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Observations on the Social Life
of a North China Village

(CHIEN YING, WU CHING HSIEN)

Oct-Dec. 1924

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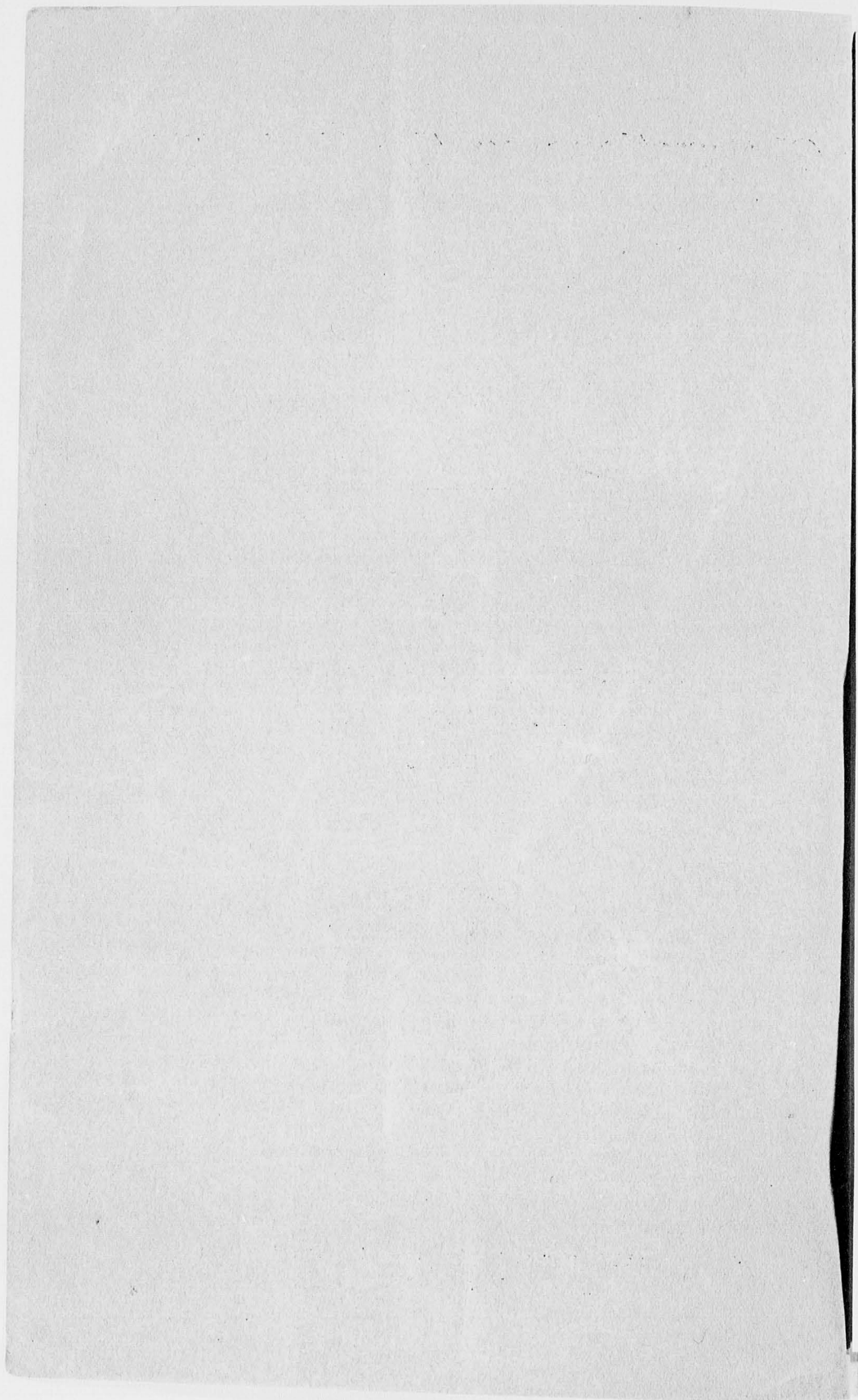


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Observations On the Social Life of a North China Village.

Introduction

Purposes and methods of the study.

The Sociologist attempting to teach in another country, especially one so different from his own as China is from America, labors under serious handicaps, so that when this city born American was given the opportunity to study, at first hand, the social life in a Chinese village, more or less typical of the northern section of the three quarters of China that is rural, it was eagerly seized.

A village was selected in which mission work had been conducted for over twenty years, and where a family was known which had a room to spare, means adequate to welcome an outsider, and which also had sufficient contact with foreigners to accept the guest.

Dr. A. H. Smith makes a statement in the preface to one of his books, which should be reiterated with each mention of China:— that in so vast a country any generalization might be true somewhere, and no generalization would be true everywhere. The following report claims only to be the careful observation of a Sociologist in one section of this huge area, a land in which the social phenomena have developed infinite variety, owing to great distances and to communications inadequate beyond that of any populous nation. The fact that one province in the south, (Fukien) is reported to have seventy mutually incomprehensible dialects is a clear example of this difficulty. The northern plain has a proverb that places separated by 100 "li" (33 miles) have unlike customs; and, I would add, many dialectic variations.

This study cannot claim to be a thorough survey, for the time was short; war broke out and interrupted it; and intelligent Chinese assistance was available for only four days at the end. This assistance could only supplement along agricultural and political lines, and was not at hand to check up the main body of the study. Moreover the numbers studied, while totaling over 15% of that particular village, are after all only eighty-two families and 555 individuals. These observations may be taken as typical of North China communities near enough to railroads and Christian chapels to have been subjected to some influence,— especially along lines of education and economic contacts,— with the world outside their immediate neighborhood.

The method of study was that of friendly visiting in company with the Chinese Woman Evangelist. Questions were asked pertinent to a questionnaire which was filled out in the inquirer's own room. It was necessary to call three or four times on the larger families, to complete the desired information. Even so there are omissions owing to the necessity of using the conversational method.

Realizing the inadequacy of this study, the purpose of the report is to give a clear, sympathetic and readable picture of village life, with special emphasis on the family, rather than to enumerate and record accurate data. The statistics appended are far too limited to pretend that they are typical of

any extensive area of China. The observer's main object in the investigation was to become more intelligent and understanding on matters of rural life, family conditions and Oriental psychology for the instruction of her Chinese students. The idea of a survey was secondary. Nevertheless, it is hoped that the following pages may help others who are interested, to secure a clearer appreciation of village life in North China.

Location of the Study.

About fifty miles from Peking and somewhat nearer Tientsin, on the railroad that connects the two great cities of North China, is a little station Chang Chuang,* (張莊) made momentarily famous as the location of the chief skirmish between the troops of Feng Yu Hsiang and Wu P'ei Fu in November, 1924. Incidentally this action temporarily interrupted the study. Three miles southwest is the market town of Huang Hou Tien, (皇后店) (which translates into Queen's Inn). Only a mile away lies the large village of Chien Ying, (尖營) (formally known as Chen Chia Ying, (甄家營) but commonly abbreviated) which was selected as the center for this study. These are among the 800 villages of the county of Wu Ch'ing Hsien (武清縣).

This whole area lies in North China's great alluvial plain, the yellow "loess" soil of which is so rich that fields regularly flooded need no fertilization. The alluvial deposit has amounted to five or six feet in 200 years, (see P. 19) A very small river and a canal lie on opposite sides of Chien Ying, both being located some miles away, but near enough to constitute serious factors in times of flood. The fields belonging to this village lie on ground slightly higher than those of neighboring villages, which is the chief cause of its relative prosperity. Most of the land adjacent to the railroad all the way south-east to Tientsin is frequently inundated to a depth of several feet, so that, every few years, crops are totally destroyed. The heavy rains of summer regularly cause partial and temporary flooding, but not necessarily extensive destruction. The denuded mountains whence the floods come are some sixty miles to the north and west, hardly visible even on exceptionally clear days.

The spring preceding the study (1924) was so dry that the wheat crop throughout North China suffered considerable loss. In the summer occurred one of the heaviest floods in years, so that taking the most favorable estimate the farmers of Chien Ying suffered a 30% to 50% loss, and in some cases, even in that locality of slightly higher ground, a total loss of the fall crops. Corn, millet, and especially cotton, suffered. The sorghum (also called Kafir corn and Indian millet) (高粱) stood high enough out of water to be little damaged. Prices of staple foods were double the normal even in December, and the crux of suffering would be due in March and April, just before the following wheat harvest.

Population. (See tables in appendix)

The facts a village knows about itself are very few. Chien Ying consists of 306 "hu" (戶). A hu is literally a gate, opening on one of the two

* Pronounce Ch as J.

long main streets, "front" and "back", or one of the few cross roads. Within the hu may be as many as ten courts all under one family. (In this study "Chia" or family, is taken to mean the economic unit, the group which prepares its food and cultivates its farm as a unit). Or, the hu may include several brothers supporting their families independently, and living in one or more courts. In some cases two or three poorer families may live in the different houses around one court.

Politically the hu is the unit for taxation and the only basis of count. Therefore the question of how many persons live in the average hu, was one which had to be studied in order to estimate population. Of the 45 complete hu investigated, more than half had but one family each, and a third had two families. Two large clans of 37 and 43 persons were so exceptional as to have been omitted in making a general average. If the average be set conservatively at ten persons per hu, the population of the village would be just over three thousand. The population is reported to be increasing slowly, chiefly due to more immigration than emigration.

Of this population, it was estimated from the 555 persons studied that 25.7% were men; 35.2% women, and 39.1% children. An explanation is due as to what constitutes a child and an adult. Since well over half of the population is married by the time they reach sixteen years, and the boys have long before that shared all phases of farming, and the girls all sorts of house work, the division between adult and child was taken to be the married state, or "18 sui" (歲) which is approximately 16½ years*.

Almost the entire village are Chinese, all are thoroughly Chinese in custom; but two or three families trace back to a Manchu origin, now all but forgotten. There are very few really old people in the population.

Agriculture.

One of the few matters of common knowledge is the area of the village and each family's holdings and liability for land taxes. "Paring the long and patching the short of it", as Mencius says, the land owned by the villagers is 4 by 10 "li", or about 4½ square miles. This makes approximately 7000 "mu" (a "mu" (畝) is ⅓ acre). The farmers estimate 4000 mu of this is first grade land, alluvial, needing no fertilizer, selling at \$30.00 **and renting at \$3.00 a mu. About 2000 mu is sandy, needing fertilization even for such crops as peanuts, selling at \$20., and renting for \$2. The remainder is too salty for any crops and is useful chiefly for willows and brick kilns. This sells for

* A Chinese is in his first year at birth, in his second after New Years, and so on. Therefore, if a child is born shortly before Chinese New Years, he may be reckoned as two years old when he is less than two months. In asking a baby's age it is usual to ask the months, or if it has passed a birthday. Thus the Chinese reckoning by "sui" averages a year and a half more than western years.

**All money quotations are in local currency. The Chinese dollar fluctuates around \$45-56 U.S. Gold.

\$10-\$12, and rents proportionately. This land could produce commercial salt by evaporation, with the expenditure of a little labor; but salt is a government monopoly, and the people are forced to buy poor quality at high rates, which is a real grievance. Land along the village street where all houses are gathered is naturally worth two or three times the value of the fields outside.

A leading elder estimates that four fifths, or more, of the villagers own land, and that the mode is 20-30 mu per family. Not all of the landless families are poor, a few depending for a comfortable income on members of the family working in Tientsin or elsewhere. It is obvious, however, that most of those without land are the poorest, and, lacking land, they have an insecure income. A few families, recently moved to the neighborhood, rent land and make a comfortable living.

Since inquiries were made almost entirely from the women of the various families, it was not possible to get accurate details concerning agricultural matters. It was rarely possible to talk at any length with the men of other families than the hospitable home where "Teacher" lived. Moreover it is a custom to modestly minimize one's land holdings, so that a family having in reality over 100 mu would reply that they owned "several tens," an answer most delicate to probe. Since this was the case, one of the subjects of supplementary study by the two Chinese men trained in social work, one of whom was a native of the village, was the holding of each family that was studied. Partly due to the above difficulties, partly due to the fact that each family had been questioned concerning the area cultivated, the answers on the question sheets varied greatly with the facts. The cases where the family had claimed to cultivate more than it was later ascertained that they owned, are undoubtedly due to the fact that many families rent or "tang" extra land. In Dr. Buck's survey of 200 families in the Wuhu district, it appears that those who both rent and own are more prosperous than those who merely own, largely because the holding is then large enough to farm efficiently.

Land or houses may be rented, or mortgaged or "tanged"*(典) if the farmer has not money to own them outright. In the case of "tang" the owner is given a sum of money, say \$20, for a small house, for a period of three or five years, without interest, while his house (or land) is being used. At the end of the time the tenant may extend his lease, by repeating payment of the sum, or the owner may return the money, entire. In case the tenant wants to go before the time is up, and the owner does not wish to return the money, he may sub-tang, or tang to others, who, in the end, receive the returned sum. If the house is injured by floods, the tenant must repair it or receive less money in return. If it burns down, he must rebuild, or forfeit the sum. What it really comes to, is that the interest on the money constitutes the rent. This method is used extensively in that part of the country. Renting fields in years of flood or draught cause grievous loss to the poor—loss not only of crops but of rent.

* local pronunciation for "tien"

Of the 82 families studied, 16 owned no land,

12	"	1-19	mu
18	"	20-39	"
11	"	40-59	"
5	"	60-99	"
5	"	100-200	"
4	"	200-500	"
(village headman)	1	"	over 1000 mu

This makes an average, including the very exceptional holding of the village headman, of 51 mu per family. Omitting the headman, a fairer average comes to 30 mu per family. This average is too high to be entirely typical of the village as a whole. There were many reasons why the families studied were predominantly those slightly more prosperous, and included a few really well to do. The families of all school children and Christians were studied and the relatives of the hosts were accessible.

It seems to be a general Chinese practice for farming land to be held in many small pieces. Villages offer no adequate investment for savings, so the successful farmer adds a piece of land wherever he chances to find it, when he has a surplus. The disadvantage has often been pointed out that implements, animals and workers have to be transported, often considerable distances, to work one piece after another. This is true, but there are no big machines, difficult to transport. There are two considerable advantages in the system. The good land is not all in the hands of the well-to-do and the poorer land in the hands of the poor, so that in times of drought or flood, (and nearly every year is more or less too dry or too wet, and a first rate crop, both spring and fall, is almost unknown), the poor man does not lose his little all while the great man prospers exceedingly. The second point is that most families will have pieces of high land and pieces of low, so that whatever the weather, it is favorable to some field; if too dry, the lowland crop is good, and if the season is too wet, the higher ground is safe. In this way no year but that of most extreme drought and flood is a total loss to the farmer.

The few largest holdings in the village are breaking up, due chiefly to the gambling or opium habits of these wealthy men. The number of farmers owning land is said to be decreasing, owing largely to natural disasters and war, which has more than once centered in this crucial place between the capital and its chief seaport. The land sold is more and more being bought up by those outside the village. However, the problem of absentee landlordism is not, as yet, serious.

Farmers say that one man alone can farm 10 mu; with one animal, 20 mu, but that with two animals he can farm 80 mu. The many families who have only one animal apiece usually cooperate, thus making it possible to cultivate more land.

Of the 306 hu in the village, 110 own animals, totaling 153 head. This bit of statistics happens to be known because special taxes, like war levies, are collected on animals, a horse or mule being taxed \$2.00; a bull \$1.00 and a donkey \$.80 a fair and clever way of taxing wealth. A good mule is worth \$150-200 (silver); a horse \$100 up, a bull \$70-80; and a donkey \$60-70. Almost two thirds of the village are without animals, where only half of the families studied own none. Only one tenth of the whole village owned two or more animals; one fifth of those families studied. Again, it must be admitted, that the study is not entirely representative, even of that village. Nearly every family owns one pig, and many have more. Almost all have a few chickens; a few own goats, ducks or geese. A nearby village has a flock of sheep.

This study cannot go into any agricultural detail. It might be mentioned, however, that the chief crops of the locality are, in estimated order of importance, first, sorghum and Indian corn, millet, various kinds of beans, cotton and peanuts, for the autumn crops. The spring crop is wheat. There are a few small orchards in the neighborhood, growing peaches, pears and apricots; while so-called "date" * trees grow in many courts. Most families would have small plots of cabbages and turnips, and only rarely other vegetables for marketing. Most families would raise a surplus of these articles, except, in bad years, to be sold in the neighboring market town, whence the surplus beyond local needs would be taken by the middlemen to the big cities.

The farmers estimate that fifteen years ago the profits on the crops from one mu of land were \$2, which would buy 50 catties of flour, (1-1/3 lb.-1 catty.) Now the profits are \$3. a mu, but the purchasing power has dropped to 45 catties. The cost of all commodities has gone up. This is especially true in such a year as this, when drought, flood, and war all combine to upset economic conditions. My host, supporting six adults and three children on 100 mu of land, saves \$500-\$600 in good years.

Farm laborers are relatively scarce in the region, so that in the busiest season wages are as high as \$1. a day. During ordinary times, however, the wages for this and other forms of semi-skilled labor run about \$.20 a day, food always being included. Farm workers far prefer, however, the dependable position of annual contracts, receiving only \$30. a year beyond food and lodging; (food has been generously estimated at \$4. a month.) In all families under observation, they have been entirely well treated, fed everyday food such as the family eats, sometimes sharing better food prepared for guests, and certainly being better fed than in a very poor home. They may or may not eat with the men of the family, and usually live in a separate room, but one not necessarily inferior to the other rooms in the home.

Just before and during harvest, the countryside in most places is dotted with high platforms hooded with matting, in which some member of the family stays every night to watch the crops. Good fishing preserves are

*Jujube (*Zizyphua jujuba*) (棗)

similary guarded. Chien Ying, however, taxes its people 20 coppers* per mu, and hires ten men to guard the crops. There is relatively little pilfering. There is also the regular village watchman, who, according to universal custom, makes his rounds clattering his rattle to warn intending thieves to do their business elsewhere. When the crop is harvested, however, and is piled high around the threshing floor, which is usually an outer court, adjacent to the street or fields, and unwallled, a tepee of stalks is built, where the man of the house sleeps, his dog sharing the guard in the most exposed position. One or more dogs can be heard barking all night long. It is curious that after the grain is stored in a houses, the threshing floor is then fenced with sorghum stalks buried in a shallow trench, interwoven and tied, making a really effective and inexpensive protection, since no man or beast can get over or through it without destroying it, which would make a clatter that no conscientious dog would overlook.

Crops are cut near the roots, (which are later dug up for fuel) and in case the family has no cart or animals, carried home to the threshing floor hung to the ends of the long shoulder pole. Here the heads of grain are cut off and the stalks stacked for fuel. A few chosen heads of sorghum and millet are threshed by hand, that the stalk may not be broken. These are later made into brushes by an itinerant craftsman, (at 2 1/2 coppers a brush.) The wheat straw is carefully saved in bundles to weave hat braid during the long winter months. For the rest, the heads of all grains and the entire bean plants are severally spread on the open space and threshed by leading an animal around and around dragging a small stone roller over them. The crop is turned and rolled, repeatedly. In families without animals, the roller is dragged by men. Women may lead the animal and turn the heads. As a rule men do the winnowing, throwing a basket full of grain into a high arc, so placed that the wind carries the chaff into one pile, while the heavier grain falls in another. The process is usually repeated several times. The chaff is gathered and saved as part of the food for pigs. The grain is swept up, dried on mats and stored, usually in a separate room of the family courtyard, in huge baskets of matting, which may be 5 or even 10 feet across and many feet high. Vegetables are stored in great pits in the courtyard to prevent freezing. The pits are roofed with poles, cornstalks and mud, with matting over the entrance. When war comes too close, valuables, and even people, are hidden in these pits, which are, however, too universal and obvious to be very good protection. Peanuts are sifted in the field, by the men. Corn is husked and shelled, beans are shelled, and all other lighter work of the threshing floor is done largely by the women and any children over eight or thereabouts. Woman's work on the threshing floor is largely sitting down, and is very sociable, especially as it is so often adjacent to the street. Women in this neighborhood rarely work in the fields, except the few poorest; but after harvest the poor women and children go to glean in the fields which the

* In 1924 a copper was worth 1/4 of a U S cent but its value is steadily declining

farmers have finished. The wonder is that there is anything to gather, after the stumps and scraps have been pulled, raked and collected. But for some weeks in the early winter, poor families can glean enough straw and stubble not only to keep their own fires, but also to sell for a pittance and feed the family.

The cotton is picked before it is all fully blown, that it may be sunned and stored in the more easily guarded spaces around the home. Cotton picking is the last of the fall harvest. After this, the men go again to the fields to put in the winter wheat, using hand made, iron-tipped ploughs, and single or double seeders, trampling the seeds in with their feet. When this wheat is up three or four inches and winter cold stops its growth, the animals are pastured on it, thus saving about twenty cents worth of fodder a day, and doing no harm to the crop. While the wheat is ripening, the next crop is put in between the rows, and after it is harvested, it is replaced by a later planted fall crop. The Chinese, like the Indian, makes his succotash in the field, planting his beans between rows of Indian corn or Sorghum.

So much for the untechnical observations of one agriculturally untrained. In general the Chinese farmer wastes nothing whatever but human time and energy. But all his traditional lore and endless patience and labor are not enough. Anyone can see the difference between the crops of peanuts or cotton from local as compared with American seeds. Agriculturalists in China urge the use of better seeds and better methods, to improve the economic condition of the farmers as a whole.

Trade and Supplementary Crafts.

It has already been stated that the market town is only a mile from Chien Ying. Markets are held on every 2, 4, 7, and 9 occurring in the moon calendar, that is, four times in every ten days. Men gather from villages within a radius of five miles or more, bringing in bags of grain and beans or vegetables, or baskets and other craft products, for sale; and buying oil, tea, condiments, kerosene, meat, tinware or other necessities of life. Crops are sold bit by bit, the well-to-do, especially, waiting to sell until or only when prices are relatively high, while the poor sell now and then as they have need for cash. The market streets are jammed with people every time, animals are brought for sale, and every possible article of common use is to be had. Poor women and children hang around the grain market, eagerly brushing up the grains that are dropped during the measuring, and these are later sifted from the dust. Soups, bread, sweet potatoes and other foods are offered on stands or wheelbarrows to the hungry farmer from far away.

This market town must have a mile or more of regular shops, covering every local need. The large proportion of the population are chiefly engaged in trade or manufacture, but on the other hand, most of these same families would own or rent enough land to produce much or all of their own food.

The village of Chien Ying has no stores. Its four places of business are

two hot water shops and two small inns, at any of which only trivial articles, such as tobacco, candies, and nuts, are sold, outside the regular business. Since almost no cold water is drunk (an age-long sanitary precaution) and since every guest of any degree must be offered tea, boiling water is incessantly needed. Few families waste the fuel to boil water for themselves, (unless in winter the well-to-do supplement the warmth of the brick platform bed with a tiny portable coal stove), so the hot-water shop is a well-nigh universal institution. Hot water is sold for about a copper a quart, and since the teapots are usually much smaller, they use bamboo tallies similar in value to the "cash", or punctured coin common in most parts of China. An economist has said that one can judge the economic standards of a society by the smallest unit of exchange. This is less than 1/50 of a U.S. cent.

The villagers are not dependent on the market town for all their purchases, however. There was no opportunity to study accurately the relative amount of trade in Huang Hu Tien with that from the itinerant peddlers in the village, but one would guess that outside the larger transactions in grain, animals, carts and the like, the greater quantity of trade was carried on at the village doors. All manner of edibles, live fish in tubs, all local fruits and vegetables, cloth, notions, embroidery patterns, crockery, ironware, baskets, coal, meat, toys, candy, nuts, and cigarettes, soap and lotions, old clothes,—indeed more than twenty kinds of wares pass through the village, transported usually in baskets swung from the shoulder-pole, or on wheelbarrows, and occasionally in donkey-paniers. Two or three men a day pass with the things in common need, as cloth and thread. There were always four or five vendors of fruit, candies and cigarettes in different parts of the village, showing the waste on luxuries, even among the poor. Sweets are constantly bought to avoid that intolerable condition of life, a child crying.

Every peddler has his own peculiar chant or cry to advertise his wares. Less often than in the cities do they use mechanical sounds, rattles, tuning forks etc. to announce their services.

The candy and fruit vender has a bamboo tube filled with protruding sticks. These he shakes and the prospective buyer has three chances to draw out a trio of sticks to see if he gets the lucky sum of dots. Thus they gamble in transactions of even a copper or two. There is similar drawing of lots in temples where the gods cure disease. In accordance with the chance number on the stick, the suppliant receives a prescription for his ailment.

Besides the peddlers there are many itinerant craftsmen, repairers of shoes, (for such as do not patch for themselves;) the tinsmith, and blacksmith, repairers of pails, bamboo-ware and baskets, sieves and dishes. They camp beside the hot water shops or public mills, remaining as long as there is work for them. There are those, also, who buy eggs, old iron, rags, cotton batting, and cat or dog skins. (Mine Host says that the only people dogs really bite are these last. However, one would not trust a dog in his own courtyard not to bite an intruder unless properly introduced and accompanied by some member of the family.)

These various peddlers and craftsmen mostly live in the villages round about, supplementing their farming by winter work. Some are sent out from shops in the market town, as for instance those representing the cloth merchants. A few, like the blacksmiths, take their bedding and cooking utensils along with anvil and tools on a wheelbarrow, cooking over their forge, and sleeping in the inn wherever they happen to be working, not returning home for months at a time.

Among the families studied, there were many supplementary winter trades, of which the peddling just described was the most frequent. One family put up the matting sheds used at funerals and weddings, and also made malt-and-sesame candy. Another made a sort of translucent bean-macaroni.* Some wove matting, sewed together the tops and soles of shoes too heavy for the women, sold notions at home, wove willow baskets, made cheap musical instruments, burned charcoal or raised bees. Some ground flour for others, used their animals, wheelbarrows, or carts to transport men or goods to market or the railroad, or did ordinary coolie labor. All but the most well-to-do women constantly weave hat braid during the winter, while they mind the baby or gossip with the neighbors. Twenty or thirty women and a few men are employed, at 19-30 cents a day, sorting, patching winding and inspecting hat braid, in the two homes which run that business. A few of the poorest women sew for others, and one made flowers, providing her own materials and selling the product at a couple of coppers each.

The income from these trades is very hard to ascertain, since no records are kept, the work is usually done by the family, and the materials used are largely home grown. The hot water shop takes in about three dollars a day, but has heavy expenses for coal, etc. Most of the itinerant venders and craftsmen earn little more than enough to pay for their food and lodging. If the best of them save a few dollars in the winter months they are doing well. Shoesoles are sewed on for 14 coppers a pair, and 6-7 pairs can be done in a long days work. This is almost clear gain, for only the hemp thread is provided. But to learn this trade a lad worked four years as apprentice in Tientsin, receiving only his food and bed, such as it was, and working 12-14 hours a day. The "macaroni," malt, and honey would yield considerable profits, but the materials are home grown, and they themselves keep no record of the profits. Matting weavers can clear twenty cents a mat, which is a full days work of one adult, either man or woman. The itinerant workers who gin and tease cotton, can make 140-150 coppers a day per man, from which they also must pay board and lodging and transportation of their ginning machine and great old teasing bows.

The House

Village houses in North China are largely built of mud, though those of the well-to-do are of partially baked brick with tile roofs. The base of all

* Fen t'iao-erh (乾粉條)

walls must be of brick to protect them from the greatest moisture of the flooded seasons. Above this is commonly an inch thick layer of straw to insulate the upper wall from dampness. Then the walls are built up with sun-dried mud brick, stuck together with more mud. The weight of the roof is borne on the upright and transverse beams, usually unhewn trunks, which constitute the main expense of housebuilding in this land where wood is scarce. The number of transverse beams, usually ten or twelve feet apart, count off the rooms (chien). The average house is three or five rooms long, costing \$30. a room to build. Brick construction costs nearly \$100. a room, in Chien Ying. The mud house, with its grass-grown mud roof, will last, with repairs, twenty years, or more. The loess soil is clay, very fine and hard. It is usually mixed with straw for building.

The courtyard faces south, the main house, where the elders live, being the northern building. This is five rooms long, for the larger homes, and in many cases, in this particular part of the country, the two end rooms are thrown together, making exceptionally large, airy apartments. In winter, the inner half may be curtained or papered off, to reduce the space to be heated. If the five rooms are divided, the inner or end ones are more often used for storage than residence. Entry is always through the center room, which is kitchen, pantry and hallway. Here too is the picture of the Kitchen God, (Tsao Wang), pasted over the fire, and often the carved shrine in which are placed the ancestral Tablets. There is usually an altar here, as in ancient Greece.

The three room side buildings are used for the residences of sons or younger brothers and their families, for storage, or for the animals, as the size of the family indicates. All windows, generously large, at least four feet square per room, open on to the court. These are papered for the living quarters, usually having some scrap of glass pasted in, to afford outlook. In summer, sections of paper are attached only at the top, rolling up and down for air. This space is occasionally screened with netting in the more modern homes. In winter the largest ventilation ever given is a two inch hole at the top. One household may have many such residence courts, usually connected through the central passageway, the northern one being the most honorable. Side court may be semi-detached for branches of the family, or may be used for animals, for storage, or for a threshing floor.

As previously explained, several courts may be organized as one family, or, on the other hand, the two halves of one building may belong to independent families, not even related.

No detailed report can be made on overcrowding. Any reasonably well-to-do home has plenty of rooms, but for considerations of warmth or sociability they may not all be used for residence. Few Chinese would choose to sleep alone. The estimate would be an average of not less than two adults and two children to a room. In poorer homes, however, there would be as many more than this, as there would be less in comfortable homes. The crucial facts of overcrowding, however, would not seem to lie in numbers,

but, first, in the absence of ventilation in cool or cold weather; and, second, in the problem involved when children and adolescents sleep on the same k'ang (see below) with their parents, where no privacy, on even the most intimate matters, is possible. It is the custom for the poorer people to undress completely every night, in order to turn the clothing wrong side out to lessen the productivity of undesirable insects.

The Furnishings

Each corner inside the central door is filled with the great pot, two feet across, ten inches deep, of very thin iron, built into the masonry that leaves a stoke-hole underneath. The flues pass into the next room, where they run back and forth in a network of clay bricks, the "k'ang" (炕) a platform built under the window, at a height of 18 inches to two feet. The flues then go out through a low chimney at the far front corner of the room. The k'ang occupies one half to two thirds of the floor-space of any room. When new-built this is a comfortable system of heating, warming that part of the room where folks sit, eat, work, and sleep. When old, the clay cracks, and smoke leaks through into the room. The materials which the clay absorbs from the smoke make it valuable fertilizer when the k'ang is broken up and re-built, every five or six years.

The k'ang is edged with wood or cement, sometimes faced with brick or plaster, and is covered with matting. Quilts are often spread during the winter. On the center of the k'ang is a table not more than ten inches high, and in the corners are neat piles of the family bedding made up of large cotton quilts. Even in this cold climate, sleeping on a warmed k'ang with several people occupying a room closely shut up, one thick quilt is ample covering. It is the general custom, except for very small babies, for each person to lie wrapped in his own quilt. Observation easily shows that few families visited in that village seriously lack bedding.

The remaining furniture of the room varies with the financial position of the family, but always includes at least a table and big boxes, with all the motley of household utensils. The table is opposite the k'ang, in the center of the wall, with a chair or bench on each side (rarely at the end of the room). Above it hang such scrolls, pictures or decorative writing as the family owns, and on it are displayed jars, the almost universal wedding clock which never goes, mirrors, tea cups, and other ornaments, arranged as far as possible symmetrically. In the center may stand the chief ancestral tablet if it is not in a special shrine in the kitchen. The walls are likely to be covered with some sort of pictures, clippings from newspapers, cigarette advertisements, or cheap prints, of luck-bringing babies, or of legendary scenes. Hardly a home in these days but has at least a few framed photographs of members of the family, and treasured picture postals*. The well-to-do home will have high cupboards where the clothes in constant use are kept, and great chests, that serve as tables, too, for storing better things. These are set up on bricks to

* Such as an uncolored photo of the wharf at Seabeach or the post office in Smithville!

protect them from the damp of the brick or dirt floor. In the poor home, all farm implements as well as things for household use must be kept in the house, presumably in the crowded kitchen.

An attempt was made to list the belongings in one of the poorest homes in the village, but the items were far too many. Innumerable are the crockery jars, large and small, for foodstuffs; baskets of all sorts, especially the universal one that hangs high out of the reach of cats and dogs, for the leftover bread from meal to meal; bottles for condiments and oil; the ubiquitous Standard Oil lamp, and sometimes the little dingy hemp-oil lamp on a tall stand like a candlestick. A box of hairdressing utensils, soap dish, basin, sewing materials, old shoes and the like are certain to be lying round. A high shelf piled with books may indicate that some present or former man of the family was to some extent a scholar. The family towel, none too clean, is certain to hang over the door. The doorway is hung in summer with a reed screen, in futile pretense of keeping the flies out of the living apartment; in winter with a wadded curtain, which also substitutes for roller towel. In the kitchen are all the bowls, bread boards, brushes, choppers and other utensils of food preparation.

Very few articles of common use come from "the West," even in a town so easily accessible to foreign trade. The universal things are the Standard Oil products and cigarettes. (There is no such universal propaganda for Christian missions as for the Standard Oil Company and the British American Tobacco Co.) Many articles come from other parts of China, however, even from relatively distant parts, or from Japan. Tea, salt, condiments, (cloves and other spices being generally used), cloth, crockery, toilet articles, and some other things, are brought from outside the neighborhood, (neighborhood being defined as the area served by the market town.) The surprise is rather how much of what they use is locally grown and manufactured;—hemp for home-made thread, rope, and lubricating oil; cotton for thread, (still spun by a few women,) and for wadding garments; sesame and peanuts for the common cooking oils; ploughs and other farm implements; coarse paper, and many other things. A few men are buying cheap foreign-style overcoats, hats and even leather shoes, but clothing is still almost entirely home-made.

FOOD AND COOKING.

The diet of the North China farmer recalls the Kentucky mountaineer, consisting largely of corn meal mush, corn pone and beans. The farmer eats three meals a day during the busy season; at daylight, noon, and dark; and two during the winter, in the middle of the morning and early afternoon. The children might almost be said to eat all day, nibbling bread or turnips or something, whenever it occurs to them. Every meal consists of three things even for the poorest, unless under famine conditions:—a porridge, a bread, and a vegetable, which is usually "salt vegetable," a small quantity of turnip soaked for a year in brine, the universal savory. The vegetable may be turnip or beans boiled into the mush, or cabbage fried in a little oil, or, for

the prosperous, fish, beets, sweet potatoes, a variety of bean products, onions, and on great occasions, meat prepared with some vegetable.

For the poor, the bread and the porridge are chiefly Sorghum or Indian corn, the finely sieved portion making steamed corn-pone, the remainder being boiled into mush. Beans are often ground with the corn. Millet is some what more expensive. Wheat is used largely and in a variety of forms, mostly made by rolling dough and chopping it into macaroni-like strings, or flaking it into scraps, boiled in the great pot. Breads are also made of the whole wheat flour, (usually not raised); and vegetable fillings are wrapped into pancakes of dough to be boiled or steamed into dumplings. White flour and rice are almost never used, and only for the greatest occasions. Sweet dishes are rare. Peppers are used but little in this region, though extensively in parts of North China. Black bread made of tares (or darnell) is used by the poorest, and is sweet and palatable, if not so nourishing. This common diet is thoroughly eatable, though usually rather heavy, requiring more chewing than they commonly give it. The starches are disproportionately heavy. The poor people get too little fat and protein; but those in comfortable circumstances who use more oil in cooking, and eat quantities of beans in one form or another, get a more balanced diet.

There seems no quicker method of winning one's way into the hearts of country folk than to like their food, unless it be to care to learn how to cook it. The average meal is all cooked in one big pot, the cabbage fried first, with water added to make a soup, and then this is set aside in a covered bowl. The mush is next boiled in the bottom of the pot, the cornpone is slapped onto the upper sides in slabs the size of a hand, or there is a reed grating set over the liquid on which bread or sliced turnips are steamed, and the dish of cabbage placed to keep warm. Preparation and cooking of a simple meal like this takes a very short time, and while the fire is doing its work the woman fixes her hair or attends to other duties. The fuel being hay, twigs, or at best cornstalks, the fire needs constant attention.

But there are other things,—the dumplings, for instance,—which require hours of preparation, quantities of cabbage must be chopped up, (or leeks, or any vegetable); and if the father has happened to shoot a bird or rabbit, there may be meat added. Whole wheat flour is most elegant, but more commonly used is the red flour mixed with Sorghum, or green with ground beans. The flour is mixed with water only to form a stiff dough, which is rolled out into hundreds of thin disks two or three inches across, into which dabs of the filling are placed by the use of chopsticks. An oyster-shaped dumpling is made by pinching the edges firmly together. These are then boiled for ten minutes, and served with vinegar and garlic. It took four women three hours to make enough for eight adults and two small children to eat. Yet, in winter, they will prepare these dumplings once a week, or more, the men occasionally helping, which is a very sociable proceeding.

The elaborate preparation and cooking of a dinner for guests, however, may be very unsociable for the feminine guest, who must always arrive before

the cooking is begun. She may be left almost or quite alone while the women do the work. A man guest, of course, would be entertained and dined in a separate room with the men of the family. But if the guest be a woman, the men do not appear, eating outdoors, in warmer weather, or crouched on their heels in the center room, or in another of the family houses. In eight weeks residence in a Christian family, the father and son rarely ate in the room with "Teacher" and the elder women, and if they did, sat at the table, and never on the k'ang with the others, as they would, had the family been alone.

Phases of marketing have already been touched upon. Farmers obviously raise almost everything they eat. The few village families not farming, usually buy grain in the market town, vegetables at the door, and fuel from some neighbor. It has already been indicated that oil, condiments, etc. are purchased either from the peddlers or in the market.

Hygiene with respect to food is little known. Experience of the ages has taught them to drink boiled water in the form of tea, and largely to eat cooked food. It is only an occasional villager with some modern education who has any appreciation of the danger of flies, which are indescribably numerous, especially in the open kitchen. Dishes are inadequately washed, and the dogs and cats lick out the family bowls. The brush with which they clean out the pot is kept quite rigidly separated from the other brushes, but the floor brush or the family hand towel are used to clean the table on which bread and other foods are set. The dogs wait patiently beside the k'ang for bones and scraps, and the cat goes where he pleases, being so well fed, on the whole, one wonders how many mice he annoys in the rooms where grain is stored. The chopsticks may be wiped on the curtain, just where the dogs brush through, and it is an almost universal practice to scald out teacups and then wipe the inside on the family towel. These things distress our germ-conscious minds, but it is doubtful whether American farm women of our grandmothers' day would have done differently.

Babies are nursed whenever they make a fuss, up to the second or even third year, just as among the Appalachians. Before they wholly stop nursing, they are given any adult food, and tea. Large greasy doughnuts, bought on the street, and other particularly indigestible things, may be premasticated before being given to the baby. A child of three was whimpering on the k'ang. The mother explained that it had indigestion, and in order to pacify it, gave it raw turnip to eat. How do they stand it? Those not strong enough to stand almost anything, would have died in early infancy.

One primary part of food preparation remains to be discussed, the grinding of the grains. There are two kinds of mills; those where one round flat stone is turned on another, never, under my observation, worked by woman-power; and the kind where a stone roller or cylinder is rolled over a flat foundation. Wheat and finer flours are ground by the former mill, always by animals or men; the poorer people either going without, or borrowing the mill and animals of their neighbors. There were five public mills of the latter sort, and but few private families owned them. Most women ground daily, for

immediate use, pushing the roller with the aid of her older children or daughters-in-law. Sorghum was husked by this same process. Families owning animals usually did several days grinding at one time. These mills constituted one of the few social features of life for many poorer and busier women. Several might be waiting their turns. Neighbors passing would pause to gossip. In winter the idle men would gather on these prominent corners to pass the time of day. The mill corners supplemented market day as the news exchange for both local and political matters.

Clothing.

Chinese clothing is remarkably sensible, comfortably adapted both to winter and summer, inexpensive and hygienic. Men, women and children all wear trousers bound in at the ankle, and a jacket, which is longer for the women than for the men. For better occasions the men wear in addition the long gown reaching to the ankles, and open at the side so as not to impede walking. For the farmer's family, these are all made of most durable, heavy, cotton cloth, usually indigo blue. There are three weights,—the single, the lined, and those wadded, more or less heavily, with cotton batting. For complete comfort, two of each should be available for each individual, to facilitate washing. Those who possess them, wear single garments under and over the wadded ones, to protect these from soil. In any case the wadded garments are ripped up annually and washed, the cotton being thoroughly respread and if necessary supplemented, when the garment is made over. The same cotton wadding may be reused for as long as 30 years. For the poor who have no under garment, and live in the one wadded outfit throughout cold weather, the state of filth is unthinkable. In bitter cold weather, layer after layer of clothing is added, making an unwieldy bulk. The Chinese garment is loose and comfortable, except that it is flat across the chest, which causes city girls of the more stylish sort to use too tight undergarments. The string with which trousers are held at the waist need only be firm. Chinese stockings are made of similar heavy cloth, usually white, and also single, lined, or wadded, for the different seasons. Children under six or eight years old wear open trousers, so that when they sit down there is nothing between them and the cold stone or dirt. In winter a wadded square tied on behind prevents this, but in no way protects them from exposure to cold or chapping.

The chief difficulty about Chinese clothing is the time taken in the making. The seams are done with fine stitches, taken individually, either "over and over" or "backstich;" and each seam twice, if not more. The cutting and folding must be very exact. As in so many other matters, not a scrap of material is wasted, but endless human time and energy is consumed. This is even more striking in the case of shoes. Scraps of damp cloth are smoothed out in a single layer on a board, spread with flour paste and another layer put on, with infinite patience. Several thicknesses are used in the making of uppers, and very many layers are necessary for the soles of men's shoes. These stiff foundations are lined and faced, usually with new cloth, and stitched, sometimes at intervals of an eighth of an inch, often in decorative patterns. The soles

must usually be stitched with an awl. The poorer women do not even get help for the heaviest and hardest process of sewing the soles and uppers together. It takes a week or ten days to make such a pair of shoes, and men will wear them out in a month or two, and women who are all active in three or four.

FAMILY LIFE.

Family relationships

The question has often been asked, especially in working out budgets or minimum wages. "What is the average size and composition of the Chinese family?" This will vary with the locality and the income, but the modes and averages for Chien Ying may be suggestive elsewhere.

Defining the family, *stbe* as the economic unit, preparing its food and farming independently, we find as the extremes, a family of one and another of twenty-one. For the 82 families studied, the mode falls at five and the average at 6.3 persons actually living at home. If however, we count the 29 men who work in Peking, Tientsin, or elsewhere, contributing more or less regularly to the family budget, and the few children who are away at school; but still partially or wholly dependent on the family, we get 6.7 persons per family. As has already been said, one quarter are men, more than a third women, and almost 40% children.* This would mean that the average family would consist of one or two men in residence, two women, and two or three children. For convenience, we might say conservatively that the typical family consists of six, four adults, and two children, (remembering that marriage or 16½ years, is our line between child and adult).

Families of 13, 15, 16, 19, or 21 persons are obviously what we usually call the large family, or clan family system, where several sons and their families have remained with their elders. In no case did the brothers remain in one economic unit after the death of both parents.† They frequently continued to live in the same court, but supported their families independently. The well-to-do usually remained in the larger units, while the poorer families were more likely to split, even during the lifetime of one or both parents. It would seem that in homes of plenty, family differences were more easily overlooked; but with the very poor, disagreements were more acute, resulting in economic division. This division of family property is usually arbitrated by some elderly neighbor. In general, at the death of the parent all sons share and something may be set aside for the support of younger daughters, who would live with a brother, presumably the eldest, until marriage.

A few cases will illustrate the causes of the break-up of families into small units. One poor old widow has two sons. The elder is strong and happy-go-lucky, with a wife selfishly rejoicing in the fact of never having borne children. The younger son is going blind from trachoma, and his wife is very lame, though not helpless. They have lost three babies. These brothers quarrel, so the elder and his wife moved out, supporting themselves very comfortably

* See appendix p. 41

† Brothers and even cousins are said to remain together more frequently in the South.

on rented land and by day labor. The younger, though left with the entire very meagre patrimony, finds it impossible to feed his mother and wife without assistance from relatives.

One very young couple and their child moved to a room in some neighbor's house, because he was a gambler and good-for-nothing, and his family quite clearly had turned him out to shift for himself. In many cases, however, there is no evident dissension in the family, but the several brothers each attend to their own affairs, around the same court, sharing the same threshing floor and mill, and frequently owning an animal in common.

In this connection, let us recount the whole interesting history of the Sheep family. Mr. Sheep had been a Christian, and had prospered in business. He had gone to Tientsin to work for a few years, became just a little too prosperous, perhaps, and had bought a concubine from the usual shameful source. When he brought her home to the village, his wife committed suicide, and was discovered by the small daughter hanging dead. The man was immediately put out of the church as soon as he came home. Missionary friends took the two girls to the city to school and made it possible for them not to return except at rare intervals, for short visits. The concubine has had no children. The older son and his family of several small children have their independent home in half of the five-room main house. Now the sixteen-year old wife of the younger son has been fighting hard with the concubine for two years, though they, too, run their separate household in a side building of the family court. When the concubine beats the girl, the father takes his daughter-in-law's part and beats his concubine. At last one day, an elder woman in the tribe came into the Chapel all eagerness to share her news.

"Sheep family is fighting again." She sat on the k'ang and related how the little concubine had finally run away to a nephew's home, (chief elder of the church), and refused to go back. There had been blows all around, and even wounds, it seemed, and the poor woman actually threatened to return to the life from which she had come, rather than remain. The breach was patched up again, however, and there is armed neutrality in that little court. The concubine locks her room when she leaves it, and the girl does not appear while the other is around. The whole makes grist for the gossip mill of all the neighbors, and they grind it fine.

Except for such disrupted homes, most families include three generations, and many have four, women are often grandmothers at forty or earlier, and may be great grandmothers before sixty. Although most homes would include elders, few of these would be really old. Only 4½% of those studied were 60-70 years; 3% 70-80 years; and there were only five over eighty, mostly women. The oldest individual was 89 years old. It is a strenuous life, and old age arrives early. There are few widowers and many widows, for men freely remarry, and women only if their own and their husband's family are entirely too poor to support them. A widow must wed a widower, if she marries at all.

Great honor is paid to the woman, who, widowed early, remains true.

In many places arches have been erected by the Imperial government to faithful women widowed over thirty years. The exceptionally fine marble arch near Chien Ying bears the legend that the man had been murdered and the widow herself, in default of men in the family, secured retribution. At her death the arch was erected at the graves of the couple, with a marble table laden with offerings before it. In 200 years, the table and base of the arch have been completely buried in silt from the almost yearly flooding.

Family Terminology

As an example of the subordination of the individual to the family the matter of names may be taken. A baby is given a "milk name," which may be humorous, like "Little Pig;" register the family disappointment at having a girl, as "Golden Brother," or "Good Son;" or may have some charming meaning, like "Jade Jewel" for a girl, or "Little Love," or "Excellence," for a boy. The name sometimes apparently has no particular significance. If the child goes to school, a more dignified name is given, and incidentally, this may be quite freely changed, to the annoyance of school registrars. Such names usually have very pretentious meanings. Ideas of purity, beauty, grace, run through girls' names, ideas of literary ability, patriotism, strength, for boys. Chinese will know that certain characters clearly indicate boy or girl, (as we would have no doubt of Charles or Mary), but other names might be for either sex, as for instance, there were a man and a woman student, entirely unrelated, at Yenching College, both named "Strong Earth." A mature man will also have a "hao", a formal name, by which even strangers may address him, a highly complimentary name, bestowed by some friend.

But the curious part of it is that names are used almost not at all, especially in the villages. A little child's name may be frequently used by relatives or friends, or by elder brothers and sisters. But the child is more commonly called "Third Sister" or "Great Son," and inevitably so by the younger children. For example, a fine 18 year old lad named "Self Faith" was never called by name at all, but always addressed and referred to by his parents and other elders in the family as "Fourth Son" (incidentally, the older three had died); by his sister, as "Older Brother;" and by the hired men as "Old Fourth." His letters were addressed by his "hao". His sister-in-law used the term "Our Youngest (literally *old*) uncle," from the point of view of her children, this illustrates a point most confusing to the outsider, especially a foreigner. They never say "my husband" and rarely "my son or brother," but usually designate the person as "Little Splendor's Father," or "our Grandfather," collectively from the point of view of the children. The preacher's wife, a fine modern woman, called to her daughter-in-law,—"Little Ceremony's Mother, come cat."

There is no word for "uncle" in Chinese, but there are different terms for Father's elder brother, his younger brother, Grandfather's elder or younger brother, and entirely different terms for relatives on the mother's side. The

designations for aunt are as numerous and as definite. Cousins, however, are puzzling for the opposite reason. Since the sons of one family all live together, their sons are counted in one series. Babies dying shortly after birth do not count at all, but any who live long enough to establish an identity remain permanently in the count. Thus:-

"Are all the these children brothers?" "Oh, yes, Here is Great Brother, Third and Fifth and Sixth and Eighth."

"Oh, no, I have only this one, "patting the Third, "Great and Fifth are Our Elder Uncle's. And Sixth and Eighth are Fourth Uncle's."

Unless they are pinned down in that way to definite parenthood, family terms may be very vague. Imagine the difficulties of determining the number of persons in a family, their relationship and ages, when this is constantly happening:-

"Are you all one family?" is asked in a room crowded with women and children.

"Yes, this is our daughter-in-law, "(having already found out that the old lady had but one son living,)" and these our two grand-daughters-in-law."

Then, turning to the daughter-in-law,

"How many sons have you?"

"Just this baby, the others all died in infancy." So the wondering question is asked as to whom these granddaughters-in-law belong.

"Why they are in Third Grandfather's family, living next door."

It may be guessed that with family terminology such as this, with all the neighbors and all branches of the family crowding into the room to satisfy their curiosity, and asking the "teacher" almost as many questions as she herself was asking, it took many visits, and the Evangelist's help, to unravel some of the families.

In short, a man's name is rarely used, and a woman's name practically never. There are 100 surnames in China, and some of these are uncommon, so there will be numberless families in one village having a common surname, though they may be of entirely unrelated stock. (It may be mentioned that Chien Ying is properly named "Chen Family Business," indicating that once it was the home of the Chen tribe. It is decidedly unusual that that tribe is no longer represented by anything but graves, though surviving members of the family regularly return for worship and repair of the graves. Most villages are named for families, and that particular clan usually continues to predominate in the place.) Since there are many named Chang, it is not always enough to say that this is Chang Three. It may be necessary to distinguish him by his name. But a woman is nothing but so-and-so's wife, daughter, or mother. If she returns to her own home, she is only "Second Aunt". Even if she registers for a class in reading the Thousand Characters, at best she combines her maiden surname with her married name; she has no name of her own.

If a woman has no child by way of which to address or speak of her husband, she may speak of him, or of her father-in-law, as "Our Family

Head" or "Our Business Head." Speaking to or of members of another family, the family status is still usually used, as "Here comes Second Grandma Horse" or "Come in, come in, King Elder Sister-in-law." In addressing people, it is generally more courteous to use name and title than to say "you."

The Woman in the Home.

If a woman is asked about "her family," she will always reply concerning her husband's family, unless the question specifically refers to her *Mother's* home. Relationships are traced wholly through males. It is probable that in the distant past, China, too, followed the metronymic system for legendary references suggest it, and the writing for surname is composed of two words *woman-born*. A sister's son is called "Outside born". Maternal relatives are not of the "family," but are classed under different terms. Therefore the average family almost always consists of relatives on the father's side. It is a rare generosity that takes in some aged and uncared for relative from the mother's side. Only now and then do a daughter and her husband live with her parents, and then only when his family are all dead, and the young people are extremely poor. If a husband is called to work elsewhere, and has no parents with whom to leave his family, they may temporarily return to her parent, to whom the husband sends funds for their support. But the widow or deserted wife who has "in-laws" is expected to remain permanently with them. An old couple, without children of their own, adopted a son, who proved worthless. Immediately after his marriage he disappeared into army service, and may have been killed for all they know. His clever little wife is now studying to be a Woman Evangelist so that she will be able to support the old people, who are already too infirm to work very hard.

Little can be said of the relationship of husband and wife, from any intimate point of view, for the very simple reason that except in the Christian home in which "Teacher" lived, she rarely saw the men at all, having little chance to observe husbands and wives together except in the relation of eater and cook. Pleasures are not taken in common. If there are men guests, the women may not even appear to serve the food. If women guests, the men may or may not enter to join casually on the edge of the gossip, but certainly do not eat with the women. The men congregate at market or on the street corner, in the leisure of wintertime, and the women on the k'ang for gossip. A few old folk of a rather disreputable class, mix for gambling. The women take little or no part in conversation if men are leading it, even in the family.

The elder woman in the home does, however, hold the purse strings so far as domestic expenses go, and it would seem to be a common household treasury. There are notable exceptions, where the woman is head and heart of the house. Grandfather Open is mildly "cracked," his weakness being religious, for he contentedly belongs to both Protestant and Catholic Churches, in the village. It is Grandma that runs the house and farm. What is more, when her eldest son was only a baby, she started an industry that has affected thousands in that and neighboring villages. Through some middle-man she learned that Germany wanted hat braid, learned how to weave it from the

local wheat straw, taught her neighbors, and all winter, bought it in large quantities, bound it in commercial sizes, bleached it and shipped it in bulk to Germany; a business that handled thousands a year. During the war, only such limited quantity could be produced as was demanded by Chinese trade, but now the business is reviving again.

With rare exceptions, the women travel little, cannot read, and have very little knowledge about public affairs even within the village. In less modernized places, the women could not appear on the main streets at all, and might not even recognize their next door neighbors. Here, there is greater freedom. Limitations exist, however. When "Teacher" and the Evangelist were invited to watch the seven sons of a well-to-do family making the bean-macaroni, the various sons' wives followed into the side building of the family court, to watch the process for the first time. That they had never seen it before would hardly be fear of bothering the workers in so large a room, nor indifference in a land full of curiosity. The Evangelist explained that the sisters-in-law should not see Second Brother with his coat off, in the intense heat of the steaming kettles. City rickshaw runners and other coolies do all their summer work stripped to the waist; but these women are sheltered in the home. Another time, a young woman evinced the greatest embarrassment at almost intruding where the brother-in-law was washing his chest crouched with his back turned to the door, his coat very modestly flung across his shoulders.

The hat braid is one of the few things a woman can make for sale. Even so it is doubtful if she could support herself on such a pittance. Some few poor women are servants in others' homes, receiving a couple of dollars a month besides their lodging. There is little demand for such workers in villages, for most families have poor relatives needing help.

One hears a great deal about mothers-in-law. Even in the West, they are almost as popular a joke as step-mothers, and their cruelty is undoubtedly partly founded on fact and partly grossly exaggerated. The great contrast lies herein, that in China, the wife is never mistress in her own home so long as there is a mother-in-law living, and at all physically and mentally able to carry responsibility. Even where the mother is in all things fine and lovable, the daughters inevitably resent their lack of independence and freedom, the fact that they are treated like children, and that they have no final authority over their own sons and daughters. Contrary to American practice, the married daughter returning to visit in her own home is the guest,* is waited on by her sisters-in-law, though they may be her seniors, and if she sews it is on her husband's shoes, or the like. The intimacies of everyday living where there is no privacy, and with constant causes for friction not unnaturally cause occasional quarrels. These are more verbal than physical, are not hidden in the privacy of home, and are the chief source of entertainment to the neighbors.

* In Manchu homes, the sister-in-law must bow first to the unmarried girl, every morning, though she may be many years older.

Cases of the vilest cruelty do certainly occur. To cite an authentic case. A woman in Chien Ying, left her daughter's feet unbound. After the girl's marriage, her mother-in-law bound them, so tightly as to break the bones, making the girl continue to walk on them and work. "She died when her first baby was born", commented her own mother. In a village five miles further from the railroad, the granddaughter of a Chien Ying family is the only child unbound, to the constant scorn of the neighbors, who have but one argument: "How will you find a mother-in-law for a girl who is unbound?"

Is there then still footbinding? It is against the law: Yes. But the Provisional Civil Code is not well enforced. The Manchus never bound their girls' feet. The one well governed province, Shansi, has succeeded in enforcing the law in all but the most out-of-the-way mountain valleys. The boat people of the south do not bind, nor the Hakka folk, (who cling to the traditions and language of central China which were theirs before they secured "guest homes" in the south, in the eleventh century.) Education and Christianity are gradually influencing public opinion in the centers of communication, and it is rare to see girls under 15 with small feet in any of the big port cities. But outside these groups, the vast majority of Chinese girls are bound at the age of four or five, thus restraining the feet from normal growth. The binding is tightest just before marriage, after which the bandages are somewhat loosened.

But it is astounding what they can do on little pegs of feet, so small that they cannot long keep their balance standing, nor walk more than a couple of miles even at the necessary snail's pace. They will walk a mile and back to market or to church. The school girls play "hopscotch" and jump rope, and the older women love to forget their dignity to learn "drop the handkerchief" or "three deep." But very few women claim that it does not hurt, especially during the early and tightest binding.

Concubinage.

The sad story of the only man in the village to take a concubine has already been related. Few country folk have the funds to support two families and they are not so influenced by style as the officials and merchants of the big cities. Chien Ying has one case of a man taking two wives, however. The headman's brother died childless, so his son has a second wife, daughter-in-law to the widow, and living with her in a separate court from the headman's home. There must be sons to carry on the family name and ancestor worship, and there must be daughters-in-law to help the mother. The more usual solution among farmers is to adopt a son, usually from some brother's family, or at least a cousin on the father's side. This happens not infrequently.

Woman's Life.

A woman's work is never done. But as a rule she rarely works under high pressure. During harvest seasons she rises at cock-crow, (since few families would have timepieces), so that the men and farm laborers may eat

early and get out in the fields by dawn. They usually go to bed shortly after it becomes really dark, and the women will have been working steadily all day. General housework is light. A careless brushing of the matting on the k'ang and of the brick or dirt floor suffices, and little if any dusting is done except in a remarkably tidy home. Cooking, sewing, and threshing-floor activities have already been discussed. Care of the baby takes a very unnecessarily large proportion of time, for he is universally spoiled, and must not be allowed to cry. A baby that can crawl and is still too small to get off the high k'ang alone, cannot be left unwatched a minute. (Babies have been burned to death by falling off k'angs into the fire in parts of the country where the cook-stove is in the one room.) Generally speaking, every child under two takes the full time of one adult or older sister for all its waking hours, most of which time is wasted, since few occupations can be carried on at the same time, though mother may shell the beans or get a little sewing done if the child is very small, or grand-mother may stand at the gate chatting with her cronies, with the baby on her back.

The woman's hairdressing takes a very long time. None but a sloven would fail to comb it once a day, a process which takes at least half an hour. Since the hair is only washed annually in summer, it is kept free of dust (and other things) by daily, thorough fine-tooth-combing, with the family comb. Different forms of coiffure indicate different ages, styles and ranks, but they all require glossy smoothness throughout, which is obtained by endless combing, wiping with an oiled rag, and tying so tightly that old women usually lose their hair. Some styles of head dress require foundation forms or ornaments of wire and cloth, the hair is secured with strings, home made nets, and a single straight pin, which on dress occasions is silver or enamel.

The fine hairs on a woman's face are considered seriously to spoil beauty and the married women must keep their hair plucked out to form a high square forehead. Therefore another woman, with a complicated twist of string held in her hands and teeth, tweaks out the hairs from the whole face and back of the neck, which can hardly be a comfortable process.

The amount of bathing, especially in winter, is scanty. Between the high cost of water and fuel, and the lack of privacy, it is doubtful if much more is done than the frequent washing of face and hands, and the necessary weekly care of bound feet. A cold snap came one Tuesday, and between dirt and wind, three year old got very chapped where her open trousers failed to protect. Bathing and oil were suggested. "But she was washed last week, we can't bathe her again."

Mother's chief recreation, as already indicated, is gossiping. For the women who do not gamble there is nothing else to do. During the busy seasons, they are tied rather closely to the duties of home, relieved by gatherings at the public mills and leisurely purchases at the gate. In winter the older women leave their daughters-in-law to do the cooking, perhaps take the baby, while they visit with the neighbors. At this season, also, every woman who

can be spared from home, takes all her small children and packs off to her own home, for a visit of a fortnight or a month. The elder woman of the house, however, cannot usually be spared, short of a wedding or a funeral. During the slack months nearly every home is lacking a daughter-in-law, or entertaining a returned daughter. It is the custom, also for brides to make long visits to their own homes, and in this locality the bride spends alternate months of her first year with her mother and her husband's family. Likewise, on the third day after a child is born, its maternal grandmother comes for a visit of several days, and when the month is completed, the mother and her children return to her own home for perhaps as long as another month. If a daughter-in-law falls sick, her mother may be called to come and stay with her, to relieve the "in-laws" of the care of nursing her. Altogether there is not a little visiting. When a woman returns to her home village, her relatives call on her, invite her to dine with them, treating her as a guest, and she calls on other neighbors and friends. The home visits continue as long as her own mother lives, and perhaps while she still has a father.

The courtesy and hospitality of the Chinese is superlative. Passing women on the street the greeting is exchanged:—"Have you eaten?" Eaten; Eaten?" "Eaten!" "Come in and rest a while, yes, do come in and drink tea." It is almost impossible to proceed past the door of a friend's house, if one is seen. No Chinese would eat, even among the motly assortment of strangers on a train, without first offering the food to everybody in sight. It is frequently embarrassing to avoid eating at every house on which a call is made. With extreme apologies for their humble food, with endless trouble and expense to buy better if it is at all obtainable, they press the visitor to dine. No trouble is too great for a friend.

Births and Deaths.

No statistics of births or deaths yet available are comparable with Western census figures. It was impossible at Chien Ying to compile them in the usual way. The questionnaire hopefully included age at death and causes, but it was soon found out that posthumous inquiry by a layman was useless. Three causes of adult death are given:— age, indigestion, and fever. Further inquiry rarely produced more specific facts, and other questioning was necessarily so full and persistent that it seemed wisest to abandon the hope of eliciting from widows and bereaved mothers the desired information. Obviously they themselves know little of diagnosing diseases. Babies die of "wind" during the first few days.

Mrs. King was an especially bright woman, whose older children were all educated, even up to college grade.

"How many children have you?"

"Six; four students and two daughters", replied the mother.

"Have you lost any?"

"No, I am particularly fortunate. I have not 'thrown any away'."

"You mean that in your whole life you bore only six?"

"Oh, no, but the four who died of wind don't count."

Information is hard to get!

"How many children have you borne, Mrs. Lee?"

"Several, I don't remember; seven or eight, perhaps." Her own daughter interposed.

"Is it not ten, Mother?" Between them they calculated, and concluded it had been eleven.

"My own sister," continued the mother, "bore twenty-two, but she 'threw away' all but two."

"Were the two who lived older or younger?"

"One of her first and one of her last." Is that physically possible? Yes, she may have been married at thirteen or fourteen, and continued to bear into her forties. As the Evangelist once remarked:-

"If husband and wife are at home together, it is almost impossible not to have one a year, if they die, and one in two years, at least."

It is a curious fact that many women do not bear children ("open the flower" or "blossom") for four, eight, or even ten years after marriage, and then have several. With these country women this is absolutely involuntary. A woman wants a son, it is not only her duty to the clan, and the customary desire to have sons, but also it gives the daughter-in-law a place of honor in the home.

There is another reason why it is extremely difficult to determine the birth rate. If many women must stop to count, or be pressed to note the babies who died in infancy, before they took their places in the numbering of sons and daughters in the clan, even less do they keep any memory of stillbirths or miscarriages, which properly come into birth records. (It is hoped that the cooperation of a few rural school teachers or pastors' wives can be secured to record, year by year, the pregnancies and losses of the women in the neighborhood, but even then it is doubtful if trustworthy facts can be secured showing the births per thousand inhabitants.) The best that could be done in Chien Ying, in so short a time, was to cross-question mothers, especially the older ones, concerning their own children, born living. The results average 7.4 births per mother, (widowed or over childbearing age) 4.5 deaths, or 60%. Of these, many would still be small children, so that it would be likely that an average of about two children per couple would live to maturity. These figures include sterile women and a few young widows' cases which counterbalance the appalling frequency of such facts as:- born 13, died 12; born 9, died 7; born 11, died 9 etc. For the younger mothers, the proportion of deaths was even a little higher, 62%.

Children are assisted into the world by the older women of the family and a midwife. She is usually a very old woman, receiving a dollar, or less, for her services, according to her skill. One, still in practice, was proud of her eighty years. She had been rather unsuccessful herself, having lost seven of her eleven children shortly after birth, and two later.

The young widow of the Open family's grandson had worked hard up to the very night before the baby came, squatting on the floor to stoke fires, chopping vegetables, washing the heavy cotton clothes, and doing all the other chores of life. At five o'clock the little first cry was heard, with the grandmother and midwife in attendance, and an aged dependent running errands. The new arrival's uncle kept the fire going briskly under the pot heating both the water and the k'ang where the young mother lay. The only other child was a girl, and of course the posthumous baby should have been a boy; and the greatgrandmother long refused to believe it was only a girl.

An hour later visitors called on the latest arrival, laid in a pile of fine dust which filled the cracks where her eyes would be, and the fine fluff of black hair. She was tightly bound in a square of blue cloth, red tapes at her elbows and knees. The mother sat in a similar pile of "loess" dust which was not removed until next day, this being much the easiest thing to clean up, in a land where water is scarce, fuel still more expensive and washing therefore difficult and little indulged. The baby was dressed after the third day in a red jacket and bag of dust, nice "clean" dust, warmed before putting the baby into it, and changed when needed. This dust is as fine and soft as talcum powder, but it is no wonder that one form of the "wind" of which so many tiny babies die, is tetanus. Since a baby cries before its mother's milk is adequate, some relative comes in to nurse it, as the baby makes demand. Otherwise the baby was handled surprisingly little during the first few days. But it was not bathed for weeks. Over the door of the baby's room were very promptly hung the symbols of her fate—an onion, a printed sheet, and a red rag. (Red signifies joy, in China.)

All the first day, nearby relatives were dropping in to see the child and congratulate the mother. On the third day the midwife was feasted, along with those who happened to be in residence, and the maternal grandmother arrived for a visit. All friends presented eggs, and the mother was expected to eat them constantly. The ceremonies of the "completed (first) month" were missed because of absence due to war. Immediately afterwards, the young mother and her two little girls went to her mother's home, for the usual visit. It was curious to notice how much Christianity had influenced character, and how entirely the science which so constantly attends its spread had failed to change the established ways. Mother and baby came through the ordeal in fine shape, but rather in spite of the treatment than because of it.

Age at Marriage

Both boys and girls are often married before adolescence and physical maturity. This undoubtedly affects motherhood. Of 100 men studied three were married at 11 years, 25 under 15 years. The mode age for marriage of boys proved to be 15 and 16, and only 20% were still unmarried at 21. The mode is the same for the 150 women studied, nearly half being married during those two years. No cases were found of girls married below 12; but, on the other hand, only 2 were left spinsters at 20, both cases of daughters needed

at home until younger brothers could bring in daughters-in-law to help the mother. If these figures are at all inaccurate, they are half a year too high. for the Chinese count averages a year and a half above the Western reckoning. Moreover, it has already been pointed out that the families studied were above the average in income and education. This fact of early marriage is one of the most notable things shown by the study. Among city people, the educated and the well-to-do, the age at marriage is considerable higher.

The village family in comfortable circumstances seeks to marry its sons early, to a girl somewhat older than the boy that the mother may have a helper. But they do not hurry to marry off their daughters, waiting until they find a suitable match for them, every family always wanting to place its daughters in a little better position than themselves. The poor, on the other hand, cannot afford to add another mouth to feed, until the boy is old enough to carry his full share of her support and can save enough for her wedding gift; or, indeed, he may have to wait until he is nearly thirty, meanwhile helping to support his younger brothers and sisters. But daughters are married off young in order to relieve the pressure on the family larder, and to squeeze a little, perhaps, from her wedding gift. So it comes about that there is often a discrepancy in age between husband and wife, a quarter of the husbands being 4-10 years older than their wives; a third, 1-3 years older; while a quarter of the wives are 1-3 years older than their husbands. Curiously few are of exactly the same age, which probably has something to do with the astrology employed when determining if the birth-dates of proposed bride and groom are in a lucky relation.

Marriage Arrangements

It has been said that brides are chosen from villages other than their own because many villagers are too closely interrelated, because any altercations can less easily be swollen into family feuds, and probably, also, because a girl should never be seen by the members of her future home. A group of 12-14 year old girls was asked to map a certain section of the village road in beginning geography class, but the plan was frustrated by the fact that one of them was betrothed to a family up that way and she must never pass her mother-in-law's house. Only 15% of the brides were from the village itself. On the other hand, less than 14% came from more than seven miles away. The remaining 71% came from the innumerable little villages dotting the nearby fields. The North China bride is carried to her husband's home in a tightly closed and curtained sedan chair, and it must lessen the discomfort, especially in summer, when the distance is short. Likewise, since her visits home are in jolting, springless carts (which may be hired,) proximity would be convenient.

It is too well known that marriages are arranged by the parents through some go-between, either professional or friendly, to need more comment. The custom of dowry and gift to the bride's family varies greatly in different parts of the country, and is hard for a foreigner to understand. It some-

times seems as if the gift to the bride's home constituted a purchase, for in parts of the country it is said that it is impossible to get a bride without the expenditure of \$200. The sum is not so high around Chien Ying. One woman was discussing the problem of her oldest son, a childless widower. She had long wanted him to remarry, but he had to wait until he had saved enough money from his work in Tientsin, to get a wife. The girl in prospect was likewise widowed (and childless,) so it would not cost as much as usual but the year was a hard one, and the girl's first "in-laws", who were making the negotiations, insisted that they must have a first installment of \$30. immediately. Another \$20. was yet to be paid, before the marriage could take place.

Well-to-do families do not arrange prices, but if the poor man did not receive some help how would he provide his daughter with the clothes, bedding, furniture, ornaments, and other equipment that she must take with her? These would be a total loss to him, and he cannot afford it. The groom's family provides the house, (or room), for the new couple to live in, and the girl's home furnishes it. Where, as in this locality, the gift and the dowry are supposedly equal, the element of purchase is lost. It remains a problem, however, for the poor man to provide the necessary housing and money for the establishment of a new home for his son.

Funeral customs.

Funeral customs cannot be discussed in detail, as only one was attended. Some features of the event are worth mentioning, if only to show the mixture of Christian and non-Christian elements. The deceased had been a Christian himself, and his wife and sons had only passed the first step of registering as inquirers. Other members of the family had not been won, however and followed the usual customs. The father died of "old age" at sixty-four, his truly bereft widow, (a second wife), being a dozen years younger. The sons were under twenty, with wives somewhat older. Their various clans assembled three days before the funeral, including members of the daughters-in-laws' families. An older daughter had previously come home from Tientsin, three months before, at the time of her father's death; but returning for the funeral, she proceeded directly to the coffin, to sit before it shrieking and moaning, describing her grief and her father's virtues for ten minutes. Immediately afterwards she entered the house where all crowded round her to hear her lively tale of coming through on the first train running in several days, owing to troop movements. The household of the departed made a hurried kowtow three times to each guest as he arrived, passing tea and the long pipe, the men entertained in one house, the women in another. As long parted friends and relatives came together, they gossiped eagerly, of weddings, babies, prices and family quarrels, in a medley of names and places impossible for an outsider to follow.

All distant relatives who arrived during the first two days were somehow housed as well as fed. A great matting shed was built over the outer court,

terminating in a shrine, highly ornamented with gay paper flowers, streamers and inscriptions. A white banner was hung at the entrance, stating the name, birth-and death-dates, and salient facts of life history for the departed, which according to some superstitions, entices the spirit of the departed to hover around until the permanent tablet is made for its residence, and the inscription finished off at the grave with a final dot, in blood. In the center of the shrine, stood the huge coffin, end on, with a table before it loaded with tall candles, incense burners, and many plates of food, mostly highly colored breads. These would be later taken to the grave and burned to insure the family against evil after effects from ghosts. In the center of this array stood a white cross!

On the third day all members of the immediate family save the widow wore coarse, unhemmed white gowns, white shoes, with white in hair or caps, in place of the lesser mourning of white buttons and sash they had previously worn. As each guest came, he was led to the coffin, where he kowtowed three times, while the men of the family knelt beside it. He was given a piece of white cloth for mourning if he were a direct relative of the dead, and he handed in his tiny offering toward the great expenses of the funeral. Women guests of the family bound their ankles in white, and twisted white paper in their hair. Unrelated guests were dressed in their brightest and finest array. Still they congregated on the k'ang, gossiping, and much enjoying the festivity which is always a welcome break in the monotony of daily life. The little widow had been suffering for days with acute earache. Her part in the affair seemed to be chief coolie, running errands for the cooks, supplying coppers for this and cart fare for that, and in general making everybody happy. She had no part in the program, but the brunt of the work and the only deep sorrow. When the pastor arrived, a very brief "Comfort service" was held before the coffin, with the women gathered behind the curtains. The two bands of wailing Chinese music continued to play right through the hymn of hope and comfort, as they did all day.

All the cooking during these days had been done in an outdoor kitchen specially built for the occasion, by villagers hired to help. They prepared a good feast, economical, without meat, which was served to the men first. While the women were finishing, the shrine was already being demolished, and put into carts in sections, in preparation for the next wedding or funeral in that part of the country. The family did not eat, but their food was laid out, candles lit, and they took two mouthfuls, each, for good luck. The candles would be blown out on returning from the grave and all who blew would be assured of wealth. A great pancake had been prepared and each of the family tore off a huge bite, (which was not eaten,) their future prosperity to be in proportion to the size of bite. Each mourner was to carry a white bun to the grave, also for good luck.

There was great merriment over these plays, and then suddenly these same folk were howling dismally, with the greatest facial contortions, as the coffin was carried out, and continued to wail until they left the village. It

was part of the program. The heavy outer lid was wedged on to the coffin with ceremony, while the men mourners knelt in the road, and the gay embroidered canopy was placed above. Village children carried tall banners and umbrellas hung with bright colored silks, to make a long and impressive procession. Bands and banners, mourners, supported by their friends, the catafalque, and carts full of wailing women moved slowly off, leaving behind a sick, grieving little woman, with unshed tears shining in pathetic eyes, who had to return with the neighbors and bear their continued chatter.

The family capital consisted of $3\frac{1}{2}$ acres of land, and the small houses. The younger son had been married in the Spring, and the combination of two big occasions in one year made it necessary to sell two acres and go into debt. This was a very modest funeral. Another family of the village had sold their entire farm to give the father a handsome funeral. The family name is important. Funerals are more elaborate than weddings for the past is greater than the future, and the parents more to be honored than the sons.

RELIGION.

In matters of religion, conditions in Chien Ying are not typical. Nearby villages, far smaller, have numerous shrines and temples, to gods of soil, wells, threshing floors, wealth, posterity, or family ancestors. Chien Ying has only one, a prosperous temple, well painted and kept up, for the two priests support themselves comfortably on a few acres of temple land, and there is the usual big temple fair in the Fourth Month. This is the great social occasion of the village, and neighboring countryside, when theatricals run for days, contests of stilt-walkers, pole climbers, etc. are held, and side-shows vie with bargains for public attention.

There were a few Christians in Boxer year. They escaped to Tientsin, but their property was destroyed. Part of the indemnity given was the control of several pieces of public land, including four of the five public mills, and two tumbled down temples to be used as schools. The Church has been semi-independent and too prosperous ever since. Yes, too prosperous, for they have lost the incentive to sacrifice, and have deteriorated. A more serious cause of the weakening of the Church is the fact that many leaders have gone out from there, to be teachers or preachers in bigger places, or at least to be prophets outside their own country. While Chien Ying complains of an aged and little admired pastor, the best rural preacher in all the Congregational work in north China has left his home in that parish for Shansi. While their boys' school suffers for lack of a good Christian teacher, seven young men of the village have gone to teach elsewhere. It is a universal rural problem, that the best leadership of the country goes elsewhere.

Nevertheless, the situation must not be pictured too discouragingly, for there are fine, conscientious Christians among the 92 left, and many of them, even of the bound-footed little women, will walk a mile and back to church on the Sundays service is held in the other two chapels of the parish. A woman Evangelist has recently joined the chapel staff, and is proving an important

addition, for she can reach the women whom the preacher may not visit. Forty or fifty boys enjoy quite fair education. About 20 girls attend the little school taught by a very young but will-liked teacher. Big Christmas parties, with plays and special hymns attract large crowds.

The Roman Catholics have been equally long in the village, and have extensive work all through that country-side. Their church is large and highly decorated. They have a boys' school and a small group of girls and women learning to read, or at least to memorize the essentials of catechism and worship, which is chanted too rapidly (and some of it is in China-fied Latin) for the uninitiated to understand. Upon learning these things, they are baptized, receiving \$3.-5. apiece. The Roman Catholic church claims to have saved nearly 1000 souls in the village, almost all of whom are the poorest of the poor. There are a few fine and devout Christians. The poor too often accept the financial help and then despise the religion that gives it. Their condition is not materially improved, nor are morals appreciably changed in this life.

It is interesting to note that most of the Elders and leaders of public opinion are Protestants. The Catholic priest was formerly an obstructionist, but has recently cooperated at times with movements for general welfare.

EDUCATION

Conditions at Chien Ying would be typical of a very small number of villages in North China in the matter of education, as has already been indicated. Both Catholic and Protestant churches have conducted some education for most of twenty years. The Catholic boys' school has about 20 pupils in four grades, giving some secular subjects. The tiny girls' school is primarily preparation for baptism. It was ascertained that few of the women and girls who have studied with them have really learned to read, in the sense of being able to recognize isolated characters. Their work is mainly memorizing, which in a only few cases stimulates an interest in learning to read. None of the older women are able to remember the form of the written word.

The Protestant boys' school has two teachers, one classical and one modern, both fairly well trained, but neither of them Christians, in this particular year. For this reason they thwart the committee's desire to have Chapel services and Bible teaching conducted by the preacher. The enrollment is 50, with an average attendance somewhat less. The work is divided into four grades and includes all the usual primary subjects, National Readers, Writing, Ethics, Arithmetic, Calisthenics, etc. Two ample class-rooms are available, though only one is used in winter. As in some parts of rural America, the holidays adapt themselves to harvests, when all the boys would be needed. The county government cooperates in financing the school. Tuition is a dollar a year.

Only the roughest estimate can be made of the literacy of this town. Many boys and young men have studied a year or two. Few have gone on beyond this school to the city schools. Most boys with more than 6 years of

primary education would scorn farming. Perhaps a third of the children of school age in the village can read, but this is probably too high an estimate, since the families studied were largely those whose children would be most likely to go to school. Perhaps as many as a third of the men are also literate, at least enough to perform elementary business transactions. Of these, about a third would have picked it up more or less by themselves, another third would have had some classical education in days gone by, (a few of them are second rank scholars); and the remainder would have studied in the new schools. Of the women of the whole village not 2% can read, and fewer still can write. There are two or three who have finished primary school and gone on to high school. A few of the older women would recognize some characters but would depend on their husbands or sons to read a letter, and would have no idea of reading books or newspapers. Some of these Christian women have learned their little in classes at the chapel, reading a religious text book or extracts from the Gospels.

A class in the Thousand Characters was organized, both to help the village women, and to cooperate with the National Mass Education movement, in its initial steps toward rural literacy. The text book prepared, with large print and pictures, was extremely easy teaching material. Three women under thirty-five learned rapidly, and covered several books. But the elders, the patient, eager old grandmothers, even with the most careful possible teaching, barely learned to memorize one book starting off from the pictures, and never knowing even the commonest characters. Finding this was so, they were given Extracts from the Bible to memorize, rather than puerile reader sentences.

Most Chinese villages would have an old classical scholar or two. The larger villages now have little government schools. Rarely indeed is there any opportunity for girls to study. Few places would have as high a percent of literacy as Chien Ying, and this is due to the churches.

RECREATION

Recreation is a serious problem in China, especially in rural districts. The Chinese are a cheerful people with real humor, but have developed relatively few games. Such as they have are largely individualistic, lacking the discipline of teamwork.

The limitation of the women's recreation to gossip and gambling has already been mentioned. The gambling is done with small, heavily varnished slips decorated with futuristic designs, which evidently indicate values. The stakes are coppers and apricot pits. A few families spend much of their time in gambling, and it is reported that many gamble occasionally, especially at festival times. Those who gamble steadily almost inevitably show the results in financial troubles.

Another financially disastrous respite from the monotony of daily life, unrelieved by adequate amusements, is smoking opium. The actual number of persons in such a village who can afford to buy it, and can get hold of it in defiance of law, are few. But several families, once wealthy, are now in direst

poverty because of heavy smoking. The headman of the village formerly owned 200 mu of land. At present the thousand that are still nominally in his name are mortgaged for more than their worth. It is reported that the elder members of the family spend five dollars a day on opium. Morphine and other drugs cannot be gotten in so small a place but are rumored to be procurable not many miles away. Moral degradation frequently accompanies the use of these drugs. A woman of good family whose husband squandered a huge farm on opium, was bemoaning the character of her sons. One, a chauffeur in a city far to the north, receives good pay.

"Does he send any home to you?"

"Not a cent. He gambles and 'supports somebody'."

"He is not married?"

"Who would marry their girl to a bad boy like that?"

Her own family lend this woman a piece of land the cultivation of which she personally supervises, to support herself and the younger women of her home in something barely above pauperism. Opium might be listed as recreation or as crime.

It is well known that the East has looked down on physical activity, so that strenuous games are not prevalent. Well-to-do men have far too little to do in Winter. When the animals are tended, and the few chores done, they sit around, gossip on the street corner, and the like. Probably not a dozen men in the place read for amusement. The chapel takes a newspaper which employs but little time of a few of the more intelligent.

The younger men and boys, especially of the poorer people, have a few seasonal games, hitting one another's sticks across a line, kicking the shuttlecock, marbles, and stiltwalking. The school boys have learned many games, but do not continue to play them out of the school courts, where they spend most of their time. There are commercialized entertainments only at the Temple fairs. No organized recreational societies were reported.

Little girls have more plays. Hopscotch and jackstones seem to be indigenous. The former is played just as in the West; the latter, with the knee bone of the pig, five at a time, to the accompaniment of a charming chant, half describing the play, half just chatter to keep the rhythm. School games have largely displaced the Chinese plays, which are more dramatic than competitive. These plays deal with some phase of everyday life, cooking, sewing, spinning and so on, and are fully planned out,—movement, speeches and all. There is very little activity or competition of strength or skill. For example:—Several children squatted in the center of the threshing-floor as "flower pots". The two other players are the owner of the flowers, who is leader of the play, and the "old lady".

"Old lady, old lady, will you watch my flowers while I go wash my face?" While she runs off, the old lady steals a "flower pot", and the child stands behind her "invisible". The leader comes back, getting very excited over the lost pot. "Where is it?"

"A gleaner came and stole it."

"Where has he gone?"

"East." She makes a feint of searching to the east and returns.

"I cannot find him."

"To the west", and so on through the four points of the compass.

"Old lady, old lady, please watch my flowers while I go comb my hair" Again a child becomes "invisible" when the leader returns, and the excuse is given that a child came and begged for the flowers. Again the hunt in all quarters. This is repeated until all the flower pots are lost, with one everyday excuse after another.

When the "old lady" has them all, she "goes to sleep," and the leader steals them back. The "old lady" makes a great fuss pretending to hunt for them, till the leader comes out with the children in a string behind her, calling out like a peddler that she is selling flowers. The "old lady comes up to them:—

"But aren't these my flowers?"

"We will see whose flowers they are" says the leader, and then the "old lady" pats the children one by one on the head, and if a child responds by lumping up and down she joins the "old lady"; if not, she remains on the leader's side.

In one such game, there is a good bit, of "tail catching." All but one player string out in a long line, holding each other's coat tails. The one left out tries to catch the last one, the leader preventing her with outstretched arms while the "tail" slips out of the way.

Several games were found which were well adapted to the needs of women on the k'angs. Two strings divide the k'ang in thirds, the women squatting at the ends, apingpong ball placed in the middle. If those on one end can blow it across the far line, they score. Even more popular was the "Frog Race," careboard frogs jiggled along strings threaded through their noses. Great-grandma and great-granddaughter competed! The older the women, the better she played!

GOVERNMENT.

Rural government impresses the Westerner as the rule of local custom rather than of formal government, because so many things which the law controls in the West are efficiently determined by tradition in the East, like marriage, care of dependents, etc.; or completely ignored, like sanitation. The farmer comes in contact with the national government through taxes collected by the county. Some trustworthy member of the village records the land owned by each inhabitant. These records are not kept well up to date, but a rough check is kept on them by the fact that gross errors call forth a demand for justice on the part of the injured one or by general public opinion. Neighbors know pretty accurately how much one another owns, and object if some man gets off without paying his share. The taxes are five cents a "mu", to be paid at the office of the "ch'u" or section" (one eighth of the county), which happens to be five miles from Chien Ying. Each man makes a special strip, during harvest. The Christian leaders are hoping to form some organiza-

tion to cooperate in this, and save time and trouble. If the tax is not paid, the county sends collectors; but in bad years they are lenient, and will let the tax carry over till a good harvest.

There are a county magistrate, (appointed from Peking,) whose duties are both executive and judicial, and a deputy magistrate. The county chief of police is appointed by the state police system. He in turn appoints the police heads for each ch'u, or section of the county, who have charge of local police, a few in each market town, or important center. There are two educational officials in the county, one appointed by Peking, and the other, elected by the teachers. The county assembly has two houses, the upper house, consists of two members elected by the house of representatives, and two appointed by the Magistrate. The lower house includes two men from each section. This assembly is very democratic in form, but has no power. The elders of the ch'u, or sections, are elected by the village elders in that section, and attend to county business in that area.

The village Headman and vice-Headman receive no remuneration, so these must be well-to-do men. The honor is likely to run in certain families. While officially representing the village, they do little of the actual work. The village elders, of which there were 24 in Chien Ying a few years ago, but now only eight, are theoretically elected by ballot of the whole village, but in practice are appointed by a few, or merely accepted for an indefinite term of service. They are the leaders of local policy. Each street or section of street has a captain, who protects the peace, settles quarrels, and generally looks after the welfare of his neighbors. The head street captain receives a salary, and does most of the work of the village government.

There are also in each ch'u volunteer associations for preserving the peace, (pao wei t'uan 保衛團) each with a head and two counsellors, for protection against thieves and other dangers. Chien Ying taxes each farmer 20 coppers for each mu he cultivates, and pays ten watchmen to guard the growing crops, and to walk through the village at night clacking a rattle.

Under the Manchu regime, there was a narrow ascending line of officials through which taxes passed, and squeeze was collected. Under the ill-organized democracy, the line of officials has spread out like a fan, and those wanting squeeze are innumerable. Moreover the iniquitous system of farming taxes is practiced, and the farmer bears the brunt of it with no redress. The taxes are not exorbitant, but numerous. Both buyer and seller of an animal pay a 3% tax. The weighing in the market is done by licensed weighers (which may make for standard scales, or may leave loopholes for bribery). In some transactions each side pays 3%, in others 1%. A tax is charged for killing an animal, 30 cents for a sheep, 45, for a pig, and \$2. for a cow. Besides these, there is a stamp tax on all documents, including bills over a minimum amount. The village also taxes 30 coppers a "hu" for general business, but the assessors overlook the poorest homes. "If we taxed them we would only have to help them that much more."

In addition, there are special war levies at times. The recent county

magistrate collected loans from the farmers, in myriad small sums, "for the conduct of the war" and then absconded with \$30,000. The soldiers conscripted animals, carts and coolies from the whole countryside. In Chien Ying, instead of drawing lots, the village assessed each man according to the animals he owned, thus taxing wealth. With the sum, they bought the required outfit. They were fortunate enough to have all returned, instead of having the animals starved to death and the carts abandoned, as happened near Shan Hai Kuan.

The war poured around Chien Ying and left it alone. When General Feng executed his "coup" and "captured" Peking, Wu P'ei Fu hurried back from the north and their troops met on both sides of the railway at Chang Chuang 3 miles from Chien Ying. Feng's troops were quartered in temples and other public places in villages to the north west, and Wu's in homes through the south east, but not a one in Chien Ying. Two explanations were offered, that the place has grown up within the last 200 years and is known not to be on military maps, or because of the two Christian churches there, and the usual policy of avoiding "foreign property."

Although this was the main engagement between the opposing sides, the casualties were few. The trenches were but a foot deep and scattered. Many Chien Ying children went over to the next village to watch the cannons fire, and gleefully collected shells, afterwards. While the country folk all opposed Feng's "treachery" they had only good to say for his soldiers. But concerning Wu's and Chang's men, who came later, they had nothing but fear and bitterness. When these soldiers camped in a village, all women and children fled before them to relatives and friends in safer places, while some of the men stayed to try and protect their homes. The soldiers, lacking food, killed off all the pigs and chickens, and hunted out the buried stores of grain. They ripped up even the reed ceilings or broke up the furniture for fuel, and of course walked off with any desired bedding or clothing they found. Some families would return to their homes in the middle of winter to find only the clay shell of the house, or at best the doors and windows, and everything filthy beyond description.

Sometimes soldiers would roam off from a city headquarters on marauding expeditions of their own. If they came singly, they might now and then be turned off with some cash or a good meal. Once a party of four went to a near by village and held the people up for some big sum in the name of an official levy. The elders suspected it was not straight, and delayed them in partly ostensibly to collect the sum, while word was sent to headquarters, and the officer in charge of the division had the decency to send out a detachment of men to take them. Two were killed in the process of capture; the other two were taken for severe punishment. The area affected by war in China is relatively small, compared to our idea of modern warfare, but the suffering in the immediate area is nothing short of absolute tragedy.

Social Pathology Crime

The countryside seems remarkably free from crime, and the minor misdemeanors are negligible. Pilfering there is, of vegetables, fuel and the like, dealt with by the defendant himself if he catches the offender, and the neighbors enjoy the beating as quite a diversion. Squabbles over land, (there are no fences between fields, and no evident markings, more than sighting from some grave or stump), would usually be settled by the local authorities but could be appealed to the officers of the ch'u or county. Housebreaking, murder, and the like would be taken to the magistrate. A six year old boy was stolen while playing near the edge of the village a couple of years ago. He would be worth as much as \$600., it is said, for work in some shop or factory. But such crimes are exceptional.

Degeneracy

A village gives the impression of high average physical condition. The lame, the halt, and the blind must largely have died off in infancy, in the desperate struggle against unsanitary conditions. Moreover survivors of these types stay pretty well at home, appearing little on the street. Three or four cripples were observed, several blind, and innumerable with eye diseases, a couple of deaf, and very few other defectives. Insanity does occur. Where it is not violent, the sufferer is likely to be bound, fed, but otherwise neglected, till he dies. One man of good family became violently insane at the age of 23, and was beaten to death, leaving a young widow and little daughter. Feeble-mindedness is less apparent where so much of the work is unskilled and so few have notable mental attainments. Some, however, are of such low grade of intelligence as to be quite apparent. Where they are included in the larger family group, they do their share of the simpler, heavy work, and can get along fairly well. "There is one old idiot in the village who cannot support his mother, wife and child. He proposed to sell his wife, but the whole neighborhood rose up in protest, so we all help to provide for his family."

Dependence

Because of the co-operation among the various members of the large families and among neighbors, there are few isolated dependents. Rarely would an old, and therefore honored, relative be allowed to want. Widows of the very poor may be remarried, if they are young enough, (the children staying with their father's family, of course), and orphans would be looked after by uncles or cousins, if the grandparents also were gone. If there are relatives, no matter how poor, it is their duty to find help if they cannot themselves provide it. The family in comfortable circumstances will take in some poor relative, half as member of the family, half as servant. A relative on the mother's side may be so helped, though there is no proper claim on them for this.

"An honorable man, with a good reputation, can always get help for the winter." He may go to the farmer for whom he does day labor in harvest and ask to borrow a few dollars, promising to pay in labor, when the times comes. No interest is demanded on such a loan, it is a matter of friendly help. The poor man may pawn his clothes in the market town, but the rates are twenty to thirty percent a month. These are the regular interest rates for money loaned to the poor, where securities are doubtful. The rich can borrow to better advantage, having land and other securities.

A man of poor character must beg, but he goes to other villages, where he is not known. Beggars come constantly to the farmer's door, especially in years of cumulative disaster, such as this, whining most pitifully, "save life, save life," and a few even keep it up for as long as half an hour, if they want money for opium. The country people give regularly, handing out left-over bread or porridge. The beggar need not starve. Neither need he lack a place to stay, for the comfortably situated farmer has sheds enough to let the beggars crowd in, or to admit some reputable man in unusual straits. "The poor suffer in the cities for they cannot find houses to live in without giving rent. But in the country they can always find some generous rich man who will give them a place to stay."

Supplementary Comment

In May, 1927, shortly before going to press, another opportunity presented itself to return to Chien Ying for a couple of days, to see what developments might have taken place in about two and a half years. Matters of personal interest predominated, new babies, children growing up to school age, recent brides, and other changes. Sheep Family were no longer quarreling. The wheat straw braid was largely being used for home consumption, being stitched into hats, coarse cheap ones, made by the women at home, and finer ones done on a machine, to be sold for 30 cents. Bundles of 500 were waiting shipment.

In spite of waves of invasion by the dreaded northern soldiers during the previous summer, when many homes were robbed and successive levies were put upon the village, there were striking signs of prosperity. Brass basins were in evidence, formerly hidden; the poorest homes had more furnishings, fresh window paper, better equipment; and the schools were growing. Attendance in both boys' and girls' schools had doubled, and a fine new building was going up for the boys. A younger preacher and better trained girl teacher, father and daughter from within this parish, were attracting students from other villages, some girls walking back and forth every day, even during the phenomenally heavy snows of the previous winter, and a few from farther away living in the school court. Not one of the girls was bound-footed, though some were unbound and still hobbling. They showed far greater teamplay and skill in games, and sang much better than before.

The International Famine Relief Commission and the Mission were co-operating in a demonstration farm, on the outskirts of the village, with a trained agriculturalist in charge. This is increasing the knowledge of and interest in

seed selection and poultry breeding, but has not yet had time to greatly influence local farming.

Like hundreds of thousands of other villages throughout China, if only war will cease and a just and stable government will largely leave them alone, as in former days, to local self government, growth and prosperity is the outlook for Chien Ying.

TABLES

Table I. Number of persons per "family" (i.e. economic unit)

Families having	Number
1	1
8	2
12	3
8	4
13	5
11	6
8	7
5	8
5	9
1	10
3	11
	12
1	13
	14
2	15
2	16
1	19
1	21

82 Total families

Table II. Number of persons per completed "hu" (i.e. gates to the street)

Number of families per hu					Total	Number of persons per hu
1	2	3	4			
3					3	3
1					1	4
3	1				4	5
6	2				8	6
3					3	7
2					2	8
1	3				4	9
		1			1	10
1	1	1			3	11
	2	1			3	12
	2				2	13
	2				2	14
1					1	15
1		1			2	16
		2			2	17
1					1	18
					1	19
1					1	20
					1	21
	1				1	37
			1		1	43
				1	1	
24	14	6	1	45	Total hu	

Table III. Average number of persons per family

Living at home		whole family (including those away for work or study)		
Number	%		Number	%
133	25.7%	men	162	29.1
182	35.2	women	187	33.7
202	39.1	children	206	37.2
517	100 %		555	100 %
6.3 living at home		Average number persons per family 6.7 in whole family		
or about 2—men				
2 women				
2+children				

Table IV. Total persons in the 45 complete hu studied 488

Average 10.8 persons per hu, (omitting exceptional cases, conservative average, 10 persons)

TABLES

Table V. *Age at Marriage*

	Women		Men	
Age	No.	%	No.	%
11			3	
12	4	} 22	6	} 25
13	2		8	
14	26		8	
15	38	} 43	14	} 26
16	25		12	
17	22	} 33.5	7	} 29
18	19		8	
19	7		5	
20	1		9	
21			6	
22			7	
23	1	} 1.1	5	} 20
24	1		2	
Totals	146	100%	100	100%

Table VI. *Relation of Ages of Husband and Wife*

	No. of years	Cases	%
Husband older	10	2	} 27
	9	2	
	8	3	
	7	5	
	6	2	
	5	6	
Husband and wife same age	4	7	} 34
	3	10	
	2	13	
	1	11	
	0	4	
Wife older			} 27
	4	4	} 8
	5	3	
	6	1	
Totals		100	100%

Table VII. *Births and Deaths per Mother over 40 years*

(Total of 71 women studied)

Average, 7.4 living births per mother

Average, 4.5 deaths per mother

i.e. 60% of those born died

Table VIII. *Distance between "Mother's home" and Husband's home*

No. brides	%	Came from distance of
22	16	same village
35	25	1-5 "li"
41	29	6-10
22	16	10-20
11	} 14	21-50
3		50-100
5		over 100
139 brides	100%	

TABLES

Table IX Education Amount	Number of		
	Men	Women	Children (8-18 "sui")
None	86	176	65
Reads very little	17	8	5
Old classical	17		
Modern schools			
1-3 years	14		24
4-7 "	6	2	9
Totals	140	186	103

Table X. Ownership of Property				
Land owned per family (a "mu" is $\frac{1}{3}$ acre)		Animals owned per "hu" (gate on street)		
No. families	having No. mu	No. hu having	No. animals	Total
16	0	28	0	0
12	1-19	18	1	18
18	20-39	3	2	6
11	40-59	3	3	9
2	60-79	2	4	8
3	80-99	3	5	15
3	100-149	Total 57 hu		56
2	150-200		animals	
2	200-250	Proportion of hu owning animals		
2	250-500			
1	1000 or over			
72	Totals			
The general average is 51 mu per family omitting the exceptional case average 39 mu per family mode 20-39 mu per family		Total village Hu studied	396 57	119 29
				38 50%

INDUSTRIES

I. Persons Working away from Home (whose occupations were known)
(men unless otherwise indicated)

Occupation	Number	Place	Number
Teachers	7	Tientsin	16
Trade	3	Peking	6
Carpentry	3	Chihli	3
Cooks	2	Mukden	1
Masons	2	Kiangsi	1
Preacher	2	Shantung	1
Bank coolie	1	Hsinchiang	1
In customs office	1		
Weaver	1		
Y.M.C.A. Secretary	1		
Paper Shop	1		
Book store owner	1		
Egg Factory	1		
Barbar	1		
Students			
Men	1		
Women	2		
Total	30	Total	30

II. Occupations in the Village

(other than farming, and supplementary to it)

Occupation	Number of families
Peddling	5
Shed builders	1
Candy makers	1
Manufacturers of bean macaroni	1
Matting weavers (men and women)	2
Chapel servant	1
Bee raising, selling honey	1
Sewing shoe soles	1
Coolie	1
Exportation of hat braid (men and women)	2
Grinding flour	1
Day laborers on others' farms	5

Other trades in the village, in families not in the main study

Carting
Selling notions (men and women)
Weaving hat braid, (by women)
Musical instruments
Paper flowers (by women)
Teasing cotton

III. Itinerant Occupations

Pedlers of;—

candies, fruits, cigarettes
cloth and thread
notions
embroidery patterns
embroidery threads and silk
crochery
matting baskets for grain
iron ware
live or dried fish
sweet potatoes
pears; red fruit; dried jujubes
willow ware
bean macaroni
candy and small ironware
mutton

turnips
coal
cotton batting
soap, lotions and oranges
toys and knick-knacks

Craftsmen;—

broom maker
shoe mender
blacksmith
tinsmith
cotton teasers
repairers of
pails
bamboo ware
baskets
sieve bottoms
dishes

Buyers of;—

eggs
old iron
old rags
old cotton batting
cat and dog skins

0028

2

9

7

4

2

8

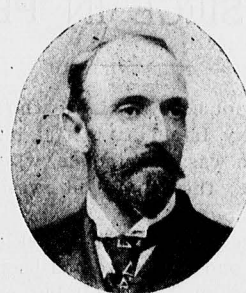
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The Siege in Peking

BY

Professor F. D. Gamewell

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THE SIEGE IN PEKIN.

"If it had not been the Lord who was on our side, now may Israel say; if it had not been the Lord who was on our side, when men rose up against us: then they had swallowed us up quick!"

At the close of the siege in Pekin, when for fifty-six days and nights we had been fired upon with shot and shell, and all but overwhelmed by incendiary fires started by the Chinese for our destruction, a British gentleman, one of the besieged, a man high in the customs service, said to me: "I do not want to leave this legation until we have had a public service of thanksgiving to Almighty God for this marvelous deliverance." The thought above every other thought impressed upon the minds of those who passed through the siege was that

OUR DELIVERANCE WAS OF GOD.

We did our part. We stretched the nerves to their utmost tension, and if that did not serve to accomplish what we wished, we stretched them a little more. We toiled day and night and on through the Sabbath, but our part would have failed of our deliverance if it had not been supplemented by God's intervention in our behalf again and yet again.

THE SIEGE IN PEKIN.

3

The gathering clouds around Pekin were first noticeable about May 1. There had been trouble in the adjoining province, but about May 1 the

BOXER MOVEMENT

began to make itself felt in Pekin. In the afternoon Sabbath school, which had been opened to the public at large, as distinguished from the morning school, which is for the students alone—in that afternoon Sabbath school, where we had sometimes 1,300 or 1,400 persons present, we noticed a large number of men present, and an atmosphere of restlessness pervaded the room. There seemed to be a tension about the city such as precedes impending calamity. Word kept coming to us from various stations of uprisings. We heard of the destruction of chapels and the slaughter of native Christians, and reported these things to our Minister in Pekin. The Ministers were holding daily conferences and doing their utmost to press the Yamen, or Foreign Office, into action, and the Chinese, with their policy of masterly inactivity, kept putting them off, saying there was no difficulty in controlling things, and no need of bringing in foreign troops. But the movement kept gaining force. It was only necessary that

SOMETHING OCCUR

to bring things to a crisis. That occurred on May 28, when the railroad was interrupted at Fengtai, five miles from Pekin. The Ministers of the various nations, who had before hesitated

about bringing in foreign troops, felt that the time had come for action, and 450 marines of all nations came up to Pekin. They came in such haste that the United States marines brought no change of clothing with them. If those 450 men, who came up on Wednesday, May 30, had been delayed five days they would not have gotten into Pekin. The railroad was cut the following Monday, and all connection of the outside world with Pekin was severed. If those 450 men had not reached Pekin every foreigner in Pekin would have been massacred.

After the first interruption of communication the traffic was resumed a day or two later, and our North China Conference being appointed for May 30, the members assembled in Pekin. We had gotten accustomed to

LIVING ON A VOLCANO,

not knowing when it would erupt, and so we went on with our work as usual. We closed the school and began the business of the Conference. The session convened on Thursday, May 31. It ended with the reading of the appointments on Monday, June 4. That morning a number of the members took the train at eleven o'clock for Tientsin. But a number remained. That was the last train that got through. I would direct attention to the fact that this Conference had called together a large number of our native helpers, as well as of foreign missionaries. In the city of Tungchou, fourteen miles away, the American Board Mission was

holding its annual meeting, and it had thus called together a large number of its native helpers and workers, who afterward came to Pekin. As dangers thickened, in various providential ways many missionaries and native preachers were called together in Pekin, and thus saved. There has been a heavy loss, and when we think of that loss our hearts bleed; but in some way

GOD HAS WATCHED OVER

the lives of His preachers, thus providing for the future carrying on of the work. We have lost some of our men, but many of the best have been saved.

There is the case of Tê Jui. He has been a minister of the Gospel for nearly thirty years. He is a Manchu of high education. He was educated when a boy in the school of Dr. Martin, for twenty-five years the president of Tung-Wen College, more recently the president of the Imperial University in Pekin. At the close of the Conference, under the stress of daily occurrences, it was hard for us to tell whether it was better to hold the members in Pekin or to scatter. We felt that all might fall in Pekin, and that if we scattered some would be saved; or we might all be saved in Pekin, and those who went out, scattered abroad, might perish. Tê Jui settled the question for himself. He said he must go back to his people. His station was Shan-Hai-Kuan, and its distance from Pekin about 250 miles. The country through which he had

to pass was in a most unsettled condition. The Boxers were appearing everywhere. They were burning and destroying villages. This man during the thirty years of his ministry had preached over a wide district, and so was very well known. As a precaution against arrest he dressed himself elegantly, and got a junior preacher to act as an outrider, and traveled by cart as a Chinese official. On the second or third day's journey, while putting up at an inn for lunch, some one recognized him and called him by the Chinese word which means "pastor," and calling him thus revealed his identity, and he had to hasten away lest he be taken. After many difficulties he reached his destination, but found things in such a state that he could do but little, and soon was obliged to flee for his life. Helped by Christians, and sometimes by heathens, hiding in caves and in the fields of corn, he was three or four weeks in reaching Tientsin. There I met him just before leaving China. He looked at me, and I looked at him. We were both gaunt and worn. He walked up to me and, grasping my hand, said: "I know all about it. You have had a hard time, but God has been with you, and He has been with me."

Pekin is a filthy city, and we were there in the summer time, with the thermometer at times between 95 and 100 degrees Fahrenheit, and we endured a long siege. It is one thing to key up to a thing for a day or two; it is quite another thing to hold on for weeks and months,

with rest broken and clothing seldom taken off; when the breakfast is to be horse and mule and brown rice and hard bread, with no variation for the other meals. Mothers watched their little ones wasting away. Seven of the children died as the result of the siege. Men were falling on the right hand and on the left. The mortality record shows that sixty-eight were killed and over 140 wounded. There were days when we lowered two and three uncoffined bodies into a single grave.

We cannot yet tell when the North China work shall be fully reorganized, but we have no question

ABOUT THE OUTCOME

of the present seeming disaster. All through those days in Pekin, when it seemed as though the enemy must prevail, we never thought for a moment of giving up. The only thing to do was to hold on. There was no such thing as giving up. For the Chinese to cross our lines as victors meant death by torture for every man, woman, and child who should survive the first attack. But that determination never to give up, to hold on, believing God would make the right to prevail, in some way carried us through. I know what it is to stretch the nerves to the utmost tension, and then, when that fails to accomplish what is necessary, to stretch them a little more.

And if the Church of God, in bringing this world to Christ, will go at the work with the determination, in the face of all difficulties, to

do her utmost, and then to do a little more, the kingdoms of this world will soon become the kingdoms of our Lord and of His Christ.

It was half past two in the morning of August 14 when the guns of the relief column were first heard. The Spanish Minister rushed into the hall where we slept in a long row on the floor. He cried: "Get up, get up! *Listen to the guns!* The troops have come!" For eight weeks we had been hearing the guns of the Chinese. The Chinese had Krupp guns, from which they threw some 2,800 shells at us, 400 in one day. And they used to throw them at most inconvenient times. We had heard their guns so long that we were ready to believe that those now reported were only another Chinese battery. We went out and listened. There could be no mistaking the sound of the guns now heard far to the east. It was twelve hours before the allies reached the legations, but deliverance was at hand. The noise which had been so hideous through the long days and weeks had now become the sweetest music. I went in and back to that corner in the hall where I had found the little sleep to be had during the noisy nights of those eight long weeks of working and watching, and, falling on my knees, I said, with a depth of feeling never known before, "Bless the Lord, O my soul, and all that is within me, bless His holy name!"

WU T'AI SHAN

Hilda Hague

Peiping, China
July, 1931

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The Road to Wu T'ai Shan

Brown of the earth, blue of the sky, green of the things that grow;
A muleteer singing a home song when the sun is low:
And the smell at night of wood smoke where the cook fires glow.

The mounting clouds shall chant a saga of folk and fairy lore;
And the brawling brooks shall sing for me the marchings songs of war;
And the whispering leaves shall tell me tales of inn and threshing
floor.

I shall not carry the printed page; no, nor the written screed,
For every day the traveller's way is a new book to read;
And the kindly faces of old men hold all the wisdom I need.

Wu T'ai Shan

/ There is a haunting quality in the names of some places. There are in Europe cities and villages whose names have haunted me ever since I was a child; and there are names of places in China which once heard, hover in the back of my mind and never let me rest until I find myself setting out on the trail that will lead me there at last.

If you should want to go to any place off the beaten track in China, it is best first to go, and tell your Legation afterwards. Consuls are very properly inclined to be pessimistic about the safety of such regions, for they are required to exyricate their fellow countrymen from any unpleasant situations in which they may find themselves, and awkward questions may even be asked at the home end if the party disappears altogether. It was only this spring that a young member of my own Legation was thus heard to sum up the case of a worthy lady who had fallen into the hands of bandits, "Well, she never should have left Tooting." Tooting is unknown to me and possibly to her also, poor lady, but from his tone one gathered that to classify her thus was a mark of his strong disapproval.

But fortunately for those of us who are of a bold and adventurous spirit and who are blessed with a frame calculated to withstand all manner of shocks, jolts, bumps, and delays, one can set off across the map of China with a light heart and a light purse, without a by-your-leave or a passport from any Legation, Chinese or foreign; and, where the railroad fails there are to be found mules, donkeys, chairs, litters, wheelbarrows, sampans, or the springless country cart, to speed you on your way. If a complete change is advised by your doctor, nothing could answer the situation better than a trip into the interior of China. There is no place in the world where you can more easily or quickly get away from the telephone and the daily newspaper. But I should hesitate to recommend it as an ideal spot for a complete rest.

There is perhaps nothing that would strike you as especially alluring about the name Wu T'ai Shan, the mountain of the five peaks. I heard of it first as one of the mountains sacred to Buddhism situated in Shansi province outside of the Great Wall; later, as a mountain of open spaces and upland flowery meadows, a mountain of Lama temples where Mongols came in their high boots and wide lacquer hats, and Mongol ladies came with head ornaments of turquoise and silver. And having heard this much, to Wu T'ai Shan I must go.

Of those who had made the adventurous trip before, we timidly inquired the way. It appeared to be very easy.

"You can go", they told us, "up the old Imperial trail from Tingsien, - a lovely trip over two mountain ranges, quite worth the five days on muleback."

When we questioned the advisability of selecting mules for a pleasure jaunt,

"Oh, no, not at all", we were assured, "you get a good strong riding mule, and you have your bedding strapped on its back, and you

go day after day through the lovely countryside and over the mountains..." (to my mind there came the thought of some of the most joyous days of my childhood, jolting along under the open sky, safe and soft on the top of a haycart, coming in from the harvest fields. With pleasing anticipation I saw myself in my mind's eye reclining easily on soft bedding on the back of an ambling pad.)

"Well, yes, " our informant continued, "the rivers in Shansi do get rather swollen in the rainy season, and you may be delayed a day or two until the water goes down. But you stay in a little mountain in and it is great fun. Oh, by all means take the old Imperial trail to Wu T'ai Shan, and you can come back through Ta Tung Fu and stay over a day to see the famous rock carvings."

Our party to Wu T'ai Shan formed and dissolved, as such parties do, many times before the start. Plans were made and unmade, but finally we simmered down to a group of five, ladies all, three of us from Yenching University, one from Peking, and one from Tientsin. Food lists were discussed, camping kit was pulled out and overhauled, and the day for departure was set. Everything that we would need for a month away from home, in a spot where we would do well if our commissariat could occasionally be varied by a chicken or an egg, had to be carried with us. We might count on the friendly shelter of an empty temple room and the use of a stove, but that was all. All our money must be in big silver dollars. Paper money would be of no use to us at Wu T'ai Shan, or indeed once we were out of our own province.

The question of costume for a trip such as we contemplated is to each one a law unto himself. You may wear what you like and what is most suited to your own needs. There are no preconceived conventions to hamper your individual taste in style or color. I have one British friend, it is true, who still feels that from the aesthetic standpoint no woman unless she retains a figure which he describes as "boyish" should be permitted to appear in breeches; and another who would concede the breeches, but only on condition that they are fashioned by a reputable tailor, British cut. Our American friends are less conservative and accept anything we wear with sangfroid. At all events they make few comments. To our Chinese brethren in the interior, we are strange creatures at best and do strange things, but what we wear, much or little, breeches or skirts, arouses no feeling one way or another. I think they would remain quite calm if we were to wear no clothes at all. You may anticipate, therefore, a pleasing variety and lack of convention in the waring apparel of our party. Our garments included impeccable riding shirt and breeches; sailor blouse and bloomers; plus fours and shorts; and even one strange upper garment evidently designed by the wearer, which was neither coat, shirt, nor blouse, but partook of the nature of all three, which for lack of a better term was known as the "shift". We had socks and stockings of every conceivable texture, color and style, and when our skin became hardened to the sun and wind we wore none at all. Our footgear ranged from hiking boots and brogues to old tennis shoes, and afternoon slippers worn to a comfortable fit; our headgear from the straw covering of the rickshaw coolie to the latest style in flowered cretonne.

Our baggage defies adequate description. If our nearest and dearest had seen us when we finally assembled everything at the station and mounted guard over our pile of personal effects, while one of the party stood in line for tickets, they would unquestionably have turned away with the sympathetic comment: "Poor things, they must be Russian refugees." The Chinese train refuses nothing in third class, no matter what size or shape provided it can be squeezed through the door or the window. And a mule is equally accommodating. I imagine he would cheerfully start off with a piano if you could get it strapped on him. We had boxes and bundles, bags and baskets of every description, a tea kettle, one battered Gladstone bag, which alone bore the faintest resemblance to what is known in Europe or America as baggage.

The time set for the start was the evening of July 10, when we were all to meet at the station just outside of the Chien Men Gate of the city and take the night train to Tingsien, the first lap of our journey. That this train carried only third class and would arrive during the small hours of the morning was a somewhat unpleasant feature of the trip, but must be faced. At Tingsien we would have a day and a night to recuperate from the journey and we would be able to visit the headquarters of the Mass Education Movement.

My own particular departure from the Yenching campus was somewhat hectic. I was late back to lunch and it took all the time of the cook, houseboy, and the amah, flying madly helter skelter, hither and thither to have me packed and strapped and roped ready to start for Peking at five o'clock. The cook's touching tribute on departure was a little cake charmingly iced in pink and white which bore the Chinese characters "I Lu P'ing An" (a peaceful journey), and which he placed on the top of my picnic basket. The unexpected may be safely counted upon to happen in China, and it began happening almost at once. It was not that I expected Charles Parr, who was kindly giving me a lift to town an hour ahead of the others that I might do some shopping, to be less than an hour late in calling for me, but I didn't expect that we would run over and nearly kill a student before ever we left the campus. As we took the slope in front of the President's House with the sun full in our eyes we collided sharply with a bicycle rounding the corner of Sage Hall. Fortunately, only the bicycle lay crumpled under our rear wheels, and the student was helped off to the Infirmary for sticking plaster, while we continued hot haste on our way. The road from Yenching to Peking is such that no car can travel on it at a higher rate of speed than about fifteen miles an hour without serious danger to the springs of the car and the brains of those riding within. This was all to our advantage, for although Charles is an excellent driver, he admitted that he felt a little shaken. No time for shopping now; to the station we went with all possible speed -- to be greeted by the news that the train to Tingsien would not run that night. We all repaired to the American Board Mission where we camped on Laura, whose nerves are strong and who can regard with equanimity the sudden arrival of four unexpected guests plus a cook. After dinner that night I hired a rickshaw and away we went into the cool night air through the crowded streets

of Peking, with twinkling lights and bells of rickshaws, motor cars honking, horse carriages clop-clopping, and slow-moving crowds everywhere. We sped down Morrison Street past the big Chinese bazaar where all the shops were still open, and into the quiet smooth streets of the Legation Quarter, its gateways guarded by soldiers of every country, and its shops closed and shuttered for the night; out through the big southern gate of the city proper and into the fascination crowded busy Chinese city. A night fair was on, goods of all kinds and descriptions spread along the street, each stall with its lantern and its owner calling and singing the merits of his wares, the crowd filing slowly by and sopping to examine everything. The big Chinese shops were brilliantly lighted. First we stopped at a dark little shop in a lane where squares of yellow oiled cloth were hanging, and a big one was purchased to cover my bedding and a smaller one through which I could cut a hole for my head, and wear over my shoulders Mexican fashion. Then down to the hat shop where for a few coppers I procured a light straw coolie hat and a fan for the train, some other odds and ends, and then back again, and into bed in preparation for an early start the next day.

We were up at dawn in the morning, and had only time to snatch a cup of coffee before setting off for the station, for when one travels third class in China one must be at the station hours ahead of time in order to get a seat at all. Crowds were gathering already when we arrived. It looked as if the whole of Peking were planning to take that morning train. How we fought our way into that already over-crowded car, succeeded in getting all our baggage in, (twenty-four pieces in all) and secured three seats for six of us, is a thing always to be wondered at. One of the pleasant things about a third class train is the unfailing courtesy and good-humour of those who travel with you. Three of us sat on our bedding rolls, for nothing is checked on a third class ticket. When the rack is full, the aisle begins to fill up, and when that space is exhausted, passengers and their effects begin to take to the roof.

After the train started, we had our breakfast out of our picnic baskets. It was a good train. It went, and actually reached Tingsien about the time it was supposed to.

Tingsien is an old historic city dating back to 1300, surrounded by a wall, and entered by a series of fortified gateways so intricate that should an enemy find his way in, it would seem impossible that he should ever find his way out again. But modern improvement has recently cut a straight road through the thickness of the walls. We had the whole afternoon before us. We first transported our things to the nearest inn and were assured by mine host that in the room allotted to us there were no bugs. Leaving the cook on guard, we set off in rickshaws to see the city and pay a visit to the headquarters of the Mass Education Movement. This spot in the heart of the quiet countryside has been chosen for an experiment in education which doesn't lift a student young or old, out of his natural environment to send him back dissatisfied ever afterward to be anything but a city dweller, but which

rather, after the manner of the Danish Folk Schools, brings to him a practical education suited to his own particular agricultural needs. We found some of our own Yenching graduates in their offices in the big buildings which were formerly the old Examination Halls of Tingsien, all eager, enthusiastic, working hard, believing tremendously in what they are attempting to do. I had not intended to write of Tingsien, but having once caught its contagious enthusiasm, it is practically impossible to prevent oneself from talking about it.

We had our dinner in the inn courtyard, set up our cots and mosquito nets, and went to bed.

We were awake again at dawn to find low grey skies and a fine drizzle. Should we wait until it cleared, or should we start rain or shine? There was some division of opinion in the matter, but the majority were anxious to be off, so we were soon all out of bed, kettles of hot water appeared, and the cheering smell of coffee was in the air. We got into our clothes, and breakfast over, watched with no little interest the preparations for our departure.

Our muleteers had arrived early - and perhaps this is as good a place as any to introduce them to you, as they sit chatting and smoking in the inn yard. There were four of them, each one in charge of two mules. One we christened "almost a Mexican" - an old man with a rosy wrinkled face and a charming smile; an old torn hat was set at a rakish angle on top of a rag that was tied about his head, a sash held together his dirty gray cotton coat and trousers. The "Kentuckyan" was a long, shambling shiftless-looking fellow, with great feet, who looked at all times as if he had been born tired. The "Gurkha" was small, compact, alert, tireless, with his watchful eye always on his charges. And the "boy", a cheerful pockmarked and somewhat irresponsible lad, who had charge of "Dynamite", the bobbey baggage mule.

But it is high time we were off. Before the mules appeared, our bedding and boxes were firmly roped onto the high wooden saddles which were scattered about the yard. The mules were then led out one by one from their stalls, and the loaded saddles lifted onto their backs. We had six riding mules and two for baggage. They made pretty high riding with nostirrups for one's feet, and the animals looked lively as they came frisking out. We watched them with no lack of interest to see which one would be our inseparable companion for the next five days, and we fervently hoped that the friskiest would not be allotted to us.

The first baggage mule to be loaded with boxes of tinned food and a few beds objected so strenuously to joining our expedition that only with one muleteer bestriding his head, and all the other others holding down bits of his anatomy, and using the gently persuasive methods known only to muleteers, could he be persuaded to allow the saddle to be lifted over his head, and fitted into place. It was an interesting performance but we felt a little dubious about it on that first morning. We soon became accustomed to it, however, for it was repeated every time he was saddled.

The second baggage animal loaded, our riding mules appeared, one by one, and I saw with relief my bedding lifted to the back of a well fed, sleek, brown animal with red tassels on his bridle. "The

Terrible Meek" I named him for I felt his gentle and placid appearance would prove to be deceptive.

Oddly enough, much as we had anticipated in advance the pleasures of this riding trip, no one of us seemed anxious to begin riding right away. The rain had stopped, and we all agreed that it was a lovely cool morning for walking. Away we went, and soon were out on the soft country road winding through the fields of wheat and corn, which was none other than the old Imperial highway over which kings and princes had travelled to worship at the shrines of Wu T'ai Shan. Through little shady villages it went, people flocking to the doorways to see the strange caravan go by, naked children, pigs, and chickens darting out from under our feet.

As the morning wore on, it grew hotter and hotter, and the mountains seemed very, very far away. It isn't as easy as you might think on a broiling day to keep up the pace of a mule on a soft country road. It seemed as if the dreaded moment had arrived at last when we would be forced to mount, when our feet would leave the good solid earth to dangle aloft in space. I looked the "Terrible Meek" over and decided to try mounting from a nearby bank. It was going to be quite a business getting on that mule without even a stirrup to give a leg up, and we realized now too late that the whole matter should have been carefully thought out in advance. We should have been practicing for it with regular daily Swedish drill, and brought some block and tackle. It requires an elaborate technique to spring lightly and accurately sideways from a bank, and to land in the right position facing forward on the back of a mule who isn't even standing still! I wondered if by a gentle embrace of his neck I might in some way haul myself upon him. I took another good look at the expression of his face and decided against that. The "Gurkha", firmly gripping his bridle with both hands offered me a bent knee as a take-off, while the mule glanced at me out of the corner of one eye in a way that seemed to indicate that he wasn't sure that he liked the look of me. I am a little uncertain still as to just how I managed it, but I eventually found myself mounted, and it felt, in those first trying moments, as if I were on an elephant with a back like a moving staircase, and nothing but a couple of ropes between me and certain death. I remember reading in an Irish hunting story of a member of the hunt who undertook to instruct a lady rider thus: "Don't sit your horse; ride it." and I thought that morning that if he had been with our party he might well have said with equally brutal frankness: "Don't fall off your mule; sit it". However, after some days we did acquire a certain art of balance, and when several of our party had kindly demonstrated to the rest that one could descend unexpectedly, without serious damage, we all gained confidence.

This seems an appropriate place to introduce to you our party, as we come slowly into view, one by one.

First comes the old white mule and upon his back is perched Laura. You would not guess to see her placidly sitting there, the false starts, the heroic struggles, the vain attempts, the heartening encouragements of her muleteer, the last final successful heave, that saw her finally

and safely enthroned. There she sits with her big shade hat tied under her chin like some fine, old ancestress of hers, forging westward to the Pacific, a homelike and steadying influence in the caravan of covered wagons.... A good leader, that old white mule, with his hind legs gracefully knock-kneed. With calm and contemplative gait he led us through rivers, over mountain ranges, aloof and exclusive when threading his way through an inquisitive and disordered group of his kind; unmoved when every tin can and kettle that Dynamite carried, rattled and shook; when pigs and chickens rushed with alarming suddenness from beneath his feet; and even when (the supreme test of a mule's nerves) a large red cotton umbrella was opened beneath his very nose. One day did the demon possess him. In a shady lane during the sleepy noon hour, when our vigilant knee and hand grip had relaxed somewhat its hold, at the sight of a harmless cow, he leaped suddenly and unexpectedly into the air. Great was the fall of Laura. Having thus shown what he could do when roused, he relapsed into a coma which continued for the rest of our acquaintance with him.

Following hard on the heels of Laura is the procession comes Dynamite, the bobbery baggage mule. In appearance he is small, dark, active. He looks as if he would make trouble wherever he goes, and his looks do not belie him. The fact that pots, pans and kettles are rattling and bumping on his back all day, disturb him not at all; but let him once lose his place in the line, confusion reigns until he is reestablished. He employs every device known to a mule to prevent being saddled, but once this is accomplished, he carries the heaviest pack as lightly as if it were a feather. The trip is one long pleasure jaunt to him. He dallies with every chance acquaintance he meets on the road or off, and resents being asked to move on. The muleteer speaks to him long and confidently, to no avail.

Next in line comes the writer upon the Terrible Meek. Only innate modesty prevents me from describing the splendid feats of horsemanship performed almost momentarily, that alone keep me upon his back. He proved, however, easy to ride in those few moments when he was not shying at a passing umbrella, trying to scrape a fly off his stomach, looking around to see who was coming, lurching unsteadily through a rushing stream, or demonstrating how near he could advance to the edge of a precipice. My mounting became in time an accomplished art. Having selected an appropriate bank or boulder, I leaped to the bent knee of the Gurkha, from which a second spring landed me onto a piece of loose harness which hung from the Meek's bridle and was attached somewhere in the rear of his saddle. Poised for a moment like a butterfly in flight, I performed the final evolution. With one foot demonstrating a graceful parabola, I found myself in a position facing forward; that is, if my feet hadn't become mixed in the process. At least, this is the way it all appeared to me. The rider who followed me has quite a different way of describing it.

Hard on my trail comes the Meek's partner, Explosive, and upon his Doris. I found it difficult to maintain my balance and see what was going on directly behind me. Consequently, although I was always conscious that he was there, and inclined to say to him at times what I once heard an ancient lady in Bournemouth say to her companion who was hurrying her off to bed too early, "I won't be hustled", he remains a
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somewhat nebulous figure.....If her friends from far-off Boston had seen Doris on her way to Wu T'ai Shan, they might have had some difficulty in recognizing her. Dim gleanings of what I had read of the conquering march eastward of Alexander the Great floated through my mind when I beheld her. Clad in the scantiest of garments, sleeveless jacket and shorts, of fine physique, regular features and short crisp curls, she looked to me always, walking or riding, like some Greek statue which, in deference to fussy modern conventions, had donned a few light garments, and was off on a pleasure trip in China. Her hat even added to the illusion, for it had netting openings in the crown, which gave it a faint resemblance to a visored helmet. She was very splendid in immaculate white during the first day out, but after that her appearance was rather that of a statue that had just been dug up, slightly soiled and not yet polished up and ready for the museum.

Now comes Marjorie. Marjorie is a Ph. D. and a woman of some importance in her sphere of influence, but she will only be remembered among us as the fly-swatter. Her dauntless efforts in this campaign in the face of insurmountable obstacles and deplorable lack of cooperation and appreciation, is one of those heroic tales of self-sacrificing devotion that alas, will never be fully known to the world. Armed only with the simplest and far too inadequate equipment, she conducted, night and day, a vigilant and never ceasing war upon the flies of Shansi that should rank as one of the most daring of the military manoeuvres that were ever conducted in that province. From the first it was a lost cause. As Queen Mary murmured in her dying moments, "You will find Calais written on my heart", so I can imagine Marjorie, while life is ebbing fast, whispering, "Oh, do watch that butter tin, there's a fly on it". It was during the noon rest hours in the inn chambers that she was in her greatest glory. What she accomplished with an old flit machine and what unnumbered hosts fled before her fierce onslaughts could never be done full justice to in this brief chronicle....

The next rider in line was Cookie, on the Manchu Lady. Cookie was not our cook. It is hard to say just what she looked like, certainly like nothing I had ever seen before. Her head was crowned by a perfectly enormous shade hat, which made her look in the distance like some vast mushroom which had taken root in somewhat unusual soil. She wore a blue outing shirt and well-cut riding breeches. But where one would expect to find polished riding boots, there appeared socks of a somewhat violent hue and tennis shoes. The Manchu Lady which she bestrode was so called because of the very elaborate headdress which she wore adorned with many large red tassles.

Last, but not least, comes the cook. I do not know much about his antecedents or his previous exploits, but I do know that he left a wife and four small children to willingly accompany five foolhardy women on an expedition to a place of which they had but the vaguest notions, over a road of which they all knew nothing; five women who carried no map of the country through which they travelled, and who were blissfully unaware of bandit hordes operating two days' march to the north of them, and a sizable little rebellion brewing to the south of them; to whom the name of Wu T'ai Shan gleamed like some desirable star to which they hopefully hitched their wagons one fine morning, and trusted that the traces wouldn't break. If I were asked to write an epitaph for

the cook's tomb, I would not hesitate to inscribe: "Here lies an excellent and a gallant cook", which unlike most epitaphs would be no exaggeration.

But perhaps by now the gentle reader feels that the first day is already far too long, and that it is hightime we were getting somewhere. We felt so, too, long before that first day was over. The heat was considerable. Our backs ached on the mules, and our legs ached, off. The sun blistered our shoulders and our knees, and, in fact, any portion of our anatomy that was exposed. The road wound interminably through cornfields, and even the foothills of those mountains that we hoped some day to reach, seemed very far away. When every bone in our backs seemed bent and broken, and we could ride no more, we walked; and when our legs ached, and the heat and pace were too much for us, we mounted again, - and on, and on, and on. The thought of four days more upon those mules seemed more than we could bear, and we prayed for rain, that our progress might be interrupted, and that we might be storm-stayed in some mountain inn. It is only under very unusual circumstances that one would willingly choose to stay any longer than was necessary in a country inn in China. You, who have known the comforts of some cosy little mountain hostel, with glowing fires, and polished pewter, easy chairs and attentive landlady, little you know of the comforts of the inns we encountered. The courtyard full of kicking mules, pigs, chickens, and the entire population of the town who gather to inspect any guests out of the common run; the swarming and determined flies; the dark and dirty common rook which is occasionally sketchily brushed out by an apologetic innkeeper; the hard brick k'ang (bed) on which you rest at noon with its battered grass mats; the cracked teapot and cups; the shouts, yells, bawls, brays, and noises of all kinds that go on all night, for no one sleeps apparently in a Chinese inn but yourself; those hastily eaten meals out of tins; the bread that becomes each day harder or mouldier according to wet or dry weather; the attempts to be clean in a hand basin, and the final giving up of the attempt; the everlasting taking apart of beds and setting up of beds, and the packing and unpacking of bedding rolls; the sleepiness of the early morning starts and the weariness of the late evenings when you beg your muleteers on your bended knees to take you to some quiet temple courtyard, and their final cheefful disposition of you in the inevitable inn yard. Ah, well, that is only one side of the picture, but there is another.

In a travel book which I have recently read the author comments on the fact that the things that make such trips as these worth while are seldom the things that can be told afterwards, or that anyone would listen to in the telling. They are things of mist and air, impressions and illusions, moods and feelings of inarticulate elation. The mind is free and unfettered, swept clear by the winds and the great open spaces, and it is as if you saw the world made new again, and beauty comes to you with a freshness and a simplicity that is unforgettable.

Our first halt on that first day was at noon when we clattered up the cobblestoned incline, under the covered gateway and into the spacious innyard for the little village of Chu Yang Cheng. Here packs were lifted off and the mules were led off to much contentedly from their flat baskets in the open stalls during the three hours we rested

there. We opened our knapsacks, partook of sandwiches and tea and stretched out under a shady vine. Doris, who is an energetic eager soul, after one hour's rest was anxious to be on the way again, and with a somewhat limited Chinese vocabulary ordered the muleteers to prepare for departure. Those of us who had been longer in China lazily watched proceedings. What we expected would happen, did. The muleteers appeared to agree to everything and amiably moved a few saddles about, led a mule out of his stall and not long after moved him back again; and, the caravan moved on when they were ready to go and not a moment later. The rule of the road is thirty miles a day when the going is good, with three hours rest at noon, and customs as old as Confucius cannot be changed in a day. On again, and by evening we were in the foothills, and before dark we rode down to a little walled village, and into an innyard not much bigger than a pocket handkerchief. There were two rooms for travellers and we were the first to arrive, so we took possession of both and prepared for the night, three of us setting up our beds in the open granary where there was a pleasant smell of hay. As dust was falling, into our court already full of mules and saddles, came one after another seven mule litters belong to some Chinese pilgrims and their servants from Shanghai, who had made the trip to Wu T'ai Shan, and were now on the return journey. We moved, cook and all, into one of the rooms; and very friendly we all were, as the new arrivals sat in the open court at a long bare wooden table, waiting for their hot meal to be served from the inn kitchen; telling us tales of the road before us; of the terrible rains they had encountered, and the swollen rivers they had been carried over by men wading breast high. It all sounded very alarming; but what to do. They were still talking loudly when we went off to sleep, and almost before daybreak they were away, having slept in their litters all night.

We waited until they were gone before we made our preparations for departure. It was a glorious morning with just that tang of mountain freshness in the air that made us impatient to be off. Away went the old stone Imperial highway, winding ahead of us like a great snake. Very clearly marked it was, and as the muleteers seemed very slow in packing up, we decided to walk on and let them catch us up on the road. Blithe and carefree, we never once gave a thought to the maxim learned by bitter experience by more than one traveller before us-- never lose sight of your baggage animals. After about two hours walking we came down to one of those typical broad, shallow riverbeds of Shansi; fully half a mile wide it was, with only a tiny trickle of water running down the middle of it, which after rain in the mountains would swell into a dangerous torrent that there would be no crossing until the water subsided. We lay at full length under the shade of some willows and waited for the mules which we thought were just behind us. We waited, and waited, and waited. We began to wonder what had happened; an hour slipped by, and no mules. The sun was well up, and the big bare mountains ahead of us began to look as one of our party remarked, "as hot as teakettles filled with boiling water". One of the party went off of her own accord to look for the mules. This was helpful, for no sooner had she disappeared than a traveller informed us that he had seen our caravan crossing some time ago farther up, and we waited for what seemed another hour until she returned with the news that she had no news.

The sun was now gathering strength for the day. Into that hot, san

sandy riverbed we filed, sadder and wiser travellers. On and on in the broiling heat, pushing through the heavy sand with no assurance that we would make connections with our animals until evening, and every possibility of taking the wrong road at any moment. From the other bank a shady lane led to a little village lost in tall poplars, and there in that well of coolness, our blessed mules were waiting for us. That was the only time we ever felt some slight affection for them.

There was no hope now of putting in the full thirty miles that day, and it was well into the afternoon that we reached our noon stop. Most country inns in China are much alike, the only distinction being that you may occasionally find one a little worse than the others. At this one the K'ang seemed harder to my aching back than any I had ever lain on, and rest was a mockery and bread a bitterness. At four o'clock we were on the road again with small hope of reaching our next stop before darkness had fallen.

It was during the course of this afternoon that we met with the one river that caused us any trouble. Our road dipped suddenly down to it as it swept under a great bank of black rock - a wide swirling river of sullen yellow waters flowing swiftly; and on the bank, the most astonishing, yelling horde of stark naked men and boys that ever I beheld. The only thing to do in moments such as this is to keep calm, and await events. We kept calm and waited. Soon from the welter of noise and confusion there emerged the information that this was a river to be crossed; that it was a fearfully dangerous river; that these brave men were willing to risk their lives for us and carry us over; that borne on the backs of three men apiece we could be carried to safety, and our mules steadied across, - all for the insignificant sum of eight dollars. Other travellers who had assembled before us on the bank began to prepare for the crossing. It seemed awkward - this carrying business. We looked hard at the river. We looked so hard and so long that one small boy waded in and then slipped and was before our horrified gaze carried away in the swirling waters with despairing shouts. He came ashore farther down. Our mules were now in and buoyed up by a shouting, pushing mob, were propelled, sustained, hustled, pulled, and pushed into the river and across. We expected to see the whole mass go down in the dark waters. But no, the water never rose above their thighs. They all reached the farther shore in safety. Then we made a noble resolve - we would pay no eight dollars to be carried over by naked men. We would join hands and wade, - and to the astonished gaze of all, we fearlessly stepped down into the turgid flood. Would we ever win through to the far bank? Claspings hands we steadily and slowly advanced. The water rose over our ankles, but we never flinched. When it rose to our knees, our faces blanched, but with heartening words of encouragement the stronger of us cheered the faint hearts of our weaker sisters. In midstream as the water rose higher, the line wavered, trembled, almost stopped, but never broke; and with a last tremendous effort we triumphantly staggered to the other side, wet to the waist. None had been lost. We had fooled them all, even as they had hoped to dupe us. But that crossing would have been a ticklish business after rain.

That afternoon was one of the loveliest of our trip. The valley narrowed in, we left the river behind and followed a mountain stream

as it came brawling down over the rocks. The progress was slower here and the air cooler, and we began to really enjoy the walking and climbing. Back and forth across the stream we went, our muleteers offering a broad back wherever stepping stones were missing. Then, in the very late afternoon, down into a lovely level valley, all golden in the setting sun. The road grew slippery as it wound in and out of the green paddy fields and up a long slope of poplars to the village. The way was full of people, men and boys coming home from the fields where they had been working all day. The women were preparing the evening meal.

We were hungry and tired, and it was getting dark, and it was still some ten miles from where we should have been. We could go no farther that night. Oh, for the shelter of some friendly temple court where we could be quiet and clean - and there it was - just ahead of us, its big gates still unbarred. We sent the cook to inquire if they could shelter us, and back he came with the good news that we could all come in. For some strange reason the muleteers made no objection. Perhaps they were tired, too, too tired to argue with us.

It was a very old temple that had been completely rebuilt, nearly finished now; the great statue of Buddha over forty feet high which had so long been out in the rain and the wind was now under roof again. They led us into a clean, quiet courtyard for guests, quite new, whose lofty rooms were placed at our disposal, and so eager were they all to be courteous to the foreign guests, that we found them summarily turning out some travellers who had arrived before us, and who had already gone to bed. We told them we would rather sleep outside under the stars. As soon as our beds were ready we crawled into them, some of us so dog-tired that we hadn't enough energy to crawl out again at eleven o'clock to partake in the courtyard by the dim light of a lantern, of a wonderful Chinese meal prepared for us in the monastery kitchen, while wondering faces of priests and children peered out of the surrounding gloom at these strange guests. A camp cot is hard and narrow, but I know of no bed on which I have ever slept more soundly.

When we finally awoke, day was well advanced, and allively concert had evidently been going on for some time in the room within. If you have ever heard Chinese singing accompanied by a few musical instruments, you would realize that if this could not wake me, my slumbers were indeed profound. We rose restored, and even those who the night before had issued an ultimatum that nothing could induce them to move on the next day, were quite ready for the road.

We had a leisurely breakfast, inspected the temple where the sounds of the saw and the hammer mingled with the chanting of the monks as they made their early round of the shrines, called upon the head abbot to whom Laura, the best linguist of the party, extended our grateful thanks, made our bows and departed. We were in a pleasing state of uncertainty now as to what day it was, what time it was, and where on earth we were.

We had an easy morning through a lovely valley of fresh green growing crops, as crops grow in well-watered valleys. The fields were terraced far up the steep mountain slopes. We passed through lanes and

villages shaded by tall poplars where little golden-brown naked children played in the clear clean streams, and the women chatted with each other as they washed their babies and pounded their clothes. As we neared the village of Fu P'ing we met coming over the crest of a hill a flock of stout-hearted little donkeys almost submerged beneath enormous brassbound trunks that hung from either side of them; a company of strolling players on the march from village to village. The villages of Shansi are gay with theatricals at harvest time; every village, however small, having its Hsi T'ai, or stage, - a high platform roofed, with a little green room behind. The stage is open to the public gaze and the show is free for all, supported by public subscription.

We passed many travellers on the road, for the harvest was swelling in the ear, but not yet ripe for the cutting, and even whole families were going a-visiting; the mother seated calmly on her mule or donkey under a large, shade umbrella, a baby in her arms and another small creature behind clinging to her waist; the father of the family leading the animal, and perhaps one or two older children walking beside him. Sometimes they were all resting by the roadside, the mother feeding the baby. All were dressed in their best, tidy and clean; and the children with little touches of gaiety, a cap with a brass Buddha, or a pair of red satin trousers. She rode not as we did, that Shansi lady. She sat her mule with ease and grace, for she had ridden in that fashion since she was in her own mother's arms. Sometimes she had fixed to the front of her saddle a high wooden bar on which her hands rested, - and how we envied her. Once in a narrow gorge we came upon a little bridal party; a young countryman was bringing home his bride, proudly leading the mule on which she sat astride of her bedding, and very eagerly he was talking to her. A pretty young thing she was clad even to her tiny bound feet in embroidered silk. Her hair was drawn tightly back from her squarely shaven forehead as befitted a married woman, and she lowered her eyes modestly as they passed us.

The inn chamber at Fu P'ing was a long, narrow room, quite clean, - and Marjorie, having made a fairly successful round-up of the flies, we had quite a comfortable rest lying on our backs on the K'ang. I shall always remember the innyard there, because of its children, mostly little boys who were carrying smaller brothers and sisters, and had come to have a look at us, waiting patiently outside the door until we emerged. When I strolled out to see if there were any signs of activity among the muleteers, I came upon a very charming pantomime. On the old, worn, dirty stone steps that led from the outer into the inner court were two little creatures sitting, who might have stepped out of some old painting of palace children. The little boy who sat with his back to me, was offering melon seeds to a child so lovely that I was reminded of the Chinese simile of the lotus growing out of the muddy pool. She looked up at me out of her long eyes with a sidelong tilt of her head, that was very alluring, as were the movements of her little hand and arm as she played with the melon seeds. Her hair was drawn tightly from her forehead in short pigtaails which radiated from her head like the spokes of a wheel and which left bare the lovely curves of her cheek and brow.

She wore a flowered apron, red tasselled shoes and silver bracelets. Someone called from an inner courtyard and she vanished, - and I have been wondering ever since if it was not a little fox fairy that I saw sitting in the innyard at Fu P'ing.

An afternoon of hilly country, and up over our first mountain pass. We were climbing well ahead of our mules, and had just passed some of the poorest human dwellings, when suddenly there came floating to us on the wind, a wailing, sobbing sound, so wierd, so full of sadness that we wondered if it could be real. Who in all that lonely region was in such distress. And then by the roadside we found her, - a young thing crouching in front of a grave newly made, her hand close to the little door through which the spirit of the dead is free to wander, and know that there are those on earth who remember. She was young, and perhaps she loved him, and perhaps her thoughts were of the long, empty years ahead of her, when she would be nothing but a servant in his father's house, never to have the distinction of being the mother of sons. It followed us on the wind, that mournful sobbing, that hopeless supplication to her dead to come back.

Stoerly we climbed up over the pass at the top of which the magnificent Great Wall surged and billowed over the hills, and through the broad width of which we led our mules, commanding a gorgeous view of the valleys on each side. The mountain peaks closed in close about us, and it was impossible to see how the road had reached the top. In the distance, range after range of incredibly lovely mountains came into view. And as we passed through the Great Wall we saw spread out before us a wide, gently sloping valley, all planted with fields of wheat and corn, with the late sun turning everything to gold. From below came the sound of temple bells, and some mule litters were winding up from the road towards us. We felt a sudden happiness at finding ourselves in so lovely and restful a place, and as we went down the winding road we thought with hopeful anticipation of the pleasant little inn that we must surely find. Just as we thought, the most charming of villages; a high camelback bridge at the entrance and a quaint towered gateway at the far end of its short, wide street. And then, as always, the unexpected. We were deposited in the noisiest, dirtiest, smelliest inn of the whole trip. - We were disappointed in that village; it was much too alluring to harbour such a place. I had loitered behind to investigate a little village school which was even at that late hour full of merry little scholars armed with the most modern of text books, but pursuing no modern methods of study. Their voices rose and fell at the full pitch of their lungs, each one shouting independently his own particular lesson. They redoubled their efforts for my benefit, while their teacher calmly partook of tea in an adjoining room. When I rejoined our party I found several of its members on the verge of mutiny. They couldn't and wouldn't stay in that inn. They would rather sleep in the open fields. - But in the end they had to, as we invariably did, and though as soon as our heads touched the pillows we forgot our woes, almost at once someone was shouting that it was dawn again, and time to get up. Would we never any more be able to sleep as long as we wanted to? Must we forever be going on and on like the Wandering Jew? Would we ever reach Wu T'ai Shan? The usual hopeless struggle to find the lost toothbrush, the lost shoes, the lost everything that we tried to put our hands on; the genial and curious crowds that swarmed about us as we

tried to eat our breakfast; the ineffectual efforts of Marjorie to keep off the flies. - They might tell us that this afternoon we would be at Wu T'ai Shan - we knew those muleteers by now; everything was just thirty li further on, and we would never really get there. We had given up all hope of getting anywhere now. We would go on and on for the rest of our lives, risking our precious necks on those everlasting mules, forever taking beds apart and setting them up again, forever doomed to bathe in a handbasin, never again to have any clothes that were not crumpled and forlorn; always to be dragged out of bed at dawn.

But it is wonderful what a cup of good coffee will do for you, and the world seemed bright again when the village was left behind, and we were out on the road once more - the world was clean and fresh, and the bare mountains lifted clear out against the sky. We were off on foot, and I vowed that if it were really only half a day's march to Wu T'ai Shan, I would walk it, tired as I was.

A lovely valley we climbed, while the mountain peaks rose higher and closer, the road forever crossing and recrossing the river, and back and forth I went, jumping and slipping over the wet stepping stones. A fine mist came down the valley which turned into a drizzle, and for the first and only time on the trip we had the cillskins out.

About noon the valley narrowed still more and the river cut its way through a gorge - and through this we entered the valley of Wu T'ai Shan, ten thousand feet about the sea. It looked dreary enough that afternoon, the mountain tops lost in the rain, as we stumbled up the great stony empty riverbed, but soon on every spur and in every hollow of the hills there appeared the rose-red and grey walls of temples, new and old, big and small, Buddhist and Lama. Boldly they stood against the skyline like fortified Italian towns with their great gateways and retaining walls, towers and peaked roofs. Very bare was the valley, and very bare the smooth slopes of the mountains that went up and up, green and soft, with never a tree except where the temples sheltered them in the fields and hollows. And then, in the centre of the valley we saw before us the city of temples clustering about a little hill, with a huge white dagoba rising from the foot where the buildings were thickest. A flight of steps broad and high led to the proud monastery on top, with its bright blue and yellow tiled roofs shining through the rain. Narrow cobblestoned streets went winding and twisting up the hill, and we heard the ringing and hammering of the metal workers as all day long they beat out the images and vessels for the altar, of brass and copper, silver and pewter; and far and near the sound of bells and horns, conches, gongs, and drums, and the chanting of the monks that never ceases in the valley of Wu T'ai Shan. It was as if in a dream that we climbed those steep, narrow, slippery steps.

I had walked from early morning and it was now getting on to four o'clock, and we had had nothing to eat since our very early breakfast. I cared not where I laid my head that night provided I could put it somewhere soon. Our muleteers steered us straight for the big temple near the Dagoba, and the mules huddled in out of the rain under the shelter of the towered gateway, and I with them, feeling that neither they nor I would get any further up the hill that night. The rest of the party went to investigate, and came back with disappointment and

despair written upon their countenances. The place was full of soldiers, and the only court they could put us in was a busy thoroughfare, with small hope of any kind of privacy. So, my undaunted companions toiled up the hill looking for accommodations more worthy of our struggles and adventures in reaching this holy spot. The rest of that day is for me rather a blurred memory. We did finally all get up the hill, and came to rest at last in a big courtyard, well above the noises of the town; an old bald-headed abbot bustled about with his big clumsy keys and opened up two empty, dusty rooms for us; a stove was produced and a little low table and some grass mats; and old man was sent off to the well for water; we were fed with something hot that the cook managed to produce, and as we put up our cots we sighed with content to think that we would not have to take them apart again for many days to come. We watched the grey, rainy, cold evening darken in the grey court outside, and with everything we owned piled on top of us (for it was bitterly cold) we went to sleep with one last blissful thought that we could stay in bed just as long as ever we liked in the morning.

From my diary: "We are here at last, living within the walls and gates of a Buddhist temple familiarly known as the temple of the brass tiles. Its inmates are rather few in number, and as far as I have been able to judge consist of the tall old abbot, one middle-aged and scholarly-looking monks, two young lusty monks - one with a twisted back - and a very giggly middle-aged lady who occupies a court just behind our rooms, and who spends her days mending old bed quilts and keeping the fire going under her bed. She describes her status here as the "niece of the God", a relationship we have thought it best not to inquire any further into; then there is a wistful-eyed small acolyte who is at everybody's beck and call. He wears a little black cap, and carries to the "niece" with a somewhat unsteady hand bowls of food from the monastery kitchen. There is in addition, the old man who fetches our water, a very splendid and fierce mastiff chained at the inner gate, and a beautiful grey rooster with long and arching tail feathers who seems to be the inseparable companion of the mastiff. The whole establishment (with the exception of the mastiff) has quite taken us for granted....

I am out on the terrace this first lovely fresh morning 'wathhing the Mongols go by'. From where I sit on the stone steps of our main gateway, I can see the big white Dagoba towering over the jumble of buildings below. I have read somewhere that it is built to enclose the hair of one of the followers of the Buddha, an old man who came from India nearly two thousand years ago riding upon a white lion, and in this spot which he marked as holy, he built the first humble shrine. Now each of the five peaks of the mountain range that encloses our valley has its temple up in the mist and the cold, and near and far, in the hollows of the hills and on the spurs are temples, big and small. On the near slopes to the right of me, set like chessmen on a board, are even ranks of little white dagobas under which sleep the holy men. How quietly these old monks lived their uneventful lives in this valley, and now how quietly they rest. Only the river is never still, and forever passes and repasses in ripples of

the chessboards are set. Only the wind, and the pilgrims who come and go as the wind.... On the little paths that climb and wind in all directions they are always to be seen - the moving figures of the pilgrims wending their way hither and thither, pilgrims from Mongolia, from Tzechuan, and from far Thibet. Some of the little chessmen are quite new all white and glistening, and others are old and cracked. They are very thick in the hollow just below our temple; a hillside of white ghosts in the disk, and just where they cluster, the thickest, we have discovered the well from which our water drawn. We had noticed a peculiar flavour in our tea, but had not until now, realized that it must be the somewhat unusual one of monks' bones. In the early morning when it is first light, little bells and big bells, wooden gongs and brass gongs, drums and horns, are set ringing and booming out over the valley, and the smell of incense and the sound of changing rise on the air; and again in the evening we hear the praises of the Buddha just as they have gone on through all these centuries.

As I sit here, first a Mongol goes by in his dirty purple gown and red sash, his high boots, his rosary and his jade bracelet. He stops to watch me writing, but as he speaks no Chinese he soon goes up the broad flight of steps to P'u Ssu Ting, the Lama temple just above us. Now, round the corner on his way down to the temples in the town, comes an old man with white beard and bronzed massive face. In one hand he carries a staff, and in the other his prayer wheel which he never stops turning. Round and round it goes with strings of silver coins to keep it whirling. Its handle is made of a deer's horn. He sits down to rest on the step beside me and watches what I am doing. He speaks Chinese and tells me that he has come from far over the mountains to worship here. He lets me have his prayer wheel, and I can only send it round in jerks, not smoothly as when he turns it, and I say to him: "You are skilled in one thing, and I in another." He nods his old head, picks up his staff and bundle and goes off down the steps that lead to the town below, his prayer wheel still revolving. Now, comes by a flock of rosy-faced little boys, fat and jolly, in their long monk's robes. They are full of mischief, these little disciples of Buddha. Then, a workman sits down to smoke his long pipe with its jade mouthpiece. This he lights with an old-fashioned brassbound flint and tiner. He inquires if I have any matches about me, for he explains this contraption he uses is really very clumsy. He is mending the tiles and painting the big devil screen that stands guard before the flight of steps leading to P'u Ssu Ting - in preparation for a big festival. Now, comes shuffling by the old coolie from our temple in his faded blue clothes, carrying over his shoulder the wooden pole from which are suspended the tins in which he fetches our water from the well. Very little water was used before our arrival I gather from the looks of things, except for drinking purposes - clothes never washed from one year's end to the other. Now the poor old man is kept running to the well all day, and such a washing of clothes, taking of baths, shampooing of heads has been going on as he has never seen in his life before. He must think we are all crazy. But he goes by with his smile, for China is the land of unfailing courtesy, and of patient and incessant labor. I have noticed that he takes a long time on his trips to the well, - so long is he going and coming that he would never have time to make more than three or four such journeys a day. He has, it seems, worked up his own immunity to overwork...

They are all interested in me, these passers by, but they are not obtrusive. If I look up and smile or speak to them, they come closer

or sit down for a chat and ask me where I come from and how old I am. If I don't look up they stand a while and then pass on. They are all very much interested in my book of Chinese fairy stories with its Chinese characters, and are deeply impressed by the fact that I can read them, for very few of them can read at all. Bashfully one young fellow is pushed forward by the others, for it appears he is a scholar and can read. I cannot resist the temptation to show off a little, so I read aloud. Great is the delight expressed on the faces of all, for they are simple souls. They all know the story of the old woman of the mountains of Shansi whose son was eaten by a tiger: "Ah, yes," they say, "they are reading of the old woman of Chiao Cheng Hsien, we know that one", and they squat down on their heels to listen. "They are great scholars, those two", they say, nodding their heads. How easy it is to be thought a scholar at Wu T'ai Shan; a big frog in a small puddle. At Yenching my friends are not so easily impressed."

How quietly the day goes by at Wu T'ai Shan. In the morning just as the sun comes up over the mountains, we hear the priests begin to move about our court. The great doors of the square temple that stands in the centre, are opened. The priests, pulling yellow silk robes over sober grey ones disappear into the building, and the chanting begins, softly at first, the little wooden fish drums marking the rhythm. Then there is a drift of incense smoke on the air as the little acolyte issues forth to go the rounds of the lesser shrines, with the lighted sticks. It scarcely wakes us after the first morning. We have our breakfast in the open court, sitting on the ground on the rush mats. How delicious our meals taste, and how very simple they are! Besides the tinned things that we have brought with us, the cook has managed to prepare chicken broth and chicken cooked in rich gravy every night, and the young onions we eat stalks and all. Sometimes he finds a marrow or a watermelon. He makes us wonderful brown bread in the little deep tin that carried "I Lu P'ing An". We could wish for nothing more, unless perhaps that the eggs and chickens were not of so ancient a vintage. Sometimes the "niece" peeps at us from round the corner while we are eating, or the little boy stops on his trips across the court to ask politely if we have eaten enough; but no one pays much attention to us.

It is impossible to be restless at Wu T'ai Shan, for there is nothing to do between meals but to take walks on the hills or descend the steep cobblestones to the lower town and poke in and out of the shops and temples. The shops are soon exhausted, for the metal work is crudely fashioned, and there is little to buy beyond the simple necessities of the village. The shiny old wooden tea bowls which are carved from tree roots, from which they drink tea in Lama temples, now rub elbows with the cheapest of enamel ware from Japan. Doris has even discovered tinned milk which she consumes in great quantities.

But the temples are inexhaustible in their store of dim interiors, crammed and crowded with pictures and hangings blackened with age and incense smoke and all the fascinating conglomeration of things that are concerned with temple worship. No two of them are alike. Religions in China are confused and intermingled so that it is sometimes impossible to tell whether the temple you are in is Taoist, or Buddhist. It is usually adaptable to both forms of worship. To the ordinary layman the

theology, practices, and symbols seem to be interwoven beyond all hope of unwinding. The Lama worship in China, however, although a form of Buddhism, is quite distinct in the minds of the worshippers, from the ordinary Buddhist worship. The temple we lived in at Wu T'ai Shan was known as a Buddhist temple and the monks were all Chinese. They all wore sober grey cotton robes and grey cloth shoes, and when conducting worship donned canary yellow or orange silk cloaks. But in the Lama temple just above us, the Mongals and Thibetans foregathered, for the Lama worship is the worship of Mongolia and Thibet. Their robes, practices and temple symbols were in many cases quite distinct from those used in our temple. The Lama monks dressed at all times in gorgeous reds and purples and imperial yellows. They wore woven woolen cloaks and full pleated skirts, and their hats were of gold lacquer or fibre, wide and of elegant shape. The boots were of high well-worked leather. And, when they decked themselves for the service, they were gorgeous and splendid beyond description with jewelled capes and stoles and belts. The attitude of our priests to their brethren in the Lama temple above us seemed to me rather analagous to that of the Protestants to the pomp and ceremony of Rome. There was no confusion in their minds between the two, but there was this difference. There seemed to be not the slightest bad feeling; they regarded rather with a wide and friendly tolerance and a certain amount of pride the spectacular ceremonies of P'u Ssu Ting.

I remember especially one afternoon we had followed the trail that led to a walled temple above us, and penetrating to the inner courtyards we came upon a solitary monk sitting cross-legged as if in a trance before an enormous drum, upon which at intervals he beat with a long hook-like implement. The afternoon sun streamed through the doorway upon his squat figure enveloped in the flowing lines of his robe and upon the richly colored background against which he sat. He was a thousand miles away communing in some far country of the mind, and he seemed unaware even of our dark shadows that fell upon him. Even within the walls of our own temple there was much to see. We watched the weekly housecleaning of the brass and pewter altar vessels polished up with their own incense ashes by two of the priests sitting on the steps of the building in the sun. And, we followed the old head abbot into the dim recesses of the temple halls and even up onto the musty upper stories, where all sorts of fascinating rubbish is stored and slowly turning to dust. Here we found the beautifully cut woodblocks from which the sacred books are printed, old pictures and books stained dark with smoke; old broken pieces of carved temple furniture; and sometimes he could be persuaded to give us some old treasure that was no longer in use.

Wherever we go there are Mongols, but they are thickest in the shadow of the big Dagoba, where a constant stream of them is always to be found, men, women and children, going wildly and dizzily round and round the open corridor at the base. Round and round they go like their own revolving prayer wheels that they set turning one after another, and we wait to see them drop one by one with fatigue. But no, surely the Mongol heaven must be like some vast squirral cage where they can tirelessly and without cessation perform this their favorite evolution.

So, we read, and write, and wash our clothes, and explore, and it is soon evening again, and first the bells and gongs call us to the service above, and just at dusk our own service begins again; and after we have gone to bed, the father of the pipe organ (a musical instrument which looks rather like pictures of the pipes of Pan) and a flute are brought forth, and the priest with the twisted back and another, tootle away in the dark at some old and never-ending tune.

At least this is all that happened the first few days, and then our peace was rudely disturbed. We had a visit from the Kentuckyan who came frequently to call on the cook and to help himself to any stray tins or matchboxes he might find lying about. He squatted on his heels, and after discoursing of many things, for he is never in a hurry, he asked me when we were going to the Hsi T'ai. To Ch'ou T'ai, he explained, was to make the round of the shrines on the peaks. It seems that this is the proper thing to do at Wu T'ai Shan, for to come to Wu T'ai Shan and not to Ch'ou T'ai is an unheard of thing. He assumed that we were now rested and ready for this pilgrimage, and he offered to supply us with riding mules at the rate of \$2.00 a day a mule. He intimated that by going to one T'ai (peak) each day we could be kept so occupied for the rest of our stay, and those of us who were to return the way we had come would have his mules at their disposal for the return journey. All the time he was talking I was conscious of an unnatural glitter in Marjorie's eye, and her gaze travelled off to a tiny speck on the distant peaks that indicated the existence of at least one T'ai. I felt then that we were lost.

That very evening she said casually as one might suggest taking a walk in the garden: "I wonder what day we had better go to the first T'ai?"... And it was not long after that, that bright and early one morning there was a sound of stamping in the outer courtyard, and five old friends appeared; our bedding was strapped to the wooden saddles for comfort, and we were out on the road again, on the way to the East Peak (Hsi T'ai)

We followed the riverbed up the valley and climbed to the pass that led out at the far end, mounting very steeply after the first hour, and zig-zagging up the hill on a fairly good, though narrow and precipitous mountain trail. But the air grew colder and fresher with every foot we climbed, and the flowers on the hillside thicker, and finally we came out on the saddleback, which was nothing but a vast meadow of flowers. We stood knee-deep in flowers of every hue, yellow, and red, and blue, and purple. Very lovely they all were, but I shall remember always the poppies and forgetmenots, the latter massed in solid washes of color, and the yellow poppies wandering over everything, nodding wantonly as poppies will. On the very roof of the world we were, looking away from our own shut-in valley over ranges of blue mountains that stretched away to infinity. We looked across to Babylon and away to Timbuctoo. The road on the other side went lapsing down out of sight, but our path clung to the ridge, and finally climbed steeply up the peak on the top of which stood the aquat square stone building, which must be always in the rainy season because of perpetual mist. I had never understood until now why flowers grow in such profusion in such big exposed places, scorched by the sun, whipped by the wind, and chilled by the cold. They grow

luxuriously here because the ground is always damp, even when there is no rain in the valley.

We received a warm welcome at the little shrine. The priests had seen us coming from afar and were out on the terrace to greet us, clad in the heaviest of padded winter clothing and quilted bonnets. They ushered us in and insisted that we eat our lunch in the dark interior with its windows deep in the thickness of the walls, and were surprised when we explained that we would rather sit outside where we could look off across the world as hawks and eagles see it, floating motionless in the upper air. The poor old mules had their halters off and their noses buried deep in the grass and flowers. We came ~~along~~ home along the ridge that formed the wall of our valley, and so steep and so smooth were the long slopes we descended that our mules above us looked like great ungainly birds outlined against the sky. The sun was low on the valley when in the late afternoon we dropped down on the little temple town that had seemed so tiny and insignificant from the heights above; and we threaded our way at the end through strawberry patches and down a hillside covered with wild pink roses and through a little pine forest, a pleasanter smell than Mongols. Home again, thoroughly tired out, and another blistering coat of sunburn on knees and shoulders. But we had had a day to remember. We had done the first T'ai. There were those of us who felt that a visit to one T'ai was sufficient; that having seen one T'ai we had seen them all; and even one who vowed that nothing on earth could persuade her to visit another, but after two days' rest weakened with the rest of us to the seductive voice of the Kentuckyan who was too much for us, and we succumbed to his suggestion that we visit three T'ai's in one day. This seemed possible for they were all on different peaks of the same ridge. The last T'ai would have to be left for another day. And to the three T'ai's we went all in one glorious day of climbing ridges from which the hills and valleys fell away on every side, and where the wind came fresh from the other side of the world; past herds of cattle feeding on the upper slopes; warmed by the sun, chilled by the mist, to the last little shrine where the hail lay unmelted among the flowers. The shrines on the peaks looked very much alike, low, thick-walled, grey stone buildings, enclosing an open court wherein firewood and other such necessities were stored; and where wild marigolds were drying in the sun--perhaps to add a flavour to the tea. Some of the shrines had double walls that formed a kind of inner cloister. Everywhere were signs of protection against wind and weather. The altars were in the main rooms where the monks ate and slept.

It was well on to noon before we reached the first of the shrines --The Hsi T'ai. And here we sat shivering on the mountain top in the drifting mist eating our lunch while one of the monks strayed about gathering flowers for us. We didn't loiter here long, for it was cold, and we had far to go before evening.

When we came down again to the main ridge we were out of the mist and the air was glorious and fresh and the going good. We met a few other pilgrims ch'ouing T'ai, some on horseback riding rough little unclipped ponies with very splendidly embroidered trappings, and some queer old Tibetan figures on foot, clad in heavy rough white woolen cloaks. At least, we presume they were once white. They were all going at a more leisurely pace than we. When we reached the

(Chung T'ai) we heard a great commotion in the outer enclosure, and when I climbed up on the low stone wall to see what was going on within, I found it full of wild-eyed ponies, all tossing their heels and heads, in charge of some soldiers. While we were there a mule litter with a military body guard arrived in charge of a very modern young officer with field glasses and sun helmet. From the litter emerged a stout and somewhat unascetic-looking individual clad in heavy silks, whose arrival seemed to create quite a stir of excitement. We knew he was "somebody" but it wasn't until later that we discovered that he was the eighteenth incarnation of a very holy person buried in the valley below. Whether he was a greater or lesser dignitary than the Ta Lama (head abbot) of the temple on our hill we never did discover. He invited us to visit him, and this we did some days later, and found that he lived in perhaps the most beautiful of all the temples, for it was lost in pine forests at the mouth of the valley, such forests as must once have covered all those mountains. Its lovely outer courts were filled with soldiers, and the gentleman in question did not appear when we sent in our cards, but a very unctuous and modern young priest showed us about. The court wherein the bones of the first hierarchy rested under a dagoba, beautifully finished with metal cap and multitudes of little bells that swung in the wind, was very still and cool, and over it stretched the twisted branches of the old pine trees. In front of the dagoba was a long sloping board worn shiny by the bodies of those who had prostrated themselves ad infinitum before it. It was obviously a very wealthy temple, and our guide was careful to point out all the splendid gifts presented to it by visitors who had come before us. At our going, he entertained us to tea, and produced a large book in which he explained were inscribed the names of the faithful who had contributed large sums to its support. We regretfully told him that alas, we only carried about thirty cents with us, and it would not be seemly to present so humble a gift among such munificence, and hastily departed.

From the Ch'ung T'ai we toiled on to the Pai T'ai, and from there home again in the evening taking the mountains in our stride as if we were in seven league boots. After that day we decided that if we were to have any legs to go home on and any shoe leather to travel in, we had better visit no more t'ais.

We had plenty to occupy us now, for up in the big Lama Temple preparations were going forward for a Devil Dance, such a dance as takes place only every five years. - and every afternoon from four to six a most elaborate ritualistic service was held in the open court under a canopy. Up the steps and winding lanes from below came the Mongols in their gorgeous robes of purple, red, and yellow. Up above there was a great opening of doors and shaking out of hangings, and bringing out of red and yellow lacquer thrones with their enormous leather cushions, and an altar set up with all its paraphernalia. The small novices in their quaint monk's gowns and tall hats arched like the crest of a breaking wave, were running hither and thither with censers and banners, and fifes and horns, until they were finally rounded up by an older priest, and took their place in the procession that escorted the Ta Lama from his inner apartments to his throne of honor. Very, very old and full of years were some of the monks, nodding off to sleep in their big comfortable

chairs, to wake up occasionally and mumble their part in the service; but lusty and full of life were the young monks who sat in rows on the ground facing each other. The faithful who came to worship were in the rear, the women and children together on one side. The Ta Lama who had come from far away to conduct these special services, was a very frail, scholarly-looking man with a gentle face, very different from the somewhat leathery and uncouth Thibetans and flatfaced Mongols. Splendid indeed were the trappings that surrounded him, but it was a splendour tattered and faded, tarnished, and stained. Gifts are still sent occasionally to Wu T'ai Shan, but not with the magnificent largesse of the days when Emperors sat on the throne of China. The once magnificent embroidered tapestry that hung at the back of his yellow throne, was torn and soiled with the rain that finds its way through leaking roofs; and many of the gorgeous robes and jewelled collars and headdresses were dropping to pieces. But the dignity, the seriousness, and the dramatic fervour of those who led in this strange, marvellous service of worship were as fresh and as sincere as when the robes and hangings and altar vessels were new and shining.

The chanting which was carried on in a minor key sounded at times strangely like the singing I have heard in the old European cathedrals. It was led on alternate days by an old man and a young boy, and for two solid hours with scarcely a respite, the leader held with a magnetic power that could be felt, the attention of those taking part in the service; held it in the face of every kind of distraction that could possibly occur; people walking back and forth; pilgrims arriving and marching heavily round and round the court, prostrating themselves at full length before the Ta Lama's throne, or any other object of a sacred nature that might catch their fancy; workmen trailing through with their loads; children just out of arms roaming round and carrying on distracting little pantomimes of their own, to the constant amusement and delight of their womenfolk; older children marching boldly to gaze at the great Ta Lama himself, and dashing back to the shelter of their mother's robes, or playing hide and seek around the big prayer wheels, and setting them revolving with creaks and groans; dogs wandering everywhere and growling at each other; and perhaps what was the greatest distraction of all, the interest created at all times by the foreign ladies and their cameras. The attention wavered now and then, and was carried off for a few moments into a side eddy, but was eventually swept back into the main current. The little priests that squatted on the front row might giggle and nudge each other, and hide the little temple dogs inside their robes, the old monks nod off to sleep, or surreptitiously take a pinch of snuff behind their wide sleeves, but the leader from the moment he swung into the cleared space in front of the altar with a magnificent whirl of his long red cloak that swept the faces of the little singers in the front row, was as if held under a spell. The chanting was very quick with a marked rhythm beginning softly at first, accompanied by the beating of the little wooden drums, but soon it swelled, and was carried forward at the full pitch of the lungs. It rose and fell in gusts and bursts of sound, harsh and unfinished, monotonous and compelling. The leader was obviously chosen for the very musical quality of his voice, and at intervals he halted the quick rhythm, and facing the altar, with an incredibly lovely gesture of the right arm that brought his fingers to his breast, he carried the singing alone, and the cadence dropped on three long beautiful notes to a quiet low solo; when suddenly he swung his cloak back over his bared shoulder,

turned on his heel and swept them all again into the full rush of the chant. One forgot the tarnished glory of it all, the squalor, the ignorance, - one remembered only that he bore himself as one who is conscious that he has been chosen to carry on a great and splendid tradition.

There were breathing spaces when the attendants brought out and screened the altar with old and faded tapestries; when the wine was carried round in metal and jewelled teapots decked with peacock feathers; and was poured out into the palms and reverently rubbed over faces and heads; when the sacred grain was distributed; and even when a general tea drinking was the order of the moment. Once during each service a little acolyte was brought forward, and in his high, clear childish voice chanted before the Ta Lama while three times over his little bare shoulder he threw wine which was poured into a bowl he held. As the service neared its conclusion, the Ta Lama himself seemed to come out of his trance, and in his thin voice chanted alone, until finally, dipping his hands in the wine and tossing the grain into the air from his long fingers, he waited to bless those who came forward. The mothers brought their babies; the old shaven nuns advanced, but as in western countries, the men seemed a little shy about such a public and personal affair.

The service over, the Ta Lama was helped out of his high throne, his boots were put on him; the little acolytes were routed out from some inner temple where they had been carrying on activities of their own; and with swinging of censors and waving of banners the procession moved off, and the court emptied; and glad were we to escape into the fresh air, for though we had been in the open air all the time, it was far from fresh, for smells of every kind and description had thickened under that canopy as the afternoon wore on. Perhaps you may not know that Mongols do not believe in applying water to the human skin. They will tell you that the natural oil of the human skin is the best cleanser. But in summer one could wish that it was their custom to use a little soap and water.

It fascinated us; it maddened and wearied us, to hear and see so much and to know so little of what it meant. We knew that Buddha was of royal birth, that he was kind and gentle and loved the poor and suffering, and we knew that he had renounced just this kind of pomp and ceremony to live a quiet and a holy life. Then how had all this accumulation of intricate and confused symbol come to almost hide forever the simplicity, the purity and the severity of the life he led and taught? Strange how very far a religion may roam from the original intention of its founder. It wore us out and exhausted us, this service, but we couldn't keep away, and four o'clock would invariably see us climbing the long flight of steps to sit in some quiet corner of the court to watch it through. And, as the sun went down behind the mountain wall, and darkness began to enfold the valley, the long horns, longer than a man, were brought out to the terrace, and from the top of the steps they moaned and boomed out over the valley like some vast animal in pain. There were afternoons when we even stayed long after six o'clock to see them practice for the Devil Dance. Masks of Man and Women, Deer and Devils, were brought out from some inner recess to be overhauled and repainted. Special robes and music books were produced and gone over. The choir gathered around ~~then~~ drums and musical instruments, and the little monks held the books for the singers and players. And then, that wonderful pantomime began,

groups of dancers advancing, retreating, turning, bending, every gesture of the hands, feet and the whole body vibrant with some hidden meaning. Even the littlest of the children were allowed to have their part, and were led in by one of the old priests in a long row holding hands; and they solemnly capered and turned out their little toes, and bowed, and were led out again. The Ta Lama sat informally in a big chair intently watching the performance, while his rosary slipped through his fingers, but he smiled at the gravity of the children..... We never saw the Devil Dance, as it must have been held two days after we left Wu T'ai Shan.

And the time came for us to leave Wu T'ai Shan, which we did in full costume, with the muleteers with their long lashes whipping back the crowd. As we went off north over the mountain trails we passed horses, mules, and mule litters bringing the faithful to this great festival which is held only every five years at Wu T'ai Shan. It will always be a regret to me that we couldn't stay another two days.

But the day before, a somewhat unusual-looking visitor, accompanied by his servant came to call on our cook. He had black whiskers, and was dressed in a long black gown. After some little conversation, he went off to see the head priest, and we were informed by the cook that he was the chief magistrate of Wu T'ai Shan, and had come to warn us that we must not try to go home by way of Tingshien, for he had just had news that, two days after we had passed the village of Fu P'ing, a horde of bandits had descended upon the place and had sacked it, and carried off some of its womenfolk. The cook said there were four hundred bandits, but before the magistrate had left the temple the number had grown to six hundred. We followed him into the head priest's apartment and heard for ourselves the tale. When we asked if we might return by way of T'ai Yuan Fu, we discovered that that way, too, was closed to us, for after our departure from Tingshien, a rebellion had broken out in that vicinity against the government, and the bombing of railway stations made it somewhat unsafe to try to travel on that railway line just now. There was one way out still left to us, and that was to make our way north to a bus line that ran into Ta Tung Fu from which place we could come down to Peiping by rail through the Great Wall at Nankou Pass. This route he assured us was up to the present quite safe.

We were not especially alarmed by either the tales of the war of the bandits. Most of us had been too long in China to become panicky over such very ordinary occurrences. We realized that we might get ourselves into a very unpleasant situation, and that bandits nowadays are becoming somewhat unreasonable in their demands for ransom. The last missionary captured was told that along with his ransom money, his friends must send pianos, typewriters and victrolas. But I didn't want it said of me "She never should have left Medicine Hat or Rainy River", which seem the two places in Canada most widely known outside of the country. We decided that we had best start at once before the last route was closed to us, and that our party had better stick together. Bandits might think twice about the matter if they had to tackle five determined-looking women.

The next question was how should we travel? The novelty of mule-back riding had worn itself somewhat thin. We felt we would rather try anything but that. Why not Mule litters so common in Shansi? They had looked so comfortable as we had passed them on the road. We consulted the Kentuckyan, but when he heard that he must take us north instead of back to his native Tingshien, the price per mule rose in leaps and bounds.

We collectively didn't have enough money to pay for such an expensive trip, as he informed us this would be. It would cost us for three days about three times what it had cost us before for five. We began to feel we could never leave Wu T'ai Shan. We would just dream away our lives there, and when we were old and dried up, they would put us away under a little chessboard on the hillside. - all because those muleteers were robbers and rascals, and knew they had us at their mercy.

Then came the illuminating thought; we would go to the magistrate and tell our tale of woe! He would probably be delighted to do anything he could to get us safely away from Wu T'ai Shan, and to be relieved of the responsibility of taking care of us. And to the Yamen (magistrate's office) we went with our calling cards. He was charming to us, told us just what the local price per mule should be, and not only offered to hire our mules for us, but auarenteed that they would be on hand next morning at six o'clock!

We triumphantly returned to our temple. When the Kentuckyan called that afternoon about teatime, as he was wont to do, we were quite haughty with him. We told him we had made other arrangements, and that we had no further use for his services. We bid him a fond farewell, and hoped to see him no more. He smiled his enigmatical smile, and for all our bluster we knew well that when our mule litters assembled next morning, he would be there in charge of us once more.

That very evening a very unpleasant-looking man, who lacked a nose, whom we had seen hanging about the Yamen, came to see us, and told us that the magistrate had made a mistake in the price of the mules, and that we would really have to pay what the Kentuckyan had originally asked. Our cook for the first time got mad. He clapped his straw hat on his head and said that he would go himself to the Yamen, and would get to the bottom of the thing. We waited, wondering what would happen. When he came back we found that the usual compromise had been effected. He brought a letter from the magistrate saying that he was extremely sorry, but as we had offered the muleteers already more than the usual price, and as all Wu T'ai Shan knew it, we would have to pay what we had promised.

And, next morning, just as we expected, our old friend the Kentuckyan turned up as usual. There was more trouble, lots of trouble before we finally got started. The noseless man appeared and harangued the muleteers, evidently urging them to refuse to start until we paid them what they wanted. We told the noseless man what the magistrate had finally bargained for us, and as a final trump card produced his letter. The noseless man indicated with a haughty gesture that this meant nothing to him for he couldn't read, and then, the quiet old head priest of our temple came to our rescue. He took the letter and read it aloud, so that all the crowd who had gathered might hear - to the complete and final discomfiture of the noseless man. He faded away, and the last I saw of him he was headed for the big temple where the soldiers were, and as he vanished through the gate I prayed he wasn't going to get the soldiers out after us, for the difference between a bandit and a soldier is only the price of a month's pay.

The muleteers now made ready for departure. Our bedding was once more brought out, and this time placed inside the litters, and on this we were now to recline at our ease. All the priests in our temple were

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out to see us start, and the pilgrims ascending or descending the hill stopped to see us go. One old Mongol whom I had seen many times at the services put his funny old face inside my litter, and said with a look of great surprise, "Aren't you going to stay for the Devil Dance?"

We had lovely weather again on that three days' trip north to the bus line. We walked and rode alternately. The way home was more beautiful than the way we had come. Very lovely the pass we went over on the first day, and beautiful beyond telling the valley we found ourselves in, as the sun went down over the mountains, and the moon came up to bathe it in the glimmer of magic. But appalling beyond words the road we travelled over. Great gashes of it had been washed out here and there. It was for the most part like going up and down stairs made of uneven boulders with here and there a stair or two missing. The litters were fixed on two long and heavy poles as thick as young trees, and the rear mule was so close to the litter that he could see nothing, as he was dragged over the rocks and almost twisted out of shape on the sharp corners. Ah, but they are clever and uncomplaining, those mules of Shansi, as as sure-footed as mountain goats.

A very dirty and uncomfortable little inn was our lot that first night; so unpleasant that two of our party, tired as they were, had their bedding carried up to a little temple on the hill above, but I slept in my clothes in my litter.

Our noon rest next day was on a little theatre platform of a mountain village, for the innyard was so small that our litters couldn't get inside. We had come down now into the heat of a China summer, and realized only too soon that we were not longer eight or ten thousand feet above the sea. The second night we spent in a big walled city which lay in a level valley shut in by two mountain walls, over the tops of which just as we neared the city gates, the setting sun and the rising moon looked for one moment full at each other. We all refused flatly to go to the inn, but even while we protested, we were carried in and deposited in the yard. But from there we sallied forth again and found an ancient temple which had been converted into a school, and we obtained permission from the caretaker to set up our beds in the court. Having given the city, as we concluded, a reasonable time to inspect us thoroughly and carefully, we turned them all out and locked the gates, and in the dark by the light of one guttering candle, washed ourselves, had our dinner, and went to bed.

The last day was an easy one, and by noon we had reached the village where we were to connect with the bus line. Great was our luck, for a bus was just starting, and we had only time to buy our tickets, pay off the muleteers, and stow ourselves and our belongings away inside and on the roof. It was a good road, well and cleverly built over a fairly high mountain barrier that lay between us and the vast plain of Ta Tung, though you who have lived too long where motor roads have grown smooth as velvet, might not have thought it so. Eight hours we sat cramped and squeezed in the bus with occasional stops to cool the engine, when we could hop out and stretch for a few moments our stiff legs, and buy a cucumber to quench our thirst.

It was very tragic to come down from the well-watered and irrigated valleys above to the great plain where no rain had fallen for three weeks, and to find the crops withered and dried up, and standing only a foot

or so high; and to see the patient peasants hoeing and scraping under a cloudless sky, many of them without a stitch of clothing on them, for it was very hot indeed on the Ta Tung plain, even though it lies four thousand feet above the sea.

The bus deposited us outside the grim walls of Ta Tung Fu, a famous border town, and left us in a yelling mob of men and boys in charge of rickshaws and pony carts, - to make our way as best we could into the city. When the excitement had calmed down somewhat, Cookie and I left the rest of the party, who were stopping over a day to see the famous caves, which we had already visited in the spring. We had our effects piled into a little covered cart, and sitting on the shafts, we were driven into the city, our pony wading knee deep in the black Ta Tung dust.

Our first stop was to purchase a luscious watermelon in the market, and later to buy a real lemon we saw on a fruit stand. It was very expensive, that lemon, a truly terrible price we paid for it, and we saved it for the last lap of our journey - and the worst - the train home. I was hoping all the time that the few missionaries who lived in Ta Tung Fu would all be away on summer holidays, for I had expected to have time at the bus station to change into a more respectable outfit of clothes. As I was bargaining for the lemon, I turned and saw standing in the roadway gazing in astonishment at me, an old friend from Winnipeg. To say that I presented a strange appearance is to put it mildly, for I still wore breeches, and my legs were bare. My head was crowned by the now battered coolie hat, and I was dirty, very dirty. She was immaculately clad in a flowered Chinese gown that covered her to the ankles, and on her head was a spotless topee. She might have been going to an afternoon teaparty. But she swallowed her pride, and walked down the main street of Ta Tung Fu with us, and I was only sorry for her, when several of the fathers from the Belgian mission, whom she knew, passed us on the way.

She invited us into the hospital and let us run riot in her bathroom, and then gave us a drink of something very cold and refreshing, and for all this we will always be properly grateful to Miss Dorothy....

We ate our evening meal, Cookie and I, on the station platform, where the dust whirled about our heads in clouds, and all the little ragamuffins within calling distance swarmed about us. The Ta Tung train to Peiping may start at any time between five in the afternoon and two o'clock in the morning, and it behooves you to be on the platform between those hours, if you would travel that way to Peiping. The train came through at eleven o'clock, and without the assistance of the cook, whom we left with the rest of the party, we struggled and heaved and pushed ourselves and our many pieces of baggage onto that already overcrowded train that was carrying all the extra traffic that usually goes by way of T'ai Yuan Fu. We resigned ourselves once more to the horrors of third class. The less said about that trip the better, and our appearance at the end of it. At four o'clock the next afternoon our spirits revived at the sight of our own Yenching pagoda and the greenness and loveliness of the Western Hills, after the dreary desert of Ta Tung Fu. At a little wayside station not far from the University campus we descended. Whether or not we ever got all our bundles off the train I do not know to this day, for as I was still shoving them out of the window to Cookie on the platform, the train began to move on. It was either a case of leaping

through the window myself after them, or doing a hurdle race down the car over bedding, legs, children and baskets which filled the aisle. I chose the latter course, and haughtily confronted anapologetic station master who brought the train to a stop when he saw me jump from the moving train.

A short rickshaw ride, and we were at the gate of our garden. How the lotus had bloomed! There was Chang, the houseboy standing in the pathway to the house, and Bobby the pup was leaping with joy. The canary was singing on the porch, and mimi, the kitten, grown big enough to be up on the roof watching the sparrows. I heard the sound of the icecream freezer turning in the back court. Yes, the bathtub was still there, and the water still running, and fresh clean frocks hanging in the clothes press. Ah, how good it was to be home again!

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(Continued on inside back cover.)

Whiteness Constancy as a Function
of Difference in Illumination

BY
YUN HSIA, PH.D.

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SECTION I

STATEMENT OF THE PROBLEM

The phenomenon of color constancy is a well-established one, and the present study is not concerned to prove its existence nor to demonstrate constancy in some other sense modality which may not have been explored hitherto. Our problem is concerned with the degree of constancy, *i.e.*, more properly, with the degree of approximation to constancy, under different conditions of illumination. It is not concerned with constancy of hue but only with whiteness constancy.

Only when object colors are seen under two or more different illuminations does the question of constancy arise. If a girl wearing a white dress passes from sunlight into shadow, and if her dress appears to the observer equally white in the shadow and in the sunlight, then we have perfect whiteness constancy or ostensibly so. Under laboratory conditions constancy is seldom perfect. A white seen in a shaded area does not look quite so white as when seen in a good light. If the observer has a graded series of grays to work with and attempts to match a gray seen under strong illumination with one seen under dim illumination, and then brings his two matched grays together under one and the same illumination, he usually finds the grays different. He has matched a darker gray in strong light with a lighter gray in dim light. However, he has not matched the physical stimuli either. Of the two grays which he has matched, the one seen in strong light has reflected much more light into his eyes than the one seen in dim light. He has not matched strictly according to the stimulus brightness nor according to the whiteness of the object but has compromised between these two extremes. His compromise can be measured. His match lies somewhere between a brightness match and a whiteness match; it may lie half way between, it may lie $\frac{3}{4}$ of the way from the brightness match to the whiteness match, and its place in the scale can be determined.

By the "whiteness" of a neutral gray we mean its albedo or reflectance, or rather we mean the subjective dimension corresponding to physical albedo. The correspondence is not linear, since a 50% albedo is subjectively a very light gray, much nearer to white than to black. Whiteness is by no means the same as brilliance or apparent brightness, for a piece of white paper may appear perfectly white though its apparent brightness is very far below what

it would have under direct sunlight. Brightness extends upward practically without limit, while whiteness has a finite limit, 100% white, which to be sure is never realized in actual objects or pigments.

Our particular problem can be explained in this way. When an observer attempts to match grays presented under different illuminations, he is pretty sure to compromise between a stimulus or brightness match and a whiteness or albedo match. Suppose his match lies half way between these two extremes when the difference in illumination is small, will it move toward the brightness match or toward the whiteness match when the illumination difference is increased. He is trying for a whiteness match and the illumination difference is a disturbing factor. Our hypothesis, nevertheless, is that the greater the difference in illumination, the more his match will lie toward the side of a whiteness match and away from the side of a brightness match. Why should we conceive such a hypothesis? Because the illumination difference is an obstacle; the greater it is, the more he will react against it, and his reaction may well be more than proportional to the obstruction.

Our experiment takes shape as follows. Within the observer's total simultaneous field of vision are two regions that are differently illuminated. In one region a certain shade of gray is present, and in the other region is a gray which the observer adjusts by making it lighter or darker until he decides that it matches the first gray in apparent whiteness. The illumination of the region containing the adjustable gray is the "reference illumination" which remains constant throughout a given experiment, while the region containing the gray to be matched receives "variable illumination" which differs in different parts of the same experiment. The gray paper subjected to this variable illumination remains the same throughout the same experiment. The illumination in which this gray paper stands is our independent variable, and the observer's match in the constant reference illumination is our dependent variable. The observer's match is measured in units of physical brightness.

Expressed in the most direct form the data from such an experiment give the observer's match for the whiteness of a certain gray, as dependent on the illumination received by that gray. We thus determine the relation between the illumination thrown on a gray and the apparent whiteness of the gray as indicated by the physical brightness of the observer's match. We do not have in our data any direct estimates of whiteness from the observer—as we could

have by working out a whiteness scale extending from black to white and asking the observer in each trial to estimate the whiteness of a given gray—but we do find the physical brightness which the observer accepts as matching the whiteness of a given gray under each illumination. In other words, the data give us a direct indication of the apparent whiteness of a given gray as dependent on the intensity of its illumination—or, more precisely, a direct indication of the changes in apparent whiteness resulting from changes in the illumination.

In this direct expression of our results, no mention is made of constancy. However, the interest in the results is largely concerned with constancy. If there were no brightness constancy in perception, the apparent whiteness of our gray would be directly proportional to the illumination; the observer would always give a match equating the stimulus brightness received from any two grays, no matter what their respective illuminations. If there were perfect brightness constancy, on the contrary, the same gray would always appear equally white no matter what its illumination; the observer's matched value would be constant in spite of the changes in the variable illumination. Therefore a graph of the data can well include, besides the actual findings, what they would have been with a pure stimulus match (zero constancy) and what they would have been with perfect constancy.

MEASUREMENT OF CONSTANCY

What we wish to measure is most correctly stated as the approximation to constancy. If the observer gives an exact whiteness or albedo match, in spite of the difference in illumination, his approximation is complete and his constancy is said to be 100% or 1.00. If he gives a brightness match, he has practically disregarded albedo altogether and is matching simply according to the light received as stimulus from each of the matched grays; so that his approximation to constancy is zero. After other inefficient methods of measuring constancy had been tried, Brunswik (2) based his "constancy ratio" on the above considerations. The observer's match, R , usually lies between the pure brightness match, S , and the pure whiteness match, A , and his approximation to constancy can be measured by comparing the distance of R from S with the total distance of A from S , *i.e.*, by the ratio,

$$\text{Brunswik ratio} = (R - S) / (A - S)$$

Thouless argued that this formula should be modified by first transforming the values of S, A and R into logarithms, that is, in the case of a whiteness constancy experiment, he argued that the physical intensities should be expressed in a logarithmic scale rather than an arithmetical scale. Some justification for this argument is afforded by Fechner's law according to which the sensory effect of light intensity should be proportional to the log of intensity. However, Fechner's law is not known to hold exactly.

Brunswik's formula, $\frac{R-S}{A-S}$ has the virtue of bringing together the three terms, S, A, and R, of giving numerical values within the range of 0 and 1, whether the variable illumination is higher or lower than the reference illumination, and whatever method is used to measure the brightnesses. These points become clear if we illustrate them with the following diagrams assuming the method of matching on color wheels and measured in terms of percent of white disc:

CASE I		
S	R	A
10W	50W	100W
$\frac{R-S}{A-S} = \frac{50-10}{100-10} = \frac{40}{90} = .444$		

CASE II		
A	R	S
10W	50W	100W
$\frac{R-S}{A-S} = \frac{50-100}{10-100} = \frac{-50}{-90} = .556$		

In substance the Brunswik formula is interested in the ratio of the distance from R to S in relation to the total distance of S to A. The values assigned in the diagrams are hypothetical but the relative positions of the terms are possible. When the variable illumination is lower than the reference, S is lower than A, and R is somewhere in between, as in Case I and when the variable illumination is higher than the reference illumination, S is higher than A, as in Case II. The beauty of the formula lies in the fact that it is workable no matter whether S or A is higher than R. Indeed when A is higher one has to work with negative values, but then both the numerator and the denominator are negative and the resulting ratio is positive, because it is always the distance, R to S, being divided by the distance, S to A, and the latter is the total distance, so the

ratio will not exceed 1, unless for unusual reasons R should jump out of the range, S to A.

The mathematical relationship of the Brunswik and Thouless ratios can be shown graphically, as presented in Figure A. In Case I where the reference illumination is ten times stronger than the variable illumination, a disc giving 100° w in the latter would be equal to a brightness of 10° w under the former; and let us assume that various observers made a series of matches under the reference illumination ranging from 10° w to 100° w. By applying the formulas we get the curves in the upper plot of Figure A for the Brunswik ratios which is a straight line, and for the Thouless ratios which is a curved line. In Case II we have a disc with a brightness of 10° white (A) in the variable illumination and to reach equality of reflection, the disc in the reference illumination which is only one tenth as strong should have a brightness of 100° white (S); but let us assume a group of observers, for one reason or another, individually yielding different matches ranging from 10° w, through 20° w, 30° w, up to 100° w, on the disc under the reference illumination. The Brunswik ratios and Thouless ratios would be as shown in the lower plot of Figure A, the straight line being the former and the curved being the latter.

These graphs for Cases I and II show at a glance several interesting points. (1) The two kinds of ratios coincide at the two extremes, *i.e.*, when the constancy is 0 or 1; (2) when the variable illumination is lower than the reference, all Thouless ratios, save the extremes, are higher than the Brunswik, and when the variable illumination is higher than the reference, all Thouless ratios, save the extremes, are lower than the Brunswik; (3) when the constancy ratios are plotted against the various possible R values, the Brunswik ratios describe a straight line, the Thouless ratios a curved one; and (4) when the R value is midway between the S and A values, the Brunswik ratio gives 0.50, while the Thouless ratio does not give such a value of 50%.

The dotted curves in Figure A are provided to show a crucial factor that decides the amount of departure of the Brunswik and Thouless ratios. We have worked out in our hypothetical Case I, that when the variable illumination is ten times lower than the reference illumination, a Brunswik ratio of 0.50 corresponds to a Thouless of 0.74, giving a difference of 0.24. Does this mean that whenever the variable illumination is lower, they will always differ by 0.24 at that point? Or we may ask a more general question:

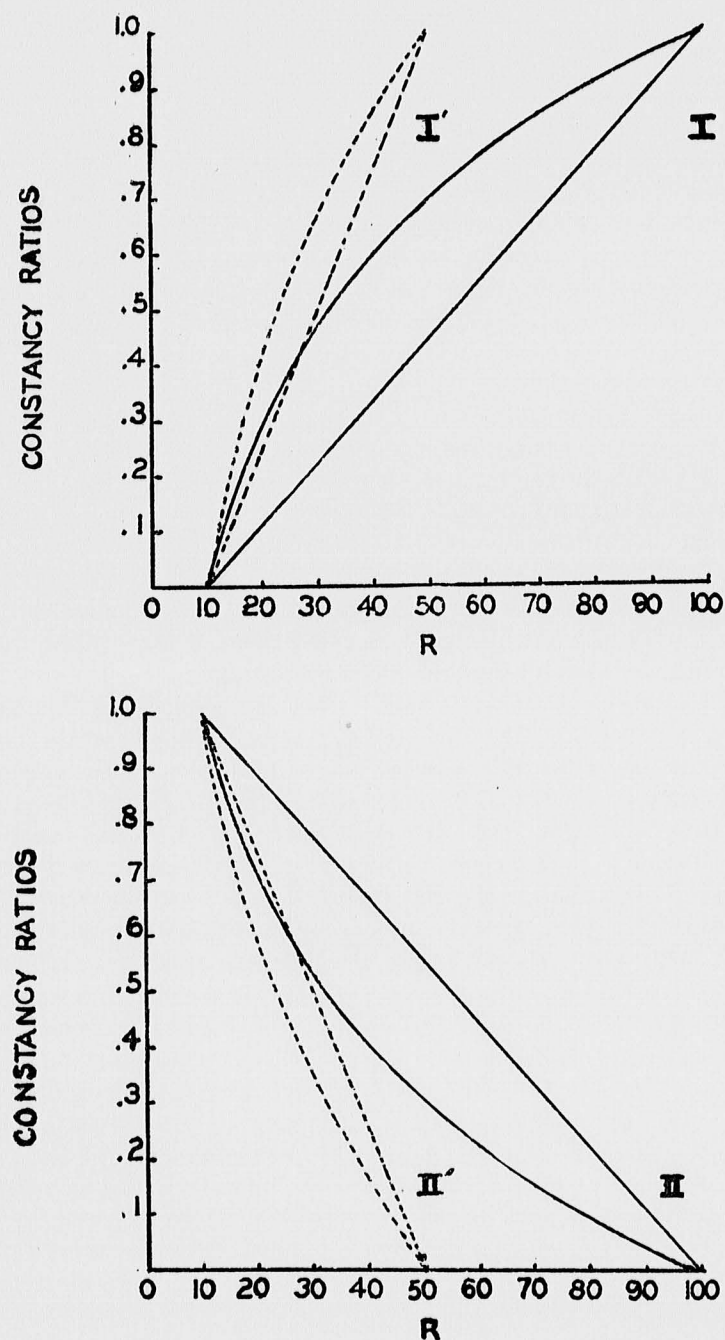


FIG. A. Mathematical relationship between Brunswik and Thouless ratios.

would the "arc" and "chord" in our figure proportionally remain constant? The answer is, "no." For let us assume the variable illumination is only five times lower than the reference, instead of ten times. This gives us Case I', as plotted in dotted lines in the upper graph of Figure A. We notice here the distance between the Brunswik and Thouless ratios is reduced. At the mid-point where the Brunswik formula gives a ratio of 0.50, the Thouless now gives 0.68 instead of the 0.74 of Case I. The distance between the Brunswik and Thouless ratios is similarly reduced when the variable illumination is only five times higher than the reference, as shown with the dotted curves in the lower graph of Figure A. So in general we may say the greater the difference between the two illuminations, the greater is the difference between the Brunswik and Thouless ratios, with the exception of the 0 and 1 constancies.

These mathematical deductions may not have much direct bearing upon the problem of the present study, but they make the meaning of the constancy ratios more explicit.

SECTION II

AN ANALYSIS OF RELEVANT STUDIES

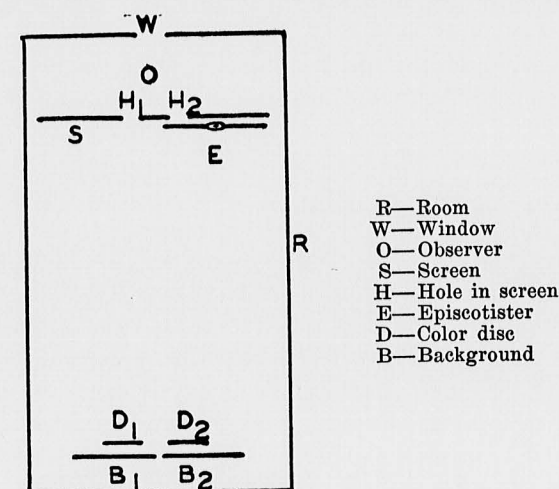
The literature on constancy in general is enormous. We shall not attempt to cover it all here. Woodworth has given an instructive review of it in his *Experimental Psychology* (20) and the summaries made by Sheehan (18), Henneman (8), MacLeod (15), Gelb (5) and others (9, 14) are all useful references. We shall only try to bring together some of the comparatively more relevant studies here.

1. *Katz's episcotister experiment* (14). The observer sat with back toward the window through which daylight came. He looked alternately through two holes in a screen and saw two color wheels, one behind each hole. The two wheels were illuminated at the same distance by the same source. But beyond one observation hole an episcotister was introduced to cut down the effective illumination for one wheel and its immediate surroundings. The smaller the opening of the episcotister the more the illumination was reduced according to Talbot's Law. With a disc of 360° white on this wheel under such decreased illumination, for each level the observer was to make a match on the other wheel upon which the illumination was unaltered. It was discovered that constancy existed at each level of decreased illumination. Our problem, however, is to examine whether the degree of this constancy changed from level to level. For this purpose we sorted out the data for one of Katz's observers in this experiment and have them arranged in Table A together with the degrees of constancy calculated with the Brunswik and Thouless formulas.

We must point out that for each level of illumination Katz had the backgrounds of the two wheels equated as to their retinal effects by means of the reduction screen technique (*i.e.*, looking through a darkened tube to determine their subjective equality in brightness by substituting the proper shade of gray for the background of the comparison side). In taking his final data he also corrected for the white valences of black and orange used by adding them accordingly to the actual portion of white used by the observer to give the full amount of white for the match.

Now let us take a look at Table A. (For the review in this section, the tables and figures are marked alphabetically, but those for the experimental data in the following sections are numbered.)

Column 1 gives the degrees of the openings of the episcotister behind which stood the wheel with a disc of 360° white. When the opening was 90° the illumination was cut down $\frac{1}{4}$ and so also the brightness of the disc; the match to be made on the other wheel where there was no reduction of illumination would be 90° white if there were no constancy, but if there were perfect constancy, the match would be 360° white. However, the actual match made was 121° white. The values based on the assumption that there was no con-



stancy are given in Column 2, and are called S. The values for perfect constancy are given in Column 3 and they are called A. The actual matches, R, are given in the 4th column.

TABLE A
ORIGINAL DATA AND CONSTANCY INDICES OF KATZ'S EPISCOTISTER EXPERIMENT

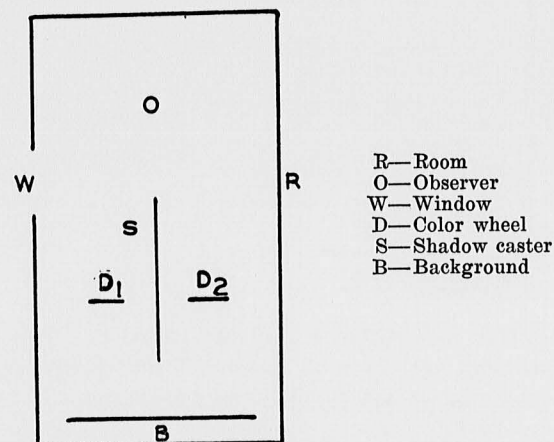
Episcot. Opening	Brightness Matches			Constancy Indices	
	S If no Cons.	A If Perf. Cons.	R Actual	Brunsw. Ratio	Thou. Ratio
90°	90w	360w	121.0w	0.115	0.214
30°	30w	360w	102.4w	0.219	0.494
10°	10w	360w	91.6w	0.233	0.618
3°	3w	360w	85.7w	0.232	0.700

The Brunswik ratios calculated for Katz's episcotister experiment are shown in Column 5, Table A. Here we find, in general,

constancy increasing with the increased difference between the two illumination fields, although it is doubtful whether there is any change for the levels with episcotister openings of 10° and 3° . The Thouless ratios in Table A are given in the last column.

For Katz's episcotister experiment both the Brunswik and Thouless ratios, on the whole, increase with the intensity difference of the reference and the variable illuminations.

2. *Katz's shadow experiment* (14). In this experiment Katz used shadows to alter illumination intensities. He had four kinds of shadow-casters or partitions of various translucency set in between two color wheels. As the light came obliquely from a window, the partition cast a shadow over one field in which one of the wheels stood. The 4 shadow-casters were made of black cardboard, folded tissue paper, single-ply tissue, and oiled tissue respectively.



The disc on the shadowed wheel in all cases was 360° white which we call the A value, the match made on the unshadowed wheel, the R value. Since he had no way of telling the illumination difference of the two fields for each shadow situation, he could not arrive at the S value by calculation, but he applied the reduction screen method, and determined the value empirically, *i.e.*, having another match made by looking through a darkened tube, and such a match was said to be free from constancy effect.

The data and constancy ratios are reproduced here in Table B, where the first column gives the descriptions of the source of the shadows, the next three columns give the S, A, and R values, and

the last two columns, the Brunswik and Thouless ratios. Here, we see, the deeper the shadow the higher was the constancy. It amounts to saying that greater divergence of the illumination intensities is accompanied by increased constancy. The result is similar to that demonstrated with the data of his episcotister experiment.

TABLE B
DATA AND CONSTANCY RATIOS OF KATZ'S SHADOW EXPERIMENT

Shadow Caster	Brightness Matches			Degree of Constancy	
	S If no Cons.	A If Perf. Cons.	R Actual	Brunsw.	Thou.
Oiled tissue	202.4w	360w	246.0w	.277	.339
Single tissue	80.1w	360w	180.0w	.357	.569
Folded tissue	65.9w	360w	178.6w	.383	.587
Cardboard	4.2w	360w	116.0w	.314	.745

3. *Brunswik's size-correlation experiment* (1). Although our problem is specifically concerned with whiteness constancy, the question can be asked, whether the trend of growing constancy with the increasing divergence of illumination intensities as shown in Katz's experiments on brightness is paralleled in the constancies of other fields of perception. In other words, is this trend, if true, a characteristic of perception in general?

Brunswik in a recent experiment, devised to demonstrate his new method of correlation for the expression of the existence of constancy, has provided some data, which after re-arrangement will serve to enlighten us about this trend in size constancy. The observer, with a series of 13 cubical blocks varying in size from 30 mm. to 90 mm. lined up before him and 12 m. away, chose among them one which matched in apparent size a standard block placed at a distance of 2, 4, 6, 8, or 10 m. from him. Data for one standard are enough for our consideration here, but since he used, one after another, five blocks as standard, namely, 50, 55, 60, 65, and 70 mm., we shall reproduce his data in toto for added support.

Our re-arrangement of his relevant data together with the Brunswik and Thouless ratios is given in Table C. In the table for each standard the first column gives the distances of the block from the observer. It is understood that the nearer the standard to the observer, the farther away it was from the comparison series.

All the constancy ratios, Brunswik and Thouless, rise with the increase of distance between the standard and the comparison. The

TABLE C
DATA AND CONSTANCY RATIOS OF BRUNSWIK'S SIZE-CORRELATION
EXPERIMENT

Distance from Obser. in m.	Size Matches (mm.)			Degree of Constancy	
	S If no Cons.	A If Perf. Cons.	R Actual	Brunsw.	Thou.
	(Standard block: 50 mm.)				
10	60	50	55	.500	.477
6	100	50	61	.780	.713
2	300	50	59	.964	.906
	(Standard block: 55 mm.)				
10	66	55	60	.545	.522
8	83	55	63	.714	.670
4	165	55	66	.900	.834
	(Standard block: 60 mm.)				
8	90	60	69	.677	.656
4	180	60	73	.892	.822
2	360	60	74	.953	.886
	(Standard block: 65 mm.)				
6	130	65	80	.846	.700
6	130	65	77	.815	.755
2	390	65	80	.954	.884
	(Standard block: 70 mm.)				
10	84	70	82	.143	.131
8	105	70	82	.657	.609
4	210	70	84	.900	.834

(13 blocks as variables: size, from 30 to 90 mm.; distance, 12 m.)

greater their distance apart, the greater is the degree of constancy. For instance, when the 50 mm. standard was 10 m. from the observer, it was 2 m. from the comparison series, and the Brunswik ratio is .500; when it was 6 m. from the observer, it was 6 m. from the comparison, and the ratio is .780, and finally, when it was 2 m. from the observer, it was 10 m. from the comparison, and the ratio becomes .964. So the trend we see here is in good agreement with that shown in the Katz experiments, though in one case it is size, and in the other case brightness perception.

4. *Holaday's experiment on size-constancy* (9). Holaday studied the effect of distance on size constancy. He used red cubes as stimuli. The standard was a cube of 7 cm., and a series of cubes ranging from 6 to 39 cm. were presented for comparison. The cubes were arranged on the floor and the observer also lay on the floor with his eyes 25 cm. above it, the standard being always nearer to the observer than the comparison cube. Here we reproduce Holaday's table for our convenience. Constancy ratios are expressed with the Brunswik formula.

TABLE D
BRUNSWIK RATIOS FOR HOLADAY'S SIZE-CONSTANCY EXPERIMENT

Distance in m. from Observer to Standard Object	To Comparison Object			
	1	2	4	8
$\frac{1}{2}$	.889	.914	.964	.819
1	.....	.820	.891	.843
2	.....	.....	.789	.738
4	.....	.....	.....	.670

In Table D we may notice that size constancy grows with the increase of the distance between the standard and the comparison objects when we either examine the rows or the columns. For instance, in the first row with the standard at $\frac{1}{2}$ m. and the comparison object at 1 m., i.e., a distance of $\frac{1}{2}$ m. between the standard and the comparison, the constancy ratio is .889; similarly, the constancy is .914 for a distance of $1\frac{1}{2}$ m., between standard and comparison, .964 for a distance of $3\frac{1}{2}$ m., though only .819 for $7\frac{1}{2}$ m., the longest distance used between them. The other rows tell similar stories. Looking down the columns, we have the comparison object at a fixed position but the standard shifted, and we find in the last column, for instance, reading from the bottom upward the constancy ratio for a distance of 4 m. between the two objects is .670; for 6 m., .738; for 7 m., .843; though for the longest distance, $7\frac{1}{2}$ m., the constancy is only .819, which seems to be a decrease of constancy. It is hard to decide whether this decrease is true and general, or due to some special experimental reasons. We cannot, of course, argue against data, but it would be of interest to retest the matter with more subjects and with longer distances.

Generally speaking this study of Holaday's is in agreement with our expectation that constancy grows with increasing diversity of situation.

5. *Sheehan's size-constancy experiment* (18). There are some incidental results from Sheehan which should be quoted in this connection particularly because of the interesting way she presented them. "Unfamiliar with the work of Holaday at the time," she "attempted to reduce the constancy by the logical device of increasing the distance between the two objects." In the first experiment the standard was 150 cm. from the observer and the variable, 300 cm. In the second experiment the standard was 100 cm. from him, while the variable remained at 300 cm. "The results," we quote,

"were unexpected to us (Sheehan), but wholly in conformity with those which Holaday had earlier reported . . . ; instead of effecting a decrease in the E-ratios (Thouless ratio), they markedly increased them. . . ." For every one of her 25 observers, the constancy ratio was higher for the longer distance between the standard and the variable. For the 150/300 distance, the average ratio was .819, but for the 100/300 distance, it was .970.

6. *Thouless' shape-constancy experiment* (19). This general hypothesis that constancy grows with diversity of situations may be tested once more with shape perception. Thouless has provided us some data on this matter. A white circular disc of 29.7 cm. in diameter was mounted with its axis of rotation horizontal and perpendicular to the observer's line of vision. The disc could be tilted back on its axis. Apparent shape of the disc at each inclination was matched with a series of ellipses cut out of cardboards with different ratios of short to long axis, also placed at right angle to the observer's line of vision. When the disc stood upright, *i.e.*, at frontal parallel position, the angle of inclination was considered to be 90°. When it lay parallel to the table, the inclination was 0°. Inclinations and Thouless constancy ratios are presented in Table E. The data are not complete enough to permit the calculation of Brunswik ratios.

TABLE E
THOULESS RATIOS FOR THOULESS' SHAPE-CONSTANCY EXPERIMENT

Inclinations	7°	10°	20°	30°	45°	65°
	(from table surface toward frontal-parallel plane)					
Thouless ratios	.28	.41	.33	.32	.16	.10

Table E, read from right to left, shows that the smaller the inclination (down to 10°), *i.e.*, the more the disc was tilted from the upright position or frontal-parallel plane, the higher is the constancy ratio. However, at 7°, the smallest inclination used, the constancy is low. Since the true perspective round shape was at 90° of inclination, smaller inclination means a decrease of perspective roundness, which, however, is accompanied with increased constancy, though there might be an optimum point. So shape constancy is in good agreement with the results found with brightness and size constancies.

7. *Eissler's shape-constancy experiment* (4). Eissler has published some data which are contradictory to those of Thouless' and

to our general expectation. He used one after another 6 forms, namely, one circle, three ellipses, one square, and one rectangle as stimuli. The object mounted on a turnable wooden frame over a table was matched with a series of pictorial shapes on a screen projected from a lantern. Each form was turned away from the frontal-parallel position along the vertical axis to the following degrees of lateral inclination 30°, 45°, 60°, and 75° (away from the frontal-parallel plane) and yielded on the average for the 6 forms, constancy in terms of Brunswik ratios, .932, .769, .686, .543 respectively. Eissler concluded that shape constancy falls with increased angle away from the normal; the more the form turned away from its frontal-parallel position the smaller is the constancy. We must recognize that these results of Eissler's are categorically a challenge to our hypothesis. Besides the Eissler study the writer has not yet located any other data which are against the general tendency. There must be a reason why Eissler's results came out to be contradictory to the general trend. The writer is unable as yet to locate the reason. There is, however, one thing, which can be pointed out. Whereas Thouless turned the disc along the horizontal axis, Eissler turned it along the vertical. In the former case the two eyes seem to be able to cooperate better.

SECTION III
APPARATUS AND METHOD

After careful technical and theoretical considerations our apparatus finally takes the form shown in the drawings on pages 22-23. It appears to be very different from the classical plan used in most studies of color constancy. The modifications are made for certain reasons which we will point out.

What we refer to as the classical setup used in one way or another essentially a pair of color mixers against a vertical background as adopted by Katz, Kardos, Katona, MacLeod and others in some of their early experiments. It may have many virtues for solving other problems, but it does not seem to fit the present problem very well.

In the first place, we cannot afford the time to change the discs on the mixers since we have to make quite a number of matches in one sitting (in most cases, 24, to be exact), unlike some other experiments where a few determinations are enough. It is unwise to prolong the sitting to allow time for operating the mixers, as it will cause fatigue in the observer.

In the second place it is difficult to equate the background, and if this is not done, contrast will come into play and complicate the results. It is to be remembered that our problem requires the change of illumination repeatedly in one sitting, and it would be inefficient to equate the backgrounds each time.

To represent brightness or whiteness by measuring the percentages of white and black involved is also unsatisfactory, because the assumption that the black is absolute or 100% black is erroneous. This, of course, can be corrected somewhat by partialing out the white valence. It must, nevertheless, be recognized that the procedure is indirect, and would still allow a margin of error.

There is another familiar method which could be hopefully adopted for the solution of the present problem, namely, the light-perspective technique. Illuminated by a single source of light, one series of grays is to be situated near the source and another series farther away, both against the same vertical background. The two series are then to be matched for whiteness. The difference of illuminations for the two series can be varied by changing the distances between them and the source of illumination. To get good results we must have a long series of grays, such as the fifty shades of

Hering, so that the observer can have the freedom of reaching satisfactorily close matches, and we must have a kind of glass which is transparent but not reflective to support the grays, so that they can use the common background with no local contrast coming into play. We had to abandon this method because of inability to obtain the desired materials.

The apparatus we used consists essentially of a large light box, a series of gray discs, a projection lantern, and a MacBeth illuminometer.

Standing on a large table is a box (B) made of beaverboard on wooden frame-work 95 inches high, 45 inches wide in the front, 40 inches wide at the back, and 24 inches deep, front to back, with a partition (P) in the center dividing the whole box from top to bottom into left and right halves. The box is open front and back so that the observer can look through the two chambers against a distant vertical background. These open chambers are the observation fields (F) for the experiments. A dark curtain (C) made of roller window-blind is affixed to the front of the light box and can be conveniently pulled up or down over the observation fields to expose or conceal the fields. With the upper part of the chambers always concealed by a black cloth in front, each of the two observation fields finally is 15 inches high in the front and 14 inches high at the back. A piece of black cardboard (A) 2.5 inches wide is affixed to the forward edge of the partition which is thus hidden from the observer's view.

Above each chamber in the light box a lamp board is suspended with sashcord. Several electric bulbs can be installed base-up on the lamp board, although we made use of only one bulb for each chamber throughout our main experiments. The sashcords extend to the top of the box and over to the outside through series of pulleys. The lamp boards then can be pulled up and down at will and are easily set at their desired positions with the help of counter weights. A scale in half centimeter units is pasted on each side of the light box and with a round disc attached on the sashcord it can mark the height of the lamp along the scale.

The inside of the light box is painted dull gray (albedo = .13) so as to cover up the yellowish tint of the beaver-board which might alter the quality of light. In the opening chambers, which serve as the observation fields, the side walls are lined with large gray sheets of mat surface with an albedo of .17. The floor of the fields,

i.e., the top of the table, (T), is also covered with the same kind of gray paper.

In each field an iron rod, 1 cm. in diameter, painted dull-black, is screwed firmly on the upper frame back of the chamber. It extends first toward the background 10 inches, and then at a right angle downward, and again at a right angle turns forward into the

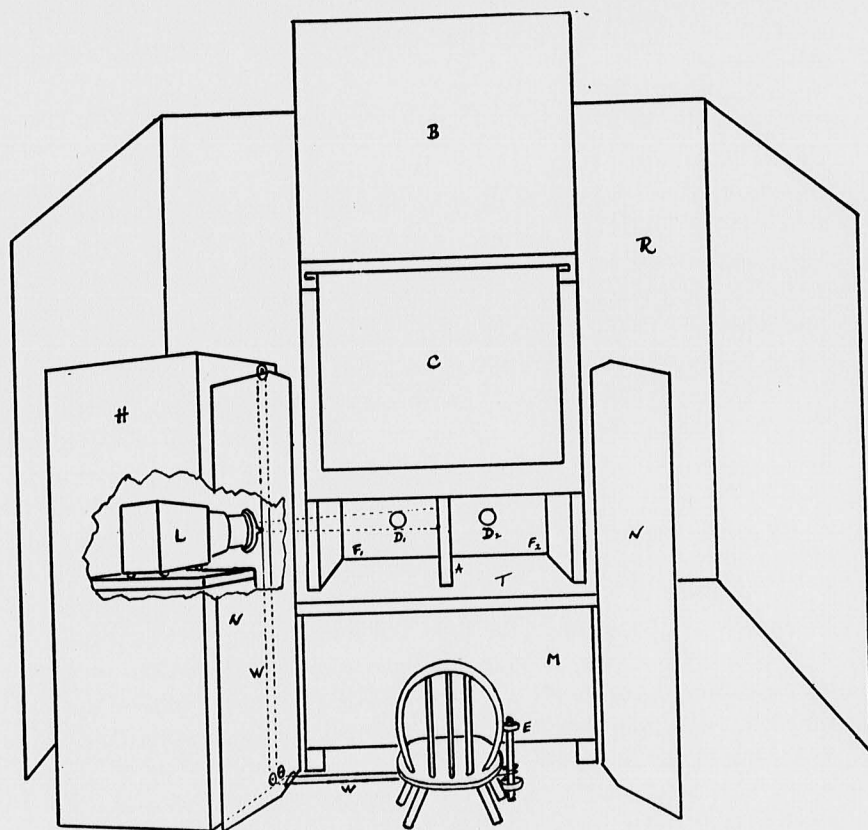


FIG. I. Front view of apparatus.

field. Thus it is hidden under the shadow cast by the upper edge of the chamber or at least made inconspicuous. To the tip of this rod an aluminum disc (D) 3 inches in diameter is carefully screwed at an angle of 80 degrees to the horizontal plane. In other words, the disc stands nearly at right angles to the observer's line of sight but is slightly tilted backward. The distance from the center of the disc to the field floor is $7\frac{1}{4}$ inches, to the center partition, 8

inches, and to the side wall, 13 inches. There are two little brass teeth fixed at the bottom edge of this disc and a small portion of the top edge of the disc is cut off. Such arrangements are made so that another disc of the same size can be laid on or taken off conveniently. These other removable discs with gray paper coverings are our stimuli. They are made by pasting Hering grays on aluminum discs, 3 inches in diameter. The paper is cut slightly larger than the disc, namely, 8 centimeters (about $3\frac{1}{8}$ inches) in diameter so that it may hide the edges of the metal discs from the observer's view. To help careful handling, on the back and near the edge of

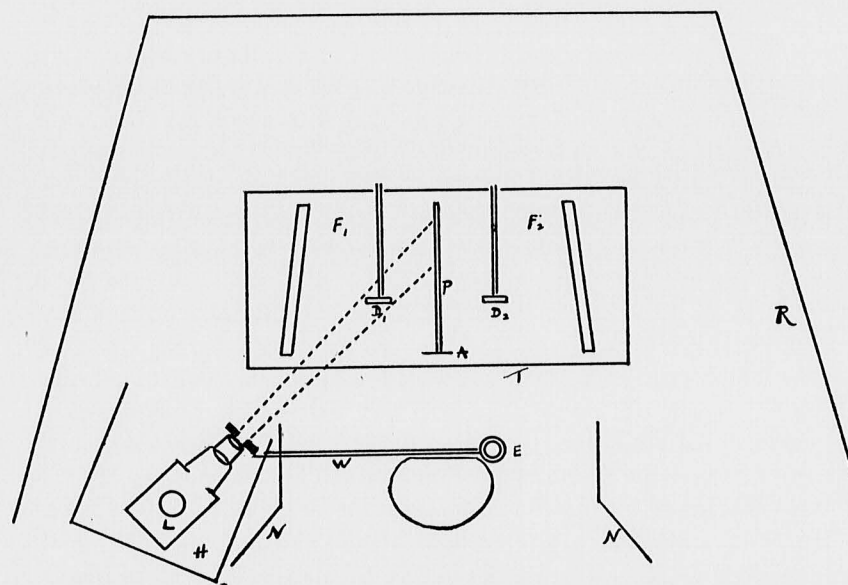


FIG. II. Horizontal section of apparatus.

the stimulus disc is pasted a strip of Scotch tape with one end free which will lie in place of the cut-off part of the stand disc. White gloves were always worn in handling to insure further protection of the discs.

These grays are in 30 shades obtained from C. H. Stoelting Co., cat. #12692. We were unable to obtain a better series of Hering grays of 50 shades owing to the war situation.

The observer sitting on a low chair in front of the light box, with the discs on the stands at about his eye level, can see one disc in each field against a distant vertical background, which is a drape of black cloth hanging 67 inches behind the light box (70 inches

behind the discs), and which practically sinks into obscurity owing to the darkness and distance. This is one of the important features of our arrangement of apparatus. Being in obscurity the background remains equated behind the two discs in spite of the changes of illumination in the chambers, and also the discs are made to appear standing out from the background. The drapery (R) rises up 9 feet high from the room floor and is wide enough to bend forward on the two sides embracing the whole light box at a distance, so that it also serves the purpose of excluding the extraneous stimuli around the box.

With double window shades the room can be darkened satisfactorily. The fields are illuminated only with the experimental lights.

On either side of the observer there is a standing screen (N) 5 feet and 8 inches high which serves to eliminate the other views of the environment. A black drape (M) is hung on the front legs of the table so that nothing under the table is in sight. As a result the whole arrangement looks very much like a marionettes stage with the discs as Punch and Judy! And Punch and Judy are to be matched for their whiteness when they are illuminated with different intensities.

Now suppose the two fields are differently illuminated, the left being dimmer than the right, and suppose we put on the stand of each field a gray disc, both discs being of the same shade or albedo, the one in the left or dimmer field will look darker and probably blacker. An additional spot light thrown on this darker disc can raise its apparent whiteness to equal that of the right disc. If the total amount of physical brightness on the left disc, resulting from field illumination plus the spot light, should be equal to the physical brightness on the right disc under its illumination, we should have stimulus equality. Under the principle of color constancy, however, the total light on the disc in the dimmer field is almost always made lower than that of the lighter field to reach the whiteness equality for the observing individual. How much is this difference? How will the relative difference change when the illuminations of the two fields are made more and more unequal? These questions, and especially the second one, are the main points for the present investigation.

Technically how shall we provide for this additional spot light which is to vary the brightness of one disc in order to make the matches in subjective whiteness? Behind the standing screen on the left of the observer a projection lantern is installed and directed

obliquely toward the left disc. The lantern is firmly held in place on a wooden board at the desired level in a housing made of beaver-board on a wooden frame-work, 72 by 36 by 30 inches. The beam of light is just large enough to cover the left disc, being limited by a card-board screen with a round hole in the center inserted in the lantern-slide holder. The shadow of the disc caused by the spot light is cast on the partition wall between the fields and is out of the view of the observer since the whole partition is concealed by the $2\frac{1}{2}$ inch black blind in the front. The intensity of the spot light is regulated by a diaphragm, Bausch and Lomb, No. 4, screwed on the lantern in front of the lenses. The diaphragm openings change the intensities but not the quality of the spot light.

We may have either the experimenter or the observer operate the diaphragm. If the experimenter operates the diaphragm, the frequency method or the method of limits is indicated. We prefer to have the observer operate the diaphragm and so adjust the strength of the spot light until he is satisfied with the whiteness match. This is the method of adjustment; it appears to be more efficient than the other methods, since it provides a complete set of data during a single experimental session.

To the diaphragm controller a wire (W) is attached and through a pulley system the wire is led out and passes under the observer's chair to a vertical rod on his right. After a few turns on the rod, the wire is led back to the diaphragm. The rod stands in a support which is attached to the right front leg of the observer's chair. On top of the rod is a wheel (E) 3 inches in diameter which can be grasped by the observer comfortably. By turning the wheel he pulls the wire and regulates the opening of the diaphragm, which in turn controls the intensity of the spot light.

It might be objected that since the operation is left in the hands of the observer there is no way of regulating the time of exposure. We notice, however, that our observers work in quite even speed from one determination to another and each person in his natural tempo.

It might be questioned also whether knowing the presence of the projection lantern would influence the results. In the first place, with the lantern so hidden behind the screen, most of the observers do not know how the whiteness on the left is made to vary, but believe it is effected by a source inside the light box. In the second place, even if they knew the arrangement of the lantern it would not influence the results in so far as the shadow cast by the spot

light in is not directly in view. Gelb (5) has long ago established this point, and Henneman (8) used a method similar to this. It must be understood that this spot light is not intended to be a third illumination besides the two field illuminations, it is but a device to alter the physical brightness of the variable disc. It is similar to the idea of adding portions of white on a color mixer.

Ordinary electric bulbs are used for all sources. They are frosted bulbs of 100 watts. Ideally we should use neutral lights, which unfortunately are not within our means to get. Above each field in the light chamber is one bulb which floods its respective side. The projection lantern is also lighted with the same kind of lamp of 100 watts. 144 inches behind the observer another lamp of the same strength is hung on the room wall 98 inches high from the floor. When this light is turned on the whole room is illuminated including the two observational fields, but it is used only in one of the four experiments. To operate these lamps we use the New York City alternating current.

The illuminations are measured in foot-candles, and the intensity of the reflection of the gray surfaces is measured in apparent foot-candles, with the MacBeth illuminometer. The measurements are not turned into millilambert units, the customary expression for brightness. The lambert is defined as one lumen per square centimeter, while the foot-candle is equivalent to one lumen per square foot. These units are readily convertible. Our illuminometer has been recently recertificated by the manufacturing factory.

For the comfort of the observer we do not use any chin rest or head rest, but he is requested to keep his position constant, while remaining at ease.

SECTION IV

SPECIFIC PROBLEMS AND EXPERIMENTAL RESULTS

The general problem as stated in Section I above is to study whether whiteness constancy varies with the difference in illumination between the two observation fields. Under various conditions different sets of data were obtained though all aiming at solving the general problem, and they will be presented one by one, and will be brought together in the final conclusion.

EXPERIMENT I. *The influence of difference in illuminations on whiteness perception when the two fields are separately illuminated, the reference illumination being the lower (weaker) of the two.*

To begin from the beginning it is obvious that the phenomenon of constancy exists only when the two fields to be compared differ in some principal respect. The influence of illumination difference is the point chosen to be studied. If the two fields are equally illuminated, other things also being equal, there is no question of constancy. To provide difference of illuminations, technically, we may either have the two fields separately illuminated and the strength of the illuminations separately varied, or we may choose to have a prevailing illumination which floods both fields, but is shadowed or supplemented in one field to create the difference. The choice between the two methods involves not only technical convenience but also theoretical significance. We have data from both methods. Experiment I provides the conditions with separate illuminations, and Experiment II, the conditions with a prevailing illumination. *The use of totally separate illuminations is believed to be a new departure in color constancy work.*

With the apparatus as described in Section III, 8 steps of illumination intensity were used one after another (in random order) in the right observation field, namely, 3.4, 4.6, 6.2, 8.3, 11.1, 15.2, 21.5, and 29.8 foot-candles respectively, as shown in column 2 of the 1st portion of Table 1. They were easily set by pulling the top light above the field up and down and leaving the marker at its proper reading over the arbitrary scale on the outside of the light box.

These illumination values were calibrated over the disc at its inclination.

Five Hering grays of different albedos were measured in apparent foot-candles with the MacBeth illuminometer on the stimulus stand in the field under each illumination, the strength of which was

TABLE 1
ILLUMINATION VALUES, AND S, A, AND R VALUES OF EXPERIMENTS I AND II
(Gray 14 as standard, albedo = .120)

		Illumination, in Foot-Candles			Intensities of Gray, in Apparent Foot-Candles			
		Right Field	Left Field	R - L Diff.	Under R. Ill. S	Under L. Ill. A	O's Match R	
Step 1	(I)	3.4	0.75	2.65	0.41	0.09	(See below)	
	(II)	4.0	0.75	3.25	0.48	0.09		
	2	4.6	0.75	3.85	0.55	0.09		
	3	6.2	0.75	5.45	0.74	0.09		
	4	8.3	0.75	7.55	1.00	0.09		
	5	11.1	0.75	10.35	1.33	0.09		
	6	15.2	0.75	14.45	1.82	0.09		
	7	21.5	0.75	20.75	2.58	0.09		
	8	29.8	0.75	29.05	3.58	0.09		
R Values (O's Matches)								
Observer	EJ		HC		NS		HH	
Experiment ...	I	II	I	II	I	II	I	II
Step 1	0.30	0.40	0.27	0.47	0.38	0.51	0.27	0.27
2	0.38	0.45	0.35	0.45	0.56	0.63	0.32	0.32
3	0.49	0.53	0.42	0.66	0.74	0.79	0.43	0.45
4	0.60	0.66	0.51	0.70	0.88	0.96	0.52	0.51
5	0.72	0.80	0.60	0.89	1.10	1.33	0.60	0.66
6	0.84	0.90	0.79	1.13	1.57	1.72	0.76	0.83
7	1.27	1.25	0.85	1.33	2.07	2.90	0.92	1.04
8	1.65	1.25	0.99	1.94	2.92	3.50	1.25	1.56
Observer	BF		AS		JM		EG	
Experiment ...	I	II	I	II	I	II	I	II
Step 1	0.21	0.23	0.17	0.22	0.30	0.38	0.23	0.22
2	0.28	0.35	0.20	0.19	0.47	0.48	0.29	0.25
3	0.27	0.35	0.25	0.20	0.63	0.56	0.34	0.33
4	0.37	0.49	0.25	0.25	0.73	0.84	0.44	0.39
5	0.47	0.54	0.34	0.29	1.05	1.00	0.46	0.44
6	0.83	0.80	0.37	0.37	1.35	1.46	0.65	0.65
7	1.05	0.99	0.51	0.46	1.92	1.65	0.82	0.80
8	1.16	1.16	0.72	0.52	2.48	2.15	1.00	0.96
Observer	SS		AZ		JJ		SF	
Experiment ...	I	II	I	II	I	II	I	II
Step 1	0.30	0.36	0.23	0.32	0.31	0.26	0.33	0.34
2	0.36	0.42	0.31	0.33	0.35	0.30	0.56	0.30
3	0.41	0.60	0.25	0.44	0.46	0.35	0.56	0.48
4	0.59	0.66	0.44	0.47	0.57	0.43	0.77	0.68
5	0.75	1.03	0.31	0.64	0.73	0.53	0.90	0.76
6	0.96	1.13	0.55	0.63	0.95	0.61	0.82	1.15
7	1.36	1.63	0.78	0.84	1.23	0.77	1.67	1.77
8	2.00	2.61	0.81	0.92	1.48	0.88	1.93	1.74

to be determined. With these values of reflection the strength of each illumination step was calculated in the following proportions.

$$\frac{\text{Albedo of surface}}{\text{Albedo of ideal surface}} = \frac{\text{Reflection of Surface}}{X = \text{Illumination}}$$

Example: Gray 4, albedo 0.375 $\frac{0.375}{1.000} = \frac{3.13}{X}$ $X = 8.35$

Here are the obtained values in determining one illumination:

Gray	Albedo	Surface Reflection in Foot-Candles	Illumination in Foot-Candles
4	.375	3.13	8.35
7	.255	2.10	8.24
14	.120	1.00	8.33
20	.090	0.75	8.33
28	.044	0.30	8.20
			Ave. 8.31

The illumination values computed on the basis of the reflection of five albedos were not exactly the same, but they were close enough to justify using their average to represent the illumination. The above particular illumination we took to be 8.3 foot-candles. The same procedure was repeated for the other steps of illumination to determine their strengths. The albedos of the grays were measured against the standard test-plate in connection with the illuminometer.

The question may be raised, why the field illumination values were taken from the disc at its angle instead of from the field wall or field floor. The field was three-dimensional and the strengths of the illumination as reflected from the various areas were not homogeneous. Since we did not have a method of computing the sum total of the illumination in the complete field, it seemed that the most logical point to represent the illumination strength was on the disc at its angle, in which position the stimulus was presented. Throughout the experiment we used these illumination values, measured as described above.

The illumination within the variable chamber was also measured at two other points, one on the floor under the disc, the other near the upper corner of the wall of the chamber. The illumination values at these points were:

Step	1	2	3	4	5	6	7	8
Floor	4.7	6.5	7.8	10.3	12.2	14.9	19.5	24.3
Wall	0.8	1.4	2.2	3.5	5.0	8.0	12.6	18.0

In the left field the illumination which remained unaltered on the floor was 1.1 f.c. and on the wall, 0.3 f.c.

Now let us come back to Table 1 and examine the values we finally used in the experiment. In column 3 we find the strength of the illumination in the left field as calibrated on the disc at its inclination. Since the illumination in this field was kept constant throughout the experiment, there was only one value, namely, 0.75 foot-candle, which shall be known as the reference illumination, in the sense that the varying steps of illumination of the right field were to be studied against this, one by one. The differences of the two field illuminations were then 2.65, 3.85, 5.45, 7.55, 10.35, 14.45, 20.75, and 29.05 foot-candles, as shown in Table 1, column 4. These differences of illumination were really our independent variable in the study.

In the right field we set number 14 of the Hering series, which was a medium gray with an albedo of 0.120 and under the 8 steps of illumination strengths it reflected 0.41, 0.55, 0.74, 1.00, 1.33, 1.82, 2.58, and 3.58 apparent foot-candles (column 5 of the table). The observer was to match these "standard" values in respect of whiteness with the adjustable disc in the left field. His matches might, so we may suppose, exactly equal these "standard" values, which shall be designated as S values. In that case he would be matching the physical brightness of the light from the two discs (the stimulus brightness), and his whiteness constancy would be zero.

Gray 14 measured under the left illumination, which was constant throughout the experiment while that of the right field was changed, reflected 0.09 foot-candles (column 6 of the table), which shall be designated as the A value. The observer's matches might be equal to this A value—in that case the same gray would be seen to have the same whiteness in spite of the difference of illumination, and the whiteness constancy would be perfect.

The expectation derived from previous constancy experiments is that the observer's actual match will be neither S nor A but some intermediate value, designated as R. The R values obtained are given in the lower portions of Table 1 under the initials of the 12 observers. Of the two sets of R values, set I is derived from the present experiment, and set II from Experiment II. They are placed together for comparison, a point on which we shall not dwell until we reach the second experiment. Some ratio derived from

TABLE 2
BRUNSWICK AND THOULESS RATIOS OF EXPERIMENTS I AND II
"Standard": Gray 14 (Albedo = .120)

Experiment	I	II	I	II	I	II	I	II
Brunswick Ratios								
Observer	EJ	HC	NS	HH				
Step 1	.344	.205	.438	.026	.094	-.077	.438	.538
2	.370	.217	.435	.217	-.022	-.174	.500	.500
3	.385	.323	.492	.123	.000	-.077	.477	.446
4	.440	.374	.539	.330	.132	.044	.527	.539
5	.492	.427	.589	.355	.186	.000	.589	.540
6	.567	.532	.595	.399	.145	.058	.613	.572
7	.526	.534	.695	.502	.205	-.129	.667	.619
8	.553	.668	.742	.470	.189	.023	.668	.579
Observer	BF	AS	JM	EG				
Step 1	.625	.641	.750	.667	.344	.256	.563	.667
2	.587	.435	.761	.783	.174	.152	.565	.652
3	.723	.600	.754	.831	.169	.277	.615	.631
4	.692	.560	.824	.824	.264	.176	.615	.670
5	.694	.637	.798	.839	.226	.266	.702	.718
6	.572	.590	.838	.838	.272	.208	.675	.676
7	.615	.639	.831	.851	.265	.373	.707	.715
8	.693	.682	.820	.877	.315	.410	.739	.751
Observer	SS	AZ	JJ	SF				
Step 1	.344	.308	.563	.410	.313	.564	.250	.359
2	.413	.283	.522	.478	.435	.543	-.022	.544
3	.508	.215	.754	.461	.431	.600	.277	.400
4	.451	.374	.615	.582	.473	.626	.253	.352
5	.468	.242	.823	.556	.484	.645	.347	.460
6	.497	.399	.734	.688	.503	.699	.578	.387
7	.490	.382	.723	.699	.542	.727	.365	.325
8	.453	.278	.794	.762	.602	.774	.473	.527
Thouless Ratios								
Observer	EJ	HC	NS	HH				
Step 1	.206	.109	.275	.013	.046	-.036	.275	.344
2	.204	.111	.250	.111	-.010	-.075	.299	.299
3	.196	.158	.269	.054	.000	-.271	.258	.236
4	.212	.173	.280	.148	.051	.017	.272	.280
5	.228	.189	.300	.149	.068	.000	.296	.260
6	.257	.234	.278	.159	.049	.019	.291	.261
7	.211	.216	.331	.196	.066	-.035	.376	.271
8	.210	.286	.349	.166	.055	.006	.286	.226
Observer	BF	AS	JM	EG				
Step 1	.440	.439	.581	.466	.206	.140	.381	.466
2	.373	.250	.559	.587	.087	.075	.354	.436
3	.419	.355	.515	.621	.076	.132	.369	.383
4	.413	.296	.576	.576	.131	.072	.341	.391
5	.386	.343	.592	.566	.131	.106	.394	.411
6	.261	.273	.530	.215	.099	.073	.342	.342
7	.268	.285	.483	.514	.088	.133	.342	.349
8	.306	.306	.436	.524	.100	.139	.346	.357
Observer	SS	AZ	JJ	SF				
Step 1	.206	.172	.381	.242	.184	.366	.143	.206
2	.233	.149	.317	.282	.298	.335	-.010	.335
3	.280	.100	.451	.247	.226	.355	.132	.206
4	.219	.173	.341	.314	.233	.350	.109	.160
5	.213	.095	.541	.272	.223	.342	.154	.208
6	.206	.159	.398	.353	.216	.364	.265	.153
7	.191	.137	.357	.334	.221	.360	.130	.112
8	.158	.086	.404	.369	.240	.381	.168	.196

the three values, S, A and R, such as the Brunswik or the Thouless ratio, serves as a measure of the degree of constancy.

Each sitting took about one hour. The observer was seated in the chair and the task was explained to him with some demonstrations and practice. He was instructed to match on the left disc for the whiteness of the right disc by turning the adjustment wheel. A whiteness match was obtained at each step of illumination difference. The steps of illumination differences were presented in random order. Before each determination, the curtain was down, covering the fields. Then the experimenter said, "Ready," and raised the curtain. After the observer made the determination, the curtain came down again, and the lights and discs were re-set for the next observation. For each determination, the experimenter recorded the diaphragm reading on the projection lantern. After the observer had done the 8 steps once he was allowed a rest of several minutes. The same procedure was gone through three times, each time with a different random order for the 8 steps. The diaphragm readings were later translated into foot-candles and the three determinations for each illumination step were averaged to give the final R value given in Table 1.

How great is the reliability of these experiments where the results of one sitting are used to produce a curve? To get an answer we had one observer, HH, sit four times through Experiment I under identical conditions, three times on three consecutive days, and the fourth time a week later. The results are shown in Table 3. The R's he produced are very close from time to time with slight variations. It seems one sitting is enough to get trustworthy data.

TABLE 3
R VALUES YIELDED BY ONE OBSERVER (HH) WITH REPEATED
PERFORMANCES OF EXP. I

Step	Illum. Diff.	1st Day	2nd Day	3rd Day	Week Later	Average
1	2.65	0.27	0.23	0.25	0.25	0.25
2	3.85	0.32	0.31	0.32	0.35	0.33
3	5.45	0.43	0.35	0.47	0.42	0.41
4	7.55	0.52	0.54	0.50	0.51	0.52
5	10.35	0.60	0.58	0.68	0.65	0.63
6	14.45	0.76	0.68	0.80	0.87	0.78
7	20.75	0.92	0.91	1.11	1.04	1.00
8	29.05	1.25	1.03	1.24	1.42	1.24

Observers: Of the 12 observers who served in the main experiments, 6 were psychologists, all were male except AS, and all except

SS were at the time students at Columbia University. They are listed below together with their academic interests, and the experiments in which they participated in this study.

Observer	Academic Interest	Experiments Participated
EJ	Psychology	1, 2, 3, 4
HC	Psychology	1, 2, 3, 4
NS	Psychology	1, 2, 3, 4
HH	Psychology	1, 2, 3
AS	Psychology	1, 2, 3
BF	Psychology	1, 2
JM	Languages	1, 2
EG	History	1, 2
SS	Medicine	1, 2
AZ	Economics	1, 2
SF	Sociology	1, 2
JJ	Politics	1, 2

From the S, A, and R values we computed the Brunswik and Thouless ratios which appear in Table 2. Here again we present the results for Experiments I and II side by side for comparison later. The Brunswik ratios are also plotted in Figures 3a, b.

In Table 2 it can be noticed that on the whole and with minor exceptions the constancy ratios increase with the increased difference of the illuminations of the two fields. This statement applies more closely to the Brunswik than to the Thouless ratios. In order to give a summarized picture of the results, the medians of these ratios for the 12 observers are obtained. Statistically it seems to be more reasonable to use the median rather than the mean, since the ratios are not homogeneous as constancy varies a great deal in size from individual to individual. The problem here is to see whether there is a general trend for constancy to change with the increased difference of illumination; the medians will show. Table 4 arranges in order the eight steps of illumination differences together with the actual values of differences in foot-candles, and then gives the medians for the Brunswik and Thouless ratios for Experiments I and II. These medians are plotted in Figure 4, with the ratios of constancy on the ordinate and the illumination difference on the abscissa. The upper curves represent the Brunswik ratios for Experiments I and II, and the lower curves, the Thouless ratios of the two experiments. The results of the two experiments are put together for convenience in later comparison. At this point we are only interested in the solid curves drawn for Experiment I. The Brunswik curve shows a definite increase of constancy with the increased difference of illumination of the two fields, but there is very little, if any, increase in the Thouless curve.

TABLE 4
MEDIAN BRUNSWIK AND THOULESS RATIOS FOR 12 OBSERVERS IN
EXPERIMENTS I AND II

Step	Ill. Diff.	Brunswik		Thouless	
		I	II	I	II
1	2.65	.391	.385	.241	.223
2	3.25	.435	.457	.266	.266
3	5.45	.485	.423	.264	.221
4	7.55	.500	.457	.253	.229
5	10.35	.541	.500	.262	.234
6	14.45	.575	.552	.263	.225
7	20.75	.579	.577	.245	.244
8	29.05	.635	.629	.263	.256

EXPERIMENT II. *Whiteness constancy as affected by the amount of difference between the prevailing illumination and the special illumination of one field, the prevailing or reference illumination being lower than the special illumination.*

The fact that the two fields were separately illuminated in Experiment I will unavoidably create some uneasiness in the minds of readers familiar with the history of the constancy problem. To the best of the writer's knowledge never in the past have wholly separate illuminations been used in the study of constancy, but always a general or prevailing illumination has existed within which a special area has been placed in a shadow or given an additional illumination. The observer has been supposed to take the prevailing illumination as a standard of reference, and to correct the sensory impressions received from the special area by making allowance for the shadow or extra illumination. So the use of two wholly separate illuminations which was technically convenient raises a theoretical question: Does the constancy phenomenon exist only when the observer can refer to a prevailing illumination?

This question is quickly and easily answered, for we have seen in Experiment I where separate illuminations were used that constancy did exist. However, a quantitative question will be raised: Is the constancy the same in degree with separate illuminations as under conditions providing a general illumination? To answer this question the present experiment was undertaken. We used the same observers, the same "standard" and the same illumination differences, and everything was the same except that a general illumination now fell on both fields.

Instead of having the two observational fields illuminated separately each by its own top light in its own chamber, we had a single light of the same kind as before, that is, a 100-watt lamp, installed on the wall behind the observer lighting up the whole room and flooding the two fields. This common source shall be known as the

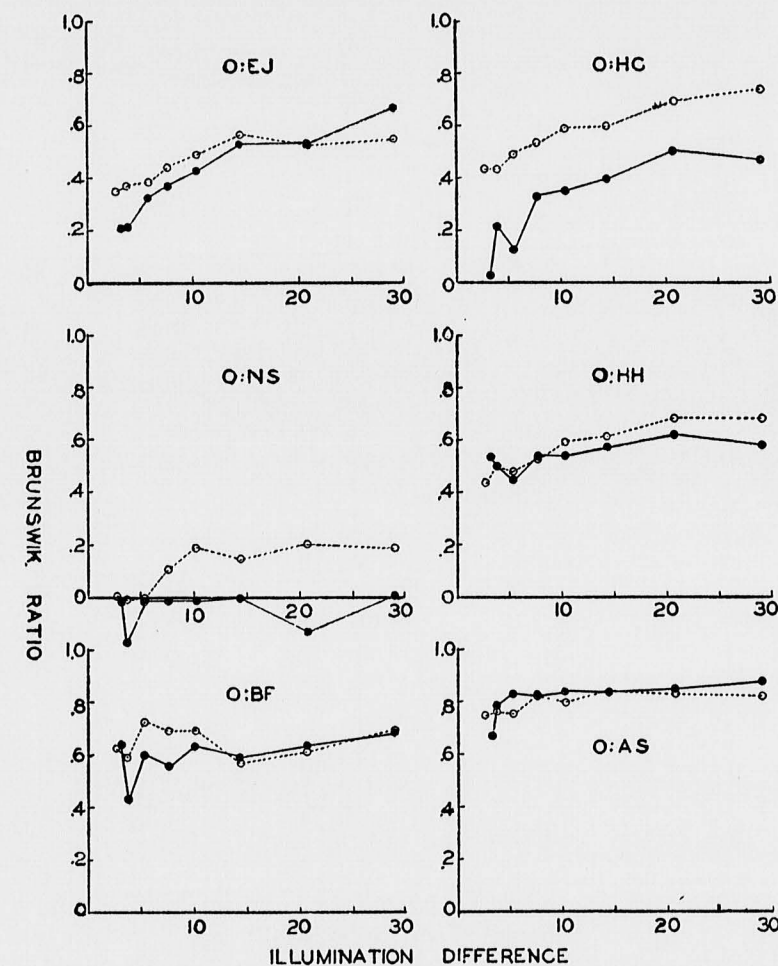


FIG. 3a. Brunswik ratios for individual observers in Experiment I (dotted line) and Experiment II (solid line).

prevailing illumination. Now in the right field we increased the strength of the field illumination by adding the illumination from the top light, but no top illumination was added to the left field,

which was only illuminated by the prevailing illumination, *i.e.*, the wall light. Adjustments were made with the heights of the light so that the 8 steps of illumination strengths falling on the right disc at its angle equaled the values used in Experiment I where the

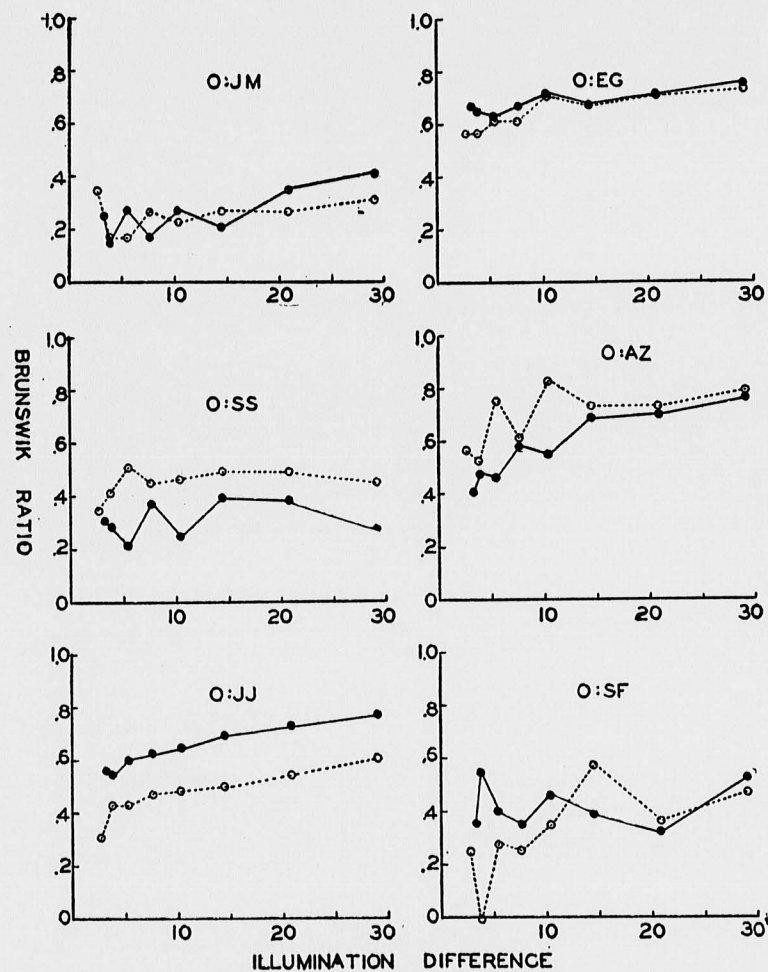


FIG. 3b. Brunswik ratios for individual observers in Experiment I (dotted line) and Experiment II (solid line).

separate illumination conditions were used (with the exception of Step 1 owing to technical difficulties).

These values are shown in Table 1 as we have explained before. The illumination in the left field was 0.75 foot-candle. The illumi-

nation differences of the two fields are given in column 4 of Table 1. Since the illumination values of the two fields were the same, the S and A values would necessarily come out to be the same when the same gray No. 14 of albedo 0.120 was used as the "standard." The S and A can be seen in Columns 5 and 6 of Table 1. We wished to know the R values determined by the same 12 observers with the same instructions under the same procedure but with a prevailing illumination. The R's are arranged side by side with the R's of

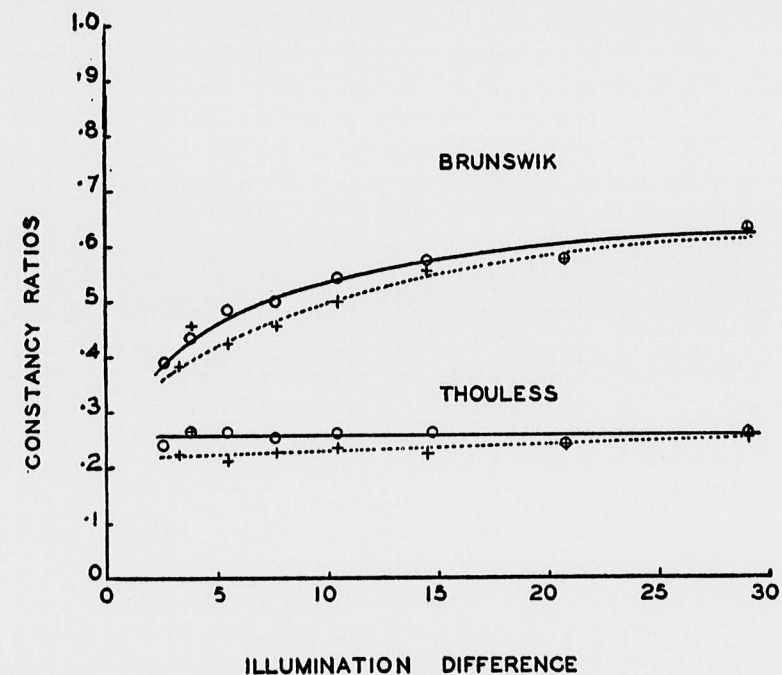


FIG. 4. Median Brunswik and Thouless ratios of Experiment I (solid line) and Experiment II (dotted line).

Experiment I in Table 1 under the respective initials of the observers. Some of the observers served in this experiment before and some after serving in Experiment I.

From the S, A, and R values we calculated the Brunswik and Thouless ratios which are given in Table 2, side by side with the results of Experiment I. The Brunswik ratios are also plotted for each individual observer in Figure 3a, b. The medians of both the Brunswik and Thouless ratios for the 12 observers are plotted in Figure 4. Here again we see that the degree of constancy increases

with the increase of the illumination difference. In Figures 3a, b the dotted curves are for Experiment I, while the solid curves are for Experiment II. They are drawn along with each other to facilitate direct comparison. Let us first pause a while for the results of Experiment II. We see here on the whole and with minor exceptions that the degree of constancy increases with the increase of the illumination difference. This statement applies not only to the Brunswik ratios but also to the Thouless ratios.

Now let us compare Experiment I with Experiment II. The easiest and quickest way of making the comparison is to examine the curves for the medians in Figure 4. It can be seen at a glance that the separate-illumination conditions of Experiment I give slightly higher constancy values than the prevailing-illumination conditions of Experiment II. It is more so for the lower differences of illumination of the two fields than for the higher differences. However, the difference in degree of constancy between the two experiments is very small and the general form of the curves is very similar—with the Brunswik ratios it is concaved and with the Thouless ratio, rectilinear. Nevertheless there is a difference between the two experiments, namely, the Thouless ratios increased slightly with the increase of illumination difference in Experiment II, but there seems to be no change in the Thouless ratios of Experiment I. On the other hand the Brunswik ratios increase considerably with the increase of illumination difference in both cases. The fact that the Thouless ratios of Experiment I do not grow with increase in illumination is detrimental to our fundamental thesis, which, however, finds its support in the other curves.

With this examination it seems that the two experiments really have yielded data of the same nature so far at least as the production of constancy is concerned. The general notion that constancy exists only when there is a prevailing condition is incorrect, because under the separate-illumination conditions, constancy is also produced. It may be said that the prevailing illumination situation is a common and natural one, but wherever there is a difference in illumination in two fields, constancy may occur. The crucial point is that the objects presented under one illumination are judged in relation to the other illumination. Exactly for this reason we prefer to call one of the illuminations the "reference illumination."

EXPERIMENT III. *Whiteness constancy as affected by the amount of difference between two separate illuminations, the reference illumination being sometime higher and sometimes lower than that of the other field.*

So far, in both Experiments I and II, the reference illumination in the left field has always been lower than any of the series of illuminations used in the right field. The gray disc serving as the "standard" to be matched has been in the right field under stronger illumination, the match being made in the left field under weaker illumination. Previous experimenters, as Katz, have often used the reverse arrangement, and it seems wise to use our setup with separate illuminations in such a way as to permit a direct comparison of the constancy obtained under the two conditions.

In the present experiment, therefore, the disc whose whiteness is to be matched is presented sometimes in stronger and sometimes in weaker illumination than the disc whose whiteness is to be adjusted to make the match.

The method of reaching a whiteness match has been explained on page 24. The example given there approximates directly the situations of the Experiment I and II, where the reference illumination in the left field was lower than the variable illuminations. The match was made by having the observer throw additional light from a projection lantern onto the disc in the left field by turning a wheel and so adjusting the diaphragm. In Experiment III, sometimes the left field had a stronger illumination than the series of varied illumination in the right field. However, the same method of reaching a match in whiteness was used, except in this case a much darker (blackier) gray was set in the left field at the start. In spite of the strong field illumination, the observer still had to throw additional light from the projection lantern to reach a match.

To avoid change of attitude we obtained matches for darkened and brightened "standards" in a single sitting. The reference illumination in the left field was kept throughout at a medium intensity, 15 foot-candles, while the experimental series of illuminations of the right field varied from 3.5 to 27.0 foot-candles. 9 steps were chosen, the illumination differences of the two fields being -1.5, -9.0, -6.0, -3.0, 0, 3.0, 6.0, 9.0, 12.0 foot-candles. This range is rather small owing to the limited supply of light from the projection lantern. These illumination values are shown in the first three columns of Table 5. Gray No. 14 (albedo 0.120) again was used as the "standard," yielding S and A values, as given in the 4th and 5th columns of the upper portion of the same table. It may be noticed that on the middle step S equals A (both being 1.80 foot-candles) because of the equal illumination of both fields. From there on S is increasingly higher than A toward one end, while increasingly

TABLE 5
ILLUMINATION, S, A, R VALUES, AND BRUNSWIK RATIOS OF EXPERIMENT III

Step	Illumination in f.c.		R - L Differences	Intensity of Gray in f.c.	
	Right Field	Left Field		S	A
1	3.5	15.0	-11.5	0.41	1.80
2	6.0	15.0	-9.0	0.72	1.80
3	9.0	15.0	-6.0	0.08	1.80
4	12.0	15.0	-3.0	1.44	1.80
5	15.0	15.0	0.0	1.80	1.80
6	18.0	15.0	3.0	2.16	1.80
7	21.0	15.0	6.0	2.52	1.80
8	24.0	15.0	9.0	2.88	1.80
9	27.0	15.0	12.0	3.24	1.80

R (Observer's Matches in f.c.)					
Observers					
	EJ	HC	NS	AS	HH
1	.....	.....	.....	0.98	.....
2	1.22	1.17	0.94	1.17	0.98
3	1.30	1.31	1.38	1.37	1.30
4	1.58	1.44	1.44	1.45	1.35
5	1.78	1.63	1.84	1.71	1.61
6	2.09	1.84	2.11	1.82	1.85
7	2.46	2.34	2.43	2.17	2.12
8	2.64	2.43	2.80	2.30	2.23
9	2.95	2.56	.....	2.37	2.40

Brunswik Ratios					
Observers					
	EJ	HC	NS	AS	HH
1	.....	.....	.....	.410	.....
2	.370	.417	.204	.417	.241
3	.306	.319	.417	.403	.306
4	.389	.000	.000	.028	-.250
5	-.090	-.170	.040	-.090	-.190
6	.195	.889	.139	.944	.861
7	.083	.250	.125	.486	.556
8	.222	.417	.075	.537	.602
9	.201	.472	.....	.604	.584

lower than A toward the other, signifying that the illumination difference of the two fields is made to increase in opposite directions. The 9 steps were presented to the observer in random order. The rest of the procedure was the same as that of the previous two experiments. Five observers served in this experiment. The R's they determined constitute the second portion of Table 5. The

third portion of the table gives the Brunswik ratios with the medians in the last column.

There is a good deal of variation in the results of the five observers, but the general trend seems to be that constancy increased with the increased illumination difference between the two fields in both directions, *i.e.*, whether the reference (matching) field is dimmer or lighter than the other. The median Brunswik ratios for the five observers are plotted in Figure 5 against the illumination dif-

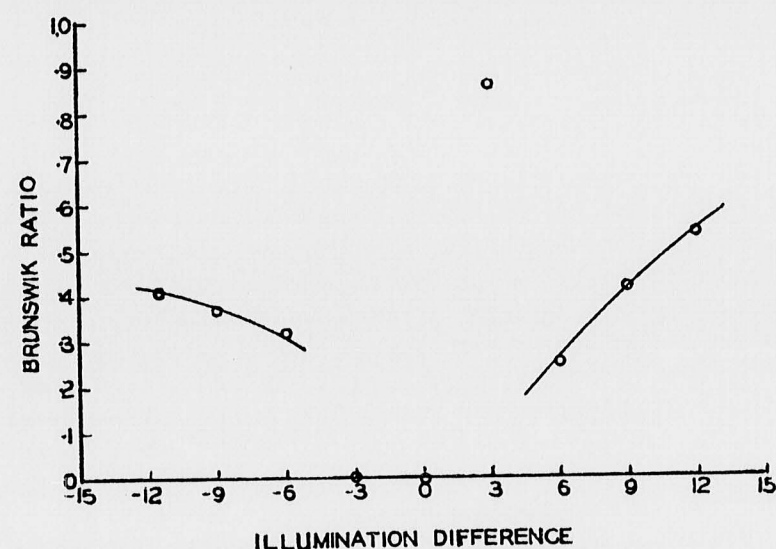


Fig. 5. Median Brunswik ratios of Experiment III.

ference on the abscissa. From the fact that the right portion of the curve is steeper than the left portion, it appears that when the reference field is dimmer than the other the rate of increase of Brunswik ratios with increased illumination difference is steeper than the rate of increase of the ratios when the reference field is lighter. In the middle portion of the graph the curve is not fitted to the points owing to their irregularity. Such irregularity can be accounted for by the fact that for the middle steps the illumination difference of the two fields is very small, and any slight error greatly distorts the constancy ratios. Ideally at that range the ratios should come out near zero.

EXPERIMENT IV. *The influence of difference in illuminations on whiteness perception with various albedos as "standard."*

Technically this experiment is a repetition of Experiment I but

with several albedos used successively as "standard," aiming at producing a family of R curves against the same range of illumination differences. (Albedo is the ratio of total luminous flux reflected to that received.) The purpose is (1) to see whether the general results found with one albedo can be reproduced with others, and (2) to examine whether the albedos behave differently in some respects. It is very likely that albedo will be a principal independent variable in determining the perception of whiteness.

The following five grays were used one after another as the "standard" against which whiteness was matched:

Gray No.	4	7	14	20	28
Albedo	.375	.255	.120	.090	.044

The illumination conditions in this experiment were identical with those of Experiment I, *i.e.*, the two fields were illuminated separately each with its own top light, the one reference illumination in the left field in which the match was made was low, and the series of changing illuminations in the right field in which the "standard" stood were all higher in intensity. These illumination values and their differences have already been shown in Table 1 in connection with Experiment I, but we again list them here in Table 6 for convenience. It will be noticed that we have Gray 14 in both experiments I and IV, and the three observers, EJ, HC, and NS served in both experiments. Their data for Gray 14 are then merely transferred here from the other experiment.

The second portion of Table 6 gives the S and A values for the 8 steps, S being the intensities of the grays as "standards" measured under the various illumination strengths in the right field, and A being the intensities of the same grays measured under the reference illumination in the left field. The last three portions of Table 6 show the R values yielded by the three observers, *i.e.*, the intensities of the variable disc adjusted by the observer with the spot light under the reference illumination in the left field. The Brunswick ratios computed from the S, A, and R values are shown in Table 7.

The over-all tendency of these ratios for two observers, EJ and HC, is that constancy grows with the increase of illumination difference, but with NS this is not so obvious. Since the latter individual did not exhibit much constancy there is little possibility of discovering whether the constancy changes or not in his case. On the basis of the other two individuals our generalization seems to stand.

TABLE 6
ILLUMINATION VALUES, AND S, A, AND R VALUES OF EXPERIMENT IV

		Illumination, in Foot-Candles								
		Right Field		Left Field		R - L Dif- ference				
Step	1	3.4		0.75		2.65				
	2	4.6		0.75		3.85				
	3	6.2		0.75		5.45				
	4	8.3		0.75		7.55				
	5	11.1		0.75		10.35				
	6	15.2		0.75		14.45				
	7	21.5		0.75		20.75				
	8	29.8		0.75		29.05				
<i>S and A Values, in Apparent Foot-Candles</i>										
S—intensity of gray under right illumination										
A—intensity of same gray under left illumination										
Standard Albedo	Gray 4 0.375		Gray 7 0.255		Gray 14 0.120		Gray 20 0.090		Gray 28 0.044	
	S	A	S	A	S	A	S	A	S	A
Step 1	1.28	0.28	0.88	0.19	0.41	0.08	0.31	0.07	0.15	0.03
2	1.73	0.28	1.17	0.19	0.55	0.08	0.41	0.07	0.20	0.03
3	2.33	0.28	1.58	0.19	0.74	0.08	0.56	0.07	0.27	0.03
4	3.11	0.28	2.12	0.19	1.00	0.08	0.75	0.07	0.37	0.03
5	4.16	0.28	2.83	0.19	1.33	0.08	1.00	0.07	0.49	0.03
6	5.70	0.28	3.88	0.19	1.82	0.08	1.37	0.07	0.67	0.03
7	8.06	0.28	5.48	0.19	2.58	0.08	1.94	0.07	0.95	0.03
8	11.17	0.28	7.60	0.19	3.58	0.08	2.68	0.07	1.31	0.03
<i>R Values (O's Matches) in Apparent Foot-Candles</i>										
Standard	Gray 4		Gray 7		Gray 14		Gray 20		Gray 28	
<i>Observer—EJ</i>										
Step 1	1.04		0.64		0.30		0.27		0.13	
2	1.41		0.77		0.38		0.33		0.16	
3	2.01		0.90		0.49		0.40		0.18	
4	2.19		1.20		0.60		0.44		0.23	
5	2.92		1.80		0.72		0.52		0.26	
6	4.09		2.32		0.84		0.65		0.30	
7	5.50		3.52		1.27		0.81		0.34	
8	6.94		4.09		1.65		0.90		0.39	
<i>Observer—HC</i>										
Step 1	1.14		0.72		0.27		0.21		0.13	
2	1.44		0.94		0.35		0.24		0.16	
3	1.74		1.10		0.42		0.28		0.18	
4	2.34		1.44		0.51		0.35		0.21	
5	2.56		1.64		0.60		0.37		0.25	
6	3.87		2.15		0.79		0.48		0.30	
7	5.27		2.59		0.85		0.62		0.40	
8	6.91		4.27		0.99		0.72		0.57	
<i>Observer—NS</i>										
Step 1	1.49		0.82		0.38		0.27		0.13	
2	2.13		1.02		0.56		0.41		0.19	
3	2.68		1.61		0.74		0.50		0.25	
4	3.61		2.06		0.88		0.72		0.30	
5	4.84		2.75		1.10		0.82		0.40	
6	7.01		4.29		1.57		1.18		0.60	
7	.....		5.59		2.07		1.71		0.85	
8	.....		.....		2.92		2.09		1.04	

TABLE 7
BRUNSWIK RATIOS OF EXPERIMENT IV

Observer	EJ	HC	NS
Standard	Gray 4 (albedo = .375)		
Step 1	.240	.140	-.210
2	.221	.200	-.276
3	.156	.270	-.122
4	.326	.272	-.176
5	.320	.412	-.175
6	.297	.338	-.242
7	.329	.359	.....
8	.389	.391	.....
M	.285	.298	-.200
Standard	Gray 7 (albedo = .255)		
Step 1	.348	.232	.087
2	.408	.235	.163
3	.490	.345	-.022
4	.477	.352	.031
5	.390	.451	.030
6	.423	.441	-.111
7	.371	.546	-.021
8	.474	.449	.....
M	.423	.381	.022
Standard	Gray 14 (albedo = .120)		
Step 1	.333	.424	.091
2	.362	.426	-.021
3	.379	.485	.000
4	.436	.533	.130
5	.489	.584	.184
6	.563	.592	.144
7	.524	.692	.204
8	.551	.740	.190
M	.455	.560	.115
Standard	Gray 20 (albedo = .090)		
Step 1	.167	.417	.167
2	.235	.500	.000
3	.327	.571	.122
4	.456	.588	.044
5	.516	.677	.194
6	.554	.685	.145
7	.604	.706	.123
8	.682	.751	.226
M	.473	.612	.128
Standard	Gray 28 (albedo = .044)		
Step 1	.167	.167	.167
2	.235	.235	.059
3	.375	.375	.083
4	.412	.471	.206
5	.500	.521	.196
6	.580	.578	.109
7	.663	.598	.109
8	.719	.578	.211
M	.456	.453	.143

The Brunswick ratios are definitely higher for the three darker grays than for the lighter ones, the average being:

Observer	Albedo	.375	.255	.120	.090	.044
EJ		.285	.423	.455	.473	.456
HC		.298	.381	.560	.612	.453

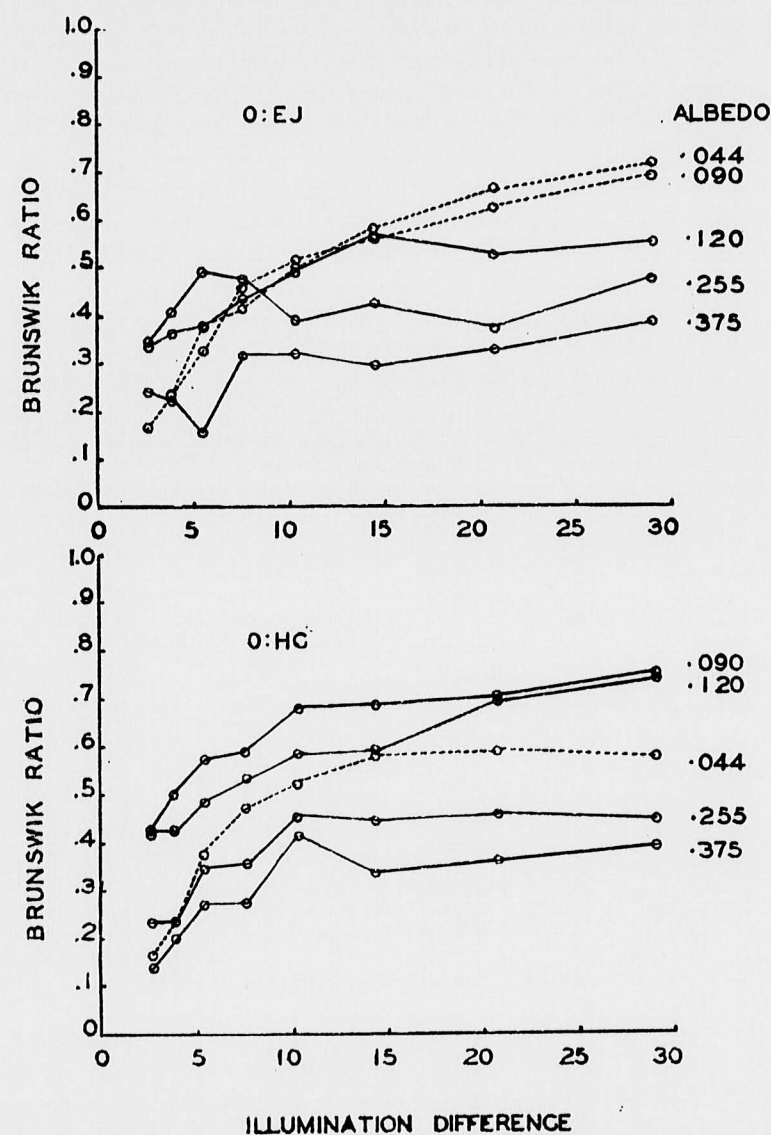


FIG. 6. Brunswick ratios for O:EJ and O:HC using five albedos as standards in Experiment IV.

Is the function in which this study is specially interested—the increase of constancy with amount of illumination difference—the same for all albedos? Or is the increase greater for dark than for light albedos? Following down the columns of Brunswik ratios in Table 7 we see that the increase is more rapid for the darker albedos; the difference between the ratios for Steps 1–2 and for Steps 7–8 becomes greater as we pass from the lighter to the darker grays. The same result appears in Figure 6 where the ratios for two observers are plotted against illumination differences. There is indeed a good deal of overlap and irregularity in the lower range of illumination differences. The plot for the observer HC does not lend very strong support to this particular statement, though it clearly substantiates our main result, increase of constancy with increasing difference of illumination.

On the basis of Experiment IV it seems that under similar conditions the lower the albedo value, the higher is the constancy ratio, with the exception of some irregularities, as shown in Figure 6 and

Experimenter	Experimental Situation		Brunswik Ratio
	Lighter Illumination	Darker Illumination	
Katz	Matches	Albedo High Medium Low	High Medium Low
Burzlaff	Matches	Albedo High Medium Low	High Medium Low
Burzlaff	Albedo High Medium Low	Matches	Low Medium High
Present experiment	Albedo High Medium Low	Matches	Low Medium High

Table 7. This is contradictory to some old results such as those of Katz (14) and of Burzlaff (3). However, there are some other results of Burzlaff (3) which are more in agreement with the present data. This contradiction seems to result from the difference in experimental situations. High-albedo-high-constancy is associated

with having the standards in the darker illumination and the matches made in the lighter illumination, while high-albedo-low-constancy is associated with having the standards in the lighter illumination and the matches made in the darker illumination. A rough sketch of the results and experimental situations is given in the table above.

A possible explanation for this difference may be sought in the change in quality of the achromatic series under different illumination. A dark surface in a low illumination is more harmonious or more "pronounced" as Katz called it, than it is in a higher illumination. Therefore, the match is more exact, and thus low constancy. The same can be said of a white in a high illumination. If the situation is reversed, *i.e.*, a white in low illumination or a black in high illumination, the "pronouncedness" is decreased, hence high constancy. If this is true, the seemingly contradictory results summarized above are really in good harmony.

SECTION V

APPARENT WHITENESS AS DEPENDENT ON ILLUMINATION

What we have called the "standard" in these experiments was in each case a certain gray receiving a certain amount of illumination. What the observer did was to indicate his impression of the whiteness of this gray by adjusting the brightness of another gray which stood in a constant "reference illumination." His adjustment was measured in foot-candles. As the illumination of the standard gray was increased, the observer's impression of its whiteness rose as indicated by the foot-candles in his match. Therefore we can discover from the data how the observer's impression of a certain gray changed in dependence on its illumination. Our data do not give his estimates on a subjective scale of whiteness. Our data are in foot-candles, a physical measure which has no upper limit corresponding to 100 per-cent white. But though we cannot fully answer the question, "How white a given gray appears in a given illumination," we can show that the apparent whiteness increases with the illumination, and we can attempt to derive an empirical equation showing the increase of apparent whiteness as the illumination increases.

Instead of the constancy ratios this time we present graphically the direct data, *i.e.*, the observer's matches plotted against the illuminations of the standard gray. The results of Experiment I (taken from Table 1, page 28) are shown in Figure 7a, b, for the 12 observers individually. Along the abscissa of each graph are the values in foot-candles of the variable illumination of the standard disc. On the ordinate are the whiteness matches in foot-candles. The heavy line through the data points shows the observer's match.

We should notice that the foot-candles along the abscissa are foot-candles of *illumination* thrown upon the standard disc, while along the ordinate the foot-candles (more correctly called "apparent foot-candles") give the light *reflected* from the matched disc. Since the albedo of the standard disc was 0.120, the light reflected from that disc is only 0.120 of the illumination. The values along the abscissa, if converted to give the light reflected from the standard disc, would read: 0.6, 1.2, 1.8, 2.4, 3.0, and 3.6; and instead of reading that observer EJ matched the standard gray under 15 foot-candles of illumination with a reflected brightness of 0.8 foot-

candles, the graph would read that he matched 1.8 foot-candles coming from the more brightly illuminated field with 0.8 foot-candles coming from the dimly lighted field. This would seem a more likely match. But our purpose here is simply to show how the apparent whiteness of the standard gray changes when the illumi-

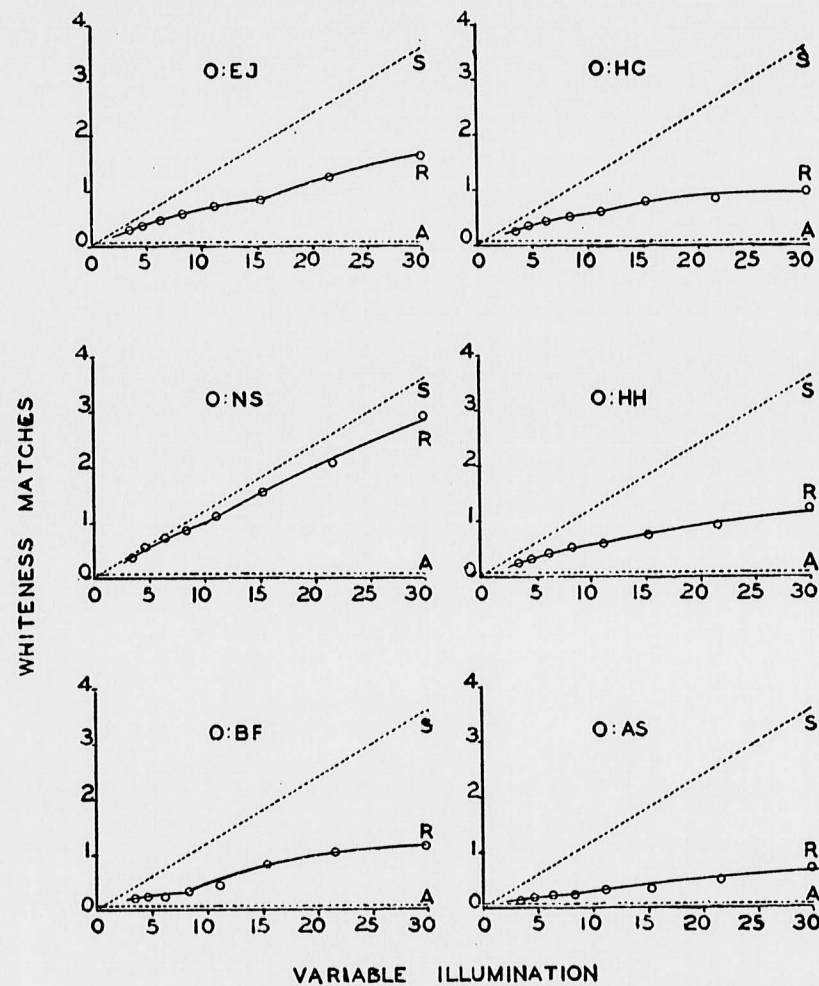


FIG. 7a. Whiteness matches (S, A and R) for individual observers in Experiment I.

nation changes. Therefore we need to have illuminations along the abscissa, while along the ordinate we need reflected light to indicate how white the standard gray appeared under different illuminations.

The oblique dotted lines in Figure 7 show the foot-candles reflected from the standard gray disc under the different illuminations. Had the observer matched reflected brightnesses simply, his matches would have fallen along this oblique line (and his constancy would

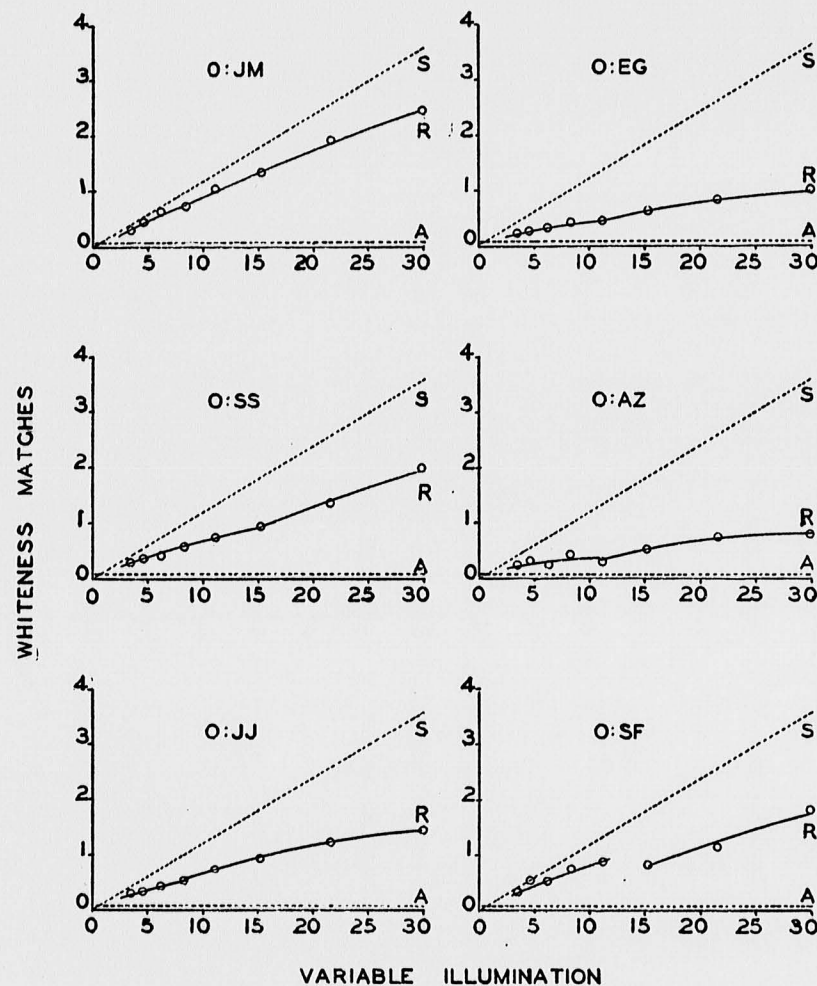


FIG. 7b. Whiteness matches (S, A and R) for individual observers in Experiment I.

have been zero, as explained on page 30). If his constancy had been perfect, *i.e.*, if he had simply matched the two albedos, his match would always have been the same, independent of the illumination, and it would always have fallen on the horizontal dotted line. Since

the actual data points fall between the oblique and horizontal lines in every case, we see that there was always some approximation to constancy—very little in the case of observer NS, very much in that of AS.

The data curve tends in most of the observers to come proportionally nearer to the horizontal line and farther from the oblique line as the illumination on the standard disc increases. Since the illumination on the adjustable disc (the reference illumination) was low and always the same, we can draw our main previous conclusion again from these curves: constancy increases as the illumination difference increases.

We can go further with these graphs, attempting to work out the rate of increase of apparent whiteness as a function of increase of illumination. We attempt to write an equation for apparent whiteness as dependent on illumination, or to answer the question, how much the apparent whiteness of a gray disc increases with a given increase of the illumination thrown on the disc. We use the observer's match in the constant reference illumination as an index of apparent whiteness and its changes. Let us examine the form of the R curve carefully. By and large it is a negatively accelerated curve. We tried various ways of plotting the data and found that a plot on logarithmic paper gave the most usable functions.

The plot of $\log R$ against $\log I$ (I being the illumination of the "standard" disc) is shown in Figures 8a, b, c for the three observers who did Experiments I and IV, so giving matches for the five albedos: .375, .255, .120, .090, and .044. The data are taken from Table 6, p. 43. Plotting the match, R , against the variable illumination, both in logarithmic units, gives us curves that come out as straight lines with minor deviations. If this fitting is acceptable, the following equation can be written for each of the functions:

$$\log R = \log a + b \log I,$$

or, in exponential form,

$$R = a \cdot I^b,$$

where R is the whiteness match, I the variable illumination, and a and b constants for any one function. The values of a and b depend on the albedo of the standard and on the individual observer; as worked out from the plots these values are given in Table 8. The values of a , in spite of some irregularities, may be taken as practically identical with the albedo values, so that a may be written A , meaning albedo. This is, for a given illumination, the whiteness match for a gray surface is directly proportional to

TABLE 8
EQUATIONS BETWEEN R VALUES (WHITENESS MATCHES) AND THE VARIABLE ILLUMINATION FOR 3 OBSERVERS USING 5 ALBEDOS AS STANDARDS

Albedo	O: EJ	O: HC	O: NS
.375	$R = .355 \cdot I^{.90}$	$R = .376 \cdot I^{.85}$	$R = .430 \cdot I^{1.02}$
.255	$R = .164 \cdot I^{.97}$	$R = .309 \cdot I^{.70}$	$R = .220 \cdot I^{1.07}$
.120	$R = .114 \cdot I^{.78}$	$R = .134 \cdot I^{.62}$	$R = .135 \cdot I^{.90}$
.090	$R = .130 \cdot I^{.60}$	$R = .096 \cdot I^{.60}$	$R = .103 \cdot I^{.60}$
.044	$R = .071 \cdot I^{.52}$	$R = .063 \cdot I^{.50}$	$R = .045 \cdot I^{.66}$

its albedo—as would be expected. The value of b also depends on albedo, being smaller for the darker grays, but the relationship is not clearly indicated and varies with the observer.

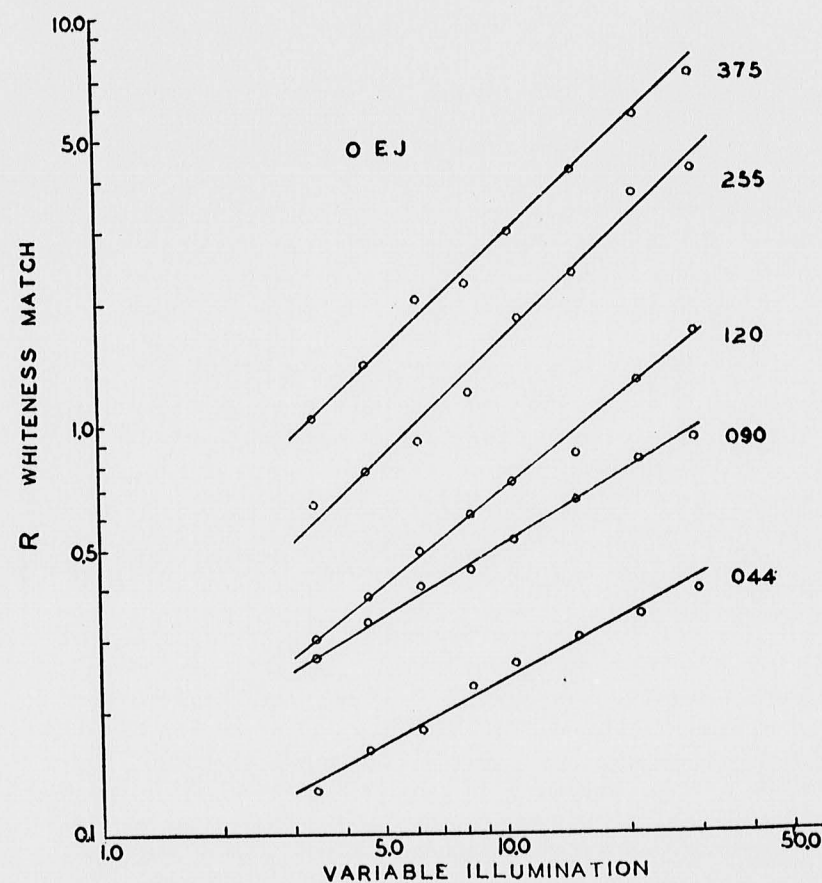


FIG. 8a. Whiteness matches (R) of O: EJ for five albedos as standards in Experiment IV against the variable illumination (I), both measured in foot-candles.

Accepting our equation as approximately correct we can say that the apparent whiteness of a gray surface under variable illumination is proportional to the albedo of the surface and to a constant power of the illumination, the power being usually less than 1. If the power were 1 there would be zero constancy; if the power were

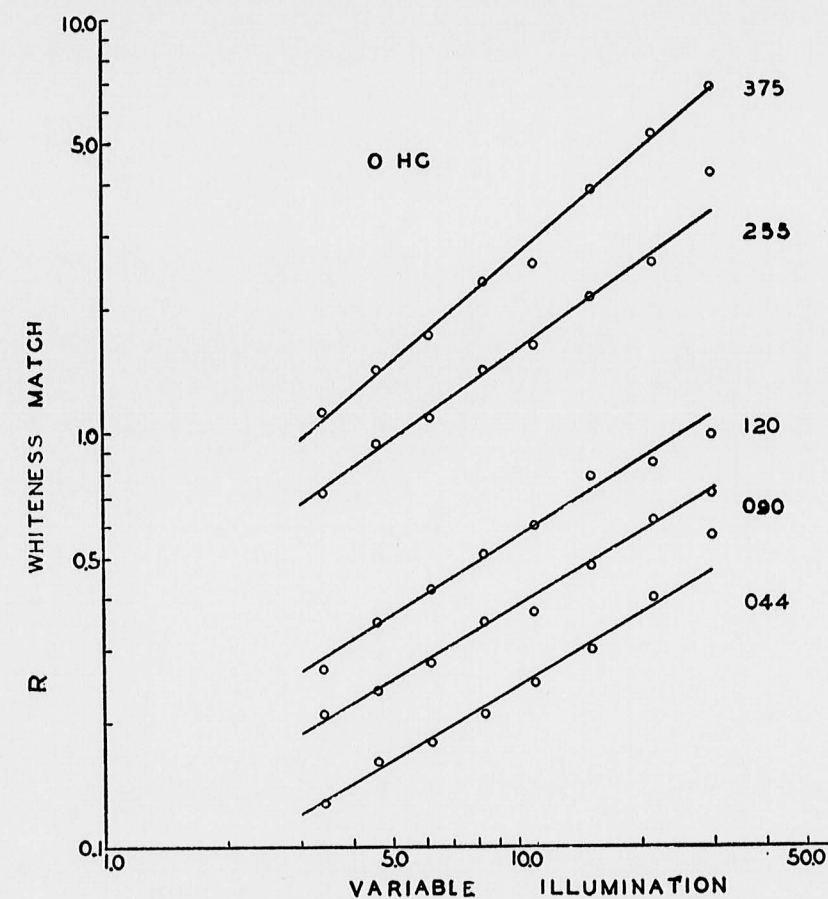


FIG. 8b. Whiteness matches (R) of O: HC for five albedos as standards in Experiment IV against the variable illumination (I), both measured in foot-candles.

0 there would be perfect constancy since the apparent whiteness would be the same for all intensities of illumination; the smaller the exponent b the higher the degree of constancy.

The writer deems this equation with the equivalent verbal statement to be perhaps the main outcome of the whole study.

There is nothing new to be seen in the data of Experiment II, which was devised to show resemblance of the separate and prevailing illumination conditions as described in Section IV. As to the dependence of apparent whiteness on illumination, the data of Experiment II reveal nothing more than those of Experiment I do.

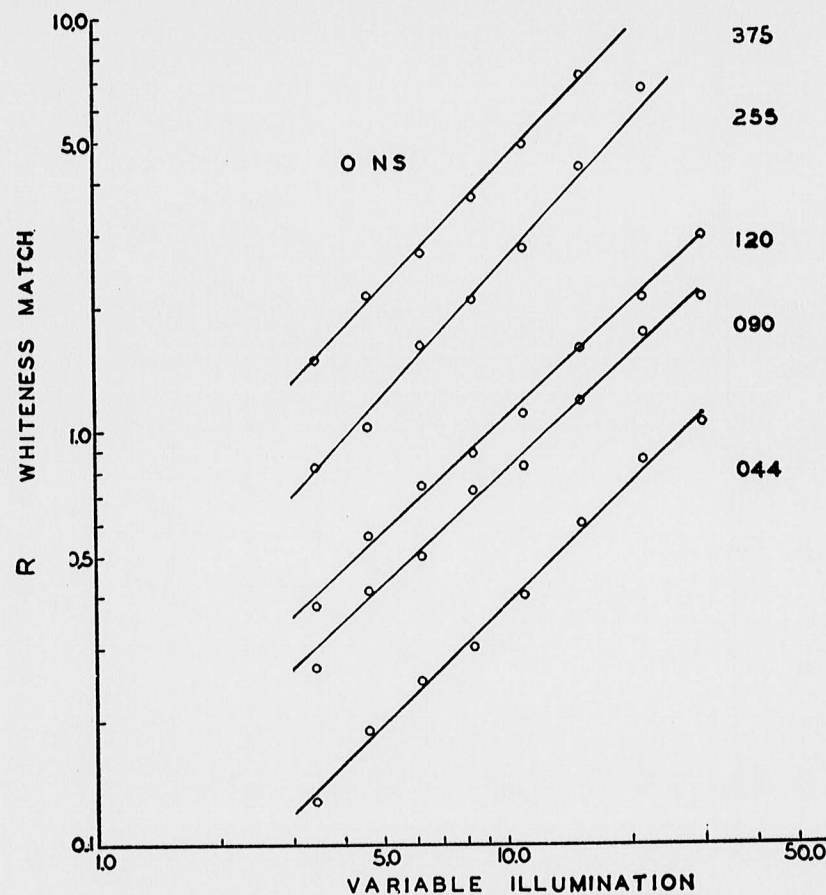


FIG. 8c. Whiteness matches (R) of O: NS for five albedos as standards in Experiment IV against the variable illumination (I), both measured in foot-candles.

We have tested them in the new plot. The curves look like those of Experiment I. So we shall not reproduce them here. There is something interesting to be seen from the data of Experiment III in this new light, *i.e.*, presenting the direct data graphically instead of working with the constancy ratios. The graphic presentation of

Experiment III is given in Figure 9, for the five observers individually. On the abscissa is the variable illumination of the right field, and on the ordinate, the whiteness matches, both in units of foot-candles. The hypothetical matches S and A are drawn in

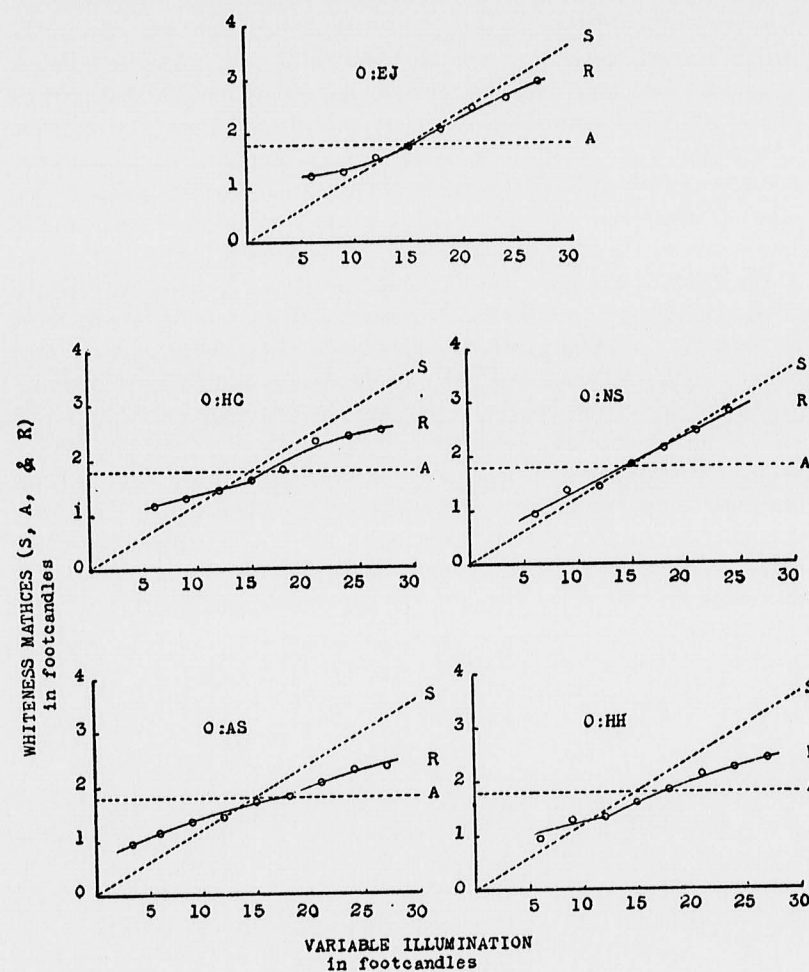


FIG. 9. Whiteness matches (S, A, and R) for five observers in Experiment III.

dotted lines, while the actual match, R, is drawn as the solid curves. Let us first examine EJ's R curve at the top of Figure 9. The right half of it is of essentially the same form as that of Figure 7 for Experiment I, *i.e.*, it falls between S and A, it departs from S more

and more as the illumination increases, and it bends toward A. The positions of the three values on the left half of the graph are reversed due to the fact that here the reference illumination in the left field was made higher than the variable illumination of the right field. The R curve again tends to depart from S and bends toward A, though this time it bends upward on account of the reversed situation. As a result the complete R curve takes a sigmoid form passing almost through the interception of the S and A curves (as it should, since at that point the two illuminations are equal). It signifies that in either successively darkening or successively brightening an object there is the same tendency of increasing constancy. However, our luck with the other four curves shown in the lower part of Figure 9 is not so good. The sigmoid form is not clear. With observer NS the curve is almost definitely a straight line. It is not surprising to find such a result with this observer, because he was the one who gave very low constancy, if any, in all our experiments. Nevertheless, his data here have one thing to our advantage. His curve does pass through the intersection of S and A, a fact (in our observer with little constancy) which demonstrates that our calibrations cannot be much in error. On the other hand, we fail to understand why the curves of the other three observers do not pass through the crossing point. Could it be that they had some position habit resulting in a place error? We are, however, not warranted to go too far with the limited data on hand.

SECTION VI

INTERPRETATIONS AND CONCLUSIONS

Three main conclusions can be drawn from this study: (1) Whiteness constancy holds good as between two fields that are separately illuminated and does not depend on the presence of a "prevailing illumination"; (2) whiteness constancy increases in degree with increased difference of illumination between two fields; (3) the apparent whiteness of a gray surface increases with the illumination of that surface and is proportional to some power, less than 1, of that illumination.

These conclusions are based upon the results of four experiments performed under different conditions. In Experiment I separate field illuminations were used and the observer's whiteness match was made in a lower illumination than that of the gray disc which was being matched; in Experiment II the same task was repeated but with a prevailing illumination; in Experiment III the reference illumination was sometimes lower and sometimes higher than the variable illumination of the standard disc; and finally in Experiment IV the procedure of Experiment I was repeated with five different albedos used as standards.

Brunswik and Thouless ratios were calculated from these data and were found, on the whole, to increase with illumination difference of the two fields irrespective of albedo, direction of the difference, or the way the difference was created, *i.e.*, with prevailing or separate illuminations, though the rate of increase was conditioned by these factors.

There were some individual variations part of which may be assigned to incidental errors, and part of which may be of theoretical significance. If we turn to Figure 3 or Table 2 we shall find that increase of constancy ratios with illumination difference is more evident with some than with other individuals. NS gave some negative constancies in Experiments II, III, and IV, and did not show much increase in constancy. In Experiment I, nevertheless, he behaved the same way as the other observers. He and EJ and HC were the three observers who gave a lot of time to our experiments; they did all the four experiments after helping repeatedly in our preliminary trials. The data for Experiment I were obtained earlier than those of the other experiments, and it is possible that NS has lost his constancy through continued obser-

vation. Such changes, however, are not evident in the other observers, and, in fact, EJ spent still more time on our experiments, but he retained good constancy clear through.

We stated above that the tendency of increasing constancy with illumination difference was independent of the way the differences were created, or on the direction of the differences. This conclusion was made in view of the first three experiments. There is a long history on the matter of illumination conditions. To make it brief, one may recall that it started with Katz's assumption of "normal" illumination. According to Katz (14) the normal illumination is of about the intensity of noonday light under clouded sky, and constancy is a tendency to retain the appearances of objects as seen under light of that "normal" strength in spite of the change of illumination. This notion was experimentally proved to be groundless by Gelb (5). In all Katz's old experiments matches were made in daylight for a disc in a special illumination reduced by shadowing, distance from source, or the use of an episcotister. So the apparent whiteness in the special illuminations moved toward the whiteness of the same disc as seen in daylight. Gelb (5) reversed the experimental situation by having the matches made in darkened illumination for the whiteness seen in daylight, and found the constancy went the opposite way, thus disproving the old assertion of Katz's that perceived objects tend to retain the appearance they have under normal illumination. Our Experiment III supports Gelb's conclusions.

In one step further we have obtained comparable data for both prevailing and separate illumination conditions in Experiments I and II. Since Gelb it has been accepted that no "normal" illumination was necessary for constancy. However, it has been taken for granted that there must be a "general" or "prevailing" illumination of the field as a whole, while a part of the field receives a "special" illumination. We question whether a "general" or a "prevailing" illumination is absolutely necessary to bring about constancy effects.

In Experiment II we had a prevailing illumination, an illumination which flooded both fields and the room, and the whiteness seen under the modified area (right field with top light) was matched in this prevailing illumination (left field without top light). In Experiment I the illuminations of the two fields were entirely separate (each field being illuminated by its own top light but no common illumination being used); the whiteness seen under one was matched

under the other. As can be seen in Table 4 and Figure 4, the results of the two experiments are the same with only minor variations. The whiteness of the disc in the right field appeared to be just about the same whether there was a prevailing or general illumination or not, provided the difference of the two illumination intensities was the same. Therefore we see that the constancy effect exists under separate illuminations just the same. The prevailing illumination situation is one of the constancy situations, but it is not a necessity.

The central problem in this study is to determine whether constancy changes with the difference of illumination. Our data have consistently demonstrated that constancy does change: on the whole the greater the illumination difference, the higher is the degree of constancy.

Can this change be explained away by contrast? Ever since Hering (7) who suggested peripheral factors in opposition to Helmholtz's central theory of unconscious inference (6), contrast has been a crucial point in a long controversy. Jaensch (10) and his followers have drawn up parallel laws of constancy and contrast, suggesting that the former is explainable by the latter. G. E. Müller (17), however, refuted them. Katona (12, 13) has demonstrated that contrast sometimes helps constancy, but sometimes it goes in the opposite direction from constancy, showing that the two are of different nature and thus separate processes. In our experiments the immediate backgrounds behind the two discs were equated in brightness because the black curtain hanging at quite a distance from the observation fields practically reduced the background to obscurity. The illumination in the light chambers did not directly shine on the background, and should there be any indirect effect from reflected light of the surroundings, such effect would be the same for both sides. One may suggest that contrast from the walls and floors within the observation fields might have come into play. In a preliminary experiment we have tried in a similar setup to test the contrast effect by lining the wall and floor of one field with white paper and lining the wall and floor of the other field with black paper. When the illuminations of the two fields were of the same intensity and the backgrounds behind the discs were equated, no appreciable contrast effect was detected; in other words, the match in one field for the whiteness in the other was very close. Besides incidental variations there was nothing resembling either the constancy phenomenon or the contrast effect. On this ground we believe that our results cannot be considered to be contrast effects from

the wall and the floor of the observation fields. It was really on account of the fact that we wished to avoid contrast effect that we took trouble to have our apparatus constructed in so different a form from the classical arrangement.

Accepting the results as representing true constancies, the increasing of constancy with illumination difference is in good harmony with the results found by others in using other methods and in studying other forms of perception, as reviewed in Section II. Whiteness constancy increases with the increase of illumination difference; size constancy, with distance; and shape constancy, with the angle turned.

In this connection the writer has had some correspondence with Dr. Brunswik, who was asked to suggest an explanation for the increase of size constancy in one of his studies which we referred to in Section II. Among other things he included the following paragraph in his answer.

"The explanation proposed for this is in terms of what I have called 'Transformation work.' In cases of greater discrepancy of retinal values due to large differences in 'circumstances' (such as illumination, distance, etc.) the psychological system has apparently to overcome greater physiological tensions in the process of adjusting the reaction to the distal bodily characteristics. In short, the elimination of the distorting effect of 'circumstances' under which perception occurs requires more drastic measures than in the case of smaller differences in 'circumstances.'"

On the basis of the constancy ratios we have obtained the results are in favor of Brunswik. This is in line with Professor Woodworth's dynamic theory of perception (2). He stressed the "dependence of perception upon one's adjustment to the situation." And accordingly such adjustment is an active process and some central factor is involved.

In the adjustment to a changing situation, possibly greater effort is dispensed to overcome a greater change of conditions. Therefore the greater the illumination difference, the higher is the constancy, and parallel statements can be made, perhaps, of the other "thing-constancies."

We have also presented our data in another way in Section V. Since what we varied in the experiments was the illumination on a gray disc, and what the observer did in response was to match the whiteness of this disk in another field of constant illumination, we may simply seek for the effect of the illumination variation on the

observer's perception of whiteness. As we have stated, a linear relationship was found when logarithmic units were used on both sides of the equation, apparent whiteness being proportional to some power, usually less than 1, of the variable illumination. By treating the data in this way we have returned the usual rather complicated way of studying constancy to the simple and easily understood framework of psychophysics.

There is no reason to expect that perceived whiteness shall be in direct proportion to the light reflected even under homogeneous illumination. Fechner's law has long before taught us to give up such expectations. A good subjective scale of whiteness is wanted to show the true relationship. Now in a constancy situation which involves dual fields, whiteness under one illumination is measured in terms of the whiteness in another. The two whitenesses must bear a definite relationship. We have only to determine this relationship and to locate the factors, internal and external, that influence it and ascertain the function.

This only extends the study of psychophysics from a homogeneous field to dual fields, from the stimulus *per se* to its related factors. It seems to be more of value or at least more urgent to state the phenomenon thoroughly in quantitative and descriptive terms than to seek to explain it with some meagre data.

Finally it must be pointed out that the illuminations used in this study were limited within the range of comfortable observation, to be exact, between 3.4 and 29.05 foot-candles. Just how perception behaves beyond those limits, it is hard to predict.

SUMMARY

Whether whiteness constancy changes with the change of illumination is the problem of this study. A vertical light box was built with two chambers, the illumination of one of which was held constant, while that of the other varied. Under the variable illuminations a "standard" gray was observed, and its whiteness was matched under the other illumination (the reference illumination) against equated backgrounds. With the help of a spot light the whiteness of the disc under the constant reference illumination was adjusted to equality by the observer. Eight steps of illumination differences were determined. The whitenesses were measured in terms of the intensity of the physical brightnesses with a MacBeth illuminometer. Four experiments were performed under various conditions. The crucial condition for each experiment was one of the following:

Experiment 1. The two illuminations were from separate sources.

Experiment 2. There was a prevailing illumination.

Experiment 3. The reference illumination was sometimes higher and sometimes lower than the changing series of illumination.

Experiment 4. Several albedos were used successively as the "standard."

Some or all of the twelve observers, psychologists and non-psychologists, serving in one or another of the experiments, have yielded the consistent result based upon Brunswik and Thouless ratios, that constancy increases with increasing difference of illumination between the two fields (see Fig. 4, p. 37). A functional analysis was attempted for the basic series of data apart from the constancy concept. It was found that the perceived whiteness of a gray surface under variable illumination is proportional to some power of the illumination. If R stands for the perceived whiteness (as indicated by the brightness of the observer's match), I being the variable illumination, and a and b being constants dependent on the albedo of the gray surface and on peculiarities of the individual observer, then

$$R = a \cdot I^b$$

This statement is offered as an improved summary of the facts of whiteness constancy.

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