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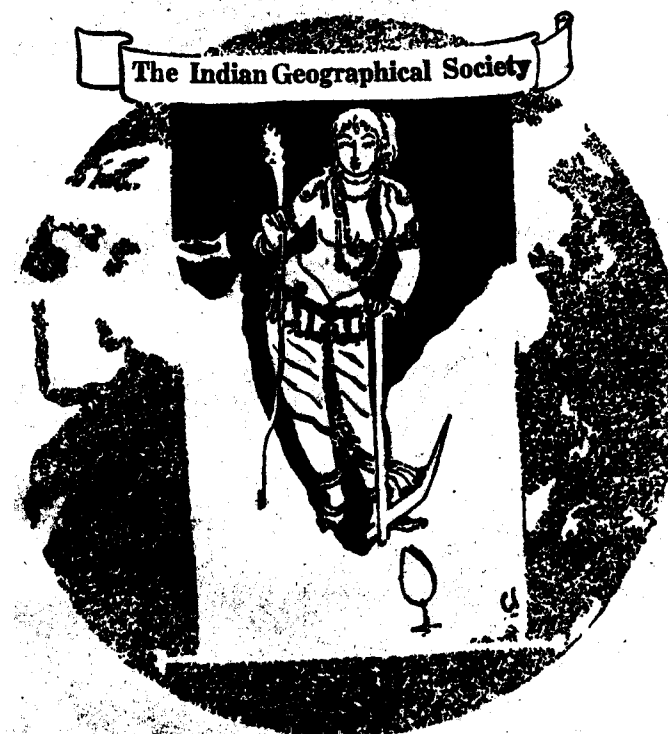
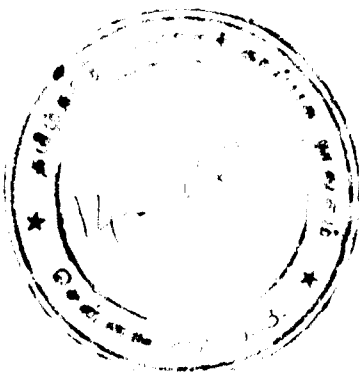
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Foundations of College Geography

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The Editor takes no responsibility for the views expressed in the Journal. Authors alone are responsible for their respective statements.

Java and its King as noticed by Arab Geographers.

By

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The history of commercial intercourse between Arabia and the Eastern countries, India, Ceylon, East-Indies and China goes back to very ancient times. In three directions Arab explorers widened the horizon of what we may call the concrete, as opposed to the abstract or scientific, world. First in the Far East they improved the connections between China, India, Tartary and Persia to such an extent that, in a sense, they may be said to have realized, for the first time in history, the true bulk of Asia. The lands beyond the Ganges, the Jaxartes and the Bolor mountains had never before been so thoroughly and so permanently brought within the ken of the Levantine countries. Again, it was the Arabs who first among the civilized races made any lasting impression on Soudanese Africa beyond the Sahara, or upon the Zanzibar coast of the Indian Ocean—from Mağadoxo to Sofala. Lastly the earliest attempts to penetrate the steppes of European Russia were due to the trade enterprises of Saracen merchants. And, as usual, these movements, like all great advances of the human race, were the outcome of favourable circumstance. The subjects of the undivided Caliphate had a wider outlook, and better opportunities for a still greater enlargement of the field of vision than had been possessed by any people before. The commerce, like the politics of the Empire, centred in Baghdad and Basra. It was from this source that the main current of their trade started for India and for

China, just as the lesser stream of East African commerce took its rise in the harbours of the Red Sea. Very early in the history of Islam, the Arabs established their factories in the lands of the *Sun-Rising* and their merchants were probably among the strangers to whom the port of Canton was thrown open in 700 A. D. Half a century later (in 758) this town was actually pillaged and burnt by the subjects of the Caliph in alliance with the native rebels; but until 795 they continued to frequent this harbour, and, even after they had abandoned it, they found a second home in Khanfu for another hundred years. After the domestic revolution which convulsed China in 878, their trade in the Far East seems to have been more and more concentrated at Kalah in the Malay Peninsula. The Chinese merchants therefore, so far as they still desired to retain the Arab trade, were now compelled to resort to Kalah. From the 9th century to the 14th century Kalah was the 'Chief harbour' for all regions between Oman and China, and from this commerce came the improved knowledge of Java which the mariners of Siraf gained in the tenth century.

Sulayman says that the distance between Kukammali (Quilon) and Kalahbar is a month's journey. Kalahbar is the kingdom of Zabaj (Java) situated to the right of the cities of Hind. Sweet water is stored in here by the ships and then proceeded on their journey. The people high and low wear al-fut; sometimes they wear only one futah.

Ibn Khurdadbeh says:—

Jabah is the chief of the islands in the East. The king of Zabaj is styled as Maharaj. The island known as Bartayal is included in his kingdom. The king wears gold ornaments and dons a gold cap. He worships idols. He has revenue collections which amount to two hundred *mann* of gold every day. He takes out a piece as big as a brick and throws out into water saying "This is the house of my property." In Jabah there is a volcano which emits smoke during the day and fire during the nights. There are in the mountains of Zabaj huge snakes which swallow men and buffalo, while there are some of these which could swallow even elephants. Every night the sound of music is heard in this island. The navigators say that Antichrist is in this place. A horse resembling the terrestrial horses, comes out of the sea, but this sea-horse has a longer mane falling to the ground. Cocanut, plantain, and sugarcane are produced here.

His revenues from Kumar:—Every day about 50 *mann* of gold are realized as taxes on cock fighting. That is, the cock that wins in the fight belongs as a matter of right to the king and the owner of the cock has to liberate it by paying a ransom.

Ibnul Faqih gives the following account:—

The ships from Kulumali sail towards the sea of Harkand and reach a place called Kalahbar. It is in the kingdom of Zabaj situated to the right of the cities of Hind. It is under the rule of a king. The people's dress is al-fut. There is a mountain near Zabaj which is called the mountain of fire. It is not possible to approach it. It emits smoke in the day and flaming fire during the night. Two springs flow from underneath, one is cold and the other hot. The water is sweet in both these springs. At Zabaj there are parrots of different colours, white, red and yellow, and speak clearly what they have been taught of the languages, Arabic, Persian, Greek and Indian. There are peacocks green in colour with spots of white and black; falcons white in colour with red tuft. There are very big white monkeys as big as a buffalo. There are other beings which resemble man, speak an understandable language; they also drink and eat. There are cats of different colours which have feathers like those of bats, beginning from the ear up to the tail. The rat *mask* is conveyed from Sind to Java. The musk of Civette is more excellent perfume than *mask*. The female one gives the *mask*. When it moves about in the house the smell penetrates the whole place. If you touch it with your hand the smell clings to it.

Ibn Rustah says that those who intend to go to China cut across the eastern side of the Indian sea and sail along till they reach Kalah and then to the cities of Zabaj. The biggest sovereign of Zabaj is called Maharaj which means king of kings. There is none among the kings of Hind reckoned more powerful than him. He lives in islands. There is no king richer than him and none more strong and gets larger income. It is said the revenue from Kumar that accrues from cock fight is about 50 *mann* of gold per day. When the proprietor of one cock lets it combat with another cock, the king takes hold of the winning cock and the owner of that cock has to redeem it by paying one *mithqal* of gold, either more or less. This is the common custom in his country.

Abu Zayd says:—The city of Zabaj is situated opposite to the town of China and the distance between the two is a month's journey by sea or even less if the wind be helpful. The king of this city is known as the Maharaj. It is said that the area of this city is about nine hundred parasangs. This king is the master of many islands, the extent of his kingdom being one hundred thousand parasangs or more.

The island of Sarbaza is included in his kingdom; its area is said to be four hundred parasangs.

This island of Rami is another one, its area being eight hundred parasangs. Baqqam tree (Brazil wood) and Camphor are available here.

The island Kalah is another one in his kingdom. It is situated midway between China and Arabia. Its area is said to be eighty parasangs. Kalah is the meeting place for various kinds of commodities like aloes wood, Brazil wood, aromatics and other merchandise, too many in number that their enumeration will become long. In these days the trade ships sail from Oman to that place and return to Oman.

Maharaj is the ruler of this island. The island where he lives is exceedingly fertile and the buildings in that island are set in rows. One whose words may be trusted upon relates: when the cocks crow at day break in the usual hour, just as they do in our country, they answer each other a hundred parasangs and more on account of the contiguity and the good arrangement of villages. There are neither deserts nor waste land. The traveller in these cities either walks on roads or rides; he can proceed along his way if he chooses, or if he is tired or weary he can halt wherever he pleases. Of the many wonderful information we have heard about this island Zabaj one remarkable account is as follows:—

In ancient times one of its kings *i.e.*, Maharaj had his place on the river bed. The river takes in water from the sea as well. When it is high tide the sea water predominates but sweet water flows from it during low tide. The town is like Baghdad and Basra on the banks of the river Tigris. The water from this river is let into a small pond adjoining the palace. Every morning the king's steward brought an ingot of gold safely concealed so that its value is not known and threw it into the pond in the presence of the king. When it is high tide, it is carried away and it mixes up with those of its kind and is concealed from sight. When it is low tide it flows from there and comes in view in the bright sun. The king comes to look at it when he takes his seat in the Majlis which overtops the pond. This practice of throwing every day an ingot of gold into the pond is observed as long as the life time of the king and it will not be touched. After the king is dead his successor will cause them to be taken out of the pond without leaving anything and count them. Then they melt them down, and the sum thus accumulated will be distributed among the members of the royal household men and women, their children, to the officers of the Cavalry force, domestic servants according to the rank of each. They have, for this purpose prescribed different classifications. The sum that is left after such distribution is shared between the poor and the infirm. Then they make an account of the ingots and their weight and say that such and such a king was a ruler from such a year to such a year, for he left behind so many ingots of gold

in the pond of kings which were distributed after his death among the people of his kingdom. It is a great pride with them for one to reign long and increase the number of ingots for distribution at his death.

The following account is related in their ancient history. There was a king of Qumar. Qumar is a place situated opposite to the kingdom of Maharaj namely the island known as Zabaj. The distance between the two is about ten to twenty days journey by sea in moderate wind. One of the kings who was the ruler over this Qumar in ancient times was young and hasty. One day he sat in his palace which looks upon a river with fresh water, like Tigris of Iraq, the distance between the palace and the sea being a day's journey. His Wazir was sitting by his side. In the course of the talk mention was made of the kingdom of Maharaj, his pomp, the number of buildings the number of islands under his rule. Then he said to his Wazir: "I have a desire in my mind which I should like to fulfil". The Wazir, a wise man, and one who knows his master's hastiness addressed him: "What is your desire". The king said "I wish to see the head of Maharaj, the king of Zabaj in a basin, before me." The Wazir understood that jealousy was the cause of this idea in his mind and said, "O, My Lord! I wish you abandon such ideas from your mind, for nothing has happened between us and those people; they never offended us by least word or deed; we have not had any cause of complaint against them. They are in a remote island without any communication with us in our country. They do not covet our kingdom. Hence it does not behove any one to linger upon such words." The king did not say a word upon this, but he was enraged. He did not hearken to the advice of the wise man, but revealed this idea to the general of his army and to all those present in his court. The news spread from mouth to mouth till it became widely published and reached the ears of Maharaj. This Maharaj was a prudent, nimble and a very experienced man, and was of middle age. He called his Wazir and informed him of what he had heard and said to him, "It is not desirable to give publicity to this affair of an ignorant man.....Then he enjoined his minister to conceal what had passed between them, but at the same time commanded him to prepare a thousand ships with all equipments necessary for warfare. He gave out that he would go on a voyage for pleasure among his islands and wrote to his tributary princes in various islands that he would visit them in the course of his sojourn. When everything was ready he sailed over to the kingdom of Qumar. The king of Qumar and his people were effeminate. They never knew the designs of Maharaj till he arrived at the mouth of the river, and landed his troops and took them by surprise. Every one fled away from the army of Maharaj and the king of Qumar was captured in his palace. The

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king Maharaj issued a proclamation that he granted perfect security of life to all the inhabitants of the country. Then he seated himself upon the throne and ordered to bring to his presence the ex-king. When he was brought, Maharaj reminded him of his insolence and then ordered his men to cut off his head. After this Maharaj departed to his own kingdom appointing another as King in his place. The news of this action spread far and wide in China and Hind and it added to the respect they had already for Maharaj.

Masudi says that Maharaj is the king of the islands whose dominions form the frontier between India and China and considered as part of India, Zabaj is the chief island of his kingdom and the seat of his Empire. The country of Qumar is the point of communication with the dominions of the Maharaj, the king of the islands, like Zabaj, Kalah, Sarandib and other islands. The splendour and high civilization of the Empire and islands of the Maharaj are celebrated. The conquest of Qumar by Maharaj increased his glory in Hind and China. The kings of Qumar turned their faces every morning towards Zabaj and prostrate themselves to express their veneration for the Maharaj. In another place Masudi says that the dominions of the Maharaj are in the sea of al-Sinf. The population and number of the troops of his kingdom cannot be counted and the islands under his sceptre are so numerous that the most fast sailing vessel will not be able to go round them in two years. This king is in possession of several kinds of spices and perfumes; and no kingdom has more natural resources nor more articles for exportation than this. Among these are camphor, aloes, gilly-flowers, sandal wood, betel nuts, mace, cardamoms, cubebs, and the like.

His islands extend as far as the sea of China. In some part of his islands there are high mountains, with a dense population, who have slit ears, and a white complexion. Their faces look like a piece of a hammered shield; they wear their hair long, as Muslims wear their beard. The mountains in this island issue fire, by day and night. By day it has a dark appearance, and at night it shines red. It rises to such a height, that it reaches the regions of the heaven. The explosion is accompanied with a noise like the loudest thunder. Some times a strange sound proceeds from these volcanoes which is indicative that their king will die; and if the sound is lower, it foretells the death of one of their chiefs. They know the meaning of these sounds by long habit and experience. This is one of the great chimneys (craters) of the earth. At no great distance is another island, from which, constantly, the sound of drums, lutes, fifes, and other musical instruments, and the noise of dancing and various amusements, are heard. Sailors who have passed this place, believe that the Dajjal (Antichrist) occupies this island.

To the Dominions of the Maharaj belong Sarira, Zabaj, Ramni and many other islands which are not known to us. The Maharaj is the king of islands from which drugs and spices are exported,

Masudi also gives an account of the conquest of Qumar as narrated by Abu Zabyd.

Biruni says that the islands of Zabaj are nearer to China than to India. They are called by the Hindus "Swarnadeepa".

Yaqut says that Zabaj is one of the famous islands in the Indian Ocean. It is an island at the extremity of country of Hind, behind the sea of Harkand, on borders of China. Some say it is land of the Zanj. The inhabitants resemble men but they are savage in their behaviour. There is in this island *Nasnas* which have wings like those of bats. Many wonderful things are reported about this island. There are rat-musk and the musk animal resembling a cat. Musk is exported from this island.

Qazwini has the account that Zabaj is a very big island on the borders of China adjoining the country of Hind. It is a vast country with wonderful things. There is a powerful monarch called the Maharaj.

Dimishqi gives the following account: Zabaj is the chief of the islands of the Maharaj. There is a big volcano on one side of it. The king of Zabaj is the Maharaj. His islands are so numerous that it will not be possible to reach all of them in a year's journey. Sanja is one of his islands.

Abul Fida says the islands of Ranaj are famous in the mouths of merchants and travellers. The biggest of these is the island Sarira. Its longitude is $108^{\circ} 30'$, latitude is $3^{\circ} 40'$. The islands of the Maharaj are too many. The ruler is the wealthiest of the kings of Hind in possession of gold and elephants. The biggest of his islands is the one where he resides.

From the foregoing account given by Arab Geographers from the earliest times down to the middle of the 14th century it is clear that the Arabs in spite of the variations in the name as Zabaj, Zanj, Ranaj, Zabah they mean only Java. Both Abu Zayd and Masud narrate at great length what appears to be a legend of an invasion of Qumar's territory by the Maharaj of Zabaj for the purpose of punishing the king of Qumar who spoke ill of the Maharaj. This Maharaj may be identified with one of the rulers of the line of Sri Bhoja, Maharaja ruler of Java mentioned by I-TSING, a Chinese traveller in the last quarter of the Seventh century A. D. who speaks of the Maharaja of Java, in whose court he lived for some years.

The kingdom of Qumar is mentioned by several writers. As regards its position Ibn Khurdadhbeh says that proceeding from Mayit the island of Tayuma comes on the left; then to Qumar five days' journey. From Qumar to Sauf (champa) on the coast is three days' journey.

Yaqubi mentions Qumar after Sarandib (Ceylon) and says that Qumar is a powerful kingdom of great importance.

Ibnul Faqih has the remark that Qumar is a part of Hind. Abu Zayd gives more precise information. Qumar, he says, is not an island but is situated (on that part of the continent of India) which faces the country of the Arabs. It is opposite to the kingdom of the Maharaj, the island known as Zabaj, the distance between the two is about ten to twenty days' journey by sea in moderate wind.

Masudi has the same account with slight variation. The country of Qumar is not one of the islands of the sea but is a coastal land and is mountainous. It is opposite to the kingdom of the Maharaj, the king of the islands like Zabaj, Kalah, of the Sandib, and others islands. In another place Masudi says that Qumar is opposite to the islands of the Maharaj as Mandurfin (Madura) is opposite to the island of Saraudile (Ceylon).

Yaqut and Qazwini say that Qumar is a place in Hind associated with aloes, but Yaqut qualifies his statement by saying that it is the popular view; those who have knowledge say that Qumar is Qamouin (Assam).

Of these writers who mention Qumar only three give precise details as to its location. The information of Ibn Khurdadhbeh shows clearly that Qumar is an island between Java and Champa. The accounts of Abu Zayd and Masudi indicate that it must refer to the area round about Cape Comorin including the portion of Travancore south of Quilon. The details furnished by the remaining writers are vague. It is also clear that Yaqut confuses Qumar with Qamirun (Assam). If Qumar is the area round about Cape Comorin, the king of Qumar must refer to one of the Pandya kings. But as the invasion of the Pandyan territory by an island king is not attested by facts of history the account is, with doubt, a mistake or confusion on the part of writers like Abu Zayd and Masudi. Qumar is to be identified with Khumayr (Cambodia).

Some Ancient Tribes of India.

BY

N. M. BILLIMORIA.

The Keralas or Cheras:

In Ray Chaudhuri's "Political History of Ancient India" we read 'The Keralaputra (Ketalaputra or of Chera) is the country south of Kupaka (or Satya) extending down to Kanneti in Central Travancore (Karunagapalli Taluk). South of it lay the political division of Mushika.' It was watered by the river Periyar on the banks of which stood its capital Vanji (near Cochin) and at its mouth the seaport of Muziris (Kranjanur).

Prof. Barnett on page 595 of Cambridge History of India, Vol. I writes "In the earliest time of which we have any record the Tamilaṅgam or Tamil realm extended over the greater part of the modern Madras Presidency, its boundaries being on the north a line running approximately from Pulicat on the coast to Venkataṅgiri (Tirupati), on the east the Bay of Bengal, on the south Cape Comorin, and on the west the Arabian Sea as far north as the 'White Rock' near Badaṅgara, to the south of Mahe. Malabar was included in it; the Malayalam language had not yet branched off as a separate tongue from the parent Tamil. It consisted of three kingdoms, those of the Pandyas, Cholas or Colas, and Cheras or Keralas.

The Chera or Kerala territory comprised Travancore, Cochin, and the Malabar District; the Konṅu-desa (corresponding to the Coimbatore District and southern part of Salem District) which at one time was separate from it was afterwards annexed to it. Its capital was originally Vanji (now Tirukarur, on the Periyar river, near Cochin) and later Tiru-vanjikkulam (near the mouth of the Periyar). It had important trading centres on the western coast of Tondi (on the Aḡalappulai, about five miles north of Quilandi), Muchiri (near the mouth of the Periyar), Palaiyur (near Chowḡhat) and Vaikkarai (close to Kottayam).

The three Tamil kingdoms, Cola, Chera and Pandya are mentioned in the Sanskrit Epics and Puranas. Sir R. G. Bhandarkar points out that in the Puranas the term Daksinapatha or Daksina denoted the whole peninsula to the south of the Narmada. According to the Mahabharata the Keralas were a forest tribe. In historical times they were associated with the Colas

and Pandyas. In the Ramayana we read that Sugriva, the monkey king sent his monkey soldiers, in search of Rama's wife Sita and Ravana, and directed them to go to the countries of the Andhras (Telugu people), the Pandyas, the Colas and the Keralas in the south, and told them that they would see the gate of the city of the Pandyas adorned with gold and jewels.

Long before the beginning of the Christian era the Dravidian South had developed a considerable culture of its own, and its inhabitants had consolidated themselves into powerful kingdoms some of which carried on a thriving trade with Western Asia, Egypt, and later with the Greek and Roman Empires. The chief of these were the three Tamil kingdoms, the Andhras, Kalinṅas, and Maharashtra. The Syrians apparently imported thence ivory, apes, and peacocks (Tamil, toḡai), as we know from the Bible (I Kings, X, 22, and Chronicles IX, 21). Somewhat later we find—India—to a large extent Southern India—exporting pepper, rice, ginger, and cinnamon, besides spices, precious stones, coral, muslin silk, tortoise-shell etc.

In the time of Periplus (A.D. 70) Damirica is shown as including Cerobothra; Schoff states this is a transliteration of Cheraputra or Keralaputra, the western Tamil kingdom, which in its greatest extension reached from Cape Comorin to Karwar Point, nearly 7 degrees of latitude. At the time of the Periplus the northern part had separated, while the southern end had passed to its neighbour, the Pandyan kingdom; leaving Kerala nearly coterminus with modern Malabar and Cochin districts. The capital was Karur or Parur, opposite Muziris or Cranganore.

Cheraputra is "son of Cheras", one of the legendary three brothers who founded the Dravidian power in South India.

After the Colas and Cheras, the Pandyas became the supreme power of the South. After them came the Pallavas.

The sister nations three

Cholas, Cheras, and the Pandyas dwelling by the southern sea.

The Pandyas.

Prof. Barnett in the first Volume of Cambridge History of India writes that in the earliest time of which we have any record the Tamilaṅgam or Tamil realm extended over the greater part of the modern Madras Presidency. It consisted of three kingdoms, those of Pandyas, Cholas or Colas, and Cheras or Keralas. The Pandya kingdom comprised the greater

part of the modern Madura and Tinnevely Districts, and in the first century also Southern Travancore, and had its capital originally at Kolkai (on the Tambraparni river in Tinnevely), and later at Madura.

Dr. Schoff annotating the Periplus writes that the great empire of the Mauryas went to pieces in the 2nd century B.C. leaving as its strongest successor its Dravidian element, the Andhra country in the Deccan, which comprised the valleys of the Godavery and Krishna; the Telugu peoples, roughly the modern Nizam's dominions. In the south the other Dravidian kingdoms, the Tamil-speaking Colas, Pandyas, and Cheras retained their independence as before. Periplus mentions the Pandian Kingdom—this was Pandya, the southernmost and traditionally the earliest of the three Tamil States. Roughly it coincided with the modern districts of Tinnevely and Madura; at the time of the Periplus (60 A.D.) it extended beyond the Ghats and included Travancore. The capital, originally at Korkai had been removed to Madura.

COLCHI—this is the modern Kolkai. By tradition this was the earliest seat of Dravidian power in Southern India, where Chera, Chola, and Pandya, the legendary progenitors of the great dynasties ruled in common before their dominions were separated. At the time of the Periplus it was one of the chief ports of the Pandyan kingdom, being more accessible to the capital than Nelcynda. The sea retired from Kolkai owing to the silting up of river Tambraparni, and in mediaeval times Kayal (which Marco Polo calls Coil) became the port. At present the trade of this district passes through Tuticorin.

This is the country from which Hanuman, the monkey-god leaped across the sea from Mahendraḡiri mountain to Ceylon, helped to rescue Sita from Ravana, as told in the Ramayana; and this became the centre of worship of Hanuman, which was carried afar by the Dravidian sea-folk.

This was the original capital of Dravida-desam, and the birth-place of the dynasties ruling in Southern India at the time of the Periplus. The "Dominion of the Pandyas" was established by the descendants of Pandu, the father of the Pandava brothers, who fought in the battle of Kurukshetra, narrated in the Mahabharata,

Arrian in the Indica gives another version of the origin of the dynasty of the Pandus, from Pandaea, who, he says "was the daughter of Heracles, among many sons; the land where she was born and over which she ruled was named Pandaea after her". In Greek literature concerning India, Heracles is usually identified with Vishnu, and Bacchus with Siva.

The dominion of the Pandyas was divided among three brothers Chera, Chola and Pandya, in which form it appears in Asoka's inscriptions of the 3rd century B.C.

Pliny states that the capital had been removed to Madura, which the Ramayana describes as a great city; its gates were of gold inlaid with gems. The pearl-fisheries belonging to this kingdom, the product which was sold only at the capital, Uraiyur were those of the Palk Strait, north of Adam's Bridge, as distinguished from those of the Gulf of Manar, which belonged to the Pandyan kingdom, and were administered from Madura.

URAIYUR (city of habitation) mentioned above is a correct transliteration of Arjaru, mentioned by Periplus; this was the ancient capital of the Chola kingdom.

Strabo mentions of an embassy sent to Augustus Caesar about the year B.C. 22 by a king 'Pandion', possibly a Pandya of the Tamil country. In the Periplus the Pandian kingdom was included in Damirica. Both Periplus and Ptolemy made a mistake and wrote 'Limyrike' Ptolemy (Majumdar's Ed.) mentions the country of the Pandouoi. The Pandya country here indicated is that which formed the original seat of the Pandavas or Lunar race is the subject of the Mahabharata. Princes of their line have obtained for themselves sovereignties in various parts of the country, in Rajputana, in the Punjab, on the banks of the Ganges and the very south of the Peninsula. At the time of the birth of Sakyamuni a Pandava dynasty reigned at Hastinapura, a city on the Upper Ganges, about 60 miles N.E. of Delhi. Megasthenes mentions a great Pandava kingdom in the region of the Jamna, of which Mathura was the capital. According to Rajput tradition the celebrated Vikramaditya who reigned at Ujjain, about half a century B.C., was a Pandava prince. From the 8th to the 12th century, of our era, Pandavas ruled in Indraprastha, a city near the site of Delhi. The name of the Pandus is mentioned only in the two votive inscriptions of Buddhist stupas at Bhilsa.

The Colas.

The Tamilagam or Tamil realm extended over the greater part of the Madras Presidency. The Cola region extended along the eastern coast, from the river Pennar to the Vellar, and on the west reaching to about the borders of Coorg. Its capital was Uraiyur (old Trichinopoly), and it had a great port at Kaviri-pattinam or Puṅgar, on the northern bank of the river Cauvery (Kaveri). Another of its chief town was Kanchi, now Conjeeveram. The Cola country comprised the land between two streams having the same

name, Vellaru, in the north and south, the sea on the east and Kottaikkarai in the west. The area included the modern districts of Trichinopoly and Tanjore and part of Pudukkottah State.

Naṅapatam, about 10 miles south of Karaikkal, also on the seaboard was known to Ptolemy as an important town; Yule has identified Nikama of Ptolemy, the capital, with Naṅapatam; at any rate it became a centre of trade, and of many religions, including Buddhism. Of former Cola country, the present notable cities are Tanjore, Trichinopoly and Kumbakonam. In the 11th and 12th centuries Ganṅaikonda Colapuram rose as the capital of the Cola; this place is at the meeting point of Trichinopoly, South Arcot and Tanjore Districts.

The Cola country was watered by the River Kaveri, and comprised the districts of Trichinopoly and Tanjore, Ptolemy calls Kaveri Khaberos. Kavera is the Sanskrit word for saffron. Kaveri according to a legend was changed by her father's curse from one-half of the Ganṅa into the river which bears her name, and which was therefore also called Ardha-ganṅa, that is half Ganṅa.

Uraiyur (old Trichinopoly) was the capital of Pudukkottah state. Kaviri-pattinam or Puṅgar on the northern bank of the Kaveri was its great port while Kanchi (modern Conjeeveram) was one of its chief towns. Uraiyur corresponds to Sanskrit Uraṅapura. Dr. Burnell identified Khaberos with Kaveripattam, which lies a little to the north of Tranquebar (Tallangambad) at the mouth of the Pudu-Kaveri (New Kaveri).

From an inscription we find that Calukya king Pulakesin II crossed the river Kaveri with his victorious army to enter the Cola country when 'the Kaveri had her current obstructed by the causeway formed by his elephants'.

Tamil poems testify to the flourishing state of Kaveri-pattinam (Kamara in Periplus, Khabari of Ptolemy) capital of Cola, on the Kaveri river, at about the same period, as a centre of inter-national trade, especially frequented by Yavana (Yona, Ionian) merchants.

The Cola kings belonged to the tribe of Tiraiyar or men of the sea. During the age of the Periplus the kingdom of Arjaru (Uraṅapura) was included in Damirica. Ptolemy refers to the kingdom of Soa (Chola) ruled by Arkatos and the kingdom of Malanṅa (Kanchi) ruled by Basaronagas.

Ptolemy (Majumdar's Ed.) page 162 "Sora designates the northern portion of the Tamil country. The name in Sanskrit is Chola, in Telugu

Chola, but in Tamil Sora or Chora. Sora is called the capital of Arkatos. This must be an error, for there can be little doubt that Arkatos was not the name of a prince, but of a city the Arkat, of the present day. This is so suitably situated, Caldwell remarks, as to suggest at once this identification apart even from close agreement as far as the sound is concerned. The name is properly Ar-kad and means the six forests. The Hindus of the place regard it as an ancient city, although it is not mentioned by name in the Puranas. There is a tradition that the inhabitants of that part of the country between Madras and the Ghats, including Arkad as its centre were Kurumbars or wandering shepherds for several centuries after the Christian era. Cunningham takes Arkatos to be the name of a prince, and inclines to identify Sora with Zora or Jora (the Jorampur of the maps) an old town lying immediately under the walls of Karnul. The Sorai he takes to be the Surai."

In the 2nd century B.C. a Damila of noble descent, Elara by name, came to Ceylon from the Cola country (Colaratttha) overpowered Asela, who was ruling at Anuradhapura for ten years (155-145, B.C.). Elara ruled for 44 years (145-101 B.C.) and was famous for his justice.

About the beginning of the Christian era the Cola king was Peru-nar-Killi; under his grandson Karikal the Colas became the leading power in the south. He defeated an allied army of the Cheras and Pandyas, and led an army in the north. At home he suppressed the turbulent Ayar, Aravalar Kurumbar and Oliyar, and made his capital at Kaviri-Pattinam or Puṅgar, which he secured against floods by raising the banks of the Cauvery and constructing canals. The Pandya king defeated his successor; the Pandyas became the premier power until the rise of the Pallavas.

The Topography of Rajputana

BY

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Rajputana including the British territory of Ajmer-Merwara lies between $23^{\circ} 3'$ and $30^{\circ} 12'$ North and $69^{\circ} 30'$ and $78^{\circ} 17'$ East with a total area of 132,818 square miles.¹ It is roughly rhombic in shape. The east-west diagonal is about 540 miles long, and the north-south diagonal about 510. It is bounded on the west by the province of Sind, and on the north-west by the Punjab State of Bahawalpur. Thence its northern and north-eastern frontier marches with the Punjab and the United Provinces until it touches the river Chambal where it turns south-eastward for about two hundred miles dividing the States of Dholpur, Karauli, Jaipur and Kotah from Gwalior. The southern boundary runs in an irregular zigzag line across the central region of India, dividing the Rajputana States from a number of States in Central India and Gujarat.

Any boundary chosen to demarcate 'natural regions' within a province or country, where sharp contrasts of configuration and structure are not many, has the disadvantage of being rather arbitrary; and any demarcation or mapping which aims at establishing definite boundary lines is bound to be misleading and mistaken, for regions do not come to an abrupt end like political frontiers, except in very exceptional cases. One system of agriculture or land use shades into another, and, therefore, what we have to look for is what may be termed the 'gradient of transition' between zones never mutually exclusive but always over-lapping in greater or less degree. However, for purposes of convenience in classification and description, the use of a boundary for partitioning the various climatic-botanical regions is legitimate.

Fortunately, however, the hand of Nature has defined, in the boldest characters, the eastern geographical limits of the Indian desert, and what we are required to do is only to follow minutely this line of demarcation, i. e., the Aravallis which are but the depressed and degraded relics of a far more prominent mountain system, and which stood, in Palaeozoic times, on the

1. According to the 1941 Census of Rajputana and Ajmer-Merwara, the total area is 134,959 square miles, whereas the Census of 1931 put it as 129,059 square miles. This increase in total area is due to the extension of modern surveys with consequent adjustments and to the addition to Rajputana Agency of the States of Palanpur and Danta (2,141 sq. miles) which, however, are excluded from the scope of this study. See Census of India, 1941, Vol. XXIV, p. 2.

edge of the Rajputana sea"². The disintegrated rocks which once formed part of the Aravallis are now spread out in wide red-sandstone plains to the east which, topographically, are quite different from Western Rajputana. Moreover, there are noticed marked contrasts with regard to climatic and botanical characteristics of the area bounded on the west by the Aravallis. Thus we can divide Rajputana into three 'natural regions' possessing more or less homogeneous physical features: Western Rajputana, Southern Rajputana and Eastern Rajputana.

The most striking feature about the Physical geography of Rajputana is the Aravalli range of hills which extends for about 430 miles, and which intersects the country almost from end to end by a line running from south-west to north-east. About three-fifths of Rajputana lies north-west of the range, leaving two-fifths on the east and south. The region lying to the west and north-west of the Aravallis is a wide expanse of wind-blown sand, and comprises the sparsely populated States of Bikaner, Jaisalmer and Jodhpur and also the Sheikhawati portion of Jaipur State. With the exception of the sub-montane districts of Jodhpur which lie immediately below the Aravallis, this region is sandy, ill-watered and unproductive, improving gradually from a mere desert in the north-west and west to comparatively fertile and habitable lands on the east. This natural division is styled as western Rajputana³.

About eighty per cent of Western Rajputana is part of the 'Maroo-sthali' or 'the region of death' (the emphatic and figurative phrase for the desert) which, according to ancient geography, extended from Aravalli hills in the east to Indus valley in the west.⁴ All this territory is incumbent upon a Sand-stone formation. Over much of this tract, in the dim past, are supposed to have flowed the waters of the Indian Ocean. Indeed, in many parts of Jaisalmer State and in some parts of Bikaner State there still remains the illusion of a tide recently gone out, but forgotten to return leaving great stretches of thirsty, flat rock gasping in the sun-light. That, at least, would appear to be the evidence of such a place-name as Chatra-dhara⁵ near Harsh village in Sikhar Thikana (Sheikhawati portion of Jaipur State). Over-lying this ancient bed of a great primaeval sea are ranged sand-dunes from 50 to over 100 feet high, in systemated curves, moving in slow procession in obedience to the westerly winds.

2. Imperial Gazetteer of India, 1908, Vol. I, P. 1.

3. Census of India, 1931, Vol XXVII, p. 1.

4. The word is compounded of the Sanskrit *mri*, 'to die', and *sthali*, 'arid or dry land'.

5. See Tod, *Annals and Antiquities of Rajhastan* (Calcutta, 1894), Vol. II, p. 811. Cf. 'For 300 miles this desert extends between the Aravallis and the Indus, arid, hot, and desolate.....' (Imperial Gaztt, Vol. I, p. 33).

6. Etymologically, it means the confluence of four streams.

The origin of the desert may be attributed to a long-continued and extreme degree of aridity of the region, combined with the sand-drifting action of the south-west winds, which sweep through Rajputana for several months of the year without precipitating any part of their contained moisture. Here it will not be un-interesting to study how winds work as sculpturing agents and help in the formation of deserts. In the absence of any moisture or vegetation to fix the soil, a wind of even moderate force soon catches up enough grit in the desert to become a powerful sand-blast. It rubs smooth rock floors, removes pebbles from one place to another, opens out joints and crevices, and etches cliff faces into fantastic shapes. And where the wind-driven sand encounters an obstacle, there a dune is generally built, a chain of dunes, a sea of dunes, a vast ocean of dunes, with a spume of sand blowing from the wave-crests in place of a spume of white foam. Sometimes the dune ocean moves, and along with it there is the dreadful inevitability of the choking of wells, the over-whelming of the oases, and the burying of the passing caravans.

In this way the south-west winds have transported inland clouds of dust and sand-particles, derived in a great measure from the Rann of Cutch and from the sea-coast, and in part also from the basin of the Lower Indus, and have created sand-dunes of gigantic size. Moreover, there is but little rainfall in Rajputana, and consequently there is no water action to carry off the detritus to the sea, which has hence gone on accumulating year after year.

A certain proportion of the desert sand is also derived from the weathered debris of the rocky prominences of this tract, which are subject to great diurnal as well as seasonal alternations of temperature, characteristic of all arid regions. Here it should be noted that the Aravallis are the oldest mountain range of India, and the denudation of the main range as well as of the off-shoots has gone on for a very long period of time. Dr. D. N. Wadia has correctly-observed: 'The rocky prominences which stand up above the sands belong to the older rocks of the country, presenting in their bare, bold and rounded out-crops, and in their curiously worn and sun-blasted topography, striking illustrations of phenomena of desert erosion.'

The daily variation of heat and cold in some parts of Rajputana 'often amounts to more than 100° F. in the course of a few hours. The seasonal alternation is greater. This leads to a mechanical disintegration and desquamation of the rocks, producing an abundance of loose debris, which there is no mechanical or organic (or humus) action to convert into a soil cap',⁷

7. D.N. Wadia, *Geology of India* (Macmillan, 1944), pp. 290-291.

8. *Ibid*, pp. 291-2.

As is true of other desert regions, the Indian desert landscape also holds for a new-comer an element of terror because of the starkness, abruptness and unfamiliarity of its outlines. The desert, however, is not one flat level waste of sands, but there are numerous rocky projections of low elevations in various parts of it, and its surface is further diversified by the action of the prevailing winds which have heaped up the sands in a well-marked series of ridges, dunes and hillocks.

The country to the east and south-east of the Aravallis affords a striking contrast to the sandy deadlands on the north-west of the range which, it should be noted, has acted as a great check to the extension of the desert. But for this impediment, Central India, too, would have been submerged in sand. This is proved by the fact that wherever there are passages or depressions in the range, the floating sand-clouds from the west are wafted through, or over, and form a little *thul* even in the bosom of fertility, and thus 'not at once, on the east of the Aravallis does the desert relinquish its sovereignty'.⁹ Because of this encroachment of the desert, Tod was quite justified in demarcating Marwar and Mewar botanically on the basis of this couplet:

'Anwal, anwal Mewar, Bambul, bambul Marwar.'

This means that wherever we find 'Anwal'—an yellow-flowering shrub, there the land is not very infertile, and where we find 'Bambul'—Acacia, another child of the sand, there the land is characterised by great infertility.

The country to the east and south-east of the Aravallis is blessed with wide vales, fertile table-lands and great breadths of excellent soil. This area may, however, be sub-divided into two natural regions: Southern Rajputana and Eastern Rajputana. Southern Rajputana, comprising the States of Banswara, Dungarpur, Kishangarh, Udaipur, Patabgarh and Sirohi, receives the heaviest rainfall. It has long stretches of forest where fuel and fodder are abundant. Eastern Rajputana includes the British territory of Ajmer-Merwara and the States of Kishangarh, Alwar, Bharatpur, Dholpur, Karauli, Jaipur (excluding Sheikhawati), Tonk, Bundi, Jhalawar, Cotah, Shahpura and Lawa. From the stand-point of average annual rainfall it stands midway between Southern and Western Rajputana.

It has been correctly observed that the 'Great Desert'¹⁰ of India has, from time immemorial, proved 'to be a more effective barrier to the advance

9. A. W. T. Webb, *These Ten Years—A Short Account of the 1941 Census Operations in Rajputana and Ajmer-Merwara*, 1941, p. 8.

10. Some writers like W. T. Blanford (*Journ. As. Soc. Bengal*, XLV, 1876, Pt. II, p. 89) have pointed out that the name 'Great Desert' conveys an imperfect idea because the tract is neither barren nor uninhabited. But this statement is not correct in as much

of armies than the Indus itself'.¹¹ In this vast, open 'space of desiccated plain there is but little vegetation, and what there is, chiefly concentrates in the neighbourhood of the cities of the desert Jaisalmer and Bikaner'.¹²

The western and north-western parts of Bikaner State lie within the 'Great Desert', and its southern and eastern portions form part of the vast sandy tract known as the 'Bagar'. The northern and the north-eastern corners are the least infertile sections. The general aspect of the countryside, however, is dreary and desolate in the extreme. The surface is for the most part covered with undulating sand-hills from 20 to over 100 feet high, and the aspect presented by the sand-hills resembles that of a series of magnified wind-ripples. In 1808 Elphinston, who passed through the State, wrote, 'within a short distance of the capital, the country was as waste as the wildest parts of Arabia; but during and just after the rains it wore a very different appearance, i.e., it became a vast green pasture-land covered with the richest and most succulent grasses.'¹³

as the aridity, extreme type of agricultural poverty, and sparseness of population, characteristic of a desert region, are all found here. Cf. Dr. Stamp (*Asia*, 1939, p. 340): 'The Great Indian Desert lies between the Aravalli range and the alluvial plain of the Indus and the Punjab. The desert lies for the most part in Rajputana.....'

11. *Imp. Gaz.* Vol. I, p. 33.

12. *Ibid.*, p. 33. In recent years, however, some portion of the bare, parched desert of northern Bikaner State has been turned into green lands on account of the extension of irrigation facilities.

13. *Imp. Gazett. of India*, Vol. VIII, p. 203.



Spatial Distribution of Industries in India

By

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Decentralization and regional development of manufacturing industries are important items in a planned development of resources of a country. These have been recognized both by the Government of India and indigenous manufacturers. The nature and need of this regionalization and planning of spatial distribution of industries will be discussed in the following pages.

By regionalization of industries is meant that the authorities should plan for the proper growth and development of manufacturing industries commensurate with regional resources and needs. Hitherto industrial development worth the name has taken place only in two regions—the provinces of Bengal and Bombay—accompanied by erratic and regionally unplanned industrial ventures in various other parts of the country. The result has been that the industrial fabric of the country has become peculiarly unbalanced, with consequent gross disparity of regional incomes and undesirable and excess labour migrations to particular parts. Needless to say, all these have led to progressive industrial congestion in selective parts, which is more a sign of national economic disease than of balanced buoyant health.

Bombay:—It is one of the leading industrial provinces where cotton textile industry has made the most rapid headway. Out of the total paid-up capital of Rs. 45.98 crores of this industry in the whole of India, Bombay's share is Rs. 24.42 crores. Bombay's textile industry employs about 268,000 persons out of 475,692 employed in this industry in the whole country. Manufacture of heavy chemicals, sugar, engineering equipments, hydro-electric energy, etc., are also important.

Bengal:—Jute and coal mining are the most important industries. It also produces iron and steel by utilizing the raw materials of the neighbouring provinces. Bengal stands first in engineering industries and the manufacture of chemicals has made some progress. Joint-stock enterprise has made more headway in this province than elsewhere in India.

Madras:—Development of hydroelectricity has given rise to various industries, especially in the chemical line.

U. P.:—Sugar, textile, leather and glass are the principal industries. Cawnpore is the industrial focus.

The Punjab:—In recent years chemical industries are spreading rapidly; textile and miscellaneous industries are also present.

Bihar:—Jamshedpur is the hub of industrial activity and is the centre of the iron and steel industry. Around it are developed several important subsidiary industries. Coal mining employs large number of workers and coal-tar distillation and its products are being slowly developed around the coalfields.

C. P.:—In spite of the possession of rich natural resources, the Province remains a back-number in industrial development. Cotton textiles (centred on Nagpur) and mining are the chief industries.

Sind:—Salt and cement are the only principal industries.

Orissa:—Jute, sugar and paper are the important industries, but even they are most insufficiently developed.

Assam:—Most of the labour is employed in mining (petroleum) and tea industries.

N.W.F.P.:—The province is practically without large scale industries.

This brief account reveals the degree of inequitable distribution of industries in India. If, in the years to come, the present state of affairs continues, or if the future Plan merely leads to an accentuation of unbalanced industrial development, then the country will be faced with the unenviable situation when economic apoplexy and economic anaemia shall invest the same body.

Decentralization:—There is hardly any difference of opinion about the advisability of a speedy industrialization of India. Recent developments in the economic situation of the country, nay of the world, necessitate a reorientation of the traditional views about the usefulness of localization of industries at a few centers only. Localization, or centralization is an important stage in the industrial development of a country and its strategic significance can in no way be denied in industrial evolution. But there is always an optimum and a limit up to which an economic principle can be rationally applied; and this holds good in the case of localization as a geo-

economic factor. If that limit is exceeded, disutility will out-weigh utility and diminishing returns will follow as the ultimate consequence. In order to avoid this, there ought to be a decentralization of industries over wider areas instead of their localization or centralization at a few centres only.

Apart from the usual economic considerations, decentralization is recommended in view of the revolutionary changes in the technique of modern warfare, especially the technique of aerial bombardment. The disadvantages of localization of industries were exposed in England by the German Blitzkrieg by air. The collapse of USSR in the critical days of 1941-42 was avoided by the foresight with which the Soviet planners laid out the industries, based on the principles of decentralization. In the face of Allied air assaults, the industrial structure of Germany was radically altered and decentralized. Japan decentralized her industries not only in the home islands, but also in Manchuria, Korea, North China, etc. In India the principle of decentralization assumes much topical interest and deserves careful considerations.

The picture of Industrial India, as noted previously, shows one of heavy centralization in the Provinces of Bengal and Bombay. As for specific industries, jute, cotton and sugar display striking concentration. In the case of jute industry, centralization perhaps has some justification and during the war has been of some practical advantage. Still, its development in the heart of the production zone can certainly be a point of serious consideration. The sugar industry based on the raw material of sugarcane is concentrated mostly in the U.P. and Bihar. It seems that sugarcane in India is not being grown under optimum conditions available in the country, and more favourable tracts in Bengal and South India are being sacrificed in preference to the present production area. For a more vigorous development of the sugar industry, the first step is the development of sugarcane production in its optimum agricultural areas and building up of the sugar industry on principles of decentralization in the new production zones. The cotton manufacturing industry is another example of concentration. Bombay and Ahmedabad are the two principal centres of the industry, maintaining about one-half of the total number of mills in the country. With a wide zone of cotton production and an enormous home market, the industry should be progressively decentralized. It would depend on how best an equilibrium is reached among market, raw materials and power. The tendency of decentralization of the industry is already making itself felt in India as shown by the growth of cotton mills in Coimbatore, Nagpur and Cawnpore sectors.

There is another aspect of the problem. In this country industries have grown up mostly around the cities, because of their easy access to markets, as also cheap labour. Although this industrial growth is negligible in comparison with other countries and falls far short of expectations, the evil consequences of concentration have emerged quite boldly. Money is plentiful and cheap in financial foci like Calcutta, Bombay and Madras and credits go abegging at those places and can be had at such low rates as $\frac{1}{2}$ per cent and $\frac{1}{4}$ per cent, whereas funds are small and costly in mofussil areas. It is not available even at such high rates as 12 per cent and 24 per cent. People in the mofussil areas are, therefore, compelled by circumstances to borrow money from moneylenders at 100 per cent interest, or more. A number of economic causes may be operative to bring about certain differences in rates between the money-markets in different places. But such a wide divergence of rates is not at all justifiable even on economic grounds. This will mean the overgrowth of a certain part of the economic system at the expense of the other, leading to the total collapse of the whole structure. Thus, on account of heavy localization of industries at a few centres only, money flows freely within those areas and can be had in abundance. But the outlying regions are denuded of whatever funds would otherwise be available. Therefore, the cities are being pompered, while the mofussil areas are being disorganised. The sum-total of the results is—accumulation of wealth in chief cities and decay in rural areas.

Industrial Concentration in Bengal :—So far we had been discussing the problem in broad and general terms. But if we direct our attention to smaller regions, we see the effects in more real form. Bengal may be considered here.

Really speaking, Bengal has only two major industrial regions the Hooghlyside zone and the Coalfield zone. While jute, engineering and a host of miscellaneous industries are characteristic of the former region, mining and heavy industries (and their subsidiary offshoots) dominate the latter. The rest of the land is overwhelmingly rural and even cottage industries are moving headlong to ruin.

Some specific industries may be considered. Most of the cotton mills in Bengal are situated in the Hooghlyside region. There are as many as 6 mills in Howrah, 6 in Hooghly, 6 in Dacca and Narayanjanj together, 2 in Khulna, 1 in Nadia, about 5 in the 24 Paraganas and 1 in Chittagong. The rest of the districts possess either very few or no mills at all. Originally, Calcutta and environs were the homes of cotton mills. People could hardly believe that the other districts of Bengal contained equal possibilities

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like Calcutta, till the Dhakesweri mills were started in Dacca. This move diverted the attention of the industrialists towards the exploration of new areas for such industrial concerns. Instead of encouraging concentration of such mills in the neighbourhood of Calcutta, there should be a diffusion of these in other parts of the land, for which favourable conditions exist.

Out of the 400 hosiery mills in Bengal, more than 30 registered mills are in the Hooǵhlyside industrial region. There are 12 mills in 24 Parāṇas, 11 in Howrah, and 5 in Calcutta. Outside this area, Pabna has some 8 mills and the rest of Bengal only perhaps 3. Of the unregistered hosiery mills, 191 exist in Calcutta, 89 in Pabna and 79 in other parts of Bengal. These figures show the grossly uneven distribution of the hosiery mills in Bengal and reveal their excessive localization in the Hooǵhlyside region and Pabna. There is ample scope for the erection of such mills in other parts of Bengal to ensure a balanced growth of her industrial life.

There are some 100 jute mills in the Province, 95% of which are located within a radius of 30 miles of Calcutta. There are 16 mills in Hooǵhly, 25 in Howrah, and 56 in 24 Parāṇas. The rest of the Province has 3 or 4 at the most. This means that while there are practically none in the heart of the production zone like Mymensingh, Dacca, and other districts, mills are agglomerated in an area dominated by the finance factor. This maldistribution has got to be remedied and as experimental measures, mills of small economic units should be started in the actual production zone.

This short article pleads for regionalization and decentralization of industries and advocates a check of the centripetal forces in the industrial evolution of India. The fundamental issues have been examined in a brief compass. But it is hoped that both the Government and the people will appreciate the contentions urged. It is well worth remembering what was pointed out years ago by a leading thinker: "Just as there should be a free circulation of blood through all the tissues of the body to keep the system fit, so there should be an even distribution of industries in different places so that the industrial system may be broad-based on a stable foundation. Just as the jamming of blood at a particular tissue should be avoided, so should be the over-concentration of industries. For, both mean anaemia at the extremes and apoplexy at the centre and heart."

Groundnut in Madras.

BY

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(Continued from Vol. XXI. No. 3, Page 112.)

Growth and Distribution of Groundnut Acreage in Madras.

Groundnut is said to have been introduced into India as early as the 16th century but its cultivation became popular only in this century. From about 294,000 acres in the beginning of the century the area trebled by 1910 and doubled again within the next five years. In 1914 there were about 2 million acres under groundnut. During the war the closure of continental ports, scarcity of tonnage, higher freight and insurance charges and exchange difficulties caused a reduction in trade and therefore in acreage to 1·2 million in 1918-19. But the recovery was fast enough to reach 2·4 million acres in 1922-23. The great depression does not seem to have affected acreage seriously, possibly because the peasant responds to falling prices of his products by producing more of them.

The growth of acreage in Madras shows similar trends. In fact it would be more correct to say that Indian position just reflected the position of Madras, the dominant producer of groundnut. Here are the quinquennial averages.

	Acreage in Madras. (in thousands of acres)	Percentage to acreage in India.
1901—1905	388,000	90
1906—1910	593,000	82·5
1911—1915	1,174,000	82·7
1916—1920	1,295,000	83
1921—1925	1,705,000	74
1926—1930	3,100,000	62
1931—1935	3,171,000	50·6
1936—1940	3,613,000	48

There was a slight set back during the war years, but the acreage as a whole rose from 0·4 million to 3·6 million, since the beginning of the century—an increase of nearly ten fold. The reasons for such rapid extension are easily surmised. The groundnut is a hardy plant capable of growing under a variety of conditions and on soils on which no other crop would be worthwhile to grow. On the demand side new uses have been found for groundnut, such as manufacture of soaps, margarine, lubricants. With growing industrial use, the acreage may well expand further.

The percentage figures show a progressive decline in the share of Madras in the total acreage in India—from 90% to 48%. This is due to extension of cultivation elsewhere in India, especially in Bombay. Yet Madras has an acreage thrice as much as Bombay, the next important producer.

Importance in Madras.—In Madras itself, groundnut is the most important oilseed. Among the other oil seeds of importance, cocoanut, castor, linseed, mustard and gingelly, the last two are unimportant in Madras, while gingelly has only a domestic market. Of the other two entering trade, cocoanut has been ousted from its first place among exported oilseeds by groundnut, while castor is confined to a modest acreage now, its ancient importance for medicine and lighting having declined.

Even considering all non-food crops in the Presidency, groundnut is easily the most important.

The share of groundnut in the total cultivated area in the Presidency may now be considered. Whereas it occupied only 1.6% of the cultivated area in the beginning of the century, it accounted for 12.6% in 1937—38.

From the point of view of importance to the ryot, the Province of Madras produced in one year alone (1939—40) 1.15 million tons of kernels valued at Rs. 16 crores, a sum nearly equal to the budget amount of the Government of Madras in those days.

Geographical distribution in the Madras Presidency.

Though groundnut is grown all over the Presidency, yet two zones strike one's eyes when a map of distribution is looked at. The northern zone, mainly the Ceded Districts, accounts for 34% of the provincial acreage and the southern, mainly Tamil districts has 38%.

Let us study the distribution of groundnut in each district and account for the differences in density noticed. It may be useful to group the districts for purposes of study into some natural regions.

1. Northern circars—Vizag, Godavari, Kistna, Guntur.
2. The Ceded Districts—Bellary, Anantapur, Cuddapah, Kurnool.
3. The Southern Districts— (i) The Southern Coastal Plains—Nellore, Chingleput, Tanjore, Tinnevelly. (ii) North Interior Upland Districts—South and North Arcot, Chittoor, Salem. (iii) South Interior Upland Districts—Coimbatore, Madura, West Ramnad and Trichy.

The Northern Circars.

Vizagapatam.—This district which has 190,000 acres under groundnut has two well defined physiographic features, a mountainous and mostly jungle clad region to the north and an extensively cultivated plain to the south. The coast is moist and the inland is relatively hotter and drier. The average rainfall of the district is about 41", falling mainly under the S. W. Monsoon. The north central portion of the district comprising Palconda, Chiparupalli, Vizianagaram and Bobbili taluks is the groundnut area, with 76% of the district acreage there. Only Sarvasiddi is equally important. The reason for the concentration in the north central area is that for a dry crop, here only is available an area of relatively level terrain, apart from the coastal districts where wet cultivation with rice and ragi is important. Srinagavarapukotta and Bhimlipatam with 10,000 acres each and Saluru, Golconda and Vizagapatam with 5,000 acres each are minor areas of groundnut cultivation. In the district groundnut accounts for 9.4 of the 19.25% of cultivated area under non-food crops. This means that groundnut equals in importance other non-food crops. The district has witnessed a rapid expansion in acreage in recent years, the quinquennial average for 1915—19 being 30,000 acres and 1935—1939 being 190,000 acres—a sixfold increase in 20 years. There is little irrigated groundnut, but the average yield per acre is 1200, above the average of the Presidency.

In the Godavari district the North west is hilly as a continuation of Vizag, while elsewhere the rich river delta has imposed rice culture as the most profitable. A few hundred acres of groundnut lie scattered in the middle west of the west Godavari district. Kanarupukottah and Ellore have 6,000 acres each while Tadepalligudam and Niddadavole have 9,000 and 3,000 acres respectively. But groundnut does not play an important part in the economy of the district, because groundnut accounts for only 3 of the 18% of the cultivated area under non-food crops, and the share of the district is only 0.8% of the Province. The acreage in East Godavari is almost unimportant. A few acres are reported for Peddapuram, and Rajamandri taluks and Polavaram agency. But as elsewhere in the Presidency, the acreage is increasing. It rose from an average of 86 acres in 1915—19 to 31,500 acres in 1935-39. The yield per acre is reported to be higher (1254 lbs) in East Godavari than in West Godavari. Irrigated groundnut is insignificant in both, though relatively commoner in the western half.

In Kistna, with 158,000 acres, the greatest concentration is found on the stony uplands and drier interior to the north west end of the district. There is some cultivation round the lake Colair. The alluvial southern half of the district is under rice favoured by the river Kistna, then on soon

rains and moisture from the sea. The drier interior taluk of Nandigama leads with 78,000 acres, Tiruvuru coming as a poor second with only 22,000 acres. Groundnut is rather important among the non-food crops, taking 14 out of the 24% of cultivated area under non-food crops. Therefore, it is not surprising that the area rose phenomenally from 1,378 acres, (average of 1915-20) to 1,584,000 acres (average of 1935-39). Irrigated groundnut is unimportant as in the rest of the Circars, only a few acres being returned occasionally. Yield of the district is rather high-1389 lbs.

In Guntur groundnut acreage has grown from an average of 4,000 (1915-19) to 311,000 (1935-39). It accounts for 9% of the provincial acreage and 13% of cultivated area of the District and forms the most important among the non-food crops which cover 34.25% of the cultivated area of the district. Another non-food crop of importance here is tobacco. The black soil, the low rainfall (32-35") and absence of rich deltas make this a good millet-cotton-groundnut tract. Groundnut has displaced tobacco to a certain extent. The groundnut belt lying diagonally across the district covers the taluks Sattanapalle, Guntur, Narasampet, Ongole and Bapatla. This is the area of black soil. To the east on the coastal plain rice is cultivated. The yield per acre averages 1100 lbs.

The Ceded Districts.—South of Guntur and east of the Nellamalai hills lies an extensive rice-*chulam* belt covering Nellore and Eastern taluks of Kurnool and Cuddapah, where groundnut is absent. But to the west of the Nellamalai and Vellikonda ranges, we have the great groundnut zone where 34% of the provincial acreage lies. Bellari, Anantapur, Western portions of Cuddapah and Kurnool form the northern groundnut zone of the Province.

The crop is well distributed over the Kurnool District. With the largest acreage in the Presidency (447,000 acres average 1935-1939) the district has 12.4% of the provincial acreage and groundnut takes 20.4% cultivated area in the district and is the most important non-food crop, taking 69% of non-food crop area. Kurnool (74,000 acres) and Pattikonda (72,500) are the leading taluks, the next in order being Sirvel, Nandikotkur and Dhone with 58 to 62,000 acres each. Area under groundnut in this district expanded over threefold, from 132,000 acres in 1914. Except in the Cuddapah—Kurnool canal area, spreading variety is the most common. The average yield per acre is about 1,070 lbs. and the district has relatively more irrigated acreage than further north.

In Bellary the westernmost taluks Hadagalli, Harpanahalle and Kadliji have large areas. But Adoni has the highest acreage (39,000). Non-

food crops occupy 36% of the sown area, of which groundnut takes 10.4. But the total acreage 241,000 forms only 6.7% of the provincial groundnut area, though progress has been uninterrupted from 35,000 acres in 1915. Yield is among the highest (1,200 lb) and some areas are returned as irrigated in each taluk, but these are insignificant when compared to the total acreage.

Cuddapah had 236,000 acres in the period 1925-29 but declined to 198,000 in 1935—39. This is only 5.5% of the provincial acreage, but 16.4% of the cultivated area. It displaced *chulam* in the rotation with cotton as for instance in Pulivendla taluk, in the beginning of the century and came to be the most important of the non-food crops which together cover 26% of the sown area. Prodattur, Cuddapah and Royachoti are the important groundnut taluks. The first two have much irrigated acreage (2,000 and 4,000). Irrigated area has been increasing in the district from 1,500 in 1934-35 to 9,450 in 1938-39. Yield per acre averages 945 lbs.

Anantapur.—The District Gazetteer prepared in the beginning of this century states "Groundnut which is an uncommon crop in the Deccan is raised in some places in Tadpatri, especially Yellanur firka and round Hindupur". Even today these two places are the most important producers but no longer is groundnut an uncommon crop in the Deccan, much less in Anantapur. 315,000 acres cover 15.6% of the cultivated area in the district and amount to one-eleventh of the provincial acreage. Among the industrial crops that occupy 28.5% of the sown area, it is second only to cotton. The area has more than doubled since the war. The yield per acre averages 970 lbs.

The large acreages in the Ceded districts can be accounted for easily. Groundnut forms a useful complement on light soils while jowar takes the heavy black soil. In a tract with just the minimum rainfall 20—30", it is the most valuable *kharif* crop on light soils, where the soil is not heavy enough for jowar and rainfall not high enough for rice, groundnut is grown. Once it was cultivated in a small way, but the growth of export trade and extension of communications have extended cultivation on both good and bad lands alike. The introduction of foreign varieties of shorter duration (3 to 4½ months) has rendered the crop less liable to *tikka* disease and therefore, it is more dependable than even cotton, on inferior soils. Further, cultivation of groundnut here is the most intensive and scientific in Madras and so profits of cultivation are high. Thus nature and man have contributed to the success of groundnut here.

The Southern Districts. An ampler rainfall and predominance of light red soils have given this tract a larger area of irrigated groundnut, a different type of crop association, and a poorer yield than in the north.

takes 7'6. The crop seems to have gained rapid popularity; as area has increased from 1,465 acres in 1910 to 42,700 in 1920 and 147,000 in 1936-39 and yield per acre is fair (1060 lbs). Talaghat has always been important. Salem was once the chief groundnut taluk but now Tiruchengodu and Namakkal are more important. Irrigated area is relatively small in the district. Rice is unimportant in Salem (7% of cropped area in 1937-38) but millets, especially *jowar* and *bajri*, occupy 53% and cotton 6%. Salem and Chittoor are therefore akin to the Ceded districts in crop association.

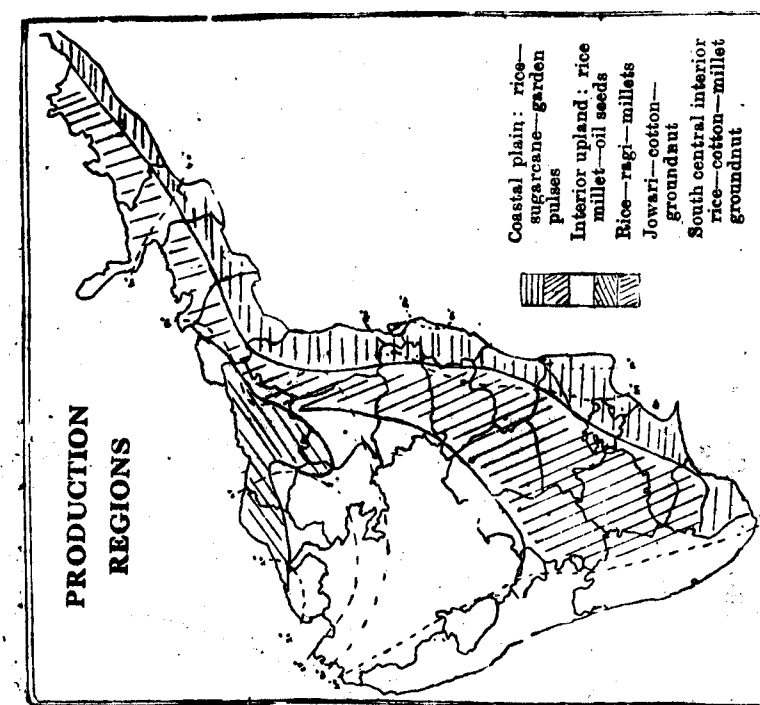
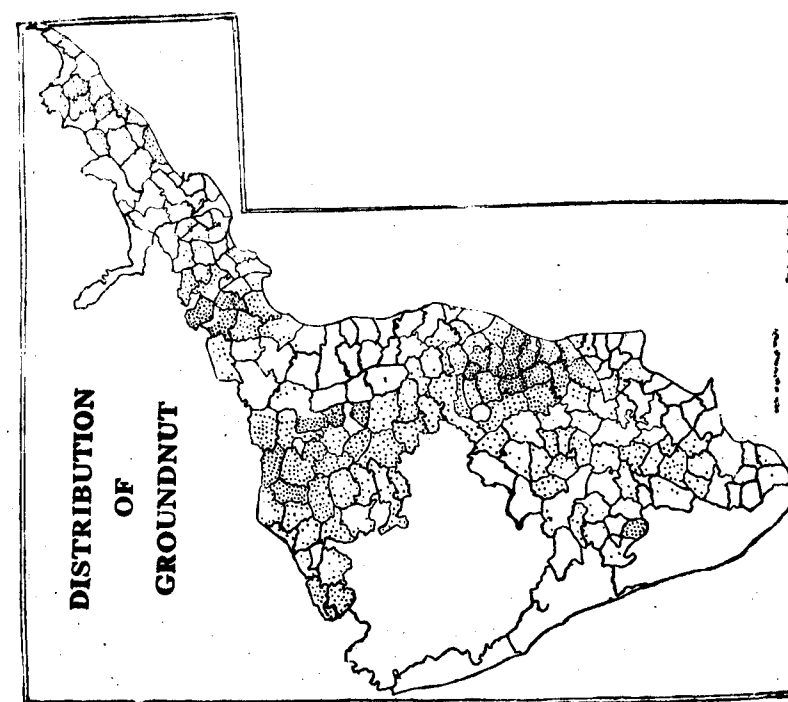
The Southern upland region comprises the districts of Coimbatore, Madura, and parts of Trichinopoly and Ramnad districts. Here the surface soil is thin but fertile enough and there are patches of blacksoil here and there.

In Coimbatore cotton occupies double the area of groundnut which covers 164,000 acres or 9% of the cultivated area. Of cereals, millets have 37% and rice only 4% of cropped area. Crop associations are similar to the Ceded districts belt, but the difference is in the relatively smaller importance of groundnut here. Pollachi taluk leads with 80,000 acres, Avanasi and Bhavani being poor followers with 9,000 and 3,000 acres respectively. Irrigated acreage is small (3,600 acres in 1937-38) though relatively more common in Udampet and Dharmavaram.

Of the 49,000 acres in Ramnad district Arupukottai, Sattur and Srivilliputtur have 10,000 each. Rice occupies 29% of the cultivated area and cotton 18%, while groundnut only 2'6%. Though non-food crops take 39% of the cropped area, groundnut is unimportant, but the yield is good (1120 lbs) per acre.

Madura has 3% of the groundnut acreage in the Province while Ramnad has only 1'3%. Cotton is nearly double as important in acreage, though groundnut has nearly trebled since 1915. Of the total 113,000 acres, Tirumanthalam and Dindigal have 36,500 and 27,500 acres. The yield is about 1040 lbs per acre and irrigated cropping has expanded in Palni, Madura and Periyakulam taluks.

Trichinopoly has about 125,000 acres distributed mainly in Udayarpalayam (60,500), Perambalur (15,000) and Musiri (11,000) taluks, as a crop rotating with *cumbu* and *varaḡu*. Irrigated acreage is fairly large in the district, about 18,000 acres or one-sixth of the groundnut area in 1937, lying mainly in Karur (7,000) Kulithalai and Musiri taluks. In this district also cotton is important among non-food crops but groundnut has 8'4% of cropped area, leaving for all others only 9'6%.



The coastal plain from Nellore to Tinnevely is a continuous rice belt where groundnut is unimportant (except in the coastal taluks of South Arcot). In Chingleput district groundnut is found mostly on the interior uplands with low rainfall. The red loams there give a good crop of both wet and dry crops. Though groundnut area (64,800 acres) is less than two per cent of the provincial total, the crop is the most important cashcrop. Non-food crops cover 13% of cultivated area of which groundnut alone accounts for 8%. As from Chingleput we have the southern belt in which the summer irrigated crop is important. Of the main groundnut taluks Madurantakam, Conjeevaram and Tiruvellore, the last alone has 7,000 acres irrigated. Yield per acre averages 1,000 lbs.

Tanjore is obviously a rice area because of the Cauvery and its delta, but groundnut is grown in the non-deltaic portions of Tanjore and Pattukottai taluks, in rotation with millets and gram, and cover only 4.2% of the cultivated area (rice 97%). Yet it is an important non-food crop. On the red loams of Tanjore, there are 29,000 acres and on the dry uplands of Tanjore 17,000. Pattukottai has much irrigated crops (3,400 acres). The moist soil and the mango showers help an unirrigated summer crop in this district (5,000 acres). From an average of 92,000 acres before the depression there was a decline to 62,500 just before the recent war. The yield is low, 920 lbs. per acre.

In Tinnevely groundnut is unimportant, though it has spread fast enough from an average of 572 acres (1915-19) to 15,000 (1936-39) and the yield is over a thousand pounds per acre. This is not due to the predominance of rice which itself covers only 22% of the cultivated area owing to the low rainfall, but it is because of its competition with cotton which is important as a cash crop and grows well on the black cotton soils here.

The interior districts.—These lie to the west of the coastal plain and can be grouped as north interior upland districts and the south interior upland districts, the dividing line being the Cauvery. The northern upland region comprises Salem, the two Arcots and parts of Trichy where the red soils, though sandy and gravelly, give a good crop of millets or groundnuts if there is sufficient rain or irrigation.

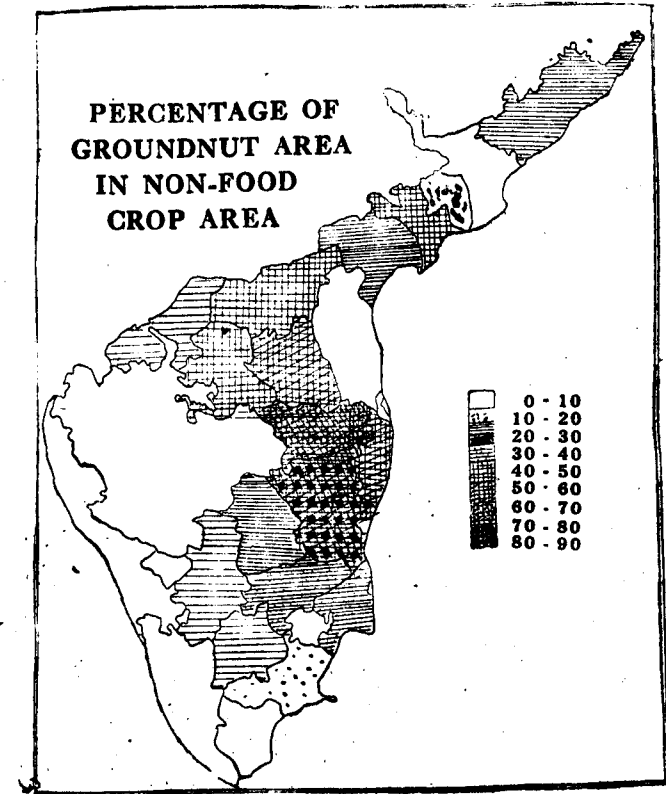
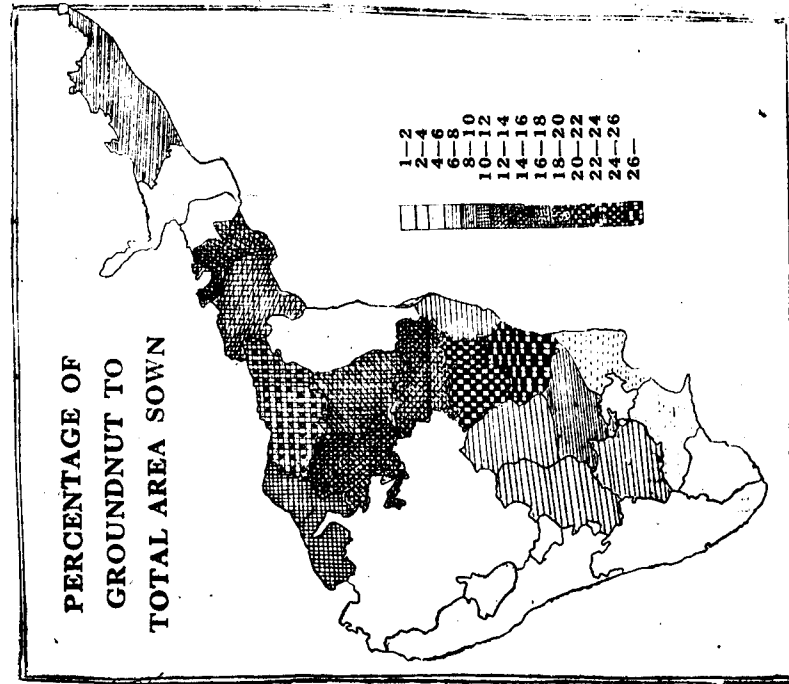
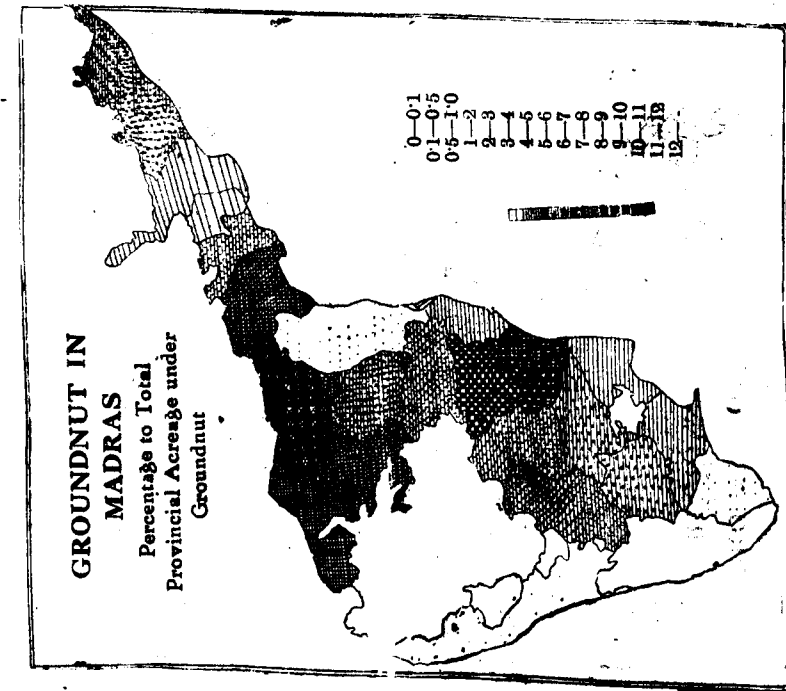
In South Arcot groundnut had found its earliest ideal habitat and is now important in the economy of every taluk. On dry lands it is the commonest monsoon crop and on wetlands it rotates with rice as an irrigated summer crop. Tindivanam, Kallakurichi and Tirukoyilur taluks have 62 to 64,000 acres and Gingee has 53,000. Villupuram, Vriddhachalam and

Cuddalore have 42 to 45,000. Chidambaram with much wetlands and black-soil has 29,000 acres. Groundnut covers 27% of the sown area in the district and is the cash crop, other non-food crops occupying only 6%. The peasant depends on it more than elsewhere. Whether we consider the percentage to the sown area in the district or to the area under non-food crops or to groundnut area of the Province, South Arcot stands supreme, with only North Arcot to follow it closely. Groundnut is three-fourths as much important as rice in acreage, and three times as important as *cumbu* and *ragi*. But this was the result of a century of progress. Cultivation of groundnut began early in the last century and by 1,850 had assumed sufficient importance in trade. There was rapid extension up to the early nineties when due to crop-disease the acreage declined. Parry & Co., the chief exporters introduced the Mauritius variety and recovery was rapid, much at the expense of indigo, the former cashcrop. Average acreage was 323,000 between 1915 and 1919. Irrigated acreage is very important in this district, occupying 82,000 out of the 425,000 acres in 1936-39, mostly lying in the wetter Villupuram, Cuddalore and Chidambaram taluks. Irrigated summer crop has always been important and increasing in area. Due to backwardness in the art of cultivation, the yield per acre is low (920 lbs.)

In North Arcot over 25% of the cultivated area is under groundnut and other non-food crops occupy only 5% of the sown area. Acreage has been expanding rapidly since the seventies of the last century—from 1,071 in 1871 to 24,000 in 1892 and 366,000 in (1936-39). Tiruvannamalai taluk with the highest acreage was till recently part of the S. Arcot district. Wandiwash, Cheyyar, Wallajah and Arkonam are the other taluks of importance. Irrigated acreage is much less than in South Arcot, as the facilities are lacking and yield also is lower (896 lbs.) per acre.

In Chittoor rice occupies 25% of the cultivated area and groundnut 14.6% and the inference is obvious. The Northern portion of the district shows the greatest density, as a continuation of Cuddapah—Anantapur belt. Vayalpadi and Madanapalli have 33 to 35,000 acres while Punjanur, Palmaner and Chandragiri have 13,000 each. The crop has extended steadily from 26,000 acres in 1915-16 to 153,000 in 1936-39 which is 4.2 percent of the provincial area. As a part of the ghat country and Mysore plateau, the district is well suited to the crop, if only there is sufficient moisture. In the lowland taluks groundnut is irrigated, as in Chittoor and Chandragiri. Puttur and Tirupati record even larger irrigated area than unirrigated. Being similar to the northern zone, the yield per acre is moderate, about 1000 lbs.

Salem has 147,000 acres which is 4.1% of the provincial groundnut area. Non-food crops cover 19% of the cultivated area, of which groundnut



The foregoing analysis of distributions shows the growing importance of groundnut in all districts for cash, even in the face of rival crops like cotton and tobacco. If only prices are steady at remunerative levels, we can expect phenomenal expansions of even irrigated crops. The concentration of the crops in the interior uplands is obvious and further sub-divisions into north and south belts and coast and upland belts suggest themselves when we analyse the crop associations.

Crop Association in Production Regions.—Rich soil, high temperature and plentiful moisture by rain or irrigation have made the coastal plain from Vizagapatam to Tinnevely a rice tract. Here is a low plain with the richest redloams, favoured by the deltas of the Godavari, the Kistna and the Cauvery and by a good rainfall in two seasons. The monsoon crop of rice is followed by pulses or sugar cane in the north, but in the south by sugar-cane or irrigated groundnut and occasionally by pulses. All along the coast; certain amount of garden cultivation is to be expected, especially in the neighbourhood of important towns. Therefore this is the Rice—Sugar-cane—garden cultivation—millet, pulse zone.

Immediately to the west of this coastal rice belt lies a tract highly hilly but sufficiently rich with a soil cover resulting from the weathering of the hills and with some fertile river valleys. Though poorer and rugged compared to the coastal plain, rice is grown on low level thick soils with the aid of monsoon rains or tanks. Raḡi is an associate of rice in this region, rotating with it as an irrigated crop on the same soil. Higher up on lighter but fairly good soils groundnut is cultivated as a dry crop. The crop association here is similar to that on the coast but the material difference is the importance of dry crops like groundnut and millets, due to poorer soil and rainfall. This is therefore the Rice—Sugar-cane—garden cultivation—groundnut—millet zone. This pattern is typical of the two Arcots.

In the southern interior districts like Coimbatore, Trichy, Madura and Tinnevely a different type of crop association is found due to patches of reḡur soils. Cotton and jowar rotate on this heavy soil, while on light red soils rice is common wherever irrigation is possible as in river valleys; otherwise a dry crop of pulse, millets or groundnut is only possible. Such an association can be found in isolated patches in several districts where any area of reḡur is seen e.g., Ramnad, South Arcot, Nellore, Kistna, Guntur and Godavari. As a type, the association here is jowar—cotton—rice, groundnut being relatively unimportant.

In the northern groundnut zone, the Ceded districts, cotton, millets and oilseeds dominate the economy and on the basis of the basic crop three types of associations can be distinguished.

(i) Jowar—cotton—bajri—oilseeds—pulse :—found on the regur soils proper and typical in Bellary, Kurnool, Cuddapah and especially in the Nandiyal Valley (ii) Bajri—pulse—sugarcane—groundnut—cotton—found where the soil is not heavy enough for jowar and rain not sufficient for rice. Bajri becomes the staple in drier western portions of the districts like Guntur, Chittoor, Trichy and Tinnevely also (iii) Rice—sugarcane—groundnut—ragi—pulse :—found mainly in Cuddapah and Anantapur, as a transition to the rice tracts on the east coast and rice millet tracts in south interior up-land districts.

Production, Utilisation and Trade

Production in Madras.—Estimates of production in a year is made by multiplying the area by the standard yield and again by the seasonal factor. The area is fairly accurately ascertained but the accuracy of the standard yield will depend on the nature and frequency of the crop cutting experiments. In Madras the standard yield is said to be 1120 lbs per acre and has not been revised for a long time.

Production in thousands of tons (nut).

	India	Madras	Share of Madras percent.	Share of Madras in Total acreage in India percent
1901—1905	204	142	70	90
6— 10	308	207	67	82.5
11— 15	624	378	60.5	82.7
16— 20	845	630	74.5	83
21— 25	1005	747	74.6	74
26— 30	2065	1499	72.6	62
31— 35	2497	1485	59.5	50.6
36— 40	2943	1647	56	48

These figures show that there was a doubling of output every 15 years and that there was relatively more decline in acreage than in production. Yet Madras is the dominant producer in India as she accounts for 56% of Indian production while her rival Bombay and Hyderabad contribute only 17 and 14 percent respectively.

To calculate production in terms of kernels, we must know the ratio of the weight of the kernel to the total weight of unshelled nut. This ratio is different for the different varieties and for the same variety in different places due to soil and seasonal factors. On the assumption the kernel accounts for 70% of total weight of nut calculations are made in this article.

Utilisation.—The total production has to meet the demand for seed, edible use, crushing and export. Here is an estimate of the quantities used for the different purposes. Figures are in thousands of tons.

	Export	Seed	Consumption Edible and crushing	Ratio of produc- tion to exported in Madras	Ratio of Indian production exported
1921—25	388	78	281	52%	43.2%
26—30	690	142	667	46	53
31—35	591	146	748	40	43.8
36—40	933	166	548	57	40.4

The seed rate depends on the variety of the nut, the soil and season. While the all-India average is 72 lbs per acre the rate in Madras is as much 80 lbs. The figures for seed in the table above are at the lower average of 72 lbs. This has been done in order to make comparison with all-India figures possible.

The export Trade.—Imports into Madras are almost nil, except in a few years where a score of tons may be recorded—for the sake of seed. Bombay imports relatively more for seed purposes. But in export which is in the shape of kernels Madras is very important in world trade. In the early years of the century the quantity was small, but later underwent rapid expansion. The figures reveal set backs during the World War I, when Madras exported only 12.5% of its production while the percentage for India was 21.6. In the postwar years the general tendency appears to be that Madras is exporting an ever increasing proportion of her output, while the export of India as a whole is declining. Calculation of share of Madras in Indian export trade bears this out.

in thousands of tons kernel

	India	Madras	Share of Madras
1921—25	304	272	89.5%
26—30	764	483	63%
31—35	755	414	55%
36—40	834	653	76%

The exports from British India are shared between Madras and Bombay in the ratio 4 : 1. The important groundnut ports in Madras are Cuddalore, Cocanada, Masulipatam, Negapatam, Calicut, Vizagapatam, Calingapatam and Porto Novo. The first four are the most important as in the period 1935-36 to 1938-39 about 420,000 out of 571,000 tons kernels expor-

ted from the British ports of Madras were from them. The ports lie at the obvious focal points of the groundnut tracts on the Coromandel coast. Some ports have recently risen to importance while others have lost. Masulipatam, with only 1000 tons in 1930-1 topped the list in 1936-7 with 157,000 tons. Calingapatam appeared first in 1933-4 as a port for groundnut and has ever since been gaining in importance. On the other hand Porto Novo recording a thousand tons annually has now ceased to be a port for groundnut.

The chief destinations are the United Kingdom and a few European countries like France and Germany. Pondicherry, the port for the southern districts, is primarily a port for export to France (43%). Of late the share of French ports in India in groundnut export trade has been declining, for instance, their share in the prewar quinquennium was 43% but only 10% in the next two quinquennia.

The bulk of the kernels exported from Madras (including Pondicherry) consists of the coromandel variety—naturally because Madras accounts for 80% of the Indian production of this variety. The demand is mainly for the machine decorticated kernels. Of the 3000 decorticators in India, established near assembling markets and railway stations, the biggest are those found in Madras and Bombay which are the chief trade centres. They are owned generally by wholesale merchants who buy nuts on their own account, or occasionally shell for others. Oil mills may do their own decortication. Except in the Ceded districts where the ryot stocks his produce and comes to the market at the appropriate time throughout the year, the decorticating factories are seasonal and hence they are multipurpose factories doing other jobs like milling, cotton ginning and pressing.

The Prices at London provide a fair index of world prices of groundnut. The London prices for groundnut kernel move more or less parallel to those of the substitute oils and oilseeds. The price of coromandel kernels (c. i. f.) in 1912-13 and 1913-4 was about £ 16 per ton but during the war period 1914-18 the maximum controlled price rose to £ 32 per ton. After decontrol, price rose to £ 50 by the end of 1919. Then there was a rapid decline and fluctuation between £ 14 and £ 27 up to 1928. Several factors then operated to depress the prices to still lower levels: £ 18/5 in 1930, £ 13/3 in 1931 and £ 10/1 in 1934. Fall in the price of vegetable oils because of low price of butter, heavy production in India and Africa, general fall in price level, imposition of duty by France on groundnut of non-empire origin and restriction on the production of margarine in Germany, all these worked to the detriment of the Indian producer. From an average price of

Rs. 251 per ton of kernel in 1928-9 price fell to the bottom of Rs. 102 in 1933-4. There was then recovery until Rs. 163 was reached in 1936-7 but again a setback ensured depressing the price to Rs. 110 in 1938-9. The average for 1939-40 showed a slight improvement to Rs. 130 per ton. With 1922-25 as the base period, the following index numbers * show the trend.

	Groundnut	Cocoanut
1928—29	84	101
29—30	77	82
30—31	55	68
31—32	43	57
32—33	54	67
33—34	39	47
34—35	32	35
35—36	55	49
36—37	55	62
37—38	51	63
38—39	38	40

We notice that the heaviest fall was during the depression and the worst year was 1934 when the price was just a third of the base year. The recovery in subsequent years could at best take the prices back only to 1930 level when the depression started. The trend in cocoanut prices is given to illustrate how rivalry between oilseeds affect both. In the post-war years groundnut was a serious rival to cocoanut due to advances in oil technology and displaced it from the first place among oilseeds exported, by sheer low price. But when cocoanut prices thus fell, groundnut had to follow suit in order to retain the ground already captured. The Madras peasant suffers a great handicap in competition in international markets from the fact that groundnut is produced on uneconomic holdings and is marketed in an unorganised manner.

It may be mentioned here that because of the large number of intermediaries in the marketing stage and numerous malpractices prevailing in market centres, the peasant may get a price much divergent from the quotations at the ports. Further, while prices in Indian ports differ from those at London to the extent of cost of transport and a variable brokerage, within India prices at ports move in harmony with those at Madras, but the prices in the different district markets do not always move together. These depend primarily on the convenience of the groundnut merchant. For instance, if a buyer required groundnut at Cuddalore to satisfy a contract with an export

* Dr. P. J. Thomas & Sundara Rama Sastri—Prices in S. India.

firm, he may buy it from the nearer market at Vriddhachalam paying a higher price for the produce, than buy it from a cheaper market like Tanjore, a few miles away. Similarly, when delivery is at Neṅapatam Tanjore market will have the benefit of demand through higher prices. Seasonal variations also are noticeable in groundnut prices. Prof. Thomas and Sastri conclude on the basis of trends between 1922 and 1938 that prices are almost steady from March to October but tend to fall from November as harvests come in and to rise again from January.

Crushing in Madras.—Crushing is an old industry and therefore primitive methods have largely continued to this day, though modern plants are gaining ground. The object of crushing is mainly oil, the cake being a bye product. It is usual to crush kernels alone, but the best oil is said to be obtained from crushing of uncorticated nuts. In America unshelled nuts are said to be added upto 25 to 30% of the lot. Crushing involves two processes, heating and pressing. In France a preliminary pressing before heating is common as the resulting cold-drawn oil is said to be the best for culinary purposes. Elsewhere, the first pressing after heating is considered to give excellent oil for cooking and margarine manufacture. A second pressing gives an inferior oil used mainly for soap making. In Europe the crushing of groundnut for oil is to a large extent a French development, with Marseilles as centre.* France uses 75% of her imported kernel for crushing. But demand from the rest of Europe has been growing with improvement in the knowledge of the properties of groundnut. European use of groundnut oil as a salad and cooking oil has increased at the expense of the costlier olive oil. But in industrial use groundnut has rivals in cheap whale oil and soya bean oil. Yet new uses have been found, as for e.g., lubrication, preservation of fish, textile dressing etc. Experiments are being made to use it as a fuel oil.

Methods of oil extraction known or in use are :

- (1) the screwpress and the wedge press.
- (2) the *chekku* with animal power or mechanical power.
- (3) the Anderson expeller.
- (4) the Rotary mill.
- (5) the Anglo-American hydraulic press and hydraulic cage press.
- (6) the solvent extraction process.
- (7) the Bacterial process.

Chekkus, the most numerous, are found in all villages and are usually made of wood (rarely of stone, as in Arupukottai, Ramnad District). The

* Survey of Imperial Economic Committee—Oilseeds—Groundnut.

capacity of a *chekku* varies with the size of the mortar but the average is about 60lb kernel. Oil from stone *chekkus* is clearer and so enjoys a premium in price. Mixing of several kinds of oil seeds is unknown in Madras. Crushing of unshelled nuts is uncommon.

The screw press is of limited use in Madras. The oil is reddish in colour and hence helps to adulterate gingelly oil. Once very popular in the South Arcot District numbering as much as a thousand, it has of late gone out of use—to number just a hundred because of its principal defects; slowness, exacting labour and incomplete pressing. In the Rotary mill, the pestle is stationary while the mortar revolves while in the *chekku* it is the other way. But output is three to four times that of a *chekku*. Marshall & Co., have introduced some improvements to reduce the power required, yet the defect of incomplete pressing due to the fast revolution of mortar remains. However such mills are popular in groundnut tracts. Expellers are fast becoming popular and there are different types of them. The capacity is about 3 tons per day of 10 hours. Their advent is responsible for the extinction of the hydraulic press and cage press. The solvent extraction process, superior to all others in maximum recovery of oil (leaving only 1 to 3% unlike 17% in *chekku* cake and 7-10% in mill cake) is yet not in commercial use in India, though Germans attempted the process in Calcutta even before 1914 war and later developed it in their own country. Unless it be for processing the mill or *chekku* cakes to recover the wasted oil, it is not likely to supplant other methods in India because of the cost involved at 2 gallons of solvents per ton of kernel. The bacterial process discovered by Bejman of California capable of giving a clear oil and an excellent feed for cattle has yet to become popular even in the west.

In 1935-36 there were in Madras 145 expellers, 70 rotary mills, 300 handpresses and 18,000 *chekkus* taking part in groundnut crushing. The Report on the Marketing of groundnut in India has estimated that the quantity crushed by machines is about 130,000 tons and by *chekkus* 345,000 tons nuts. What is the amount available for crushing on the basis of the calculation we made above regarding production and uses in Madras?

Average production (1935-40)=1,647,000 tons.	
seed :	184,000
edible use :	70,000
export :	933,000
	1,187,000
available for crushing in Madras ...	460,000

The discrepancy between this 460,000 tons and the 475,000 tons of the Marketing Report can be explained. The export figure 933,000 is a three year average. The Marketing Report's calculations pertain to a different period, 1933-34 to 1937-1938. Further seed rate has been taken here as 80lbs. per acre for Madras.

As the most important producer, Madras has 38.4% of stock available in India for crushing, while Bombay has 29%. But while India has 42% of total production (1933-37) available for crushing, Madras has only 27.6% which shows the backwardness of Madras in crushing.

Disposal of oil and cake.—The yield of oil and cake depends on the oil content of the variety, soil and the method of crushing. In quantity, oil expressed by the expeller amounts to 40—44% of the weight of the kernel, by rotary mills 36—42% *chekku*, and handpress 35—39%. But the average for India for all varieties may be taken as 40% of kernel weight being oil and 60% cake. At this rate 460,000 tons nuts available for crushing will yield 128,800 tons of oil.

The quality of oil, depends on (1) the condition of the kernel at the time of crushing of which the percentage of free fatty acids is the most important index, (2) the conditions and period of storage and (3) the method of crushing. High temperature at crushing results in the production of a dark coloured oil. The screw press gives a dark oil due to crude heating of the groundnut meal before pressing. Stone *chekkus* give a clearer oil than wooden *chekkus*. Expeller gives a better oil than *chekkus*. The colour of the oil depends also on the variety of the groundnut crushed. The peanut and the kandesh give white oil while the coromandel gives a yellowish oil. But the quality of the kernel is not determined by chemical analysis in India but by a general check up of the variety, size and shape of kernels, the locality of production and the proportion of impurities and split kernels. The quality of the kernel depends on oil content, moisture and free fatty acids. The conclusions of the Marketing officer on the basis of analysis of some samples are these: In Madras, pea-nuts have an oil content of 50.2%; coromandel 50.7% and red natal 40.8%. Peanuts and red natal of Bombay have more. Moisture content in peanuts is 6.5%, coromandel, 5.3% and in red natal 6.2%, kernels with 5% moisture are supposed to be dry, that being the inherent moisture. In general kernels of Madras have more moisture than those of Bombay. The moisture in samples of coromandel kernels at Madras port averaged at 4.5%; at South Arcot ports 5.1%, at Coimbatore 6% and at Madura 6.4%. The effect of drying on the way is reflected in the decline in moisture as a place is situated nearer Madras. The high percentage of moisture in

kernels coming from the south is to be explained by the fact that it is usual for the peasant, especially in South Arcot to moisten the nuts before shelling them with sticks or purposely to moisten the kernels to increase the weight, without realising its reaction on price paid to him. Of free fatty acids, peanuts of Madras had 0.69% and coromandels 1.35%. Pollachi and Coimbatore samples had as much as 3.4% because rains coincide with harvests there. South Arcot kernels had 3% due to the practice of wetting the nuts before shelling. Similar high percentages were found in consignments from Tanjore and Trichy. In general kernels of Tamil districts had a larger percentage of free fatty acids than those of the Ceded districts for reasons already mentioned. These acids increase in percentage while the kernel is in transit, from inland to the port, and from India to Europe in proportion to the amount of damaged kernels, split kernels and nooks, and naturally hand-shelled kernels of the Tamil-districts are most liable in this respect. The MacEwan process of pressing nuts to half their size and packing up, saves the kernel from deterioration from exposure in course of transit but it has not yet come into use in the Indian export trade. Meanwhile the Madras ryot has to be educated in the need to stop his malpractice of wetting kernel and the trade already discourages hand-shelling by a heavy discount in price.

Trade in oil.—Imports of oil into Madras are negligible, 2 to 3 tons only a year. Exports are very much more important though not as much as kernels and have fluctuated widely.

	Madras	India	Share of Madras
1900—5	68 tons	238 tons	29%
6—10	150	212	70.7%
11—15	840	882	95%
16—20	1337	1797	74%
21—25	135	241	56%
26—30	150	646	23%
31—35	68	2042	3.3%

Bengal was leading in the beginning of the century but since 1907-08 Madras began to lead so that by the time of World War 1 she accounted for 95% of India's export of oil. Even during the war she was the leading supplier. But from 1928-29 Bombay began to take a prominent share and held it up ever since. The rapid decline in the oil exports of Madras indicate in creasing consumption within the Province.

Trade in oil cake.—On the assumption of 60% of the weight of kernel being cake, the production in Madras would amount to about 200,000-

tons of cake. The bulk of this is from *chekkus* and have a high content of oil. They are preferred for domestic consumption to expeller cakes of which the exports mostly consist. Such exports from Madras have been growing recently.

1934—35	49,500 tons
35—36	38,700
36—37	61,550
37—38	81,980
38—39	126,990

But while quantity increased in five years by 150%, value has increased by only 33% from 39 lakhs to 52 lakhs rupees. It is to be regretted that such a valuable stuff should have been exported increasingly inspite of fall in prices. While keeping back her oil for domestic use, more and more, Madras appears to release an increasing quantity of cakes for export. This tendency has been the subject of much discussion in our country. The oil cake is excellent both as manure and animal food. The peasant is cognizant of this value, but has an unreasonable preference for *chekku* cake whose oil content is more than 6% the optimum permissible, and therefore harmful both to the field and the cattle. The neglected expeller cake finds a foreign market except to the extent of its use to adulterate the *chekku* cakes which have a ready inland market. In an agricultural country like India where the field and the farm cattle are crying for nourishment it is criminal to export them. Groundnut cake has a higher food value as shown below than other cakes in use for cattle.

	Groundnut Cake	Gingelly Cake	Cocoanut Cake.
Protein	39.6	35.64	19.1
Fat	10.1	11.7	8.1
Carbohydrates	23.6	12.3	33
Fibre	0.3	1.3	8
Food units	88	77	76

The following observation of the oilseeds Specialist to the Government of Madras is illuminating. "As a feed for animals groundnut cake is better than cotton seed, cotton seed cake, or gingelly cake because of the presence of much higher percentage of crude protein in groundnut cake. It can be fed in small quantities to the cows after milking, without any danger of giving

peculiar flavour to the milk. As groundnut cake is a highly concentrated food it should not be fed in large quantities and the proper balance in ratio may be maintained by the addition of other starchy grains like *chulam*, *cumbu* and maize. The groundnut meal (crushed cake) is used extensively in fattening pigs in a short time. Two or three weeks before the pigs are to be sold the groundnut meal should be stopped and the pigs should be fed on starchy grains for hardening the pork as otherwise soft pork results. A mixture of groundnut meal and cocoanut meal can replace horse gram and oats in the ration of horses and bullocks after they have been accustomed to the mixture. The addition of groundnut meal to poultry feed stimulates egg laying and aids in bringing chickens rapidly to a marketable size."

Should then the exports of groundnut oil and cake be stopped? If we consider the needs of lands also, not only of animals, the export of all sorts of oilseeds will have to be stopped or penalised by a heavy duty so that all the oilseeds may be crushed and their products utilised within the country. But the temptation to the peasant to part with his valuable stuff arises from good prices from abroad. If internal demand is not large enough to replace foreign demand, the peasant will suffer by export restrictions. That is why the Royal Commission on Agriculture opposed export duties on oilseeds, while the Taxation Enquiry Committee had approved of them. The Commission pointed out that in the absence of a well developed crushing industry in India to compensate for the loss of foreign markets, the duties will fall ultimately on the ryot. The local market for oil being undeveloped, the oil producer of India will have to attempt sales abroad in the face of competition. One section of agricultural population will be penalised for the benefit of another, as when the sufferer from fall in oilseed prices is not himself the user of the cheapened cakes.

Thus the question hinges on the development of a local crushing industry big enough to replace foreign markets. A huge crushing industry cannot be built up on the basis of an inelastic demand for oil for illumination or cooking. India has yet to put her groundnut to maximum use even in the manufacture of margarine and soaps. With the asset of a taboo on animal fats imposed by religion, the making of vegetable fats must be highly profitable, as a substitute for *ghee* which is too costly for the poor. India has been importing every year 23,000 tons of vegetable fats worth 180 lakhs of rupees in the early thirties of which Madras alone took 2500 tons worth 20 lakhs of rupees. Yet Madras had no *vanaspati* factory, though there was one in the State of Cochin and ten in the whole of India capable of producing 60,000 tons. Similarly groundnut oil can be used in making

soaps, as it has the same chemical characteristics as the costlier olive oil. In Europe the refuse called 'foots' left behind in the process of purification of groundnut oil for culinary purposes is used for making soaps. Soaps of vegetable origin made within the country have an assured market, as recent experiences of the industry illustrate. The more recent industrial uses of groundnut familiar in the west have yet to engage the attention of the Indian industrialist. Such are the manufacture of lubricants for which groundnut is eminently suited with its low freezing quality, of fuel oil after removal of hydro-carbon, of glycerine which groundnut contains in large quantities and of preservatives for the fish canning industry. The industrial uses of groundnut products are numerous enough to make a large contribution to national wealth. Even the shells left to rot in India are powdered and mixed with animal feed abroad since they have as much food value as straws. The making of paper and extraction of alcohol from shells are common in the west while in India only cardboards have been attempted. The Germans make an animal feed out of the red testa over the kernel. The responsibility for the neglect of these known uses is not only with the industrialists but also with the Government whose duty it is to promote industrial research and dissemination of knowledge and remove obstacles, if any, in the way of private enterprise. It should help the ryot to get a fair price by preventing malpractices of middlemen through the establishment of organised marketing. Crushing of groundnut in the area of production must be encouraged through proper arrangement of railway rates; viz., higher rates for nuts or shells moving out and lower rates for the products of the crushing industry. Industries based on the products if developed in the area of production will make a welcome addition to the income of groundnut tracts which are generally dry districts with rather poor resources in other agricultural income. It is to be regretted that though the standard rates of Indian railways are such as to promote local crushing, they have not done so because of the purely commercial motive of railway companies which readjust those rates to the needs of competition in service as between centres.

The edible use.—The yearly consumption in Madras has been estimated to be 70,000 tons nut which is about 3'36 lbs per capita, Bombay consumes 30,000 tons or 3'73 lbs per head. While 6'7% of production is taken up by edible use in the whole of India, Madras consumes only 4'2% of production. Groundnut being a valuable foodstuff Madras can consume more, especially because it can be a useful adjunct to the poor diet of the Madrasi. Rice is rich only in carbohydrates and is very deficient in protein necessary for muscle building.

GROUNDNUT IN MADRAS

	Protein	Carbohydrates	Fat	Calorific value
Milk (cow's)	3'3	4'8	3'6	65
Eggs (fowl's)	13'3		13'3	173
Mutton	18'5		13'3	194
Beef	2'6		2'6	114
Red gram (dhal)	22'3	57'2	1'7	333
Groundnut	25'33	10'20	40'5	500-600

Hence one ounce of roasted groundnut is as rich as one and onethird ounce of dhal, one and two thirds of mutton, two and a half ounces of egg and eight ounces of milk. It is rich in phosphorous, Vitamin B, especially B₁ and an important member of B₂ group, and has nicotinic acid in fair amounts. In small quantities it can be eaten daily. In America and Europe it is a handy edible like grapes or chocolates, taken to working places. To more than hundred uses the kernel has been put in America in the preparation of eatables, sweets, chutneys, butter, cakes etc. But in poor India groundnut, one of nature's richest foodstuffs, is despised, not only by the rich but by the poor also. An American Scientist says "By reason of its superior food value, the peanut has become almost a universal diet of man and I think I am perfectly safe in the assertion that it will not only be a prime essential in every balanced dietary but a real necessity. Indeed I do not know of anyone vegetable that has such a high range of food utilities".*

* This paper is adapted from a dissertation submitted for the Diploma in Geography examination of the Madras University.

Reviews.

Tamilagam—Urum Perum (தமிழகம் ஊரும் பேரும்) By
R. P. Sethu Pillai. Available at Messrs Alliance &
Company, Mylapore, Madras. Price Rs. 5/-

This is the first attempt in Tamil language to publish a systematic treatise on place names. Elsewhere, especially in European languages, exhaustive scientific treatises have been published basing them on thorough research. Such a work was recognised as a part of the general research done in the fields of history, archaeology and ethnology. Sporadic attempts had been made in Tamil as well by a few authors of *stalapuranams* when they tried to explain the origin of the names of places which they wanted to describe. Fantastic explanations mostly based on myths were invented for the purpose with the main object of giving as much holiness and sacredness as possible to their beloved places. They often led to absurd conclusions, far fetched and imaginary, in as much as their connections were sought with some hero or deed of the great epics of our country. Such absurd explanations are no longer tenable in the modern world. A new and reasonable line has been taken up by the author of this work in his treatment. This is an incentive to further research in this field and it would prove to be a new and fruitful line of work open to scholars.

This work may not be the first attempt in research on place names in our country as far as the language is concerned. The Geographical Association of Madras had published a good number of articles in their journal by collecting the essays read by its members at their annual sessions. Invariably the place names of the district in which the session was held were taken up, analysed and published. One of such articles dealt in general with the place names of the Tamil country. The article was read at the Geography Section of the Science Congress at Calcutta. The author of this book would have utilised the ideas contained in them, since a reference to that journal has been made in this work.

The theme in this work has been divided into six chapters which are again sub-divided into a number of sections. The author's intimate knowledge of Tamil literature has been of considerable help to him in dealing with the analysis of words in finding out their origins. The religious aspect in

place names has been considerable in our country and a large proportion of the work has been concentrated on it. But the author is not solely carried away by that principal aspect alone in this work. He has carefully investigated other sources of information for instance historical, physical features, customs and manners, trend of thought in the locality, literature and other similar aspects. Historical research has been a special feature in this work and the author has culled out much information from ancient literature and epigraphical records which are abundant in Tamil and temple walls.

The ancient classification of the land by the Tamil scholars into five physical features has been taken up as the principal line of work in finding out the origin of names. The sea-bords, the river-courses, the pastoral lands, the hilly-country and the waste or desert lands have been dealt with systematically by the author as of old. Under the head 'Giri' or mountain, examples like Vellianjiri and Bhuvanaajiri (page 5) have been given as names of towns due to their proximity to such mountain. It is to be pointed out that there is no town by the name as Vellianjiri and that there is no hill near Bhuvanaajivi. The suffixes 'Endal' and 'Thanjal' (page 24) are given as water courses, but it should be understood that they mean elevated places. There are many such examples which require a little more research for the purpose of further study. The appendix which gives the names of sacred places is very useful and instructive. There is further scope in adding the large number *Vaippustalams* and the names found in the sacred works of *Thirumurais*, *Thiruppuazh* and other Tamil works. It is hoped that this suggestion would be availed of when a revised edition is contemplated. The author deserves congratulations from the South Indian public for the laborious and intensive work done by him in this work.

C. M. RAMACHANDRA CHETTIAR.

A class book of Geology of India for Junior Students by
N. C. Mittal. Publishers: Messrs Malhotra Bros., Book
Sellers and Publishers, Jammu, India. Price Rs. 2-8-0.

The book is an elementary treatise on the stratigraphy of India with a short note on the economic minerals of India and a separate section dealing with the economic Geology of Jammu and Kashmir. The book, according to the author, is meant for the Intermediate students of the Punjab University.

After a brief chapter on the physical features of India, stratigraphy of India is dealt with, system by system, but the author could, with profit, have devoted some space to the palaeo-geographic conditions of the various periods.

In a work of this type, the value of the book will be enhanced by some pictures of the fossil flora and fauna and some maps of the detailed geology of the more important type areas. Unfortunately the book is totally devoid of the former and the only illustrations contained are (1) a geological map of India and (2) a map of India showing mineral localities. The former is not quite so clear and the latter, will not serve its purpose as the different symbols used are not quite distinct from one another, and on poor reproduction on a reduced scale, clarity has been lost.

A perusal of the book makes one feel that it may have been got up in a great hurry. Apart from printers' mistakes from which practically no page is free, the language of the book leaves very much to be desired.

The author has in his introduction acknowledged his indebtedness to the records and memoirs of the Geological survey of India, 'Geology of India' by D. N. Wadia and a Summary of Geology of India by E. Vredenburg; but it is surprising to note that in a book published as late as January 1945 no reference has been made to the most recent and fairly comprehensive treatment of Indian Stratigraphy—Geology of India and Burma by Dr. M. S. Krishnan.

V. KALYANASUNDARAM

