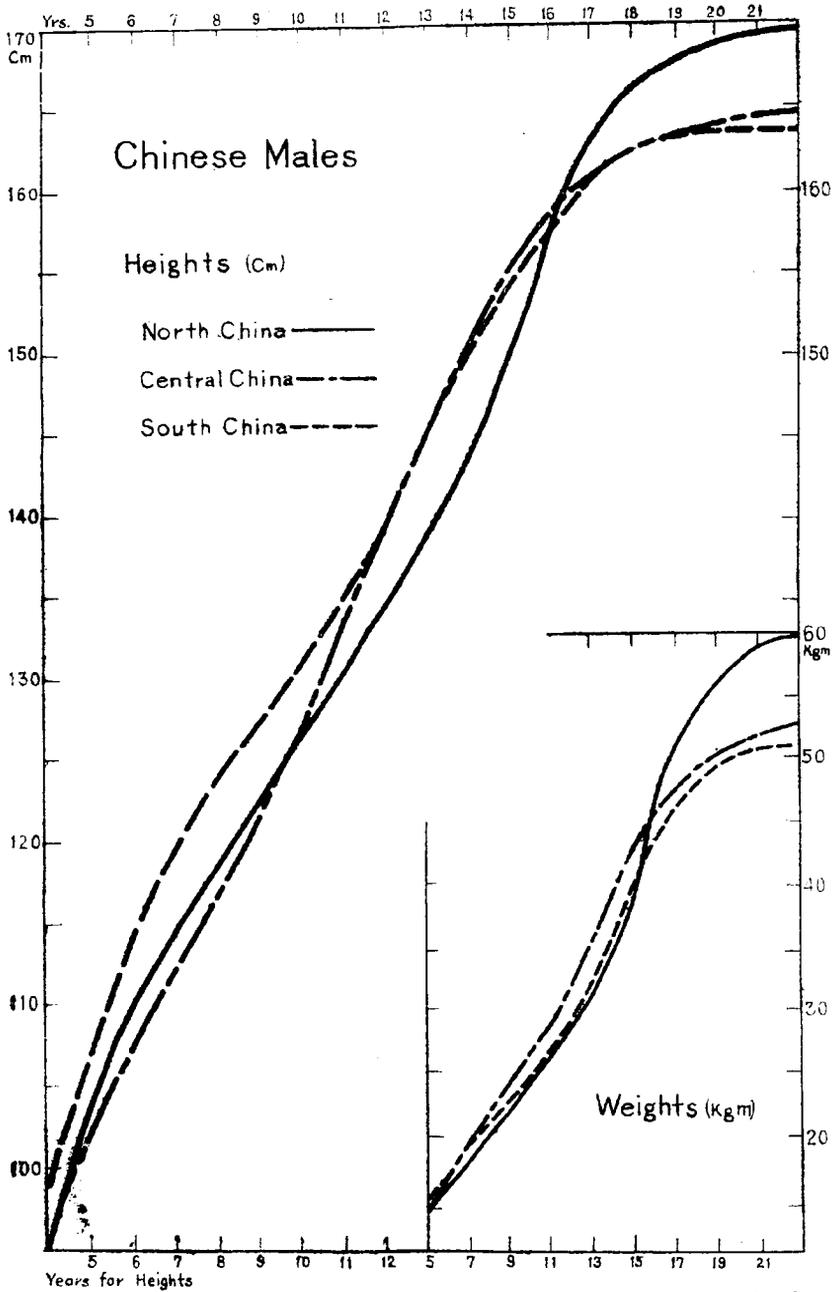


FIG. 5. Superimposed growth curves for Chinese males of North, Central, and South China.

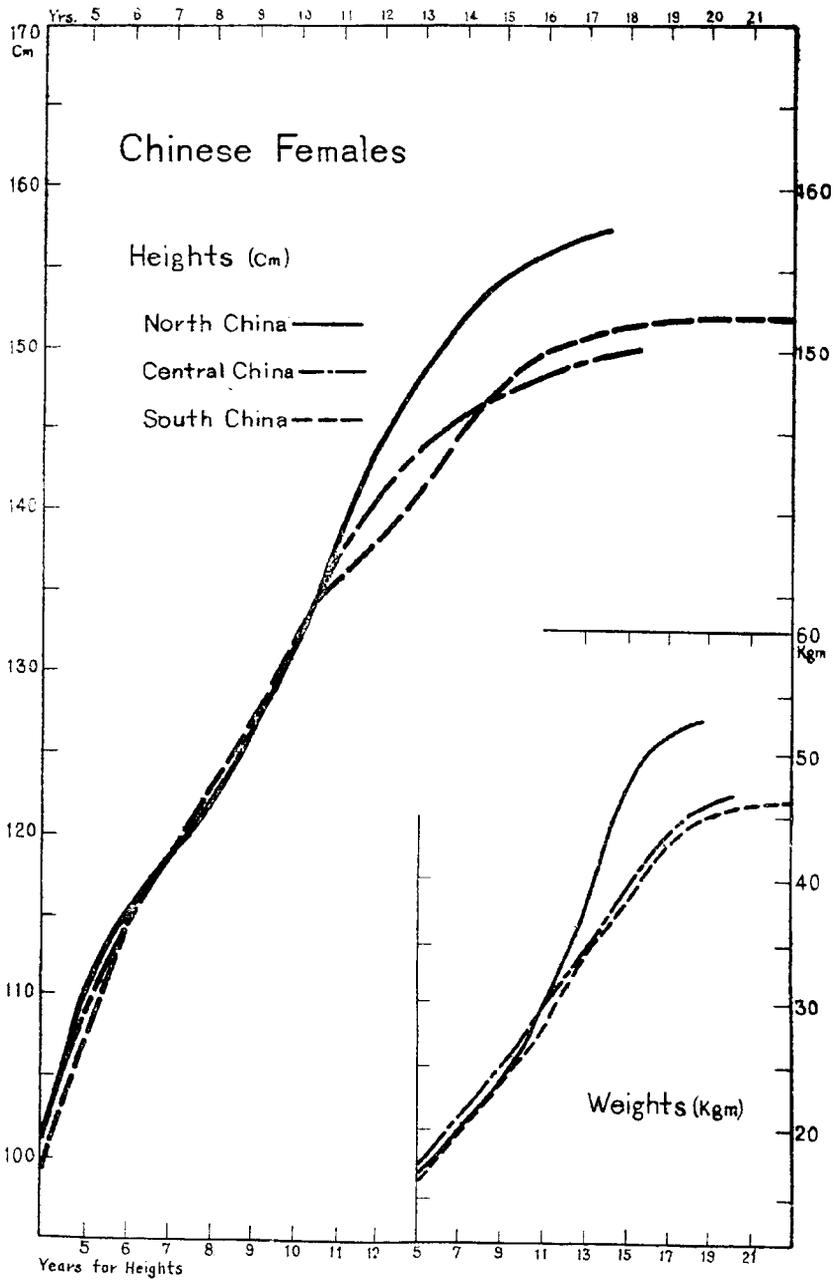


FIG. 6. Superimposed growth curves for Chinese females of North, Central, and South China.

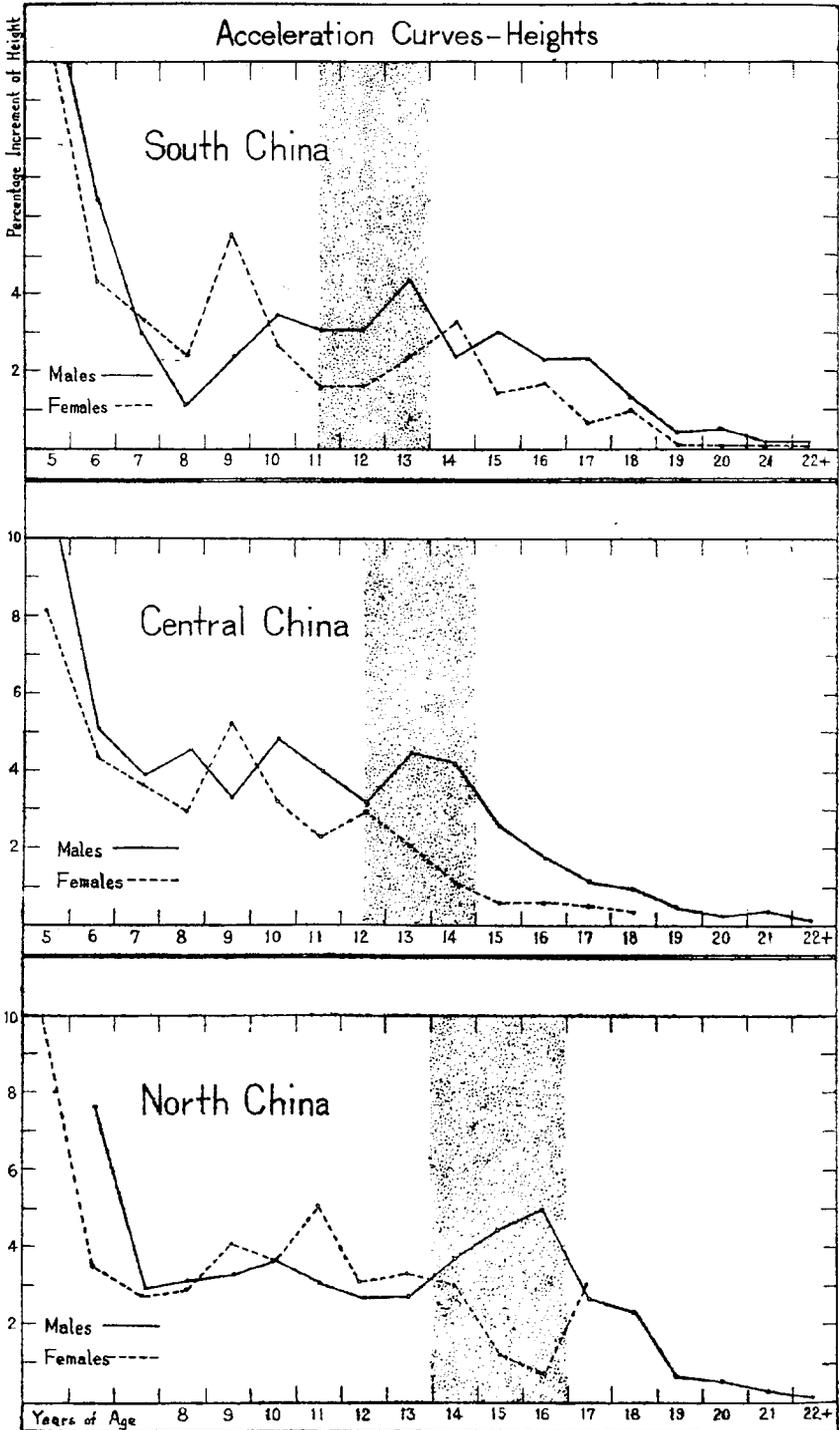


FIG. 7. Acceleration curves for height, plotted from annual percentage increments.

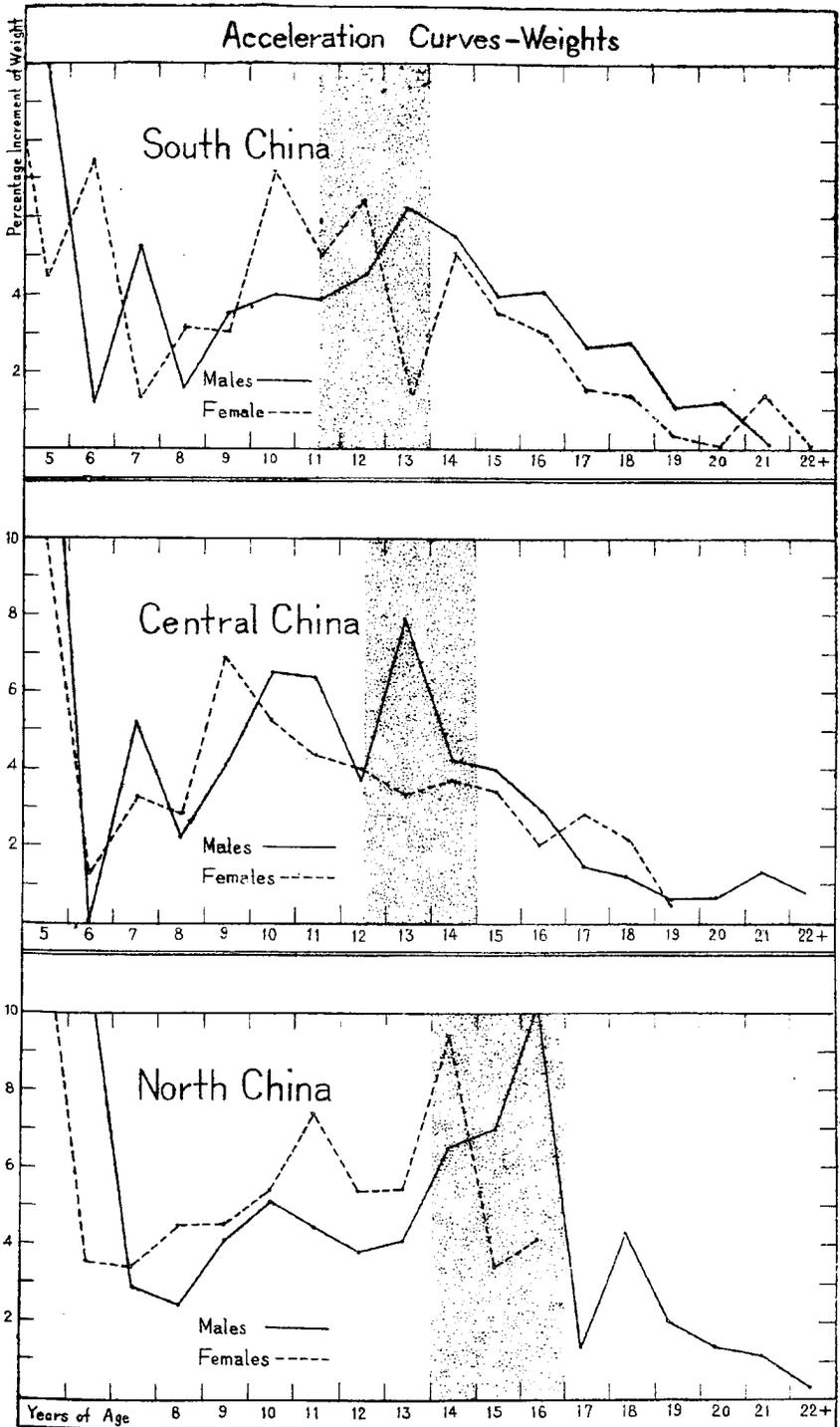


FIG. 8. Acceleration curves for weight, plotted from annual percentage increment.

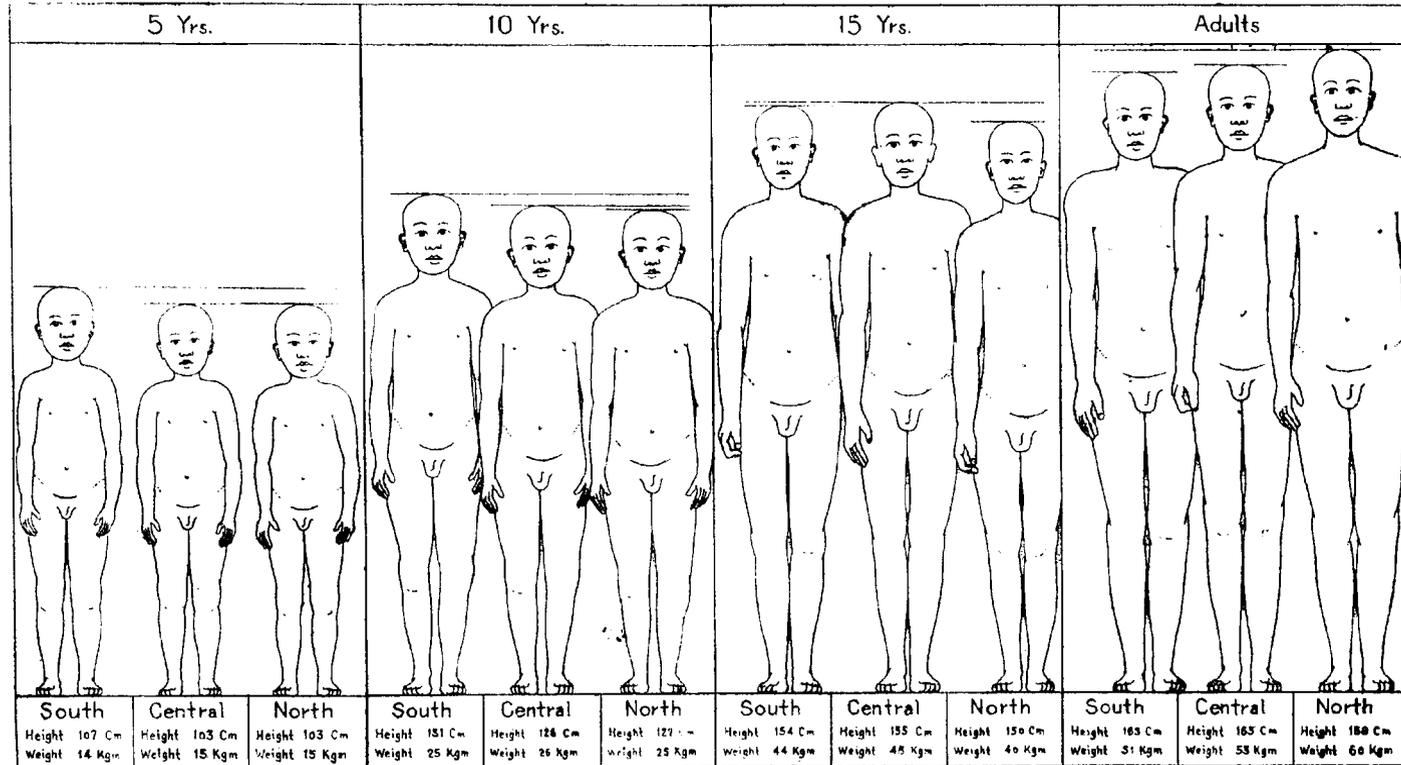


Fig. 9. Graphic heights of Chinese males of corresponding age periods in South, Central, and North China respectively.

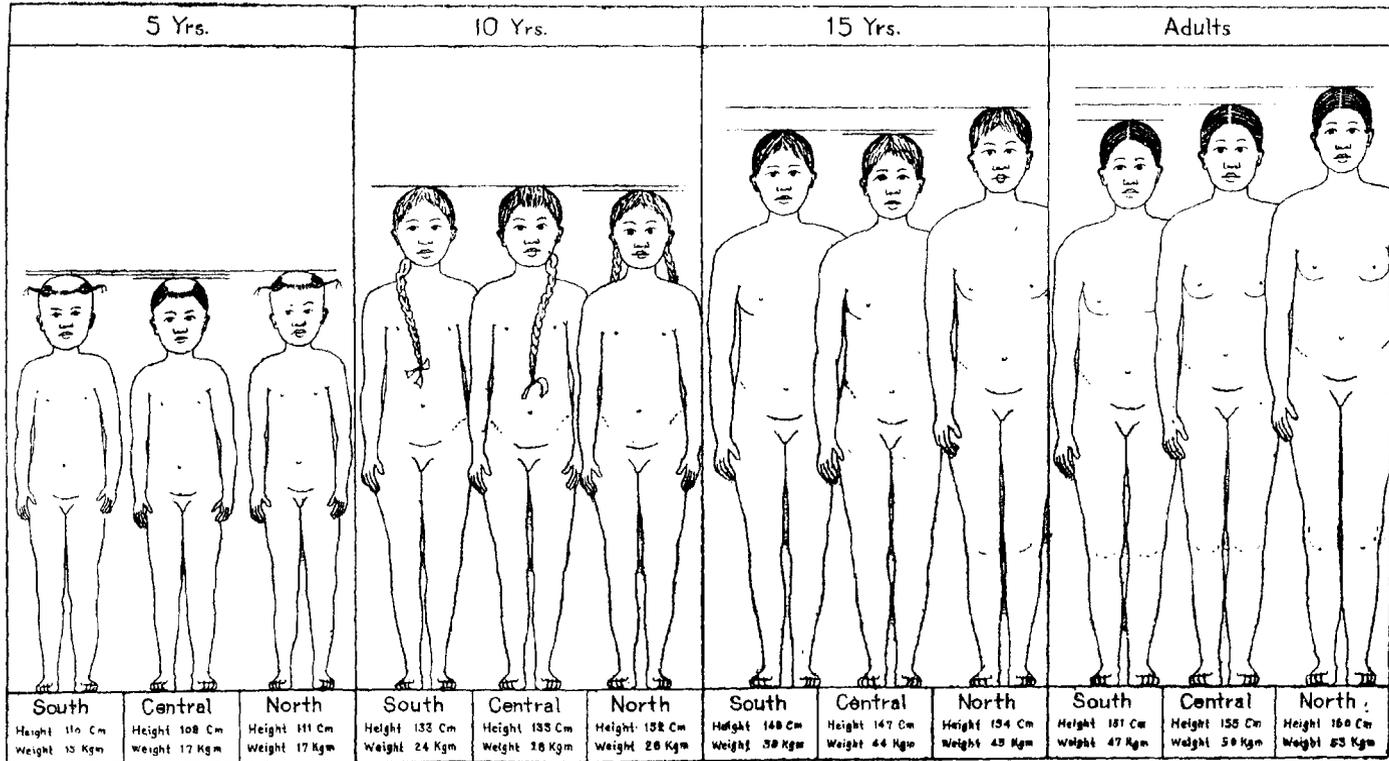


FIG. 10. Graphic heights of Chinese females of corresponding age periods in South, Central, and North China respectively.

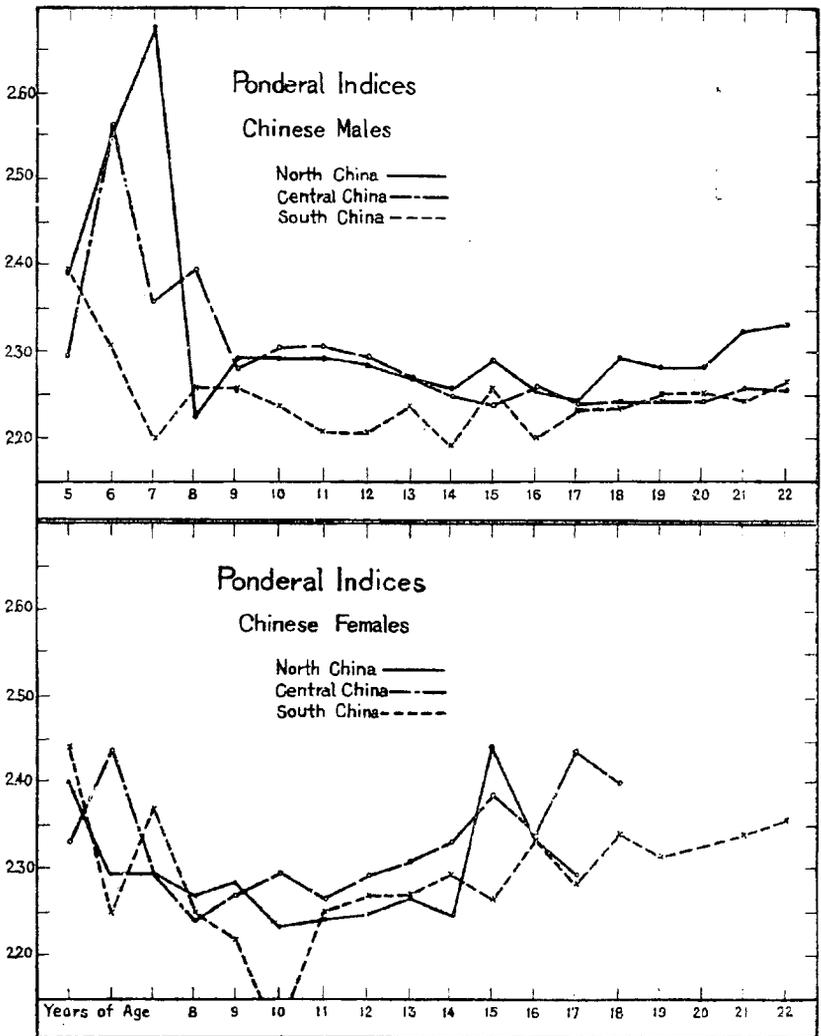


FIG. 11. Comparison of the ponderal indices of Chinese males and females of different regions of China during the growth period.

**PRIMARY TUBERCULOSIS OF TONSILS AND ADENOIDS
AMONG CHINESE.***

J. H. KORNS, M.D., Peking.

Tuberculosis of the tonsils is usually secondary to tuberculosis of the lungs and is a common accompaniment of the latter. Primary tuberculosis of the tonsils and adenoids, as noted in many series of tonsillectomies in Europe and the United States, occurs in approximately 5 per cent. Among those manifesting tuberculosis of the cervical lymph nodes, the incidence is much higher. Crowe's¹ series, one of the largest reported, of 3,260 tonsillectomies shows an incidence of 4.18 per cent, rising to 48.2 per cent in patients with tuberculosis of the cervical lymph nodes. Mitchell's² series in Edinburgh showed 38 per cent of tonsils from 106 tonsillectomies to be tuberculous, most of the patients having presented themselves for treatment of enlarged cervical nodes. In this connection it should be said that out of 406 samples of mixed milk, bought from this number of milk shops in Edinburgh, 82 (20 per cent.) were found to contain tubercle bacilli. At the time of this investigation it was the exception, not the rule, to sterilize milk in Edinburgh. Equally striking are the findings of Austin³ of Chicago that among children who drank pasteurized milk only one tonsil out of forty-five pairs removed was tuberculous. Histologically, even this one was negative, the tuberculosis having been discovered by inoculation. The statistics of Crowe and Mitchell, above given, were derived from histological examination alone, whereas Austin used routine inoculation in addition.

The above findings lend credence to Crowe's statement that primary tonsillar tuberculosis is probably due in a majority of cases to drinking tuberculous milk. Another fact supports this belief, viz., that the bovine strain is usually found in the tonsils showing primary tuberculosis, in the various series of the West where careful differentiation of strain has been carried out. Thus Mitchell² found that 84 per cent of tuberculous tonsils, in a series of 19 children under ten years of age, who had at the same time tuberculosis of the cervical lymph nodes, harbored the bovine strain.

More important than the knowledge that primary tuberculosis of the tonsils exists is the problem of its significance as regards bodily welfare. Two facts indicate it to be of importance. One has already

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been mentioned, viz., that the incidence of tuberculosis of the tonsils is very high in cases with tuberculosis of the cervical lymph nodes. The second fact is an anatomical one, worked out by Wood⁴, who showed that the efferent lymph ducts of the tonsils drain directly into a lymph node located between the ascending process of the mandible and the anterior border of the sternocleido mastoid muscle. This "tonsillar lymph gland," so named by Wood, is found, clinically, to be the first involved in acute tonsillar infection and to be usually involved in tuberculous infection of the cervical lymph nodes. These two facts, when considered together, link up primary tonsillar tuberculosis and tuberculosis of the cervical lymph nodes in an etiological way.

A mooted question has been whether tubercle bacilli can pass through the tonsils and involve the regional lymph nodes without setting up a reaction in the tonsils themselves. Certainly some mucous surfaces can permit such passage. Calmette, Guerin and Grysez⁵ showed that ocular instillation of tubercle bacilli in the guinea pig could produce typical lymph node tuberculosis without causing any lesion in or about the eye. The same absence of lesion at the portal of entry has long been noted in primary tuberculous infections through the intestinal mucosa.

As regards the tonsils, Aufrecht⁶ found tubercle bacilli in normal tonsils of individuals who did not show tuberculosis elsewhere in the body, the regional lymph nodes being the first site showing colonization and multiplication of the bacilli. Harbitz⁷, who was one of the first to draw attention to the latency of tubercle bacilli in lymphatic tissue, implies that tubercle bacilli often pass through the tonsil to the cervical lymph nodes without leaving evidence of injury in the tonsil. It seems a fair assumption, therefore, that while tubercle bacilli usually excite reaction before they can pass entirely through the tonsil, they may fail to do so, particularly in those who have not been sensitized by a previous tuberculous infection.

The above matters are of more than academic interest in North China where native children and young adults show a considerable incidence of tuberculosis of the cervical lymph nodes, although cow's milk is not used as an article of food. There are several phases to the question. The present paper deals with one only, the incidence of primary tuberculosis of the tonsils and adenoids.

MATERIAL AND TECHNIQUE.

The material used has consisted of tonsils and adenoids removed routinely by the Department of Otolaryngology, no selection having been made. The material was studied by both microscopic and in-

oculation methods, as it was felt that both were essential. Histologic studies make possible the diagnosis of tuberculosis, providing the changes are sufficiently characteristic, even though the process is no longer active. But because tubercle bacilli may lie latent in lymphatic tissue and small tubercles may be overlooked unless serial sections are studied, inoculation is also important. And while inoculation of tonsillar material results frequently in the death of the guinea pigs from acute mixed infection, those surviving provide the best known differentiating culture medium for tubercle bacilli, only a few of which are required to infect the animal.

Each tonsil, after removal, was cut laterally in the vertical plane into halves, one half of each was studied histologically, the other half was inoculated. Serial sections were not done. Staining of sections for tubercle bacilli was done only when inoculation proved positive. Where adenoids also were removed these too were studied by both methods.

The material intended for inoculation was washed in several solutions of distilled water, ground in a mortar to which a few cubic centimeters of normal saline were added, then introduced subcutaneously into the groin of a guinea pig. The attempt was made to inoculate as much of the material as possible, although there was always some fibrous residue left. One half of each tonsil, together with half of the adenoid tissue, if present, were combined to make one suspension. Only healthy guinea pigs, which had been under observation for about two weeks and which presented no enlarged superficial lymph nodes, were used.

The entire series consisted of 91 patients. Ninety-one guinea pigs were injected; of these 17 died within 5 days from an overwhelming infection. There remain, therefore, 74 cases which were studied by both methods above-mentioned, and which form the material for this report. Of these 46 were Chinese and 28 non-Chinese, the average age of the Chinese being 14 and that of the non-Chinese 16. More than half of each group were under 12. The clinical conditions which made operation advisable were various and need not be enumerated here; in every case either hypertrophy of the tonsils or chronic tonsillitis or both were present. Adenoids were present in 24. The cervical lymph nodes were enlarged in 45, but no clinical notes were made to indicate that tuberculosis of the cervical lymph nodes was suspected. In no case were there history or signs of tuberculosis of the lungs or other organs.

RESULTS.

Table 1.—Showing Results of Microscopic Examination and of Inoculation.

	No.	Enlarged cervical lymph nodes	Adenoids	Microscopic Diagnosis			Results of Inoculation of Guinea Pigs.	
				Chronic tonsillitis	Chronic adenoiditis	Tuberculosis of adenoids	Tuberculosis present	Tuberculosis absent
Chinese	46	33	13	46	12	1	1	45
Non-Chinese	28	12	11	28	11	0	1	27
Total	74	45	24	74	23	1	2	72

The microscopic diagnosis was chronic tonsillitis in all 74 cases, chronic adenoiditis in 23, tuberculosis of the adenoids in one. This case, Hospital No. 7948, a Chinese boy aged 8, showed no tuberculosis of the tonsils although numerous sections were studied. This patient also had chronic suppurative otitis media and chronic cervical lymphadenitis. Some months after tonsils and adenoids had been removed he was found to have a discharging sinus under the right jaw, from which tubercle bacilli were recovered.

The results from inoculation were positive in two guinea pigs. All were autopsied two months after inoculation. In all there was a definite gain in weight, the average gain in the two months being 128 gm.; the two tuberculous ones gained even more, averaging 145 gm. One of the tuberculous guinea pigs corresponded to Hospital No. 7948, shown by microscopic study to have tuberculosis of the adenoids. This animal showed a lymph node tuberculosis, with insignificant involvement of spleen, liver and lungs. Microscopic examination of the tissues showed typical tubercles. Cultures on Dorset's egg medium showed, after six weeks, a scant growth of acid-fast bacilli, which failed to grow when subcultured. These bacilli were long and quite thin, resembling the human rather than the bovine strain, although definite conclusions cannot be drawn as to the strain.

The other tuberculous guinea pig had been inoculated with material from Hospital No. 8932, a Swedish girl aged 10, born in Shansi but who at the age of 5 had gone to Sweden where she remained for three years. While there she had a partial tonsillectomy. The clinical diagnosis in her case was chronic tonsillitis, hypertrophy of tonsils and adenoids. Autopsy of the animal showed lymph node tuberculosis with slight splenic involvement. Section of the lymph nodes showed acid-fast bacilli. No growth was secured on Lubenau's

medium. Failure to secure growth on this glycerinated medium favors the assumption that the strain was a bovine one.

SUMMARY.

In summary, in a series of 74 tonsillectomies and adenoidectomies, among Chinese and non-Chinese patients, one was shown to have tuberculosis of the adenoids, with no microscopic evidence of tonsillar involvement, and one tuberculous infection of tonsils. In 46 tonsillectomies and adenoidectomies among Chinese, one had tuberculosis of the adenoids, and this case shortly after operation showed a discharging sinus from the cervical lymph nodes which contained tubercle bacilli. In other words, the 45 Chinese cases, without tuberculosis of the cervical lymph nodes, showed no tuberculosis of the tonsils or adenoids. While this series is small it would indicate a lower incidence of primary tuberculosis of the tonsils than is found in the West. The fact that Chinese do not drink cow's milk may be suspected as being responsible for this difference.

NOTE.—I am indebted to the Otolaryngological Department, and, in particular, to Dr. Tze King, for permission to publish the microscopic findings in the above series.

REFERENCES.

1. Crowe, 1924, *Am. Jour. Dis. Children*, XXVII: 113.
2. Mitchell, 1916-1917, *Jour. Path. and Bact.*, XXI: 248.
3. Austin, 1919, *Jour. Dis. Children*, XVIII: 14.
4. Wood, 1905, *Am. Jour. Med. Sc.*, CXXX: 216.
5. Calmette, Guerin and Grysez, 1913, *Compt. rend. Soc. de biol.* LXXIV, 310.
6. Aufrecht, *Pathologie und Therapie der Lungenschwindsucht* de. 1913, p. 48.
7. Harbitz, 1905, *Jour. Inf. Dis.*, II: 143, 1905.

PEANUT BRONCHITIS IN CHINA; WITH THE REPORT OF A CASE.*

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With the use of peanuts as a meat substitute during the world war, there appears to have been an increase in the condition known as peanut bronchitis (Patterson²) in the United States. Similarly the introduction of the large peanut into China, with its growing popularity as a food as well as a tit-bit to appease hunger between meals, has

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been productive of the same type of case. In America the peanut is usually given to small victims in the form of peanut candy, but in China roasted peanuts fresh from the hull usually cause the trouble.

The first reference in medical literature to this condition is to be found in the book by Jackson¹ published in 1914. Writing on the subject of foreign bodies in the larynx and trachea he states: "Peanut kernels are among the more fatal of foreign bodies, and this does not seem to be due to comminution and multiple abscesses so much as to the peculiar irritating effect of the peanut kernel upon the trachea-bronchial mucosa." And in 1919 he writes³: "The most irritating of all substances we have encountered in the air passages is roasted peanut kernels. Other nut kernels (raw) are also very irritating; whether less or more so, has not been determined because of the remarkably less frequency of occurrence of kernels other than peanut as foreign bodies."

In August 1919, Jackson and Spencer⁴ published a more complete report of this condition under the title of "Arachidic Bronchitis." They explain their selection of this term for peanut bronchitis as one which probably more nearly describes the condition, which they suggest is due to a chemical irritation caused by "arachidic acid, a saturated fatty acid which is present in about five per cent strength in peanut oil."

According to these writers the symptoms resemble those of laryngeal diphtheria. There is an asthmatic cough with toxemia and elevation of temperature. A number of cases have been given antitoxin in spite of the fact that no diphtheria bacilli were found. Physical signs show certain variations, but there are usually signs which indicate that there is a general diffuse bronchitis with accentuation over the site of the foreign body. A roentgenogram will frequently help to locate the site of reaction even though the foreign body cannot be seen. They conclude that "we should always remember the possibility of peanut bronchitis when consulted regarding a child who rather suddenly develops irregular fever, listlessness, dyspnea with cyanosis, paroxysmal cough, and the signs of a diffuse, generalized bronchitis, attended with wheezing respiration. A history of choking on a peanut or of eating peanuts at about the time of inception of the illness, renders the diagnosis almost certain."

The patients are almost exclusively children of ages ranging from a few months to six or seven years. There is one case reported of an adult. While it is probably true that older people do not aspirate peanuts as easily as children, it is also true that the glottis is larger in adults and they are able to cough out foreign bodies with greater ease.

The pathology of this condition is based on the endoscopic examinations which have been made by various observers. Jackson writes that there is "an edematous, generalized, purulent bronchitis, with accentuation of the morbid processes at the site of the peanut kernel." This condition he believes can be explained as a chemical reaction, with swelling of the mucous membrane. Others conclude that the alien protein in the peanut kernel may produce the reaction. The presence of profuse secretion in these cases suggests to some an infection. These observers point out that the small pieces of peanut are well covered with organisms of the oral cavity which may infect the bronchial mucous membranes. Jackson and his co-workers state that metallic foreign bodies, which have been in the mouth before entering the bronchus, do not produce this peculiar reaction; furthermore, that the removal of the peanut kernel is followed immediately by a cessation of the copious discharge, which would not be the case if a real infection had taken place. In support of his belief that the peanut contains an irritant which produces the reaction, Jackson reminds us that "Peanut threshers' fever" is a well-recognized condition where peanuts are grown, and may be caused by a definite irritant contained in this tuber.

Lung abscesses invariably develop in those cases in which the peanut is allowed to remain or is not expelled. The secretion may be so thick that it is expelled from the larynx with great difficulty, necessitating an opening into the trachea for the purpose of drainage.

If the patients can be seen soon after the peanut has entered the bronchus and before there are signs of distress in breathing, an attempt should be made to remove the foreign body, since the chances, especially in young children, are extremely small that the kernel will be coughed up, and there is grave danger of a fatal termination.

REPORT OF CASE.

On October 11, 1924, Kao Wen Yun, a boy of five years, was admitted to the medical service (Pediatrics) with difficult breathing, dyspnea, and cyanosis. Five days before entrance, the child had been slightly ill with a "cold" and cough. Two days before admission the child had been eating peanuts and had been punished by his father by a blow on the back of his head for attempting to eat too many at one time. The child immediately cried and there were symptoms of choking and vomiting. Afterward there was considerable cough with periodic attacks of cyanosis. The following day and night the boy was feverish and restless. He was able to sleep only when carried in an upright position.

The patient was seen on the day of admission in the Out-Patient Department by a member of the Nose and Throat staff. No membrane or inflammation was found in the throat. The breathing was free at the time and apart from the history there was nothing to lead one to suspect a foreign body in the bronchus.

The physical examination on entrance showed a well developed and nourished boy who looked sick, lying in bed with half closed eyes, breathing with some difficulty. Respiration was noisy, cough asthmatic in character, with voice sounds fairly clear. With the exception of the lungs all parts examined were negative. The lung examination disclosed no localized dullness, but there were moist râles everywhere, with bronchial breathing. Temperature on admission was 38.6°C.; leucocyte count 17,100 with 82% polynuclears.

On October 12th his condition was better, breathing much easier, herpes over lower lips, bubbling râles over entire chest but worse on right side; no dullness. On the next day there was persistent cough, dyspnea with grunt, no cyanosis, no areas of dullness. Breath sounds throughout both lungs indicated free exchange of air everywhere. No bronchial breathing. Coarse râles throughout both lungs, more marked on right. Impression: broncho-pneumonia.

On October 15th patient's general condition much better. Breathing much easier and less rapid. Temperature slowly coming down to normal. No dullness. Coarse râles throughout both sides. No bronchial breathing. X-ray taken on October thirteenth and reported on this day showed no evidence of consolidation. Coughing less.

October 17th. The child had been getting on nicely for the preceding two days. Temperature came down and remained normal throughout preceding day. Respiration easy and less rapid. Lungs: coarse râles still persist especially in the right side. No dullness; no bronchial breathing.

Since noon coughing again increased. Temperature rose to 39.8°C. Respirations increased and difficult; lung signs unchanged. X-ray taken on October 15th showed no evidence of broncho-pneumonia or lobar pneumonia.

October 18th. Rise of temperature to 39.8°C. preceding day with slight remission this morning. Dyspnea about the same, some dilatation of the ali nasi. Percussion note reveals slight dullness on left side anteriorly; there is suppression of breath sounds in this area and just below left clavicle there is a small area of distant bronchial breathing. Posteriorly, breath signs are distant over entire left side.

The patient was seen on this day by a member of the Nose and Throat service who recommended that a direct bronchoscopy be done to determine whether or not a foreign body was causing the condition. The Pediatrics service was requested to secure permission for the examination in case they wished one done.

October 19th. Temperature has stayed below 37.8°C. since morning of preceding day. The child seems more comfortable. The cough is less frequent but still hard and croupy. The voice is not metallic, but harsh. Lungs: breath sounds quite loud, especially on the right side. Slight prolongation of expiration sound over the left apex in front. No moist râles.

October 20th. General condition about the same as yesterday. Temperature 38.2°C. this morning. The cough is not very severe but somewhat spasmodic. Lungs: no dullness found. The breath sounds are about equal on both sides; they are loud and harsh with much wheezing at end of expiration. No moist râles. Adrenalin 0.2 c.c. (1-1000) was given to relieve the bronchial spasm. No marked effect after half an hour. The same dose was repeated and in about fifteen minutes the breath sounds became less rough and the wheezing disappeared.

Our examination of the patient this morning led to the diagnosis of irritating particles of peanut still in the bronchi and probably some laryngitis.

The child's marked improvement over a few days previous, coupled with his extreme antipathy toward every examiner, decided us to delay bronchoscopy, since we had no desire to give ether to such a patient.

October 21st. Patient breathing quite easily, with some inspiration and expiratory stridor. Lungs resonant throughout. Below left clavicle breath sounds not distant, but expiration seems slightly high pitched and prolonged. No real râles heard but coarse stridor transmitted throughout entire chest. Cough less frequent; hoarse; produces purulent sputum.

October 23rd. General condition very good. Temperature normal. Respiration easy. There is still some occasional croupy cough. Lungs clear; breath sounds normal, vesicular; no râles.

October 24th-29th inclusive. General condition continued to improve, though cough persisted and was spasmodic at night. Spasm was relieved with adrenalin. At times the sputum, which was copious, was blood tinged. The child had become hospitalized and was happy and playful. The temperature did not go above 37.5°C. during these days. The patient was seen almost daily during this period by the writer, who came to the conclusion that the peanut had probably been expelled on the 17th or 18th when the temperature became elevated followed by complete remission.

October 30th. Condition was good and child was happy, playing. At four o'clock in the afternoon he suddenly became almost asphyxiated, with labored respiration, cyanosis and restlessness. Perspiring freely. Adrenalin given but without results. The writer was called, and an attempt was made to intubate the child. The insertion of the tube was successful but failed to relieve the difficult breathing to any appreciable degree. Tracheotomy was resorted to with complete disappearance of dyspnea and cyanosis the moment the trachea was opened.

October 31st. Temperature 37.2° C. this morning. General condition good. Slept fairly well last night. Had difficulty in breathing twice during the night but was relieved immediately when the inner tube was cleaned. Thin mucoid secretion. Harsh breath sounds. No bronchial breathing. No râles. No dullness. White blood cell count, 20,400. Bronchoscopy done at 11.30 a.m. by the writer. A soft piece of peanut kernel 1 × 0.8 cm. in size was removed from the trachea. Both bronchi clear. Larynx greatly swollen. (See note below concerning operation)

November 1st to 3rd. Patient continued to have normal temperature and there was no increase of lung signs. Considerable tenacious mucus was expelled through tracheal cannula. On November 3rd, three full days after the first insertion of the cannula, it was removed and a simple wet boric dressing placed over the opening. Adrenalin was given before removal of tube, but the child experienced no difficulty in getting the major portion of air through normal channel.

November 3rd-16th. Child made steady progress daily. The bronchial and tracheal secretion ceased almost as soon as the tracheal cannula had been removed. For three or four days following removal of the cannula a slight amount of mucus was forced through the opening, but this finally ceased and the wound healed, leaving a small scar. The persistent cough entirely disappeared during this period. The child was discharged well on November 16th, with a normal voice.

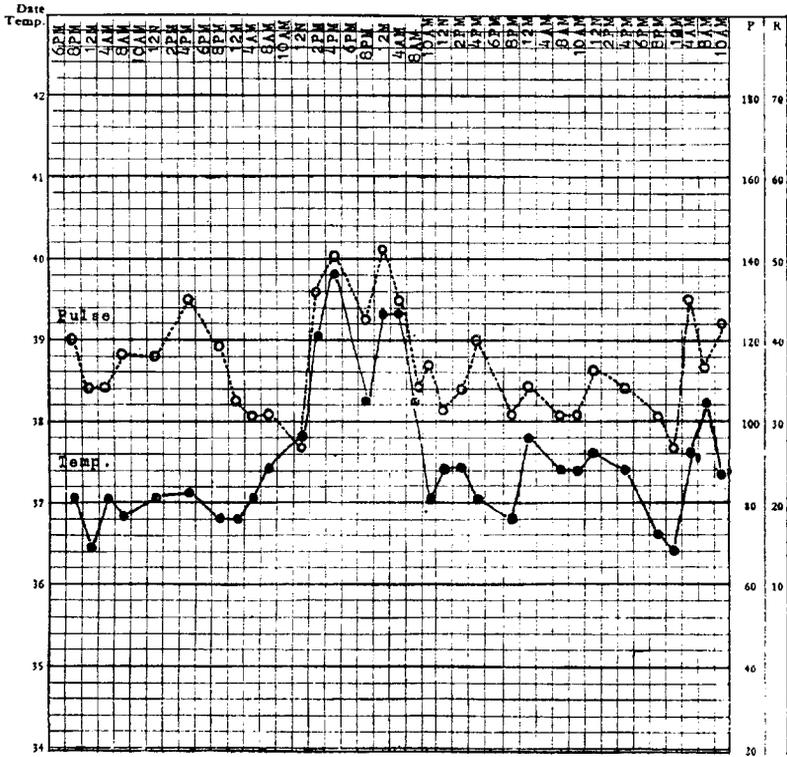
Two weeks after discharge from hospital the child was seen; he had been perfectly well since leaving the Hospital.

COMMENT.

A portion of the temperature chart is shown covering the period during which there was retention and absorption of toxic products, due probably to blocking in a bronchus by the peanut kernel and the swollen mucous membrane. The remission of temperature, as indicated on the chart, and the improvement of the patient were probably due to a shifting of the peanut upward into the trachea, where it was finally located at operation, and a freer drainage of the dammed-up secretions.

CASE OF PEANUT BRONCHITIS; PART OF TEMPERATURE CHART.

Peking Union Medical College.



Throat swabs taken early in the course of this disease were negative for *Bacillus diphtheriae*. *Streptococcus haemolyticus* and *S. non-haemolyticus* were isolated from time to time from throat swabs and the sputum.

The blood picture is of interest, if compared with the temperature chart and the record of the daily progress of the patient:

October	11	..	..	..	..	Leucocytes, 17,100
„	14	..	..	..	..	12,650
„	18	..	..	..	..	28,800
„	19	..	..	..	..	19,400
„	21	..	..	..	..	18,600
„	25	..	..	..	..	9,950
„	28	..	..	..	..	20,000
„	31	..	..	..	..	20,400
November	4	..	..	..	..	20,000
„	16	..	..	..	..	13,500

Following tracheotomy on October 30th with the immediate relief of all symptoms, we concluded that the foreign body, should there be one, was lodged in the larynx, and it was decided to explore the following morning, using ether if it became necessary in order to control the child. On the morning of the operation the cannula was removed unintentionally in an effort to clean it, and was immediately followed by dyspnea which was relieved only when the tube was replaced. It is just possible that the peanut descended from the larynx into the trachea at this time, as it was not found in the larynx at the time of operation.

Bronchoscopy was performed on the child after a preliminary injection of .005 gm. morphia. The larynx was swabbed three or four times with ten per cent cocain. Much to our surprise and wholly inconsistent with previous behavior, the patient made very little trouble on the operating table. The larynx was oedematous and admitted only the smallest size bronchoscope. When a foreign body was not discovered in the larynx, the tracheotomy tube was removed and the trachea explored. A fairly large piece of peanut was discovered just above the bifurcation, moving upward and downward with respiration. A larger bronchoscope was introduced through the tracheal opening, and an attempt made to grasp the piece of peanut with the forceps. The mass was found to be entirely too soft, and for fear of breaking it into small pieces which would descend into the bronchi, the bronchoscope was pushed deeper into the trachea, and an attempt made by using a long hook to draw the kernel into the end of the tube. During this manoeuver, it was noticed that the kernel was driven against the end of the tube at every expiration and would remain in that position if there was sufficient space outside the tube for inspired air. The tube was therefore gently withdrawn, keeping the peanut at the distal end,

until the tracheal opening was reached. Then by simply dilating the opening, the kernel was expelled into the operator's lap. On account of the oedema of the larynx, the tracheal cannula was re-inserted.

The faithful record made from day to day of this patient's condition, by either Dr. Guy or Dr. Hsü, is extremely useful in helping us to get a clear picture of peanut bronchitis, in which for one reason or another the peanut is not removed or expelled early. The difficulty with which children expel foreign bodies of this character is demonstrated by this case. Just before tracheotomy was performed the child was doing so well that we had concluded that the peanut, if there was one, had been coughed out. The persistence, however, of a great deal of purulent sputum should have warned us, had we had more experience with such cases, that the peanut was still in the bronchus or trachea. After removal of the kernel the secretion stopped within three or four days.

Cases of peanut bronchitis are frequently brought to our clinics, but it is extremely rare that we secure the consent of the parents for an exploration of the bronchi or for a tracheotomy in case such a necessity should be indicated. It is just possible that the mother of this boy would have taken him away in fear had these procedures been proposed at the first consultation. The conservative treatment may be the one therefore to adopt for the time being, if we are to secure more of these cases and carry them through to a successful end.

Not all clinics in China are equipped with an instrument suitable for exploring the bronchi by the direct method. This case of peanut bronchitis and others reported suggest the possibility of controlling them by performing an early tracheotomy to admit of free drainage, and affording a larger opening when the cannula is removed and the wound dilated for the expulsion of the foreign body. A number of cases have been reported recently in which this method of treatment was all that was needed to bring about recovery. No case of peanut bronchitis should be turned away from our clinics untreated, even though there may be a lack of special instruments, when tracheotomy gives so much hope of cure.

BIBLIOGRAPHY.

1. Jackson, C. 1914, *Peroral Endoscopy and Laryngeal Surgery.*
2. Patterson, E. G. 1919, Peanut Bronchitis. *N. Y. Med. Jour.*, CIX: 101-103.
3. Jackson, C. 1919, Observations on the Pathology of Foreign Bodies in the Air and Food Passages. *Surg. Gyn. and Obst.*, XXVIII: 201-261.
4. Jackson, C. and Spencer, W. H. 1919, Arachidic Bronchitis. *Jour. Amer. Med. Assoc.* LXXIII: 672-677.

A NEW ANTI-SCARLATINAL SERUM.

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It is generally acknowledged that scarlet fever in Peking and North China varies greatly in its severity as compared with the disease elsewhere, and that a large proportion of the cases are of the severe type—usually described as the “toxic” type in books on Infectious Diseases.

It is also generally admitted that the mortality among these cases is high, and that, up to the present, there is no remedy which can be relied upon to benefit them. The writer, after ten years at the Government Isolation Hospital, where severe scarlatina is encountered every spring, and after having tried every form of treatment, has also been compelled to arrive at the conclusion that, so far, no remedy can be depended upon. Many varieties of anti-scarlatinal serum have been used, but without any apparent benefit.

During the winter and spring of 1922-1923, throat swabs were taken from all the severe cases encountered at the hospital, and *Streptococcus hemolyticus* was isolated from each case. The Central Epidemic Prevention Bureau, Peking, was requested to prepare a serum with this organism, and 19 strains were selected and used. The method of preparation will be reported separately.

A large number of cultures were utilised on account of the fact that the hemolytic organisms isolated from the different cases seemed to differ in their mode of growth, the colonies in certain cases obviously varying in size and appearance: this point is at present under investigation.

The serum was available at the end of last year, and since then a number of severe cases have been treated with it. It seems premature to pronounce a verdict on the efficacy or otherwise of this serum, but, as the cases were all selected cases, and as the results in some of them—especially those regarded as hopeless from the very beginning—were so striking, it has been considered desirable to write this preliminary note on the subject, with the hope that, during the coming winter and spring, other practitioners may have an opportunity of testing this remedy, and that, if more cases of a severe type will be available for treatment, they will show results which will establish this particular serum as a reliable remedy for severe scarlatina.

Cases of scarlet fever may be roughly divided into three main types: (a) mild cases with moderate degree of pyrexia, sore throat, light rash, and practically no constitutional disturbance; (b) moderately

severe cases, with symptoms as in (a) but slightly more marked; (c) severe cases with high fever, rapid and weak pulse, injected eyes, apathy or delirium,—in short, with all the signs of grave constitutional disturbance.

In making use of the serum, types (a) and (b) have been left out for the simple reason that experience has taught us that these cases recover without any special treatment, type (a) in 6 to 7 days, as a rule, and type (b) within 9 to 11 days. However, it is not difficult to imagine that, with serum treatment, the course of the disease in these types would probably be considerably shortened, but the supply of serum being limited only cases of type (c) were treated with it, as, after all, for types (a) and (b) serum would have been perhaps an unnecessary luxury.

There is, of course, a possibility of error in the choice of patients in certain cases, as some of them might perhaps have recovered even without the use of the serum. But in the case of at least three of the patients there could have been no doubt whatsoever, from long experience of scarlet fever, that they would have ended fatally had the serum not been used.

With regard to the administration of the serum the route taken was the intramuscular in every case, but the quantity used was more in the nature of an experiment. The majority of the cases received 25 c.c. of the unconcentrated serum in the first instance. A larger initial dose, or a repetition of the first dose, depended upon the clinical aspect of the case, some requiring 50 c.c. as an initial dose. The maximum quantity required seems to be 100 c.c. in two to four injections.

No spectacular results in serious cases, such as a sudden drop in temperature and the disappearance of all alarming symptoms, are claimed for this serum. In fact, the temperature chart alone would not convey much information as to the effect of the serum in such cases, although in a couple of patients the temperature did come down by crisis. The point that requires emphasis is the complete change in the patients' general condition after the administration of the serum. Within a period of 48-72 hours the improvement is so distinct that no further anxiety need be felt in regard to the prognosis, in spite of the continuance of the fever. The course of the disease in the three cases in question may be gathered from the following brief notes:—

Case 1.—Yuan Hsin Chih, aet. 22, soldier. Admitted Feb. 11, 1925. Third day of disease. Constitutional disturbance on admission was so severe that the prognosis appeared hopeless, judging from past experience of such cases.

Throat: marked swelling and inflammation. Rash: severe type. Temperature: 104°F Pulse, 140, weak. Patient delirious.

February 11th. 25 c.c. serum given. February 12th. Temperature lower, but delirium continues, as a result of which patient had to be removed to another (vacant) ward. February 13th. 25 c.c. serum given. February 14th. Improvement. Mind clearer. 25 c.c. serum given. February 15th. Improvement continues: no delirium. February 16th. 25 c.c. serum given. The case caused no further anxiety. The only complication was a cervical abscess which yielded readily to treatment.

Case 2.—Tso P'ei Ch'i, male, aet. 9. Admitted, March 29th, 1925. Third day of disease. On admission lying quietly in half-dazed condition. Eyes deeply injected. Replies to questions incoherent. Rash: usual type. Throat: muco-pus plentiful. Temperature 106.6°F. Pulse, 170.

March 29th. 15 c.c. serum given. March 30th. 25 c.c. serum given. March 31st. Marked drop in temperature. Mind clear. Speaks intelligently. General condition decidedly improved.

April 2nd. 25 c.c. serum given. Improvement continues. Recovery without complications. (Throat swab gave practically pure culture of *Streptococcus hemolyticus*.)

Case 3.—Mrs. Wang, aet. 26. Admitted, May 3rd, 1925. Fourth day of disease. Constitutional disturbance severe: semi-delirious. Throat: inflamed as usual. Rash: profuse, some fairly large hemorrhagic spots on anterior surface of trunk. Temperature, 104.4°F. Pulse 150, weak. Case appeared hopeless.

May 4th. 50 c.c. serum given in morning. May 5th. Slight improvement. 50 c.c. more serum given on May 6th. Developed left cervical adenitis. Temperature higher. May 7th. Still some delirium, but general condition better. May 8th. Improvement continues. No further anxiety regarding prognosis.

CONCLUSIONS.

1. This serum appears to have a decidedly curative effect in severe cases of scarlet fever, especially those which a long experience considers as likely to end fatally without it. The serum should be administered early in the disease.

2. Although unconcentrated, the serum is required in a much smaller quantity than any of the other anti-scarlatinal sera now available.

3. This serum has the following advantages:—

(a) It is prepared with organisms isolated from really virulent cases, such cases as are practically not encountered elsewhere.

(b) It is prepared locally, and has therefore certain advantages over the imported sera, even though these are eventually proved to be beneficial here.

4. Given early in virulent cases, it appears to ward off serious complications.

5. This serum has not been made use of in the milder cases. In some severe cases it has the effect of bringing the temperature down by crisis—a result claimed for another serum which is now being placed on the market, but which the writer has not had the opportunity of testing against the virulent cases encountered in this country.

6. It appears to benefit erysipelas developing in scarlatinal cases, by cutting short the course of the disease.

NOTE.—The method of preparation of this serum is different from the methods employed by the two Drs. Dick and by Dr. Dochez.

A PRELIMINARY REPORT ON THE LIFE CYCLES
OF TWO NEW HETEROPHYID FLUKES
OCCURRING IN THE SINO-
JAPANESE AREAS.*

ERNEST CARROLL FAUST AND MASAO NISHIGORI.

Undoubtedly the most prolific source of fluke infection in mammals in the Far East is through eating raw fish which harbors the encysted stage of the parasite. The first report of a human fluke in the Sino-Japanese areas, conveyed through this methods was made by Kobayashi (1910) for *Clonorchis sinensis*. More recently fish have been found to be involved in the life cycles of *Metagonimus yokogawai* (= *Metagonimus ovatus*), *Heterophyes heterophyes*, and *Echinochasmus perfoliatus*. Two additional flukes, belonging to the Family HETEROPHYIDAE, to which *Metagonimus* and *Heterophyes* belong, are now known to be contracted in the same way, namely, through the consumption of raw fish (Nishigori, 1924). These two forms are closely related species belonging to a single genus, which possesses the common characteristics of the family except that its members have but a single testis instead of the usual two male generative organs. Because of this unique characteristic we have suggested the names *Monorchotrema taihokui* gen. et spec. nov. and *Monorchotrema taichui* gen. et spec. nov. for the two forms in question (Nishigori, 1924). A detailed account of their morphology will appear in a later publication but the essential characteristic of these flukes and the important phases in their life cycles are communicated in this preliminary account.

* Contribution No. 59 from the Parasitology, Laboratory, Peking Union Medical College, and from the Department of Comparative Pathology and Parasitology, Government Medical College, Formosa. Read in the Parasitology Section, C. M. M. A., Hongkong, Jan. 22, 1925.

Both species of worms are minute objects, oval-elongate in shape and are covered with a delicate armament of integumentary spines. They also possess pigmented areas on the dorsum just posterior to the pharynx. *Monorchotrema taihokui* is broadly oval at the posterior end and pointed in the anterior third of the body. It measures 0.39 by 0.24 mm. The large ovate single testis is transversely compressed and occupies a conspicuous position in the posterior two-thirds of the body. Just anterior to it are the small pear-shaped ovary and seminal receptacle, while the seminal vesicle lies to the left and in front of the ovary. The vitelline glands occupy triangular fan-shaped areas extending backward and lateral from the mid-point of contact of ovary and testis. The uterus winds in and out through the unoccupied spaces in the posterior two-thirds of the body. The eggs are yellowish in color, oval in shape, and possess an operculum, which is not as distinctly set off from the rest of the shell as it is in *Clonorchis*. They measure 26.1—29 by 12—15 microns. The oral sucker is a muscular cup-shaped organ at the anterior end of the body and measures 55 microns in cross section. A pharynx of small diameter and a delicate esophagus with equally delicate ceca constitute the digestive systems. The ventral sucker is partially fused with the genital sucker. The former is surrounded by a corona of small spines.

Monorchotrema taichui is symmetrically oval at both anterior and posterior ends. It measures about 0.35 by 0.23 mm. The testis is conspicuous similarly to that of the testis in the sister species, but is laterally compressed. The ovary lies anterior to it but considerably to the right of the mid-line, while the seminal receptacle lies to the right of the anterior portion of the testis. The seminal vesicle is situated some distance to the left, and is separated from the other three genital organs by a coil of the uterus. The vitelline glands have approximately the same distribution as those in *M. taihokui*. The uterus occupies the intermediate spaces in the posterior half of the body. The eggs are practically identical in color and shape with those of *M. taihokui* but are somewhat smaller, measuring 23 by 11 microns, and have very inconspicuous shoulder reinforcements where the operculum fits on to the shell.

The oral sucker is broadly cup-shaped and measures 60 microns in cross section. The digestive system is similar to that of *M. taihokui*. The ventral sucker, which is partly fused with the genital sucker, has a diameter of 70 microns, and has an asymmetrical arrangement of about eleven large irregular hooklets.

The life-cycles of these two flukes are practically the same yet involve specifically different intermediate hosts. Two species of *Metania* serve as the molluscan hosts (*M. reiniana* var *hidachiensis* for *Monor-*

chotrema taihokui, and *M. obliquegranosa* for *Monorchotrema taichui*). In these snails the miracidia transform into sporocysts, which produce progeny of rediae. These latter in turn produce lophocercous eye-spotted cercariae, with integumentary spines. The two species may be differentiated at this stage by their size, since *M. taichui* is one-fourth smaller, and by the type and number of cephalic (secretory) glands. The cercariae, when mature, erupt from their molluscan hosts and swim about for a while in the water. In the event they are in localities where fresh-water fishes of the proper species abound they penetrate into the cartilaginous tissues and according to our observations drop their tails and encyst. As far as is known they do not penetrate into the flesh. Mammals such as dogs consuming the fresh fish incur the infection. The cysts pass through the stomach intact but the cyst membrane is digested away in the duodenum and jejunum and the young worms come out and bury themselves among the cells of the mucosa.

Thus far these parasites have been found as natural infections only in the night heron (*Nycticorax nycticorax*) and in dogs in two areas in Formosa (Taihoku and Taichu). Experimentally they have been developed in various mammals including man. The presence of the encysted larva of the fluke in the outer cartilaginous parts of the fish instead of in the flesh, in a region where raw fish is commonly a human delicacy, undoubtedly accounts for the absence of the parasite in man.

REFERENCES CITED.

- Kobayashi, H. 1910. A Preliminary Report on the Study of *Clonorchis endemicus*. Jour. Bacter., No. 178 (Jap. text.)
 Nishigori, M. 1924. Two New Trematodes of the Family Heterophyidae Found in Formosa. Read at the 19th General Meeting Medical Assn., Formosa, 15-16, Nov. 1924. Jour. Form. Med. Assn., No. 237, 569-570 (Japanese text.)

FISTULA-IN-ANO.*

THEODORE BLISS, M.D., Wuchang.

At the Conference of the C.M.M.A. held in Peking in 1920, a paper read by Dr. Libby on "Fistula-in-Ano" first brought to my attention the wide prevalence of this affection in China. Recently, in reviewing the work of our hospital for the past five years I found that it is the commonest surgical lesion among our patients. So it seemed well to study the records in order to see whether the best re-

* A Paper Read at a Meeting of the Central China Branch, C.M.M.A., March, 1925.

sults were being obtained, and if not to discover some way to better our methods.

During the past four years there were 135 cases of fistula-in-ano under treatment. Since the earlier records, however, were not sufficiently complete, there remain but 112 records to form the basis of this paper. I have not included anal or ischio-rectal abscess among the cases although four cases were included in which there was abscess associated with fistula.

Age.—The age incidence does not differ materially from similar figures obtained at home. Our youngest patient was ten years old and the oldest was fifty-five. The average age of the tuberculous patients was 29.1; of the non-tuberculous, 30.3. Under 20 years there were 3 cases; from 20th-30th years, 55 cases; from 30th-40th years, 36 cases; from 40th-50th years, 12 cases; over 50 years of age, 5 cases; age not stated, 1. Total number, 112.

Occupation.—The occupations of the patients were as follows:—soldiers, 31; laborers, 24; farmers, 15; merchants, 13; students, 9; military officers, 7; clerks, 3; mechanic, 1; barber, 1; ricksha man, 1; boatman, 1; teacher, 1; hospital orderly, 1; no occupation, 4. Total, 112.

Tuberculous cases.—The most striking fact was the large number of cases in which there was tuberculosis. Johnson¹ gives the proportion observed in New York as 10 per cent; of the 112 cases in Wuchang there were 21 in which tuberculosis was demonstrated, or 18.7 per cent. If anything, this figure is too low since there were two cases in which tuberculosis was suspected but not demonstrated, while in some of the earlier cases the evidence may not have been elicited.

Mortality.—The four deaths in this series were of patients with tuberculosis: pulmonary tuberculosis in three, and meningitis in one. There was one other patient with pulmonary tuberculosis who was removed to his home and probably died soon after; he was in a bad condition in the hospital and was growing rapidly worse when discharged.

Other Complications.—Apart from tuberculosis the other complications present were: haemorrhoids, 10 cases; malaria, 4; abscess, 4; bubo, 2; syphilis, 1; amoebic dysentery, 1; schistosomiasis, 1; bronchitis, 1; opium habit, 1; carcinoma with anaemia, 1.

Patients' length of stay in Hospital.—The length of stay in the hospital varied considerably. The longest stay was 128 days; this patient had both tuberculosis and malaria and the case terminated fatally. The shortest stay was 2 days, a patient with pulmonary and laryngeal tuberculosis whose disease was too far advanced

to permit any operation. Including only the 17 cases in which treatment was given, the average stay of the tuberculous cases was 34.4 days. The average for non-tuberculous cases was 30 days. This is somewhat longer than the average at St. Mark's Hospital, London, which is stated in a recent paper to be twenty-five days.

Type of Lesion and Operation.—In 31 cases the lesion was a simple, single fistula; in 18 cases, multiple or tortuous; in 63 cases the record is non-committal. Complete excision followed by suture which entirely closed the defect was performed in three cases. In 10 cases there was a complete excision with packing the cavity; in some of these one or more deep sutures were inserted to reduce the size of the defect but not to close it completely. In 89 cases the fistula was opened and curetted.

Anesthesia.—Ether was used in 60 cases; chloroform in 31; spinal or sacral analgesia in 5, all of these being cases in which the patients had lesions in the lungs. The anesthesia was complete in all of the last group. Novocain was the preparation used.

Results of Treatment.—Eight patients were completely healed and discharged "cured." Ninety-five patients were discharged with a granulating area still unhealed, and these were classed as "improved." Most of them followed instructions to return to the Out-patient Department for treatment until healed, but a good many failed to persevere to the end. Four patients, as already mentioned, died of the complicating tuberculosis. Five patients were discharged "Not Improved." Of these, three refused permission to perform the necessary operation; one patient had advanced pulmonary and laryngeal tuberculosis and I thought any operation would only hasten the end that seemed inevitable.

COMMENTS.

It is easy to overlook the importance of the careful treatment of fistula-in-ano. The surgeon does not come with the same mental attitude to an operation for fistula as to a gastroenterostomy. Yet since fistula is one of the commonest surgical diseases, if not the commonest, that comes to us for treatment, our success or failure will materially affect the hospital's reputation and hence its influence in the community. It is well, therefore, to take care that our management of these cases is all that it should be.

Furthermore, fistula is not quite the trivial matter that it is often held to be, since there is a complicating tuberculosis in upwards of 18 per cent of the cases, or more than one case in ten (1.8).

The length of time required to effect a cure is a serious matter to many patients who have dependent families, so that we should do

everything possible to reduce to a minimum the period of disability. I therefore offer the following suggestions trusting that other suggestions of greater value will be brought out in the subsequent discussion.

PROPHYLAXIS.

Since fistulas are the result of abscesses the proper management of the abscesses will prevent the formation of the fistulas. This means early and radical incision, followed up to complete healing by appropriate treatment.

DIAGNOSIS.

Diagnosis seldom presents any serious difficulty. The examination should be sufficiently thorough to avoid overlooking a cancer, a spinal or sacro-iliac abscess pointing in the perineum, or some other serious condition unexpected until encountered on the operating table.

A caution is given against the use of the probe in exploring the fistula until the time of operation, as there is the danger of introducing infection in case of accidental perforation of the deeper tissues. The exact determination of the various ramifications of the fistula is not needed for diagnosis, but only to guide the dissection while operating. A careful examination of the chest is essential to ascertain the presence or absence of tuberculosis, and sputum if any should be examined microscopically.

ANAESTHESIA.

The result of the examination of the chest will probably determine the choice of anesthetic to be used. Spinal or sacral analgesia will probably be chosen in cases with lung lesions; chloroform if the lungs are doubtful; ether if they are normal.

PREPARATION OF PATIENT.

Since much depends upon securing a clean operative field, and the prevention of its being soiled by fecal matter after the operation, the bowels should be emptied before the operation. This is best effected by castor oil, because the oil tends to produce constipation after it has acted. If calomel and salts are given less than two or three days before operation, there is apt to be soiling either at operation or soon after. There is the same difficulty with an enema, unless it is given at least six hours before the operation. When the patient is on the operating table irrigate the operative field and lower few inches of bowel with Dakin's solution. The skin should be painted with two per cent solution of tincture of iodine. Unless

specially contraindicated, a hypodermic of morphine and atropine is given one hour before the time of operation.

OPERATION.

The best operation is the one which best meets the indications of the individual case. The simple slitting open of the fistula with curettage and packing will suffice for straight and superficial fistulas. Bad cases with multiple openings and much scar tissue may require a preliminary colostomy, and a course of antiseptic treatment before the local operation can be attempted, at all; and the local procedure itself may involve extensive dissection which will tax the skill of an experienced operator. Between these extremes are many procedures from which one can be selected to suit the case. The essentials to be kept in mind include (1) the entire removal of the fistulous tract (including suitable disposition of its opening into the bowel), or its conversion into a flat surface as nearly as possible, so that healing will take place from the bottom; staining the fistulous tract with an injection of methylene blue solution is at times helpful. (2) The removal of old, hard scar tissue is important. If this is allowed to remain it forms a dense barrier which by its contraction cuts off the blood vessels which traverse it, and so leads to the formation of a sluggish ulcer which is difficult to heal, and is more than likely to have its epithelial covering (when it does finally form) break down in a short time from insufficient blood supply. (3) Avoid causing incontinence which is best done by incising the sphincter in but one place. If there is more than one opening it is preferable to do a second operation at a later date after the first incision has healed. (4) Obliterate dead space and make the raw surface as small as may be by using deep sutures. This must not be done in such a way as to close the outside part of the wound and so encourage the re-formation of the fistula, and in any case where there is doubt it should be omitted.

POSTOPERATIVE TREATMENT.

Pain should be controlled and the bowels kept quiet by the use of tincture of opium. The diet should be liquid until after the bowels act, which usually happens in from 48 hours to 5 days. The suggestion of Johnson¹ that the operator should do the first dressing or dressings is a good one. The operator, better than anyone else, understands the exact details of the lesion, and where to look for signs of trouble. Gentleness should be used in doing the dressings to avoid irritating the wound and aiding infection to enter. Free irrigation is excellent. As a dressing, B.I.P. is very satisfactory at

first, and later, when stimulation is required, Balsam of Peru, either full strength or diluted with castor oil should be used.

I believe it pays to encourage these patients to remain in hospital until fully healed. If they are allowed to leave the hospital too early, they neglect the necessary cleanliness, and there is a certain amount of local irritation when they are up and moving about which delays healing. The net result is to change the fistula into a chronic ulcer. This may require another operation, with another period of disability longer than before. However, it is a question of balancing the patient's stubbornness against the doctor's persuasiveness!

TUBERCULOSIS AND FISTULA.

Lynch² remarks that some surgeons have claimed that 90 per cent of fistulas are tuberculous, but he does not believe that this calculation is based upon a histological examination of the tissues. His own records show only 5 per cent. It is possible for a patient with pulmonary tuberculosis to have a non-tuberculous fistula, and there may be a primary tuberculosis of the ischio-rectal fossa. Elsner³ states this is not at all infrequent, and that radical operation in such cases gives excellent results. Thompson⁴ says that fistula occurs in pulmonary tuberculosis in 6 per cent of cases in males, and 3.3 per cent in females.

Regarding the indication for operation in cases with pulmonary tuberculosis there seems to be general agreement that secondary septic infection is the most important. The danger is more from the anaesthetic than the operation, and the patient's general condition is bad. Johnson¹ cites cases in which the establishment of free drainage was followed by marked improvement in the patient's condition.

The conclusion would seem to be that tuberculosis in itself does not constitute a contra-indication to operation. An operation to secure free drainage, especially if done with the thermocautery to obviate the spreading of infection, and the use of spinal or sacral analgesia rather than chloroform or ether, will offer the best chance in most cases. It will remain to be decided by careful study of the individual case whether or not the condition is too far advanced to warrant the undertaking of any operation.

REFERENCES.

1. Johnson, A.B. *Surgical Diagnosis*, II: 235.
2. Elsner, H.L. *Monographic Medicine*, VI: 257.
3. Thompson, W. *Gilman, Practice of Medicine*, p. 257.
4. Lynch J.M., *Johnson's Operative Therapeutics*, IV: 545.

Clinical Notes.**OPERATIONS ON FOREIGNERS IN CHINA.**

E. C. WILFORD, M.D., West China Union University, Chengtu.

For a comparatively small foreign community Chengtu provides considerable work for the surgeon. During ten months of the year 1924 my share of the operations on foreigners numbered eighteen. Most of the operations may be considered major; about half were abdominal, four were appendectomies, and two were cholecystectomies.

One of the gall-bladder cases may be worth recording. The patient is the wife of a professor at the West China Union University. She gave a history of gall-bladder trouble of several years' standing. Also she had had several attacks of malaria. When I was called to see her she was suffering from coincident attacks of both diseases, the malarial parasite being found in the blood. She had high temperature and acute pain in the upper right quadrant. Intravenous injections of quinine collobiasis had a wonderful effect after apparent failure of oral administration of quinine sulphate. The patient consented to operation for the gall-bladder condition. I was assisted by Dr. Service and Dr. Speers. Dr. R. G. Kilborn gave the anaesthetic. We found a greatly thickened and adherent gall-bladder which we decided needed excision. This was a difficult task owing to adhesions to the neighboring organs. In breaking down one particularly strong adhesion we ruptured the gall-bladder slightly. On removal we found over 70 stones, most of them being in the cystic duct; some were embedded

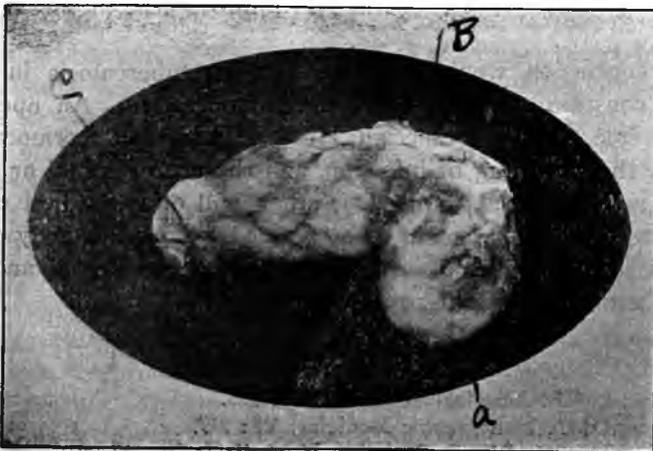


FIG. 1.—GALL-BLADDER WITH GREATLY ENLARGED CYSTIC DUCT:
B-C CYSTIC DUCT: A-B GALL-BLADDER.

in sacs of the wall of the gall-bladder. The cystic duct was found to be tremendously enlarged and thickened (see Fig 1.). A drainage-tube was inserted into the stump of the cystic duct and sutured with catgut. This drained poorly after the first two or three days and the patient became quite jaundiced. After the tube was removed we found the reason for the failure to drain properly was that two gall-stones were stuck in the drainage-tube. These apparently came down from the hepatic duct. The jaundice I think was caused by the drainage-tube being inserted too far and preventing the bile flowing down the common duct.

On removal of the drainage-tube the patient made an excellent recovery, the jaundice quickly disappearing, and she has been in good health for about one and a half years. One lesson we learned from this case was the necessity of inquiring as to the kind of catgut in use. Unintentionally we used chromicized instead of plain catgut to fix in the drainage-tube, and so it took about fourteen days before we could extract the tube, thus prolonging considerably the period of convalescence.

CLASSIFICATION OF 500 CONSECUTIVE OPERATIONS.

The following is a classification of 500 consecutive operations, on Chinese included, performed at the C.M.M. Men's Hospital, **Chengtu**. At this hospital most of the clinical teaching is given to the students of the West China Union University, Faculty of Medicine.

Wounds: gun-shot, knife, etc.	136
Eye, Ear, Nose, and Throat	89
Tuberculous glands, joints, bones, etc.	55
Abscesses, carbuncles, ulcers, etc.	55
Bone and Joint surgery	25
Abdominal (on appendix 9, gastroenterostomy 8, other operations, 3)	20
Fistula-in-ano	20
Circumcision	20
Amputations	18
Haemorrhoids	15
Tumors and cysts	14
Genito-urinary	14
Hernias	10
Unclassified	9
Total	500

The above operations were all performed under anaesthesia, either local or general. Minor operations, including aspirations, teeth extractions, intravenous injections of "914", vaccinations, etc. are of course not included.

A classification of the operations performed at our Hospital for Women and Children would work out pretty much the same as for the Men's Hospital, except that instead of "wounds" taking the first place, operations on the female genito-urinary tract come first; in other words, substitute the word "wombs" for "wounds."

TREATMENT OF POST-OPERATIVE ACIDOSIS WITH INSULIN AND GLUCOSE.

J. C. LAWNEY, M.D., L. VAN, M.D., and M. E. McDANIEL, M.D.,
Margaret Williamson Hospital, Shanghai.

The patient, aged 35, had a negative history except for occasional attacks of vomiting of two or three days duration which cleared up with the ordinary eliminative methods. Physical and laboratory findings during these attacks were negative. The symptoms indicated a toxemia rather than an organic disease. The urine had always been negative, including the specimen tested pre-operatively.

The operation which had been performed was tonsillectomy. Diet had been normal up to the morning of operation when breakfast was omitted. Pre-operative procedure consisted of a S. S. enema the preceding night and another just before operation, both with good results. Atropine, gr. 1/1000, was also given. The patient resisted the anaesthetic and ten ounces of ether were used during the course of the operation. Induction was by the open method and during the operation the oral insufflation method was used. There was normal recovery from the anaesthetic.

Patient began vomiting the first night after the operation but it was not severe until the third day. From that time on she was unable to retain either water or food, in spite of the usual procedures to check post-operative vomiting: ice in the mouth, ice bag to throat, mustard plaster over epigastrium, gastric lavage with sodium bicarbonate, injections of codeine and later morphine, chloral hydrate and sodium bromide by rectum. For dehydration the patient was given saline by hypodermoclysis and later intravenously. Glucose and sodium bicarbonate were given by rectum.

On the fourth day after operation, the patient passed into a state of coma. The urine showed: sugar, 0; acetone, + + +; diacetic acid, +. Thirty grams of glucose in 500 c.c. saline were administered by hypodermoclysis. After four hours the patient was conscious but there was little, if any, cessation of vomiting.

On the fifth day her temperature went to 101° F. She had had slightly subnormal temperature up to this time. No malaria parasites

were seen in the blood smear, but blood picture otherwise was characteristic of malaria and quinine hydrochloride was given by hypodermic injection. This resulted in a return of the temperature to normal on the following day. There was no rise in temperature after this.

During the sixth and seventh days the vomiting was not excessive but the general condition did not improve. Food could not be retained. The urine continued to show a heavy percentage of acetone. During this time she was fed by rectum with glucose and given saline by hypodermoclysis.

On the eighth day the patient became semi-comatose. Blood sugar was 0.14%. Urine showed: sugar, 0; acetone, + + +; diacetic acid, +. We resorted to the insulin-glucose treatment of post-operative acidosis¹.

Our procedure was as follows: thirty grams of glucose in 450 c.c. saline² were given very slowly intravenously, covering a period of over one hour. One unit of insulin was used for every three grams of glucose and the insulin was given in two doses. Insulin 0.5 c.c. τ 10 (Eli Lilly Co.) or five units were given subcutaneously just as the intravenous glucose was started and the same dose was repeated just as the glucose was finished. Patient became clear and bright mentally almost at once, and there was no more vomiting. On the ninth morning there were no clinical symptoms, but her urine showed: sugar, + + +; acetone, ; diacetic acid, - . Insulin, 0.5 c.c. τ 10 was given without any glucose. At 2 p.m., the urine showed: sugar, 0; acetone, +; diacetic acid, 0.

Food up to this time had been only carbohydrate, rice water by mouth which she did not retain, and glucose by rectum and hypodermoclysis. Now that nausea and vomiting had stopped, carbohydrate was given by mouth and protein was added. Glucose by rectum was discontinued on account of irritation resulting in frequent stools. However, in another 24 hours, that is, on the tenth day, she began vomiting again and coma threatened. The urine showed: sugar, 0; acetone + +; diacetic acid, +. Blood sugar was 0.18%. Glucose-insulin treatment was repeated. This time the patient had a chill when she had received only 260 c.c. of the glucose intravenously. The administration of glucose was stopped but the same doses of insulin were given. She cleared up mentally and her vomiting ceased. But the next day (eleventh) her urine again showed: sugar, + + +; acetone, + + +; diacetic acid, . Insulin, 0.5 c.c. τ 10 was again given without any glucose. From that time on she had no more nausea or vomiting, took small frequent feedings by mouth and the diet was gradually increased to normal. She took large quantities of water by mouth. The acetone in her urine gradually

decreased and at the end of the fifth day after the last glucose-insulin treatment, her urine was negative in all examinations.

A review of this case convinces us that the patient did not have power to oxidize carbohydrates and thus overcome the acidosis without the aid of insulin. Even with the high percentage of blood sugar, which showed the presence of abundant carbohydrate in the circulation, she went into a comatose state. We wish to point out, however, that the blood sugar determination is not necessary in carrying out this treatment. It was simply of added interest in this case. The only precaution necessary is that the insulin be administered with glucose, unless there is sugar in the urine, which is sufficient evidence of the presence of excess carbohydrate.

NOTE.—PREPARATION OF GLUCOSE FOR INTRAVENOUS INJECTION.—Commercial glucose was used. Thirty grams were measured out into a sterile cylinder, sterile saline added and stirred well with a sterile stirring rod. Sterile saline up to 500 c.c. was added and filtered through sterile cotton into a flask for boiling. It was boiled for ten minutes, boiling hard the first five minutes. The solution should be made up just before using and allowed to cool down to body temperature in the flask in which it has been boiled and kept at body temperature during injection. Powdered commercial glucose can be procured at many drug stores and can be made into solution easier as it does away with the necessity of stirring and is more easily and accurately weighed.

REFERENCE.

1. Thalhimer, 1923. Insulin Treatment of Post Operative (non-diabetic) Acidosis. *Jour. Amer. Med. Assoc.*, LXXXI: 1923.
2. Fisher and Mensing, 1925. Insulin-Glucose Treatment of Surgical Shock and non-diabetic Acidosis. *Surg. Gyn. and Obst.*, XI: 548.

INSULIN IN SURGICAL AND OTHER CONDITIONS.—It has long been recognised that the presence of diabetes in a patient about to undergo a surgical operation greatly increases the risk. The use of insulin does much to reduce this risk, though, naturally, the diabetic must always continue to be a more or less bad surgical proposition. With regard to the results obtained before the advent of insulin, Weeden (*Jour. Amer. Med. Assoc.*, April 12, 1924) investigated a series of 160 cases of diabetes with some surgical complication requiring operation, and found that there were 59 deaths, a mortality of 36.8 per cent. Of this number there were 14 who would probably have died in any case, but the other 45 apparently succumbed as the result of their diabetic condition and might have been saved by insulin. In a small series of 12 cases treated with insulin there were two deaths, a mortality of 16.6 per cent. Of these patients, three would appear to owe their lives directly to insulin treatment.

According to Thalhimer (*Jour. Amer. Med. Assoc.*, March 1, 1923; *Ibid.*, August 4, 1923) and Fisher and Snell (*Jour. Amer. Med. Assoc.*, March 1 1924) insulin is frequently of great value in the treatment of post-operative acidosis accompanied by marked vomiting and ketosis; also in the toxæmia and vomiting of pregnancy. In two patients, insulin, together with intravenous injection of glucose, caused the disappearance of severe acidosis; both patients were then successfully operated on for acute abdominal conditions. In another case, post-operative acidosis of a severe degree remained practically unchanged by the use of glucose alone per rectum; subsequent administration of insulin brought about an immediate disappearance of the ketosis.—*Medical Annual*, 1925.

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THE CANCER PROBLEM.

During the year 1924 there were more than 50,000 deaths in Great Britain alone from cancer, or other form of malignant disease, and the mortality in nearly all lands is probably equally heavy. There has been a vast amount of patient, scientific research in efforts to discover the ultimate causation of cancer, but hitherto the progress made has been very slow. Suddenly it seems as if the problem has been solved. In the *Lancet* of July 18th, 1925, there are two extremely important papers. The first, on "The Etiology of Malignant New Growths," is by Dr. W. E. Gye who seems to have discovered that in the production of cancer two factors are necessary: an extrinsic factor, consisting of a living virus common to all neoplasms; and an intrinsic factor, a labile chemical substance, presumably produced by the cells in the course of chronic irritation. Neither factor can produce cancer by itself; each is necessary to the other. The other paper, on "The microscopical Examination of Filterable Viruses," is by J. E. Barnard, F.R.S. who states that the living filterable virus discovered and cultivated by Dr. Gye which is invisible by ordinary microscopic study has been made visible by using ultra-violet rays and special apparatus, and is found to be a spheroidal organism belonging to a huge family, other members of which can cause diseases, as the pleuropneumonia of cattle, and perhaps influenza, sleepy sickness and smallpox. These two communications are said to mark an event in the history of medicine, as they form a detailed description of a prolonged and intense research into the origin of malignant new growths, and they may present a solution of the central problem of cancer.

In a brief and interesting historical sketch of the development of cancer research and of the opinions as to the origin of cancer advanced at various times by pathologists, the *Lancet* states that up to the beginning of this century the investigation of cancer was entirely in the hands of morbid anatomists and morbid histologists. They described the morphological appearances of the different tumours found in man and classified them; they made the fundamental distinction between neoplasms derived from epithelial cells and from connective tissue cells; they showed that each individual

tumour had individual morphological features and that these features were retained by the metastatic deposits, and they correlated different degrees of malignancy with morphological differences.

It was a notable advance when Ribbert, from a study of early carcinomata, showed that cancer in its inception was a local disease. Applying this conclusion to surgical treatment Butler emphasized the importance of operative removal at the very earliest stage of cancer, and demonstrated in this way that cancer, if attacked sufficiently early, was a curable disease.

It was next proved, in opposition to the opinion then generally held, that cancer is not a disease confined to the human race, but is common to the whole vertebrate kingdom. For example, cancerous tumours in mice correspond in every respect to cancer in man.

In 1902 Jensen reported the successful transplantation of mouse carcinoma from one mouse to another. Later investigations demonstrated that the transplanted tumour grew from the cells of the minute piece of tumor which had been introduced, and not by a transformation of the cells of the new host which only provided the stroma necessary to nourish the cancer cells. It was therefore a true transplantation. It was also found that every tumour possessed a definite biological individuality which it was able to retain through many years of transplantation and there was no evidence of convergence to a common type, a specificity which was held to explain, to some extent, the impossibility of transplanting a mouse tumour into animals of a different species. Furthermore, the transplantation of a cancer from one mouse to another was found to be dependent upon the life of the transplanted cancer cells. Inoculation of extracts of tumours or dried tumour material failed to produce new growths, and similarly negative results were obtained when the tumour cells had been kept in an incubator sufficiently long to impair their vitality.

Then a really extraordinary observation was made in 1911 by Dr. Peyton Rous, of the Rockefeller Institute. In a fowl he found a sarcoma which could be transmitted to other chickens not merely by the introduction of the living tumour cells, *but also by an extract which had been rendered cell-free by filtration through a Berkefeld filter.* The same successful result could be obtained with the dead tumour material which had been dried and kept for some time. Pursuing this line of investigation he found two other sarcomata fowls showing the same properties. But not all tumours of fowls behaved in this way: many of them, like the tumours of mice, failed to yield tumours with the cell-free filtrate

or the desiccated tumour. Here, then, was convincing experimental evidence that in certain cases a tumour could be produced *de novo* either by a living virus, or by a chemical agent. And the most perplexing feature of these extraordinary observations was this: each of the three sarcomata showed a very distinctive biological individuality in their morphological appearance—one of them, for instance, being an osteo-chondro-sarcoma. Tumours which were produced by the cell-free filtrate or by the dead dried tumour material retained this biological individuality in the same way as did the mouse tumours which depended for their propagation on the living tumour cell! The most obvious explanation appeared to be that these tumours were due to a virus. But if that was so, why did the virus reproduce the biological individuality of each tumour? There seemed to be no answer to that question, and Peyton Rous, after having contributed one of the most important and disturbing observations, retired, baffled from cancer research, as Ehrlich had done before him."

The hypotheses (1) that cancer is due to germ infection, and (2) that the malignant transformation of a cell was a physiological reaction—or a perversion of a physiological reaction—to long continued irritation, still held the field and were deemed irreconcilable. Dr. Gye has now apparently solved the problem by showing that both views are right. Cancer is infective because it is partly caused by a filterable virus, extremely minute germs which can be transferred from one animal to another. But the virus alone is unable to bring about the malignant transformation of a cell; with it there must be a chemical substance, called the "specific factor" which in some way as yet unknown renders the cells susceptible to infection by the virus. This accessory specific factor is a product of the tumour cells; and it determines the character or type of the tumour produced. Thus mouse carcinoma virus with the specific factor from fowl sarcoma when injected into mice has no effect; injected into fowls a sarcoma is produced. With tumours of human beings there are similar results. A culture of the virus from adeno-carcinoma of the breast plus the specific factor of chicken sarcoma when injected into a chicken produced a sarcoma from which the chicken died on the twenty-third day.

According to the *Lancet* Dr. Gye's carefully controlled experimental evidence leads to certain fundamental conclusions which may be briefly summarised as follows:—

1. All malignant new growths contain an ultra-microscope virus—or group of viruses—which can be cultivated. This applies to the carcinomata and sarcomata of fowl, mice, rats, dogs, and man. The virus resides probably within the cells of the neoplasms.

2. The virus alone, washed free from all adherent material, does not produce a tumour when injected, and does not even produce a visible lesion.

3. But when injected together with virus-free extracts of tumours the virus produces a malignant new growth. The extracts contain, therefore, a substance called by Dr. Gye the "specific factor," which enables the virus to attack the cells of the injected animal so as to transform them into cancer cells.

4. There is no species specificity so far as the virus is concerned, for tumours can be obtained in one species of animals with the virus obtained from the tumour of another species.

5. The "specific factor" shows a very strict specificity of species. Thus in order to produce a malignant new growth in a mouse it is necessary to use the specific factor from a mouse tumour, while the specific factor of a chicken tumour is ineffective.

6. There is probably also a strict specificity of tissue for the specific factor. So far only sarcomata have been obtained, and these only with a mixture of virus and the specific factor from sarcomata, not from carcinomata.

There are still puzzling questions which remain unanswered, and of course Dr. Gye's work will be rigidly tested in the pathological laboratories of the world. We must all hope there has been no flaw in his experiments or reasoning, and that before long he will discover some harmless process that will render men or animals immune from the development of spontaneous tumour or cancer, and make them self-protected against it by vaccination or analogous means.

Hospital Reports.

SUSAN TOY ENSIGN MEMORIAL, HOSPITAL (M.E.C.), NANCHANG, KIANGSI.

Hospital Staff: Drs. G. T. Blydenburg, W. E. Libby, C. Y. Chang, S. C. Wu. Two foreign nurses, Miss L. L. Cookson, R.N., Miss E. K. Pennepacker, R.N. and nine student nurses.

This is the first complete report that the Hospital has made. Accordingly it consists of more than a review of the work of the past year. A description of the city of Nanchang and surrounding district is given, also a full and very interesting history of the development of the medical work since it was started in 1908.

A new hospital, for the erection of which Gold \$50,000 has been given by the family of the late Mrs. Susan Toy Ensign, is in course of erection. It is confidently expected that it will be completed within the present year. At first it was planned that it should contain 200 beds. More modest counsel eventually prevailed. "We are building here in the centre of China a small, general, sixty- to seventy-bed

hospital which we hope may be a serviceable model. We have not thought it best to make experiments either in the construction, nor in the mechanical equipment, but instead have followed standard methods of building, and have chosen standard equipment developed by years of experience. The arrangements of rooms and services likewise is not an attempt to compromise with local standards, but is based on generally accepted principles developed by the American Hospital Association, and recorded in the 'Modern Hospital.' The plans of the hospital are given with the report. These may be useful to others who are planning to build hospitals. The hospital statistics for the year are well arranged. The total number of in-patients was 516; average number of days in hospital, 17. Operations performed under general anaesthesia, 136. Out-patients, new cases, return visits, out-calls, 32,413. Expenditure \$14,111.45.

C.R.C. HOSPITAL, JUKAO, KIANGSU. 1924.

Hospital staff: Drs. Huizunga and Ching. Two foreign registered nurses. Patients attended during the year: men, 2,800; women, 990. Total, 37,000. In-patients numbered 178 of whom 50 were women.

The work of this hospital began only a short time ago. Two plots of land were bought for medical purposes in 1923. One is intended for a fully equipped hospital yet to be erected. On the other plot were a few good Chinese buildings which have been remodelled into a temporary hospital with twenty-seven beds. Other buildings were rented to serve as dwelling places for members of the staff and other purposes. The first two patients were admitted and treated in the clinic on January 8th, 1924. The first in-patients were taken in on May 6, 1924. Very thorough work is done in the laboratory as shown by the list of the pathological examinations made by Mr. Philip Chow, a graduate technician from the University Hospital, Nanking. The whole work is steadily progressing and is doing much to meet the medical and spiritual needs of a large city.

SOOCHOW HOSPITAL, SOOCHOW, 1924.

Hospital staff: Drs. Park, Snell, Hendry, Li, Ramsey and five Chinese doctors; 8 registered foreign nurses and 18 Chinese nurses. In-patients; 634; average length of stay in hospital, 19.5 days. Out-patients: 20, 138.

During September and October, 1924, the work with wounded soldiers was very heavy. No less than 360 were received. Of these, 280 severely wounded cases were admitted to the hospital proper; the

rest, being less serious, were taken to the hostels. For a time the hospital accommodation was taxed to its full capacity and the staff had all the work it could well do. In many respects this work was very gratifying, while in other ways it was exceedingly difficult and disappointing. On the whole, excellent surgical results were obtained. Most of the wounded came on the fourth day following their injuries and in many cases very severe infection had already set in. Quite a number of gas bacillus infections were treated and cured. These severe infections caused a great amount of hard work. Some of the patients with injuries of the head made remarkable recoveries, but the percentage of losses in these cases was high. Many soldiers had bone injuries the treatment of which gave very satisfactory results. Unfortunately, it was necessary to discharge many patients from the hospital much earlier than was wise in order to make room for new cases. The manner in which the nurses met the situation was most gratifying.

In and around Soochow malaria is very prevalent; it occurs at all times of the year but is more common in the months of October and November. Its high incidence was strikingly demonstrated among the wounded soldiers, 33.4 per cent of whom were found, by blood examination, to have malaria. Among the students of Soochow University who visited the Clinic for various ailments 27 per cent came for malaria. Of the 865 received in the hospital in 22 per cent the diagnosis was malaria.

The reports of the various departments of the hospital are well compiled.

THE BRETHREN HOSPITAL, PING TING CHOW, SHANSI, 1924.

Hospital staff: Drs. Coffman, Han, F. J. Wampler; three registered foreign nurses, 19 nurses in training. In-patients, 559; out-patients, 11,143. Operations under general anaesthesia, 149.

In addition to the ordinary work of the hospital the members of the staff, with the assistance of Dr. Miles of the Peking Union Medical College of Peking, have been investigating the causation and pathology of osteomalacia, a prevalent disease in the province of Shansi among the women. Sixteen Caesarean operations were performed during the year, fifteen of the patients being osteomalacic women. Much preventive medical work is being done. Of the other patients the most pitiful during the year were those suffering from severe burns; among them were 24 men who had been burned by fire damp in the mines. In some cases more than one-half of the body surface was burned. Fortunately, the burns were not deep. Accidents of this kind could probably be avoided if the mines were properly ventilated. Connected with the hospital is a successful School for Nurses. The hospital is now well equipped so that all surgical cases can be operated on satisfactorily.

C.I.M. HOSPITALS, KAIFENG, HONAN, 1924.

Women's Hospital.—Staff: Drs. Jessie McDonald and Lucy Gao. Nurse Superintendent, Miss E. Soltau; two graduate nurses. Statistics: in-patients, 1,002; out-patients, 10,791.

Out of the more than 1,000 in-patients in the Women's Hospital, 39 per cent were surgical, 37.50 per cent medical, 19 per cent had diseases of the eye and 6.50 per cent were obstetrical and gynaecological cases. Of the total number of patients, 26.2 per cent were children under 14 years of age.

The comparatively small number of obstetrical cases (29) is due to the location of the hospital. Being outside the city there is always the difficulty of getting to it at night. Of the surgical patients, 28 (27 boys, 1 girl) were operated upon for stone in the bladder. The girl, aged 14, had suffered from stone for 10 years. Twenty-two of the patients with stone were under 7 years of age. Suprapubic cystotomy was done in all the cases. Among other operations, seven ovarian cysts were removed, two being dermoid. The largest weighed 88 lbs. Seven radical breast operations were performed.

Men's Hospital.—Staff: Drs. Gibson, Walker and Li. Nurse Superintendent: Miss E. Dives. Statistics: in-patients, 608; out-patients, 11,439. Operations under general anaesthesia, 315.

Reports of several interesting surgical cases are given. Of the medical in-patients, 54 suffered from dysentery, mostly amoebic. With one exception all were cured or greatly improved. For the amoebic cases the most successful routine treatment was the daily administration of sodium sulphate mixture (3 drachms in an ounce of aqua anethi). One ounce is given hourly beginning at 6 a.m. for 2-5 doses (the amount is decreased as the dysentery improves). Emetine hydrochloride, 1 grain, is given hypodermically each evening for six days. After one or two such courses of treatment most cases were cured. Others had to finish with bismuth emetine iodide.

During the year the training school for male nurses came to grief as most of the nurses suddenly discovered that nursing was not their vocation and departed in a body. For the present, two or three graduate nurses are employed from one or other of the already established schools, also several "orderlies".

The report refers to the growing spirit of nationalism with its distinctly and actively rationalistic bias. Recent events have shown but too plainly and sadly the seriousness of this change. But the religious work in the wards on the whole has been most encouraging. One of the patients was a Mr. Ai, one of the few surviving descendants of the ancient Jewish Colony in Kaifeng. Both in the Men's Hospital and the Women's Hospital there have been many conversions.

MEDICAL EXPERIENCES DURING FORTY YEARS IN CHINA.

H. M. McCANDLISS, M.D., Hoihow, Hainan, China.

Hainan is a large island off the south coast of China, between the Gulf of Tonkin and the China Sea. As early as the beginning of the Christian era it was supposed to be a part of the Chinese Empire, but there were few Christian people, and the Loi people, who are of Malay origin, held nearly the whole of the island. It was not until about five hundred years ago, when emigrants from the Fokien province appeared, and drove the Loi back from coast and river, that the island could be properly called Chinese. The island is at present a part of the Kwang Tung province.

A missionary, Mr. Jeremiassen, made extensive tours through Hainan, and from his geographical observations estimated the population at 1,500,000, of whom he thought 400,000 were Loi.

Among the Chinese the religion consists of various modifications of Confucianism, Taoism, and Buddhism. But among those of Malay origin it consists of various attempts to allay the ill-will of malevolent spirits.

In the latter half of the eighteenth century, the Jesuits began the propagation of their faith, and before long claimed a following of many thousands. The work was not stable, however, as it suffered heavy losses during the Napoleonic wars. A few years ago when the French priests took over the Catholic Church in Hainan from the Portugese priests, there were only about 300 members in good standing in the Church.

On behalf of Protestant Christianity Mr. Carl C. Jeremiassen began work in the fall of 1881, having his headquarters in Hoihow. Although a subject of the King of Denmark, he spoke English well, and from long residence on the coast of China knew the language and ways of the Chinese. In many long journeys he dispensed, surveyed and preached in nearly every part of Hainan. Not being an ordained minister he had not been specially authorized to baptize, so he sought the aid of Presbyterian ministers from Canton. By them he was persuaded to accept the aid of men and money from the Presbyterian Board in New York. I was the first to arrive and started in to learn the language and to help him with the medical work. Mr. Jeremiassen had not taken a regular medical course, and what he learned in medicine was by following Dr. Kerr around the wards of the Canton Hospital. Nevertheless it was remarkable what he could do in a market town in a stay of about four days:

Iridectomies and operations for cataract, entropion, harelip, crushing of vesical calculi, splinting of fractures, opening of abscesses, extraction of bullets, and a surprising number of other procedures. He usually carried medicines and instruments in tray baskets, and the shade of a tree or a temple wall was a convenient place to work. There were few dentists, and the gold-tooth craze had not yet come in. The number of bad teeth that could be extracted in a morning was surprising, and the fortitude of the patients, who would feel around to see if there were other teeth that could be spared, was even more so. If I could have a dollar for every tooth pulled since I took over the medical work from Mr. Jeremiassen I could build a nice little hospital. Often I have thrown open the dispensary doors and said, "Those who have teeth to be pulled, come first."

DIFFICULTIES OF PIONEERING.

Mr. Jeremiassen came to the conclusion that not much could be done in a religious way in the presence of the irreligious foreigners who were then living in Hoihow, and the Chinese had not yet separated us into the "do good kind" and the other kind. So we moved up to Kiung Chow, the capital city. We could not rent a dwelling at any price, and so had to take quarters in the east gate section of the city, where were guildhall, ancestral halls, and the Confucian temple. In this district there was much malaria of a virulent type. Such quarters as could be rented were low, dark, and close, and the owners would allow of no alterations until years had passed. We tried putting mats on the floor, but the mats soon moulded, and ceiling cloths, although they kept the dust from disintegrating roofs from falling on us, served as a playground during the night for numerous rats.

When my wife came I tried to get a house with an upstairs room to it, but the only house that seemed possible was just behind the Temple of the God of War. The man in charge asked us if we were willing to live in a haunted house, and I asked why they called it "haunted." He said that a couple of years ago a new Taotai (Intendant) had come to the city, bringing many followers, and twenty-eight of them had died in that house of a pestilential fever; since then no one had dared to live in the house, but perhaps we foreign devils would not mind. We took the house, used plenty of carbolic, boiling water, and smoking sulphur, and made it habitable.

A few weeks after moving to Kiung Chow, we purchased a four-acre farm, just outside the city wall, on which was a dilapidated house. When we presented the deed to the officials for stamping they were very displeased and the middleman in the purchase was thrown into

jail where he became ill. In the absence of the magistrate I went there to take him some medicine. On hearing of my visit the magistrate was quite angry, and said that if I came again I was to be driven away with sticks. It was only after six months and the payment of a considerable sum of money that we got the man out of prison. The man who had signed the deed as witness was not caught as he had fled to Macao. The Chinese contention was that we had no right to live outside the treaty port of Hoihow. However, the American Consul in Canton said that "possession is nine points of the law," and so we held on to the house for six months, never leaving it without a European in charge. When we attempted repairs, however, the Taotai came out with fifty of his guard and drove us out, telling the workmen that any further attempt at building would result in their being put into pig baskets and carried to the sea. We held on to the place for six years, and then the purchase money was returned to us.

Other missionaries arrived and my wife tried to open a school for girls. Immediately the city and neighbouring towns were posted with placards warning the people that under the guise of philanthropy the foreigners were collecting a shipment of girls for the Hongkong market. For a time my wife's appearance on the street was attended by insulting crowds and many things were thrown at her. Finally we gave up hope of being able to build suitable quarters for carrying on our work in Kiung Chow, and so turned back toward Hoihow where we bought a four-acre tract on the waterside from a German firm, the German Consul in Canton having guaranteed us peaceable possession. It was there that we put up the first hospital and a doctor's residence. Soon after that the French Convention terms were signed which gave missionaries the right to buy and build. To find ourselves on wooden floors with ceilings overhead, and a bit of ground around the house, seemed like Paradise after the years we had spent in Chinese houses. In getting away from a malarial district and from inside the City walls where there was no breeze, our health returned.

PREVALENCE OF MALARIA.

While we lived in Kiung Chow malaria was the worst disease we had to fight. The east gate section was the worst; we stayed there during eleven years, always keeping the quinine bottle on the table for our own use. At times we questioned whether we were morally right in asking patients to stay in the hospital, for no matter what the affection was that caused them to seek our aid they were sure to acquire malaria in that neighbourhood.

While speaking of malaria I may mention the various means by which we have held the disease in check in recent years. A patient comes in with a medical or surgical affection. In the first examination we find the spleen enlarged, and the patient admits that he and his household have from time to time had the "cold-hot" disease. Without waiting for an examination of the blood, for which in a busy season there may be no time, we at once proceed to cinchonize him. If that is not done we do not feel justified in placing him in a room with others. It is a safe plan to give quinine to all patients coming from the country, even the maternity cases. Although quinine may be a great synergist after uterine action has begun, I have never seen it initiate uterine contractions. If we could get patients to make real use of mosquito nets for excluding mosquitoes, I would be willing to buy one for every patient that comes; but, as a matter of fact the net is of more use as towel and handkerchief, than as a protection against malaria. As to screen doors the patients deliberately prop them open and the mosquitoes that are around gladly accept the invitation to enter. Oiling the surface of the neighbouring ponds is good in places where the wind is not strong, but where there is much wind, as in Hoihow, the film is blown to the far side of the pond. It has therefore been my habit to make the rounds of the whole premises once or twice a week, upsetting what crockery may contain standing water, draining surface water, and seeing whether the small fish in the neighbouring ponds are active. By these measures the forty odd hospital employees have comparatively little trouble from malaria, and those who do have attacks probably had paid a visit to a malarial home sometime within the preceding two weeks. According to observation of the three or four hundred pupils in the mission schools there are always many cases of malarial fever within two weeks of a home going, and then the quinine takes the foremost place in the consideration of all concerned.

EARLY DIFFICULTIES.

During the early years of our medical work our chief efforts were along surgical and epidemic lines, for the Chinese were slow to learn that we had medicines of any worth other than quinine and iodine. Frequently they frankly acknowledged that it was because they had no money for native (or good) medicine that they applied for ours. One of our Bible-women told me that our medicines would be much better if we boiled them.

While in Kiung Chow the Chinese were suspicious of us, and so we had the end wall of the Dispensary knocked out and put in a very broad window with iron bars so that all could see what went

on inside. Afterwards there was always a crowd outside, and if there was anything involving the use of an anesthetic the crowd would be very large indeed. Inasmuch as the roof, which was in a state of disintegration, dropped dust, I would wait until the late afternoon and take the operating table out to the shade of the temple next door, and do the cataract operations, iridectomies and so forth, where no dust would fall.

SURGICAL EXPERIENCES.

Our surgical experiences were varied and interesting. For instance, a man came a long journey to have a tumour removed from the top of his head. I commenced the operation boldly but soon found there was no bone left underneath the tumour, and there was great hemorrhage from the superior longitudinal sinus. I had my hands full until I got the blood vessels tied. I packed the wound and got the patient into a fairly safe condition. The next morning I looked for him but he could not be found. An out-patient coming from Hoihow asked, "Did the runaway patient have white cloths around his head?" On the reply being in the affirmative he said he had met the man who had told him he was going to Hoihow to get a junk to go home in and that I had cut the lump out all right. Not long afterwards a group of patients came from a distant point on the coast. I asked how they had heard about me. They told me that I had cut the man with a lump on his head and made him well, so they had come.

In these days when every operating room has hemostats by the score the surgeon may not appreciate the disadvantages under which the old-time surgeon worked. We used the fenestrated artery forceps, and the Hoihow Hospital boasted two pairs. It was quite usual to place the finger on the bleeding point until first the fenestrated artery forceps and then a ligature could be applied.

One of my first operations was the removal of a breast. As the glands of the axilla were involved, I thought it my duty to remove them even though I had in mind that my teacher, the elder Gross, had said that he regarded the total extirpation of the glands of the axilla as being one of the most hazardous proceedings of surgery. We may laugh at such a statement now, but we could not then, for it was still the day of "laudable pus" and of secondary hemorrhage. During the operation I managed to injure the axillary artery and found it difficult to tie securely. Like most of the Chinese in these parts, the patient had lumbricoid worms, and these aided the anesthetic to cause frequent vomiting, and every act of vomiting resulted in fresh hemorrhage. On the second night the woman died. The husband was disposed to make trouble, so I had to give him money for

an expensive coffin, and then money to have the coffin carried twenty miles to his home. After he got the money he reconsidered the whole matter and then purchased a cheap coffin, buried the body near by, and with the balance bargained for a new wife.

Years ago a father brought to the hospital a son born to him in old age. The son had a large rough stone in the bladder and constantly, or every hour or two, cried out with pain; he was in poor condition and had severe cystitis. I refused the case, but the father would watch for my appearance and fall on the ground to plead for operation. Against my better judgment I operated. At first the boy did well, but about the seventh night he died. The father behaved like a crazy man, running up and down the streets and calling out that the foreign doctor had killed his son. The next day the Brigadier General called with a large retinue and said how excellent it was for us foreigners to leave our honourable country and come such a long way to do good work, *but really we must not kill anyone*. In passing I may say that we formerly used the perineal route for the removal of calculi, but in the last twelve years we have used the suprapubic route exclusively. Dr. Judson of Lien Chow once wrote to me that he had just removed a stone weighing seventeen ounces. Strangely enough, just a few weeks afterwards I removed one weighing seventeen and a half ounces which had been forming for thirty years. It was so firmly embedded in the pelvis that some of it had to be broken off before the whole could be removed. Up to that time the largest stone we had seen weighed thirteen ounces; it had been removed by Dr. N. Bercovitz. Both patients did well.

MEDICAL EXPERIENCES: CHOLERA AND PLAGUE.

At first the patients could not see much use in the thermometer. One day I put a thermometer into a patient's mouth and he presently handed it back saying that he did not feel any better. Another patient sucked at the thermometer and returned it saying that he could not get the medicine out.

A patient was brought in suffering from cholera. I worked over him until he seemed much better, gave him some directions and went to dinner. When I returned I found that he had eaten half a water melon. After scolding him I threw the other half out of the back door. I came back after a while to find that he had recovered the second half and eaten it. To show my displeasure, I not only scolded him but slapped him on the back. Sometime after an official with a considerable retinue called on me and was surprised that I did not recognise him. He told me that he was the cholera patient and laughed heartily over the water melon incident.

It is easy to understand the amount of care we have to exercise in regard to cholera. Every year when the cucumbers and watermelons appear we become more active in the use of the fly swatter, and we employ every child on the compound in swatting flies. As an encouragement we give four copper cents for every match-boxful of dead flies. It is the cheapest form of prophylaxis I know of. Of course watermelons do not cause cholera, but they may easily set up the fermentation that allows any quiescent comma bacilli already in the intestine to become active. Moreover, watermelons are sliced, allowed to collect flies, and to keep the slices from getting too dry, water from the handiest source is poured over them and the water is generally impure. We have a "cholera mixture" on the shelves, the most important constituents being opium and aromatic sulphuric acid. In the earlier stages we give this mixture and at the same time give large enemata containing aromatic sulphuric acid or tannic acid. If collapse comes on the saline treatment is used. I used to dilate a vein by applying a tourniquet and introducing the saline through funnel tube and needle. But the flow is too slow even if the vein has been successfully entered, a difficult thing to do at night. We find it much quicker to use an all-glass 5 c.c. syringe, plunge the needle into the abdomen and let it remain there while the syringe is rapidly filled and emptied. In this way one can introduce a quart of saline into the peritoneal cavity in about three minutes. In the cholera season we keep a lot of saline prepared.

At one time there came a severe epidemic of plague. In those days plague serums and vaccines had not made their appearance, and the best we could do was to try to keep the patient alive. I went to the houses and to Buddhist nunneries to visit the patients. Quite a few who had got over the first stage developed large necrotic surfaces, but without the pockets of pus so common in ordinary carbuncles. These surfaces had to be redressed daily. There were fifty-one cases under my care and twenty-eight of them recovered. Here I would like to say a word about statistics. When I first arrived in China I heard that nearly all Chinese had syphilis. What should have been said was this: of those among the population who were willing to run the dreadful risks of going to a "Foreign Devil Hospital" a very large number had syphilis. The statistics of plague in Hongkong have to be discounted in the same way. Of the reported plague cases in Hongkong in the year 1894 and following year, about ninety per cent died, but this is very far from saying that about ninety per cent of all those who suffered from plague died. The Governor who was then in charge in Hongkong had peculiar ideas about the segregation of plague cases, and withstood the efforts of the Sanitary Board. A travelling mission-

ary came through Hoihow and afterwards told the Governor that the Hoihow doctor was treating plague patients in their own houses with success. The Governor used this information to support his cause. The Colonel asked, "Where is Hainan?", and the Captain Superintendent of Police said, "I would not believe the Hoihow doctor's statement unless I saw the cases". As a matter of fact I know quite a few Chinese in the neighbourhood of Hoihow and Kiungchow who have suffered severely with plague and who are in good health at the present time. During the Boxer year, out of a population of about forty thousand, the officials reported a mortality of over six thousand from the same disease. The majority of the inhabitants took straw and bamboo to the waterside, and lived in booths until the flea and plague season had passed. Since then plague vaccine has come into use and we have in the three hospitals in Hainan inoculated thousands of people against plague. The appearance of dead rats is the signal for action.

HOSPITAL ADMINISTRATION.

For a time we continued the old plan of allowing the patients to bring with them friends to cook their food and wait upon them, and the work was supported by fees received from Consulates, Customs staff, and the shipping. But the work grew to the point where it was impossible to give decent attention to the hospital and in addition visit ships and lighthouses. So the doctor resigned the foreign practice. A few hundred dollars still came from the Missionary Board in New York, but otherwise there was little money to be had. We therefore began the fee system. It was decided to fix a flat rate for registration, the money to be paid in advance. Six dollars a month in advance for food, medicine, and care for medical cases, and ten dollars a month for surgical and obstetric cases. This has now been raised to ten dollars and fourteen dollars respectively. This system nearly closed the hospital for that year, until the patients found out that they needed us more than we needed them. They said reproachfully, "Yes, all these years you have been doing meritorious works and now you want to make money."

Perhaps I am not the only medical missionary who has never had on hand at one time enough money to build satisfactorily, or to equip adequately. At one time I wrote home for more money with which to build, and received the encouraging reply that the Presbyterian Board could not undertake to relieve all the distress there was in China.

Forty years observation has taught me some things about the Chinese. They are better at starting a thing than they are at keeping it up.

The time when patients come is the time they can best pay because they are then at the white heat of their enthusiasm for treatment. If they pay in part and keep the balance about their persons, they may lose it, or have it borrowed, or gamble it away. There are about ten per cent of the ordinary run of patients who have spent their all and are still far from well. As soon as we are reasonably certain that they cannot pay we take them in without the money. After the patient has put down the money he is apt to stay by you. I have heard of a number of Maternity Hospitals that have difficulty in getting the patients to stay more than a few days. Our maternity patients put down the fourteen dollars for the first month, and in all but a few cases they stay the full time, and thus both mother and child are given a chance for continuous care. Patients with bone and joint disease often put down the money for three months, and are apt to remain and get the worth of their money.

Our experience in getting trained Chinese helpers from other places is disheartening, and all the helpers now on hand are locally trained. Our so-called nurses do not know that they are nurses, with the exception of the three that are in the maternity service. If they did know they would want three or four times the wages we are paying them. Until we can find more money than we expect at the present time, we shall have to get along with those we have.

In 1915 Dr. N. Bercovitz started chaulmoogra oil injections in the treatment for the lepers in the leper village. This and allied treatment has been continued ever since. Their condition has undoubtedly improved and there may have been a cure in the case of a girl of seventeen. We are at least encouraged to continue.

OBSTETRICAL CASES.

The average infant mortality in Hainan is at least fifty per cent. The causes of stillbirth are pressure on the head or cord, syphilis, and malposition. The deaths of infants between the fourth and eighth day is generally owing to infection through the cord causing tetanus neonatorum. I practiced in Hainan nearly twenty years before I knew this. The Chinese treat such deaths in a matter-of-fact way and soon dismiss the subject. It was with the determination to fight this evil that so much attention has been paid to obstetrical work. As a result our maternity cases of the last two years have been over four hundred cases per annum. The average stay in hospital is thirty-five days. To illustrate with a case. A merchant had a wife who bore him seven children; all died about the end of a week. He was very hostile to foreigners. A Bible-woman visited the family and heard the wife's complaints about the death of her children. The Bible-woman said

to the husband. "Why don't you take your wife to the hospital, the babies there do not die." It took the persuasion of the wife's friends to overcome his objections. In ten years his wife has visited the hospital five times and there are five living children. The husband's hostility has given way to friendship and a religious life. Another case may be mentioned. The hospital evangelist had four children at his own house some distance from Hoihow, and all of them died of tetanus. Since then four children have been born in the hospital and they are now living. To achieve results of this kind one can endure the necessary loss of sleep and the irregular hours. There is so much that can be done for the mother in preparation of the event. Hookworm and malaria can be dealt with, and we do not hesitate to use neokharsivan where it seems called for. In maternity cases I think that most Americans make a mistake in regard to the posture of the patient. Drainage is by far the most important after-treatment and we encourage the patient to sit up from the first day provided they need such encouragement; most country women do not. They are not called upon to do heavy family washings as may be the case with the poor in our own land, nor lift heavy weights. In the many women who have returned to these wards again and again, I have observed no prolapse.

PUBLIC HEALTH WORK.

During the years in which the evangelistic talks have been given by myself, I have generally spent the first five minutes in speaking of smallpox, plague, hookworm, dysentery, malaria, the care of children, etc., according to the indication of the day. During epidemics we have made considerable use of posters placed on gates and temple walls. Some instruction in public health has been given to the scholars under our care. Various vaccines as for smallpox, plague, pertussis, tetanus, etc., have been freely used. We have felt that if no other effort had been made than that against hookworm and malaria the expense of the medical work would have been justified.

THE MISSIONARIES.

In forty years time there have been sixty-seven missionaries attached to the Hainan Mission. There are now thirty. Eleven have been transferred to the mainland. Seventeen have retired and are living in the U.S.A. Nine have died; a mortality of nine in sixty-seven is not heavy. The great difficulty in Hainan is that the warm, humid climate makes it difficult to recover from a serious illness. For this reason we now have a year at home after every five years of service.

The evils that continue to grieve us are banditry and piracy. We are never without the dreadful evidence of their work. From our house in Hoihow we have often seen on the mainland twenty miles away the smoke of burning villages. What was happening under that smoke we could only conjecture by the nature of the damage suffered by those who would be brought to us a day or two afterwards. Mrs. McCandliss and I have been in the hands of bandits ourselves, and it has put us in a position to sympathise with others who encounter similar experiences. Even bandits, however, are not ungrateful. A few weeks ago one of our evangelists and eight Christians were captured, and after being stripped of valuables were taken before the bandit chief. He said to his followers, "Why are you capturing these people who took the bullet from my side?" So he prepared a boat and sent the captured men back to Hoihow.

The three things which I see to be necessary for China are:—

1. A new spring of action which can come only through a constructive religion.
2. A new discipline to be acquired through the exercise of an effective government.
3. The kind of philanthropy that is the outgrowth of Christianity.

Given these three and we can let road construction, banking and commerce look after themselves.

OPERATING ROOM TEAM WORK.

R. V. TAYLOR, Jr., M.D., Yangchow.

Not until the surgeon has perfected a standard routine procedure for his operating room will he derive the greatest pleasure, or secure the best results from his operations. In the hope that it will prove helpful to surgeons in China who must train their own assistants, a few suggestions are here given which can be used as a guide to the standardization of the duties of each operating room helper.

A complete surgical unit should consist of at least a surgeon, a first, second, and third assistant, an anaesthetist, an operating room nurse, and one operating room orderly.

After putting on their operating clothes in the dressing room prepared for them, the three assistants should be ready with clean hands and finger nails, before the patient is brought into the operating room. A pile of small, non-sterile towels on a rack above the wash-up sink are very convenient for drying the hands after this first thorough preliminary washing.

THE OPERATING ROOM ORDERLY.

The operating room orderly, in uniform, can be of the greatest assistance in the moving of patients to and from the operating table, and, along with the second assistant, in returning them to their beds. He can also be on hand during the operation, assisting wherever a strong, quick hand may be needed, and keeping the floor dry and clean, especially during those operations in which fluids are likely to be spilled, although a sterile sucking apparatus can be installed wherever there is running water, reducing to a minimum the spilling of fluids upon the floor.

THE FIRST ASSISTANT.

The first assistant is responsible for the patient's position on the operating table. There are special positions on the table for many of the operations of general surgery. Carelessness in this respect on the part of the first assistant may contribute largely to the difficulty, or even failure, of the operation. For example, in goitre operations, there should be a foot rest on the table, and the patient should be tilted so that his body slants towards the feet. A goitre shield should be in place, and the head held back with a small pillow under the shoulders. The small instrument table should be attached to the table so as to be in proper position above the patient's chest, etc. The operations of hysterectomy, prostatectomy, nephrectomy, nephrolithotomy, uretero-lithotomy, resection of the rectum, and many others, make necessary special positions, all the details of which should be mastered by the first assistant, on whom the responsibility rests. He must be sure the bend of the knees is opposite the bend in the table when a Trendelenburg position may be required. The shoulder rests should be in place, and the small instrument table over the patient must be in the proper hole in the operating table so that when the patient is tilted he does not slide off on to the floor, and that the instruments remain at an even level. The hands are strapped, and the belt is placed over the patient's knees. Small pillows are carefully placed under the elbows so that serious nerve injuries shall not result from pressure of the arm upon the side of the table. The first assistant must also see that the patient's feet are snugly wrapped in a small blanket, and that the body is protected from unnecessary cold. He should know whether or not a permanent catheter should be left in the urethra during the operation, and whether the surgeon expects the bladder to be empty or full at the time of the operation. In Kraske operations he should clean out the rectum, and suture the anus so that the operative field will not be unnecessarily contaminated during the actual resection, etc.

If ether is to be administered, the anaesthetic can be started as soon as the surgeon begins to wash his hands. The drops begin to fall upon the mask (open method) as soon as the patient is recumbent upon the table, and while the first assistant is assuring himself of all the details of the patient's position.

THE SECOND ASSISTANT.

While the first assistant is thus busying himself, the second assistant, with his hands clean but not sterile, is beginning to clean the operative field. A technique for the skin in abdominal surgery is given below. The second assistant first cleans off the skin with benzine (with enough iodine crystals in it to keep it sterile, about 1:1,000). The patient has been previously washed and the hair shaved in the ward, either the night before, or the morning of the operation. Abdominal cases are not given a cathartic immediately before an operation. Their orders are a light supper the night before, no breakfast, and an enema early in the morning.

Following the benzine cleaning the second assistant cleans off with ether. It has been found convenient to have a small table or shelf in the operating room containing the benzine bottle (with the iodine crystals dissolved in it), a bottle of ether which may have been opened some time before, and which is not the best for anaesthesia, and some small pieces of gauze. On a shelf just below, or on another part of the table, are placed a sterile enamelled cup with sterile forceps in it, and two small sterile enamelled bowls. One of these contains sterile pieces of gauze, and into the other is poured 3½ per cent tincture of iodine.

PREPARATION OF PATIENT.

As soon as the second assistant has finished with the benzine and the ether, the first assistant, with his bare hands now sterile, applies the first coat of iodine. He uses a small piece of sterile gauze in sterile forceps, and has another piece of sterile gauze in his left hand to prevent any iodine from dripping on the floor. He applies the first coat of iodine very carefully so that an excess does not run down into the groin, or upon the back, and he is responsible for correctly marking off an adequately large sterile field. The second assistant, with his bare hands now sterile, follows with a second coat of 3½% tincture of iodine, applied in a similar manner, and put on as soon as the first coat is dry.

The first assistant is now handed four sterile towels by the operating room nurse from a special package, or he can get them from the

third assistant, who with sterile hands and with cap, mask, gown, and gloves on should be now arranging the large sterile supply table upon which gauze, towels, instruments, etc., are being assembled. The first assistant places these towels, and he is then assisted by the second assistant with the accurate placing of the laparotomy sheet. A small sheet is next placed over the goitre screen, which is used to separate the anaesthetist from field of operation in all cases except in a few special operations of the head, neck, and chest. Now another towel is held up against this screen by two small towel clips, and three more towels are placed about the field of operation, one above and two below, thus covering over the small instrument table again. (It has been found convenient to place a wire rack upon the far side of the small instrument table so that when everything is covered over with sterile drapery, and a Trendelenburg position is desired, a pan or basin for soiled sponges and instruments can rest upon this rack in a level position while the operating table is being tilted.)

Now the first and second assistants give their hands a final rinsing with alcohol, followed by weak bichloride or sterile water, and put on their gloves in sterile water. A little alcohol on the hands makes the gloves slip on well when otherwise there would be a tendency for them to stick.

THIRD ASSISTANT.

The third assistant is responsible for arranging the instruments and sponges on the small instrument table. He should always arrange them the same way, as for example, the knives and scissors on the edge nearest the surgeon, the artery forceps (Oxner's) nearest the first assistant, and a few small curved forceps (Kelly's) at the other corner next to the surgeon. The abdominal gauze packs, soaked in hot sterile water, can be placed, as they are needed, on the back corner of the table, with an extra towel folded underneath to prevent the moisture from soaking through to the table and possibly contaminating the sponges. These large abdominal sponges are of the greatest assistance, and a knowledge of their proper use, in packing off loops of bowel, and in securing good exposure of deep structures, is indispensable to the abdominal surgeon. These packs are made of eight thicknesses of gauze (8 by 12 inches square), having their edges carefully sewed together so as to leave no raw surfaces exposed, and firmly attached to a strong piece of tape. If ten of these gauze packs are always placed in a package, it will be an easy matter to always account for them at the end of the operation. Especially is this true in China, as ten is a complete number. Small gauze sponges are placed at the other back corner of the table, and these too should be put up in

packages of ten, and rigidly counted at the end of each operation. Catgut ligatures for tying vessels can be placed under this pile of small sponges, with a short loose end protruding so that the surgeon can easily reach it without unnecessary searching on his part. The surgeons who use fine silk for ligatures can have this wound on glass or wooden spools.

THE OPERATION.

A bright second assistant, although he is known as the "animated end of a retractor," can be of splendid service in making the operation go smoothly. His first duty is to be sure that he is securing satisfactory exposure with the retractor that the surgeon has placed in his hand, but at the same time with his free hand he can frequently be of great help in keeping the small instrument table straight, and in handing artery forceps or other necessary instruments to the first assistant as he needs them. Many surgeons prefer to reach for their own instruments, but often an attentive second assistant can anticipate the surgeon's wants, and place the needed instrument in his hand without a moment's delay. The second assistant's ambition should be to help the surgeon as much as possible, without crowding against him in the vain effort to see all of the operation. When he becomes first assistant, this "animated end of a retractor" more or less comes into his own.

During the actual progress of the operation the position of the first assistant is a very important one. By being delicate of touch, and accurate and swift of hand and eye, he can become of the greatest assistance to the surgeon. If he will practice tying knots with a spool of thread day after day during his spare time he will find that his hands will work smoothly and rapidly during the operation. He only needs to know two ways of tying a square knot, first, when the short end of the ligature falls in his right hand (and this is the best knot to know), and, second, when his left hand holds the short end. On many occasions, by hanging the suture scissors upon his right ring finger, and allowing the scissors to protrude between his thumb and first finger, he can tie and "cut" without having to put down and take up his scissors each time the surgeon wants him to cut a ligature. Also if he, as well as the surgeon, will pass his ring finger and thumb through the artery forceps and scissors, instead of the middle finger and thumb, his movements with these instruments will become more graceful, and far more accurate.

When the surgeon is placing abdominal packs, the first assistant should help him in every way, by lifting up the abdominal wall, and by training his fingers to hold the packs accurately after they have been

put in place. The fingers should be spread out so as to present their broad, flat surface upon the packs. They should not be dug into the intestines like hooks. When the patient is rigid and straining, the first assistant is often sorely put to it to hold the bowels inside the abdominal cavity. In gall bladder surgery, the first assistant's left hand, with the first and middle fingers straddling the common duct, and the flat of the hand holding back the packed off intestines, becomes one of the most important factors in the surgeon's entire armamentarium. At the end of the operation the first assistant should see that the sponges are all counted, and that the dressings are satisfactorily applied. He should make sure that the patient is properly returned to his bed, and he should order his post-operative care.

When the surgeon has succeeded in training his assistants in some such way as outlined above, he will be able to look forward to his work in the operating room with pleasure rather than with dread.

THE SYSTEM OF RECEIVING AND ISSUING PRESCRIPTIONS IN PEKING.*

J. CAMERON, M.P.S., Peking.

So many superintendents of hospitals in China who have visited this institution during the past two years have commented on our system of receiving and issuing prescriptions, that it occurred to the writer it might perhaps serve a useful purpose if we were to detail our method of dealing with "scripts" here.

There are one or two points which it would be well to bear in mind, perhaps, before we begin to discuss our system:—

Firstly: Most of our out-patients are Chinese, who do not understand one word of English.

Secondly: Many of these patients belong to the poorest class—the coolie or servant class—and can neither read nor write their own language.

Thirdly: About 90 per cent. of our out-patient prescriptions are paid for at the pharmacy office before they are dispensed, the remaining 10 per cent. being issued free to those patients who are too poor to pay even a few coppers for their medicine.

Fourthly: There is the great difficulty about the different cash systems at present ruling in China to be overcome. To the

* Department of Pharmacy, Peking Union Medical College, Peking. Reprinted from the *Pharmaceutical Journal*.

Western mind this will, no doubt, seem strange. We in the home country have become so used to our single system of currency that it is difficult for us to imagine what it must be like to have three systems all running concurrently.

There are three distinct currencies at present in Peking: (1) Yuan Shih Kai, commonly called "Ta Yang" or "big money"; (2) Hsiao Yang, or "small money"; (3) Tung Tzu Er, or "copper." The first named is the currency mostly used by the official class and all the foreign community in this city. This second is used by some shopkeepers, and is useful for paying rickshaw fares. The third is used almost exclusively by the coolie class.

Taking the big dollar as the standard, at present 120 cents of the small money or 180 coppers equal it.

The small silver and copper exchanges fluctuate almost daily; therefore we have to be careful to get the day's rate of exchange from the banks every morning before transacting any business.

In our pharmacy we use only the Yuan Shih Kai currency, to simplify accounts and, incidentally, to enable us to register all transactions on our National Cash Register. For example, if the doctor prescribes 30 gms. of mag. sulph. for a patient we ring up a charge of 10 cents "big money," and the patient probably will pay 18 coppers.

PEKING UNION MEDICAL COLLEGE. OUT-PATIENT DEPARTMENT		D By Chk. By
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R _x		
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FIG. 1.

* From the *Pharmaceutical Journal*.

Fig. 1 is a copy of the prescription blanks in use here. The patient presents the whole form at the receiving window of the pharmacy office, where it is received by a Chinese cashier, who can usually decipher the Latin prescription and estimate the probable cost. The "script" is now stamped with a Bate's numbering machine in three places (see Fig. 2). The cashier now places the whole script in the register and rings up the value. The small perforated part is given to the patient, who goes to the issuing window and takes a seat until the prescription has been compounded, labelled, etc., in the dispensing room downstairs. The 11 Chinese characters on the small stub mean: "When this number is called, please present this slip." Each prescription is then placed in a small round basket, 6 in. in diameter, 2 in. deep. This is placed in the "dumb waiter," which connects the office with the dispensing room downstairs. When the prescription has been dispensed and checked (every script must be checked)—see the small stamp in the corner of Fig. 2—the dispenser cuts off the small slip

PEKING UNION MEDICAL COLLEGE, OUT-PATIENT DEPARTMENT.		D. By Chk. By	
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Form 539		Line of Chinese Characters here.	

FIG. 2.

and places this with the medicine in the basket; the original prescription he files away immediately the script has been dispensed, and the basket returns to the office ready for issue. The cashier calls out for "Number so and so"—in Chinese, of course—and the patient, on presenting the corresponding stub, receives his or her medicine and usually verbal directions. We use three differently coloured baskets

here—red, blue, and white. The red we call a rush prescription; this takes precedence over the other two, and is dispensed at once. The blue denotes that the prescription, when compounded, has to be sent by one of our pharmacy coolies. The white denotes that it is an ordinary out-patient script.

During our first year in the new buildings of the college, from July, 1921, until June, 1922, we dispensed 35,000 prescriptions, and in no case was the wrong medicine given to any of our out-patients.

In the event of the patient receiving a 180 c.c. mixture—our most common prescription with a 15 c.c. dose—we supply a bottle graduated on one side in 15 c.c., and instruct him to take one graduation so many times a day.

MEDICAL RESEARCH IN CHINA.

W. W. CADBURY, M.D., Canton.

Chairman, Research Committee, C.M.A..

It is now nearly ninety years since Western medicine was first introduced to the Chinese. There is not a province in China to which medical missionaries have not brought this gospel of healing for the people. Medical missionaries of to-day may well take pride in the fact that it was through the adventurous spirit and consecrated service of their predecessors that the barriers of prejudice and superstition were first overcome and the people convinced of the benefits of the new method of healing.

But the pioneer struggles are over. In nearly every city of the great Republic of China practitioners may now be found who have learned something of Western medicine from the missionary physician. Medical schools have been established, some of them entirely under Chinese patronage. Is there, then, still a place for the foreign medical man in China? A few days ago the writer was talking with an American physician connected with the Medical School of the University of the Philippines. In this institution Americans have been almost wholly replaced on the staff by Filipinos. On the other hand, at the Bureau of Science in Manila and in the field of medical research there is still a field for American scientists. Perhaps here is a suggestion for the medical missionary in China.

The lesson of the unrest throughout the country during the last few months must be a clear one to us all. Our Chinese colleagues must

henceforth take a larger part in the management of hospitals and medical schools of China and assume greater responsibilities. Doubtless in the more remote country stations the foreign physician, and the mission which supports him and his work, will still have to bear the whole responsibility for some time to come, but in the main centres the above statement will hold true.

In lines of research, however, it seems to us that foreign physicians may still have a valuable contribution to make to medical science. Only those with a thorough foundation in the medical sciences are qualified for this kind of work and as Chinese physicians are few it is evident that for some years to come the work will largely rest upon men and women-trained in the medical schools of the West.

The medical missionary need not consider that the ideals of the research worker are unworthy ones for him to proclaim to the Chinese people. Only those imbued with the highest ideals can succeed here. The research worker must have an intense yearning to find the truth as the primary motive for his efforts. His work keeps him above class or racial feeling. He holds in scorn all superficial or careless work and he is willing to sacrifice material gain for the sake of the results to be attained. At the same time he must have patience sufficient to overcome repeated failure and to try again for the solution of his problem by new methods of attack. Consequently, the doctor who is devoting himself to research in China, not only may accomplish valuable results, but by living out his ideals in the laboratory and at the bedside he will preach these ideals to students and colleagues. Surely this is no mean service for the medical missionary.

For years our Association has recognised research in medicine as a part of our programme. Through the Research Committee a considerable amount of work has already been accomplished. Last spring a circular letter was sent to all members of the China Medical Association suggesting various lines of investigation for the present biennium.

If we find that the time is now opportune to hand over the burdens of administration and some of our clinical work, we may still find abundant scope for real service in the realm of research and investigation into some of the many problems of public health and disease in China.

THE VALUE OF MEDICAL RESEARCH.—“The free disinterested search for truth is useful, in and of itself, from the delight it brings to the one who follows it, from the independence of spirit it begets, from the deep sentiment it develops of liberty and of responsibility. I dare maintain even for this inner work that it has no need of looking to or obtaining the suffrages of other men. It is sufficient that we have the consciousness of being in our place and of doing our duty honestly. You will not always find glory there [in the laboratory], you will never find fortune there, but you will experience there the delight of every day being something more than the day before, and of having brought into the world your share of the truth.”—Duclaux, in *Life of Pasteur*.

Current Medical Literature.

DIAGNOSIS OF BUBONIC PLAGUE BY GLANDULAR PUNCTURE.

URIARTE, *C. R. Soc. de Biologie*, March, 27th, 1925.

The usual method of diagnosis in suspected cases of bubonic plague is examination of the fluid aspirated from an enlarged gland. Satisfactory though this may be in the acute stage of the disease, it is, according to the author, by no means a trustworthy procedure in the mild or chronic cases. In the former type the puncture is easy to perform, and the juice which is aspirated contains the bacilli in large numbers; but in the latter type, when the glands are hard and small, the process of puncturing is often very painful, and is not always attended by success, that is, no fluid is withdrawn. To avoid this it is advisable to inject a few drops of sterile saline and to suck this up and down within the gland. Even when this method is employed the examination of the tissue juices may fail to reveal the presence of the plague bacillus; in such cases it is difficult to give a definite diagnosis. To ascertain how many of these cases are really plague infections the author examined seven patients in whom simple ganglionic puncture had failed to reveal the plague bacillus. The glands were removed from the groin, cut up with care, inoculated on culture media, and injected into guinea-pigs. In three of them the *B. pestis* was grown in culture, and in the same three the injected animals died of plague. Later, another ten cases were similarly examined; two of them were proved by culture and by animal inoculation to be cases of plague, and one of tuberculosis. Uriarte concludes that it is clear that ganglionic puncture is an uncertain method of diagnosis in all but acute cases of plague, and that it should be replaced where necessary by excision of the gland, and also by a blood culture.

DIAGNOSIS OF PULMONARY TUBERCULOSIS.

STEWART, *Brit. Med. Jour.*, May, 2nd, 1925.

In discussing the diagnosis of pulmonary tuberculosis Stewart referred briefly to the pathology in relation to the infection and subsequent spread of the disease. The infection at first attacks the lymphatic system; in the less acute cases the route may be through the tonsil to the cervical, mediastinal, bronchial glands, and thence by way of the peribronchial lymphatics of the larger bronchi to the lung, the subpleural lymphatics, and the visceral pleura. The inflammatory changes which take place in the bronchial wall as a

result of the infection of the peribronchial lymphatics may be followed by caseation, ulceration into the lumen of the bronchus, and infection of the lung, or by blocking of the lumen with subsequent collapse of the lung area supplied—a condition which favours the further spread of the disease.

Referring to the comparative frequency of the early signs and symptoms, Dr. Stewart gave the following percentages of frequency in 200 consecutive cases: cough 60 per cent, lassitude 48 per cent, pyrexia 42 per cent, haemoptysis 27.5 per cent, pleurisy 24.5 per cent, loss of weight 12 per cent, loss of voice 8 per cent, night sweating 7 per cent, dyspepsia 3.5 per cent, neurasthenia one per cent. Dividing these into toxæmic and localizing symptoms he emphasized the fact that the toxæmic symptoms,—namely lassitude, pyrexia, loss of weight, night sweating, indigestion, and neurasthenia—might appear before any physical signs could be detected. The importance of acute observation of the temperature was urged, and several illustrative charts were shown. The speaker went on to correlate the signs and symptoms with the pathological changes. When the infection was spreading through the lung it might be that the only signs present were loss of expansion—more obvious above the nipple or in the axilla—with some faintness of breath sounds on one side. Narrowing of Kronig's area of resonance over one or both apices might be found, or diminished tidal expansion at one or other base. Dullness was not usually demonstrable at this stage, but a few fine crepitations, audible only after coughing, under or above the clavicle or external to the nipple, or in the interscapular region, ought to be viewed with suspicion. As the swelling of the bronchial wall increased the breath sounds became harsh, and this harshness was more easily detected in inspiration. With the bronchopneumonia dullness appeared, often detected more easily high up in the axilla. Broncho-vesicular breathing now appeared, becoming more bronchial as the consolidation increased. To detect the earliest evidence of pulmonary tubercle both percussion and auscultation must be used in conjunction with systematic inspection and palpation.

SURGICAL TREATMENT OF NEPHRITIS.

KUMMELL, *Klin. Woch.*, March 5th, 1925.

The author describes various surgical operations that have been recommended in nephritis, including (1) nephrotomy, a very severe procedure which has been largely superseded by (2) decapsulation; (3) nephrectomy, reserved for complete disorganization of the kidney; and (4) sympathectomy or neurectomy. Decapsulation is preferred

on account of its relative simplicity and safety. Kümmell describes the immediate results following incision or the removal of the capsule, relief of pressure, and the restoration of the circulation and of the secreting function of the kidney. He states that unilateral decapsulation often relieves the congestion and restores the function of both kidneys; development of a new capsule occurs eventually, though more slowly in human patients than in animals. Ultimately a strong capsule is formed. Edebohls has pointed out that after decapsulation, anastomoses between the renal and perirenal vessels occur frequently.

In the exanthemata, and especially in scarlet fever, anuria and threatened uraemia call for decapsulation. In the case of a boy, aged four, anuria occurring in the third week of the disease and persisting for forty-eight hours was relieved by decapsulation, the renal function being restored for fourteen days. The patient, however, died later. Kümmell has performed decapsulation in 5 cases of mercuric chloride poisoning with anuria; one patient recovered. A woman who had taken oxalic acid recovered after decapsulation. In eclampsia, he adds, the operation has been remarkably successful. Sippel records 30 cures in 46 cases of decapsulation, and Poten has had over 60 recoveries in 98 cases. In acute infective (pyaemic) nephritis decapsulation has been very successful, especially in "nephritis apostematosa" with multiple (miliary) abscesses and pyelitis. Kümmell records 30 cases, the patients' ages ranging from 16 to 60; 27 patients recovered and 3 died. He reports a case of infective nephritis secondary to severe acute appendicitis in which decapsulation was performed, after appendicectomy; the patient recovered.

Chronic nephritis, both interstitial and granular, and interstitial nephritis, without albuminuria but (in many cases) with perinephritis, pain, and paroxysmal haematuria, have been treated similarly with satisfactory results. Out of 62 cases of the latter 53 were cured, 8 improved, 1 died. Of 56 patients with granular nephritis with albuminuria, hypertension, and, in most cases, very contracted kidneys, 24 were cured, 21 improved, 2 not improved, 9 died. In 24 with "nephrosis", 8 were cured, 9 improved, 4 unrelieved, 3 died. In glomerulo-nephritis, of 9 patients 4 were cured and 4 improved. Six patients with orthostatic albuminuria were cured. Of 33 patients with chronic nephritis treated by decapsulation—in 28 cases unilateral and in 5 cases bilateral—12 patients were cured, 8 improved, 3 not improved, 10 died. Among the patients who recovered, 2 remained cured after eighteen years, 1 after twelve years, 2 after five years; 2 patients died ten years after operation, but not from renal disease. Nine nephrotomies were performed; five patients were cured, 2 im-

proved. 2 died. Kümmell accepts Volhard's theory that nephritis originates through "some universal arterial spasm", and remarks that the successful results of surgical treatment corroborate Volhard's views. He observes that the operation of decapsulation has not yet become popular, but he looks forward to the time when it will be as common an operation as appendicectomy.

RECTAL INJECTION OF ETHER IN WHOOPING COUGH:

ELGOOD, *Brit. Med. Jour.*, May 23, 1925.

It has been the custom to administer ether in whooping cough by subcutaneous or intramuscular injection. This is undoubtedly the most rapid method, but it is very unsatisfactory for children between the ages of 2 and 12. An enema by the rectum is much more suitable. The enema is painless—only two cases in a series of 58 cases complained of abdominal pain, rapidly passing off, and the majority of children raise no objection to the repetition of the treatment. The only difficulty lies in getting a certain number of cases to retain it.

When ether was given by injection Elgood always used the intragluteal route. The dose was 5 to 10 minims of the ordinary anaesthetic ether. For the administration of an enema he uses a full-sized male rubber catheter, attached by a small glass tube to a large-bored rubber tube with a funnel at the other end. The ether was mixed with an equal amount of olive oil, the dose given being 1 drachm of the mixture for every year of age. If anything an excess was given, and if the symptoms were severe and the enema well retained 1 or even 2 extra drachms were given. Before administering the enema the skin round the anus was well smeared with vaseline and the catheter then passed up 3-6 inches. The ether mixture was passed into the funnel and allowed to flow into the rectum by its own weight. The rate of flow can be watched through the glass tube connecting the catheter to the tube. This also serves as a gauge to see whether there is anything left in the tube. When all the enema has been run in, the catheter is rapidly withdrawn and usually none leaks out. Ether appears in the breath about five minutes after the enema has been given and can be detected during the next twenty-four hours. It has never in this series caused any digestive upset or pulmonary trouble. In many cases it did not begin to have any beneficial effect till after the second administration, and in severe cases it actually aggravated the symptoms at first.

The first 25 cases were treated with ether alone without drugs, and the next 25 with ether and drugs; the latter improved so much more rapidly than those treated with ether alone that the remainder of the

cases were always treated with both. The drugs tried were phenazone, bromides belladonna, iodine, and opium in various combinations. Successful results followed the use of all, but belladonna was the most generally successful. The treatment of whooping cough is summarised as follows:

1. Drugs still hold their place in the treatment of whooping cough. Of these belladonna seems to be the most useful.

2. Ether will check the disease completely in 25 per cent, fail completely in 25 per cent, and be followed by considerable improvement in 50 per cent.

3. Ether neither causes nor prevents complicating bronchitis; bronchitis already present is not a contraindication to its use.

4. The method of administration seems to be of no importance provided the dose is large enough.

ETIOLOGY OF ACUTE APPENDICITIS.

WARREN, *Amer. Jour. Pathol.*, March, 1925.

The bacteriologic and histologic results noted by Warren from a study of sixty-six cases of acute appendicitis show *B. coli* to be the organism most commonly encountered, being found alone in twenty-five appendices and combined with other organisms in twelve. *Streptococcus hemolyticus* occurred alone in six and combined with the colon bacillus in nine. *Proteus vulgaris* and *B. pyocyaneus*, were each found five times. There was a scattering of other organisms. All early lesions found were at the margin of the lumen. The inflammatory reaction does not vary with the organism found in the lesion, although it is, perhaps, more hemorrhagic in those cases from which *Streptococcus hemolyticus* was recovered. In this series of cases the delicate gram-positive bacillus described by Aschoff was not found in the lesion and only rarely in the contents of the lumen. One case of pneumococcus Type I periappendicitis in a 5 year old girl was followed in four days by lobar pneumonia, also due to pneumococcus Type I. The evidence is against a hematogenous origin of acute appendicitis. Acute appendicitis is not a specific disease due to one type of organism, a streptococcus, as is sometimes maintained. Like acute tonsillitis, acute endocarditis and similar infectious lesions, it may be caused by a variety of organisms.

PROGNOSIS IN SCARLATINAL NEPHRITIS.

HANSBORG, *Acta. Med. Scand.*, February 12th, 1925.

The author finds that the prognostic significance attached by various authorities to scarlatinal nephritis differs considerably; he has therefore

investigated the condition of the kidneys of such patients from one to ten years after discharge from the Blegdam fever hospital in Copenhagen, where they had been treated for scarlatina complicated by nephritis. In the ten-year period, 1911-20, there were 14,339 cases of scarlatina treated in this hospital, which admitted 75 per cent of all the cases of scarlatina notified in Copenhagen. Among these patients there were 612 who suffered from hemorrhagic nephritis, which in several cases proved fatal in the acute stage of the disease. Of the surviving 588 as many as 284 were re-examined from one to ten years after discharge, the blood pressure being measured, the heart auscultated, and the urine examined microscopically as well as by the ordinary tests for albumin. When walking patients were found to suffer from albuminuria their morning urine was examined with a view to determining the presence or absence of orthostatic albuminuria. Of the 284 ex-patients, 23 were found to be suffering from albuminuria of a purely orthostatic character, one was suffering from chronic nephritis with characteristics distinguishing it from that of scarlatina, 259 showed no evidence of renal disease, and only one suffered from albuminuria which still persisted five years after the onset of the scarlatinal nephritis. The author concludes that the damage inflicted by scarlet fever on the kidneys is almost invariably only temporary, and that the frequency of orthostatic albuminuria is not greater among persons who have suffered from scarlatinal nephritis than it is among other persons.

DIABETES; SURGICAL INFECTIONS AND INSULIN.

R. CARRASCO-FORMIGUERA, M.D., *The Lancet*, May 23, 1925.

From personal experience of cases of surgical infection in diabetic patients and of their treatment by insulin the following conclusions are drawn:—

1. Even in the more severe cases of infection in diabetic patients it is always possible (unless there is not enough time before the patient dies) to attain a normal blood-sugar level if insulin be used in large enough doses properly spaced throughout the day.

2. It may be difficult, or even impossible, to keep the blood-sugar level absolutely normal all the time through, but it may be kept so most of the time and not far from normal the rest of the time.

3. Such a result may be obtained without any dangerous under-feeding, which must be carefully avoided. In fact, with an adequate combination of diet and insulin such patients may be kept sugar-free and at the same time well-nourished, much better than would be possible by any other known measures, dietetic or otherwise.

4. In many cases infection in a diabetic patient may follow a favourable course even when there is a certain degree of glycosuria or hyperglycaemia, but in other instances it may be very different.

5. So long as a given case of infection in a diabetic patient, in which glycosuria or even only hyperglycaemia persists, is not doing well all efforts must be made to render the urine sugar-free or even to attain a normal blood-sugar level, with the help of insulin and avoiding undue underfeeding.

THE AFTER-HISTORY OF OPERATIONS FOR GALL STONES.

SEULBERGER, *Deut Zeit. f. Chir.*, February, 1925.

The author states that from 1912 to 1920, 304 patients were operated on for gall stones in the surgical clinic of Göttingen University. In 217 cases the subsequent history could be investigated: 11 had died, death in two cases being due to carcinoma of the rectum, in one to mammary cancer, in two to peritonitis apparently not connected with gall stones, in one to pulmonary tuberculosis, and in only one to cholelithiasis. In 4 cases the cause of death was not given. The survivors were placed in three groups, namely, (1) 110 patients who had no further trouble after the operation; (2) 70 patients who complained of pain for a varying period after the operation, but subsequently made a complete recovery; (3) 37 patients who never obtained complete relief from their symptoms. In a certain number of cases information was available as to the patients' previous diseases. Five patients in the first group, three in the second, and one in the third had had typhoid fever from eight months to ten years or more before their attacks of cholelithiasis. There were no essential differences in the three groups as regards sex, previous illnesses, or the influence of pregnancy to account for the different results of the operation. Secondary operations were performed in 20 of the cases, or 9 per cent. The causes of recurrence of symptoms were (a) overlooked stones, (b) adhesions, (c) nervous disturbances, (d) dilated remnants of the gall bladder or cystic duct, (e) post-operative hernias or defects in the scars, (f) chronic pancreatitis. Many who complained of pain had an excess or deficiency of acidity in the gastric juice.

INTRAVENOUS USE OF GENTIAN VIOLET IN SEPTICEMIA.

HINTON, *Annals of Surg.*, March, 1925.

Cases of generalized peritonitis with death from so-called erethistic shock, in the majority of which a gram-positive organism was found in pure culture or as the predominant type in culture of the peritoneal

fluid, influenced Hinton in the choice of gentian violet intravenously, as the therapeutic agent to be used in the effort to cut down the high mortality. Treatment of the wounds locally with the dye was purposely omitted. Starting with its use in moribund cases, and in patients severely ill, the scope of usefulness was extended to take in those cases less critically ill. The results obtained in the eleven cases that were treated seem to justify its further use as an adjunct to surgery, but in no way as a substitute for it. It is to be considered a part of the pre-operative and post-operative treatment of a given case.

In these studies the proper surgery was performed as seemed indicated at the time of operation. In the early cases, a one per cent solution of gentian violet was made by dissolving 0.5 gm., of the powdered dye in 50 c.c., of freshly distilled (same day) sterilized (autoclave) hot water, a clean, sterile glass measure of 100 c.c., capacity and a clean sterile glass stirring rod being used. The amount of the solution to be injected was calculated by using a dosage of 5 mg., per kilogram of body weight, approximately 23 c.c., of a one per cent solution per hundred pounds. Within three minutes after the injection, in all cases there was a generalized cyanotic color, most marked in the mucous membranes on the tongue, lips, cheeks, and then in the conjunctiva, face, neck, finger and toe nails. The depth of color varied with the strength of solution and rapidity of injection. The color faded out within from two to four hours. There was no chill, rise of temperature, psychic disturbance or complaint on the part of the patient immediately following injections. The only complications that occurred were four cases of thrombosis (due largely to errors in technic), and transient nausea and diarrhea. The dye did not stain the tears, sweat, urine, feces, saliva, sputum or wound discharges. In the cases in which there were thrombosed veins, the dye stained the entire thickness of the veins and could be seen for days lending a violet hue to the vein. This thrombosis had largely disappeared after three or four weeks.

"RED STOMACH."

SCHOEMAKER, *Surg., Gyn. and Obstet.*, March, 1925.

The author remarks that every surgeon has had experience of performing laparotomy for gastric or duodenal ulcer and finding neither present. He has noticed that in some of these cases the pyloric portion of the stomach showed a vivid red colour; the stomach was usually normal in size and there were no signs of induration or ulcer. Moynihan described a somewhat similar condition secondary

to inflammation elsewhere in the abdomen, generally in the appendix. Schoemaker bases some conclusions on 45 cases of this so-called "red stomach." In 17 cases gastrectomy was performed and in these there was intense hyperaemia of the serosa. The appendix was only affected in 4 cases and so could not be considered to be the cause of the condition. Removal of the appendix in 6 cases did not relieve the symptoms. In three cases the gall bladder was found to be diseased and was removed, with good results. Schoemaker thinks that the primary cause may be found in the sympathetic nervous system. The symptoms in such cases are pain after food with periods of latency, nausea, sour eructations, and rarely vomiting. Radiograms show a normal stomach with some retention. He advises that when a "red stomach" is found on laparotomy the gall bladder should be examined. If it is normal the abdomen may be closed or gastrectomy be performed. Gastrectomy has but a slight risk and is simple in these cases; in 50 per cent the patients are healed. Therefore the author gives his patients the 50 per cent chance, and considers the reasons are sufficient for performing a gastrectomy in these cases.

CAUSE OF FEBRILE REACTIONS OCCURRING AFTER INTRAVENOUS INJECTIONS.

SEIBERT, *Amer. Jour. Physiol.*, February, 1925.

About 50 per cent of the distilled waters used by laboratories examined by Seibert produced fever when injected intravenously into rabbits. The fever-producing material is a product formed by specific bacteria which contaminate the water, and can be removed from the water by distillation. It cannot be estimated by a bacterial count of the pyrogenic water. Correlation between a bacteriologic study of the flora of twelve distilled waters, and a study of the physiologic reactions produced in rabbits by the injection of aqueous extracts of the different strains of bacteria, revealed the fact that the bacteria responsible for the production of pyrogen fall within a limited area of the group of nonchromogenic bacteria described. They are, furthermore, characterized by the production of acid in milk. These bacteria are further subdivided into four groups according to the reactions produced by their extracts. As to the chemical nature of the pyrogen, it is destroyed very slowly by heat alone, but readily by heat in the presence of acid or alkali. It can be concentrated under diminished temperature and pressure, the amount of concentration being tested by the degree of rise in temperature in rabbits. Chill and fever were produced in man by the intravenous injection of from

80 to 100 c.c. of saline solution made from pyrogenic water, whereas no reaction followed the injection of saline solution made from freshly distilled water.

POTENCY OF DIGITALIS IN TROPICS.

CHOPRA, BOSE and P. DE. Indian Med. Gaz., March, 1925.

The authors direct attention to the fact that clinical observations as well as biologic and chemical assays of tincture of digitalis show that it undergoes deterioration rapidly in a tropical climate such as that of India. This deterioration cannot be accurately determined by any single method in the laboratory, such as Hatcher's "cat method"; the "frog method," or Kundson and Dresbach's chemical method. Clinical tests give the most reliable information. The average dose of 5 c.c. (or 4 1/4 drachms) of the tincture per hundred pounds of body weight required to get the patient under digitalis effect in from thirty-six to forty-eight hours is considerably increased after the tincture has been in the tropics even for a short time. Deterioration is due to some change in the digitalis glucosides, the nature of which has not yet been determined. The tinctures on dilution become darkish in colour, unlike good tinctures which are light green and uniformly opalescent. Such tinctures are more toxic to cats when given intravenously, but a considerable weakening in the therapeutic efficacy is evident. With tinctures of standard strength, doses of at least 20 to 30 minims (1.25 to 1.9 c.c.) three times a day should be given. If rapid effects are desired in urgent cases, these may be increased from 45 to 60 minims (2.8 to 3.75 c.c.) till the amount calculated by Eggleston's method is given.

THE DIFFERENTIAL LEUCOCYTE COUNT IN A SUB-TROPICAL CLIMATE.

WALLACE. *Southern Med. Jour.*, November, 1924.

Tables are given illustrating the leucocyte count of 100 consecutive hospital cases in South Florida, Jenner's stain being employed. The results indicate that the normal polymorphonuclear percentage is decidedly lower than that usually given, the majority of cases having a percentage between 50 and 60, with extreme normal variations from 42 to 70 per cent. The average small lymphocyte percentage was usually from 30 to 40, with normal variations from 25 to 47 per cent. The average total number of leucocytes was 7,830.

These results agree with others made in the United States, and suggest that Ehrlich's original figures show too high a percentage for the polymorphonuclears in normal blood.

THE NORMAL DIFFERENTIAL LEUCOCYTE COUNT IN SOUTH AFRICAN NATIVES, CHINESE AND OTHERS.

A series of charts of the leucocyte counts of Africans, Chinese and British, illustrating the prevalence of polymorphonuclears, lymphocytes, large hyalines, eosinophiles and mast cells, respectively. The results seem to support the view that the leucocyte counts may have an important bearing on anthropological research, for wide variations are observed between the different races. In case of polymorphonuclears the average percentage proportion was about 60-70 for British, 40-45 for Africans, and 38 for Chinese. The proportion of eosinophiles was identical in all three races (3 per cent), but the other varieties of leucocyte all showed variations.

TREATMENT OF ECLAMPSIA.

EMRYS-ROBERTS, *Jour. Path. and Bact.*, January, 1925.

At the Johns Hopkins Hospital, Baltimore, as a result of experiences during the past twelve years, the treatment of eclampsia has become more and more conservative and for the past two years patients suffering from ante- or intrapartum eclampsia have been subjected to the following regime:—

1. They are placed in a quiet room and are disturbed as little as possible.

2. A hypodermic injection of $\frac{1}{4}$ gr. of morphia is given at once. This may be repeated if indicated (particularly in the presence of undue restlessness or repeated convulsions) but not more than one half-grain is given in the first twenty-four hours.

3. The patient is kept turned on one side with the foot of the bed elevated as long as coma persists. Mucus is swabbed from the pharynx as it collects.

4. Venesection after the second convulsion is performed under nitrous oxide anesthesia if necessary. One thousand c.c., of blood are withdrawn unless the systolic blood pressure falls below 100 mm., or the pulse rate shows alarming change during the process. (This is of course contraindicated in the presence of marked anemia.)

5. Water is given freely, as desired, when conscious. Those who cannot drink, on account of coma, are given 500 c.c., of 5 per cent glucose solution intravenously, which may be repeated in twelve hours.

6. A special nurse is in constant attendance until the patient is permanently out of coma.

7. No attempt is made at delivery until the cervix is fully dilated, unless some definite maternal indication apart from the eclamptic condition is present.

The treatment of postpartum eclampsia is identical with the above, except that the amount of blood withdrawn at venesection should represent the difference between the amount of blood lost at the time of labor and 1,000 c.c.

MAGNESIUM SULPHATE IN PUERPERAL ECLAMPSIA.

LAZARD, *Amer. Jour. Obst. and Gynec.*, February, 1925.

Bearing in mind the action of magnesium sulphate on the nerve cells as reported by Meltzer and Auer, as well as the intraspinal use of magnesia sulphate for the control of tetanus convulsions, the author believes that in the intravenous administration of magnesium sulphate we have at our disposal a means, not only of controlling the convulsions of eclampsia, but an efficient treatment of the toxemia itself. He gives 20 c.c. of a 10 per cent solution of magnesium sulphate as soon after the first observed convulsion as possible. Seventeen cases are reported which have received this treatment with but one maternal death. All were cases of the profoundly toxic type, having convulsions and in coma when first seen, and most of them had had little or no antepartal care. His conclusions are as follows:—

1. By the use of magnesium sulphate the convulsions of eclampsia can be controlled and the coma cleared by a sufficient dosage.

2. The intravenous use of magnesium sulphate reduces edema and promotes diuresis, thus eliminating the toxins.

3. Other eliminative measures, such as catharsis, phlebotomy, lavage, and colonic flushings may be used as adjuvants; however, as our confidence in the magnesium sulphate has increased, we have gradually reduced the supplementary treatment until, in the last two cases, little else was done.

4. Surgical interference with the pregnancy should not be undertaken during the eclamptic attack, except for the most urgent obstetric indication.

LABORATORY STERILIZATION WITH BURNING SPIRIT.

MAYSER, *Centralbl. f. Bakt.*, February 18th, 1925.

The author has made some experiments to test the efficacy of the common laboratory practice of sterilizing objects by pouring spirit

over them and then igniting it. The object to be tested was smeared over with some culture from an agar slope, or was immersed in a broth culture and allowed to dry; the organisms used were *B. anthracis* and *B. typhosus*. When dry some spirit was poured on, ignited, and cultures made in bouillon. Mayser found that flat surfaces, such as brass wire, glass rods, and spoons could not be sterilized thus. Hollow articles, on the other hand, varied in accordance with the heat-conducting nature of the material of which they were made. Basins of wood, a substance which has a very low heat-conducting power, were not rendered sterile even after the spirit had been burning for a minute, whereas glass, porcelain, or metal basins of medium and high heat-conducting power were sterilized by this means. These experiments indicated that it was not the flame itself which disinfected, but the heat generated by it.

Book Reviews.

Newer Methods of Ophthalmic Plastic Surgery.—By Edmund B. Spaeth, M.D., F.A.C.S. With 168. Illustrations. Price G.\$5.00. Publishers: P. Blakiston's Son & Co. 1012, Walnut Street, Philadelphia, U.S.A.

This is a work on the rectification of facial deformities in the orbital region, which has been planned to serve the general ophthalmologist in his everyday practice. The tragedy that may lie in a distorted physiognomy is not always understood. The patient with an ectropion, a ptosis, an incurable lagophthalmus, a complete symblepharon, or who has suffered the loss of the eyelids, or of the eyeball and its socket, is constantly distressed because of his unsightly appearance, especially if it lowers his earning capacity. If the ophthalmic surgeon by a plastic operation can manage to remedy the disfigurement he wins a very grateful patient. "Of all the patients in any class of cases," writes the author, "I doubt whether there is ever more sincere appreciation of the work performed than that which is shown by these unfortunates." The various types of plastic operations are first illustrated and explained. Then the conditions to be corrected are correlated with the operations to be used for their correction. "There is no reason why with the help of the text and the illustrations and the exercise of good judgment, also a bit of imagination on the part of the operator, the results obtained in each case should not approach closely to 100 per cent perfection." But it is cautiously added that at the best "perfection" is a relative term in plastic surgery as the results are often far from normal. In the author's own cases, however, as shown by the illustrations, the results are extremely good. Ophthalmic surgeons will be most interested in this work, but it is commended to all surgeons who may be required to perform plastic operations of the kind described.

Practical Clinical Psychiatry for Students and Practitioners.—By Edward A. Strecker, A.M., M.D. and Franklin G. Ebaugh, A.B., M.D. Illustrated. Price G.\$4.00. Publishers: P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia.

It has been reliably estimated that of the 7,000 infants born each day in the United States, about 270, or 1 in 26, eventually become incapacitated by abnormalities of the mind. It is known that 50,000 new patients are admitted

annually to the state institutions for the insane. "Few people realise that in this country there are more beds in public hospitals devoted to those who are mentally sick than to all classes of the physically sick combined." The authors use these and similar statements as a plea that every physician should cultivate that attitude toward his patients which comes from some knowledge of mental diseases and which may be termed the psychiatric point of view. The authors have adopted the case method of presentation, histories of actual cases being studied just as is done in the ward class. This is a helpful book for students, young practitioners, and others who wish to gain a good general knowledge of mental diseases.

Haematology in General Practice.—By A. Knyvett Gordon, M.B., B.C., B.A. (Cantab.). Price 5/- net. Publishers: Baillière, Tindall and Cox, 8, Henrietta St., Covent Garden. London, 1923.

This little book is primarily intended for general practitioners as a guide in the examination of the blood. Given a method which does not demand accurate weighing and measuring or the employment of complicated stains, it is possible for those engaged in the routine of a busy general practice to recognise and appreciate certain changes in the blood, the clinical significance of which is no longer doubtful. The present volume is based on the preliminary use of such a technique for immediate diagnosis, supplemented when necessary by detailed examination by standard methods. It is not intended to replace the larger textbooks on haematology, and no attempt is therefore made to give a complete description of the blood in the diseases selected as of most common occurrence. Many useful hints are given concerning technique and the interpretation of the findings.

An Index to General Practice.—By A. Campbell Stark, M.B., B.S., (Lond.) L.S.A. (Eng.), Ph.C. Price 5/- net. Publishers: Baillière, Tindall & Cox, 8, Henrietta Street, Covent Garden, London, 1923.

The young physician beginning practice finds much that is new and difficult for which his previous training at medical school and hospital has not sufficiently prepared him. The author has written this work to make his path a little smoother. The material is the outcome of some years of experience and of a considerable number of trials and errors. It is arranged alphabetically in paragraphs or chapters. Not only suggestions concerning diseases and their treatment by drugs and other methods are given; much is said concerning the equipment of the consultory room, fees, finance and book-keeping and other practical questions of a business nature. The young practitioner, and perhaps some of his seniors, will find the volume very useful.

Treatment of Gonococcal Infection by Diathermy.—With an Appendix on the Treatment of other Forms of Arthritis by Diathermy. By E. P. Cumberbatch, M.A., B.M., B.Ch. (Oxon.), M.R.C.P. and C.A. Robinson, M.B., B. Ch. (Cantab.), D.M.R.E. (Cantab.) Price 7/6 net. Publishers: William Heinemann (Medical Books) Ltd. 1925.

The purpose of this volume is to place on record the results obtained by the authors in the treatment of gonococcal infection by diathermy and to describe the methods adopted. Years ago it was found that gonococcal arthritis responded extremely well to this form of treatment. It was tried later in gonococcal infection of other parts, particularly of the genital organs, where treatment by irrigation, external application and vaccines had proved unsatisfactory. By means of diathermy success was obtained where these other methods had failed. The records of many illustrative cases are given. The volume is commended to practitioners willing and able to try new methods in the treatment of troublesome, obstinate gonococcal infections.

Health and Psychology of the Child.—Edited by Elizabeth Sloan Chesser, M.D.
Price 7/6 net. Publishers: William Heinemann, (Medical Books), Ltd.
1925.

If children in these days are not all they ought to be, physically, mentally and spiritually, those who look after them cannot justifiably plead lack of knowledge, for the books which have been written to promote the well-being of the child are very numerous. One of the best is the volume under review which consists of instructive essays by a number of educational and medical authorities. After a "Foreword" by Sir M. Craig, M.D. and an "Introduction" by Elizabeth S. Chesser, M.D., there are chapters on the following subjects: "The Psychology of the Infant," by E. Pritchard, M.D.; "Education of the Nursery Child and its Influence on Character," by Lady Barret, M.D.; "Mothercraft," by Viscountess Erleigh; "Locke's Thoughts on Education," by H. C. Cameron, M.D.; "Want of Appetite and Refusal of Food in Childhood," by H. C. Cameron, M.D.; "The Development of Self-Consciousness in the Child," by J. A. Hadfield, M.B.; "The Endocrine Glands and Vitamines," by Leonard Williams, M.D.; "The Subnormal or Unstable Child," by Helen Boyle, M.D.; "The Value of Training," by Lady Baden-Powell; "The School Age," by S. M. Sloan, M.B.; "The Physical Aspects of Adolescence," by Sir Bruce Bruce-Porter, M.D.; "Music and Education," by Agnes Savill, M.D.; "Delinquency in Children," by A. F. Tredgold, M.D.; "The Value of Sunlight to Children," by Percy Hall, M.R.C.P.; "Psychological factors in the Religious Development of the Child," by J. C. Flower, M.A. All the chapters are very good. Perhaps missionary physicians will be most interested in the last. Such statements as the following are well worth the careful consideration of religious parents: "Let us tell the children as they reach years of mental readiness and responsiveness, what are our faiths and hopes, not in the shape of dogmas which they *must* accept, but as material for them to use in the building up of their own faiths and hopes. For what will endure in the matter of religious training will not be the specific *ideas* in which we try to express our faith, not the representations of spiritual things we offer in the form of creeds and catechisms, but the vital influence of the faith that is in us; and this is communicated not in oral instruction, not in set lessons, but in the whole way of life and love." All the essays should be carefully read and studied by those entrusted with the care and education of children.

The Coming of Baby.—By Lucy E. Ashby, State Registered Nurse and Certified Midwife; and Kate Atherton L. Earp, State Registered Nurse and Certified Midwife. With a foreword by Sir James Cantlie, K.B.E., M.A., M.B., F.R.C.S., V.D. Publishers: The Scientific Press Ltd., 28 & 29 Southampton Street, Strand, London, W. C. 2. 1925.

In an interesting "Foreword" Sir James Cantlie refers to the time when he was at Hongkong as medical officer, when there were no trained nurses in the Civil Hospital, and Chinese coolies had charge of the operating theatre and attended to serious operations requiring the utmost skill and attention. Doctors and nurses are now much more numerous in tropical lands, but there are still places where it is difficult, if not impossible, to obtain their services. For young mothers who are likely to be so circumstanced, Sir James recommends very highly this little book which gives the necessary information concerning "The Coming of Baby." "In addition to its other merits, the book is begun, continued, and ended in the best of taste, in a manner which the medical profession will appreciate and the public thank the authors for."

The Rockefeller Foundation. A Review for 1924.—By George E. Vincent, President of the Foundation. New York. 1925.

United Fruit Company: Medical Department.—Thirteenth Annual Report. 1924.

League of Nations, Health Organisation.—Malaria Commission. Report on its Tour of investigation in certain European countries in 1924.

Correspondence.

Correspondents are requested to write on one side of the paper only, and always to send their real names and addresses. The JOURNAL does not hold itself responsible for the opinions or assertions of correspondents.

Chinese Plasters.

To the Editor, C.M.J.

DEAR SIR,—Will some reader of the JOURNAL kindly tell us the composition of the plasters which the Chinese use so much on boils, carbuncles, ulcers and slight wounds? In the "Honan Messenger," May, 1925, the Rev. J. G. Bompus writes: "Sometimes you hear people talk about the 'open sore of China.' But as a matter of fact open sores are not commonly seen in this country. Every kind of sore and boil is always covered up with a plaster. The idea is to keep out the wind; and I suppose the plaster does keep out infection sometimes; but probably it keeps in more than it keeps out." Have the plasters any real therapeutic value?

Yours sincerely,

DERMA.

*.*In Stuart's *Chinese Materia Medica* there is the following description of the different plasters used by the Chinese:

The character 膏 (Kao) is used for Chinese plasters, as it is also for medicinal extracts, ointments, fats, gelatinous and cereose substances. In order to distinguish plasters from these latter, medical missionaries use 貼膏 (T'ieh-kao) for the former. The Chinese do not have a very large number of these preparations, but they use what they have in season and out. An adhesive plaster pure and simple is practically unknown, unless the common compound of resin and wood-oil can be called such. Even this is not often used uncombined with other drugs. But all sorts of gaping wounds are often plastered over with some of the medicinal plasters. A UNIVERSAL PLASTER BASIS, called 萬應油 (*Wan-ying-yu*), is made in the following manner: Take of fragrant sesamum oil, sixteen ounces; peach twigs, willow twigs, *Sophora japonica* twigs, mulberry twigs, cinnamon twigs, and *Allium fistulosum*, of each one ounce; male hair (? 男髮), four ounces; *Zanthoxylum bungei*, half an ounce; castor oil bean, two ounces; *Strychnos nux vomica*

(? 馬前), four ounces; *Chavica roxburghii*, half an ounce; and *Angelica anomala*, two ounces. Soak the drugs in the oil, in the winter seven days, in the summer three days, and in the spring or autumn five days. Then boil until the drugs are withered and dry, when the oil should be drained off and boiled until it is reduced to eight-tenths of its volume. It is then ready for use.

BAROOS CAMPHOR PLASTER.—冰片膏藥 (*Ping-p'ien-kao-yao*). This is an expensive warm plaster, at present in much repute among the Chinese. Its composition is not given in the books.

DISSOLVING ABSCESSES PLASTER.—消疽膏 (*Hsiao-chü-kao*). This is made by crushing nine kernels of the castor oil bean, and beating up with this three-tenths of an ounce each of pine resin, white lead, and finely powdered Luan tea leaves. If it is too dry, a little sesamum oil is added, and it is then spread on a piece of cloth, applied to the abscess and the whole covered with a layer of cotton paper. It is said to heal in seven days.

FOUR PERFECTION PLASTER OR OINTMENT.—四聖丹 (*Ssu-sheng-tan*). Incinerate forty-nine peas, three-hundredths of an ounce of hair, and fourteen real pearls. Beat up the ash with oily cosmetic to a paste. This is for vicious small-pox eruption in children, in those cases in which eight or nine out of ten die. Use a hairpin and press out the bad blood; and then apply a little of the paste to the sore, when it will turn red and healthy in appearance.

HEALING RINGWORM PLASTER.—治癬第一靈丹 (*Chih-hsien-ti-i-ling-tan*). Crush to a pulp three-hundred day lilies (*Funkia subcordata*), and add cloves, six ounces; lign aloe, four ounces; Baroos camphor and musk, of each three-tenths of an ounce; pulverized city wall brick from Shansi, twelve ounces. Boil all in three and a half cattles of sesamum oil. Mix with charcoal dust, and drop into water, to form pellets. Place in a porcelain jar and seal with yellow wax, and then

bury in the ground for twenty-one days. Take out and apply to the ringworm, and this will soon be cured.

HEALING ABSCESS PLASTER.—治腫腫毒膏 (*Chih-chung-tu-kao*). Mix four ounces of Siamese gamboge with eight ounces of white wax. Boil thoroughly twelve ounces of sesamum oil, and add the above mixture. Keep in a porcelain bottle with a little sesamum oil on top to preserve it. This is to be applied to any sort of abscess or sore.

THE CHIN FAMILY PLASTER.—金氏癰洞膏 (*Chin-shih-li-tung-kao*). To five ounces of Universal Plaster Basis add of Siamese gamboge, one and a half ounces; yellow wax, two ounces. Boil to a dark brown colour, spread on cloth and apply. Said to be a sure cure for varicose ulcer.

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An Appeal for Arthropods of Medical and Veterinary Importance in China.

To the Editor, C.M.J.

DEAR SIR,—As I have recently come out to China in charge of a Commission of the Royal Society to investigate Kala Azar, I am taking this opportunity of adding to our very limited knowledge of the Arthropods of Medical and Veterinary importance in this country. In the course of preparation of the manuscript of a new work in two volumes, which I have in hand, on, "*Arthropods in Relation to Disease in Man and Animals*," I was astonished to find that I had very little to say about this subject as far as China is concerned. Yet it was in China that the late Sir Patrick Manson made his epoch-making discovery of an insect acting as the vector of a helminth parasite of man. It is true that the pathogenic Helminthes and Protozoa of China have been carefully worked out by many distinguished workers, and our knowledge of these parasites is tolerably complete, yet our information of the blood-sucking flies, bugs, lice, ticks, etc., of China is astonishingly meagre. Yet on stepping foot in China I find many of these Arthropods are new to me, and that there is much of scientific and practical value to be worked out. I need hardly dilate on the supreme importance of finding out everything we can about the arthropod vectors of

pathogenic parasites of man and animals, and before we can study them, we must know the different species we are dealing with; it is only on gaining this knowledge that we can ever hope to wage a successful war against them. May I then appeal to all who are interested in the welfare of this great country to help me in collecting such Arthropods as mosquitoes, sand flies, house flies, blow flies, horse flies, fleas, bugs, etc., so that I may be in a position to name them. I will be glad to hear from anyone who may read this appeal, and who is willing to help in this work, and will supply him with the necessary apparatus and notes of use in collecting these Arthropods.

I am, yours sincerely,

W. S. PATTON,

Major, I. M. S. (Retd.).

—

"Modern Treatment of Leprosy."

To the Editor, C.M.J.

DEAR SIR,—I have much pleasure in announcing, as the result of much experimental work at our Siao Kan Leper Home, that the pain attending the intermuscular injection of the Ethyl Esters of Chaulmoogra Oil can now be almost entirely eliminated by the employment of a simple formula, made up of equal quantities of the Ethyl Esters and pure sterilized Olive Oil.

If ordinary precautions are employed rapid absorption of the preparation takes place with no discomfort to the patient. There is subsequently no abscess formation. Owing to the addition of the olive oil dosage is exactly double that of the ordinary E. E. C. O. formula. This however presents no difficulty, for whatever amount is injected absorption is unusually rapid and invariably painless.

Owing to the hearty co-operation of Prof. Bernard E. Read I am further glad to intimate that the new formula is being prepared at, and distributed from the Peking Union Medical College at cost price. I shall be pleased to supply a small quantity for trial purposes to workers among lepers in China who have so far not been using the Esters.

Yours sincerely,

HENRY FOWLER.

NEWS AND COMMENT.

BIRTHS.

TUCKER.—On August 25th, 1925, at Shanghai, to Dr. and Mrs. A. W. Tucker, of the American Church Mission, a son (Beverly Dandridge).

DOVEY.—On September 29, 1925, at the Victoria Nursing Home, Shanghai, to Dr. and Mrs. John Edward Dovey, of the Shantung Road Hospital, Shanghai, a son.

OBITUARY.

Dr. HENRY W. BOONE.—We regret to learn that news was received a few days ago of the death of Dr. Henry W. Boone in his 86th year at San Bernardino, California, U.S.A. He was the son of the Right Reverend William Jones Boone, D.D., the first missionary Bishop of the Episcopal Church to China. He was born in Batavia, Java, where his father was engaged in missionary work before China was opened up by the Treaty of Nanking.

After graduating from the College of Physicians and Surgeons in New York, he returned to China in 1861, and for a time engaged in general practice in Shanghai and was in charge of the General Hospital for Europeans and Americans.

Owing to ill health, he left China in 1864 and took up practice in San Francisco, California.

In 1880 he offered his services to the Board of Missions of the Episcopal Church and returned to China in 1881 as a member of the staff of the American Church Mission. He was instrumental in the founding of St. Luke's Hospital, Shanghai, and for a number of years was physician in charge. He also founded a medical school in 1881 which later became the Medical Department of St. John's University. In 1886 he helped to bring about the organization of the China Medical Missionary Association and the publication of the "China Medical Journal." He was President of the Association, 1889-1890.

On June 10, 1910, he was obliged to leave China on sick leave and was never able to return. During the last years of his life he made his home in San Bernardino where he passed away quietly on September 20. He is survived by his wife and five children, three of the latter being in missionary service in China.—

North China Daily News. September 28th, 1925.

STATISTICS OF MEDICAL MISSIONS.—The following is a summary of medical missions throughout the world as presented in the "World Missionary Atlas." Medical missionaries, 801 men and 356 women: total 1,157. Mission Hospitals, containing 31,264 beds, 858. Nurses, 1,007. In India there are 297 medical missionaries and 229 nurses; in China, 499 medical missionaries and 320 nurses; and in Africa, 139 medical missionaries and 235 nurses.

MALIGNANT DISEASE IN GREAT BRITAIN.—The deaths in England and Wales during 1924 numbered 473,225, giving a death-rate of 12.2 per 1,000. Deaths from cancer and malignant disease numbered 50,160 (106 per 1,000 deaths).

NUMBER OF PHYSICIANS IN JAPAN.—According to a report issued recently by the Japanese Home Office, the number of physicians totalled 43,701. Dentists number 9,983 and midwives 41,709. Compared with the report of 1923, the number of physicians shows an increase of 673.

INFANT MORTALITY IN GREAT BRITAIN.—In the Government Public Health Report for 1924, considerable space is devoted to infant mortality, and it is stated that 70 per cent. of the infant deathroll came under the headings:—

- (1) Developmental and wasting conditions, including prematurity and congenital defects;
- (2) Respiratory diseases, such as bronchitis and pneumonia;
- (3) Diarrhoea and enteritis.

FOR FRACTIOUS CHINESE.—The Chinese evangelist's child, a little girl of nine, was very troublesome during the church service and on her return home became quite unmanageable. "A certain old woman was looking on and had made up her mind what was the proper remedy. She pulled out her needle and taking hold of the child she turned up her lip and pierced it with the needle.

squeezed out a drop of blood and let the child go." The little operation worked like a charm. The girl stopped crying at once and in a few minutes her face was covered with smiles as she played with her baby brother."—*Honan Messenger*.

PROGRESS IN CHINA.—Chu Feng-yi, the great "red pills" maker, was put to death last week at Nanyun. He is reported to have made \$1,000,000 out of manufacturing these pills.—*N.C.P.N.*

DEATHS FROM TUBERCULOSIS IN ENGLAND AND WALES.—The number of deaths registered from tuberculosis in England and Wales for 1924 was 41,103—32,690 respiratory system, 8,413 other forms. These figures indicate, as regards tuberculosis of the respiratory system, a check in the decline which has been experienced since 1918. An increased number of deaths were recorded both in males and females, the increase being larger in males. The increase over the figures for 1923 is not large (being under 600 for the two sexes combined), but it is more than would be accounted for by the estimated increase in population. The crude male death-rate has gone up from 958 per million in 1923 to 969 in 1924; the female death-rate from 724 to 729 per million. Several observers are inclined to attribute this to poverty and distress associated with the large amount of unemployment.

SANATORIUM TREATMENT OF TUBERCULOSIS.—Although sanatoria had not achieved all that was expected by some enthusiasts at the outset of the tuberculosis scheme, they had resulted in the cure of a considerable proportion of cases of pulmonary tuberculosis, and in the prolongation of life and working capacity in a much larger proportion, and at present there was no alternative to sanatorium treatment, which offered a more solid prospect of general all-round gain to the community in the combat against this disease.—*Public Health Report, 1924.*

A CHINESE STYPTIC.—The little boy Wu fell on the rough stones and his head received a nasty cut. A lay missionary washed the wound and applied some clean paper from a note book to check the bleeding. Another little Chinese boy timidly offered a bull-rush

head, or cat-tail (*Typha latifolia*) for the purpose, but the foreigner thought the paper was better. The old grandmother appeared. "With a snort of disapproval she ripped the paper off the cut. She fuzzed out some of the cat-tail and pressed the fuzz down over the wound." Evidently the treatment was effective.—*Honan Messenger*.

MORTALITY OF PUERPERAL STATE IN GREAT BRITAIN.—The closely related mortality among women in childbirth still remains high and has shown little or no improvement since 1894. No fewer than 2,703 women died in childbirth and another 144 from conditions associated with it. Of the 2,847 as many as 1,018 died from puerperal fever, a preventable condition.—*Public Health Report, 1924.*

Dr. Ralph G. Mills formerly of the P.U.M.C. is now Professor and Head of the Department of Pathology in the University of Colorado School of Medicine, Denver, Colorado. He writes: "Work has been very pleasant here this past year and we look forward with great anticipation to the new position. Denver is such a pretty place and the climate is very stimulating and conducive to work. If any of the China doctors happen to be in Denver I hope they will give us an opportunity to become acquainted, if not so already. We shall always be interested vitally in the problems of the Far East and hope to do our little bit for those who may still be able to carry on the work."

"IN PERILS FROM ROBBERS."—To the relief and joy of his numerous friends, Dr. Harvey J. Howard, of the Peking Union Medical College, after many wanderings, hardships and dangers, has at last escaped from the brigands in Manchuria who had held him captive for more than two months.

ROCKEFELLER FOUNDATION.—With remarkable far-sightedness the Rockefeller Foundation is now supporting studies of human biology, which "look toward the betterment of the race in the centuries and eons to come. This is long distance humanitarianism which is almost staggering in the concept, though those of us who are concerned with the current problems of hospital and health service feel an inspiration from the mere knowledge that studies of such vast importance are in progress."—*Modern Hospital*.

CONGRESS OF F.E.A.T.M.—ELABORATE preparations are being made in Tokyo for the coming congress of the Far Eastern Association of Tropical Medicine which is to be held in that city from October 11 till October 31, 1925. Among the countries to be represented at the congress are: Japan and Japanese Colonies, Australia, British India, British North Borneo, Ceylon, China, Cuba, Hongkong, Indo-China, Macao, Netherlands Indies and Java, Sumatra, Philippine Islands, Sarawak, Siam, Straits Settlements, Federated Malay States and the United States.

CHINESE MEDICAL SCHOOL BOLSHEVICISTIC.—In addition to the strikers' government, there is another government here in Canton which bows to no higher authority—the students' government. The Kuangtung University has for a long time been most Bolshevistic. As soon as Cheung Kai-shek, the leader of the Whampoa cadets, was firmly established in his office of Protector, the University gave notice to the owners of Kung Yee Hospital and Medical School that the University would at once take over this institution and run it as a part of their own organization. Nothing was said about compensating the owners for the loss of their property, and the Head of Kung Yee, who was so audacious as to oppose the scheme, had to flee for his life.

The Russian system of school management has been adopted in Kung Yee, and the Medical College students now select their teachers by popular vote, the desirability of employing anyone as an instructor being determined solely by the votes of the students. Truly Bolshevism is most firmly established in Canton.—*North China Daily News*, September 24, 1925.

CONTROL OF UNLICENSED PRACTITIONERS IN JAPAN.—The Metropolitan Police Board has started a drive against unlicensed practitioners in Tokyo and has given instructions to the police to bring into court any person whose authority for posing as a doctor appears questionable. It is stated there are at least 400 such frauds in Tokyo. The police have been particularly handicapped in the past in dealing with them by the lack of any law prescribing severe punishment for such offenses. Steps are now being taken to introduce legislation which will end the leniency of letting off convicted persons with nothing more

than a fine. Several arrests have already been reported.—*Japan Medical World*, August 15, 1925.

ALLEGATIONS OF MORPHINE SMUGGLING FROM ENGLAND.—In the British House of Commons, recently, the Financial Secretary to the Treasury was asked whether he was aware that packets of morphia, bearing the labels of three different London firms, were being exported for the purpose of being smuggled into China; and what steps were being taken in the matter. Sir W. Joynson-Hicks, the Home Secretary, replied, and said the answer was in the negative. Two of the firms were not licensed to manufacture or deal in morphine, and no licences for the export of morphine were granted them. In the case of the last-named firm, export licences would only be granted if the Home Office was satisfied that the drug was required for medical or scientific purposes. It was only right to say, in view of the fact that the firm's name was mentioned in the question, that he was not aware of any evidence to suggest that they had taken part in or connived at attempts to smuggle the drug into China or elsewhere. It was a common trick of the illicit dealers to put forged labels bearing the names of wellknown firms on their wares. The Home Secretary expressed his willingness to examine the labels in question if they were submitted to him.

SECRETARY-TREASURER, C. M. A.—Dr. J. L. Maxwell, returning after a short furlough, will reach Shanghai in the early part of November and will be glad to hear from members of the Association or to see them at its Headquarters, 23 Yuen Ming Yuen Road, Shanghai.

C.M.A. PUBLICATION COMMITTEE.—We regret to state that Dr. Philip B. Cousland, Chairman and Secretary of the Publication Committee, has not sufficiently regained his health to enable him to return to China for the coming winter.

CHINA MEDICAL JOURNAL.—Dr. E. M. Merrins having retired from the editorship, all communications relating to the Journal (apart from the Publishing Department) should now be addressed: The Editor, China Medical Journal, P. O. Box 1121, Shanghai.

The China Medical Journal

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All payments, whether subscriptions to the Journal or Association dues, should be sent to him. Checks should be made payable to the order of the China Medical Association, and the amount stated in dollars, Shanghai currency.

Members of the Association should inform the Executive Secretary of change of address and state whether the change is temporary or permanent.

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