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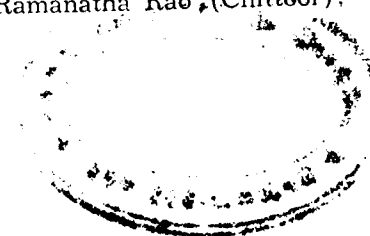
The Journal of The Madras Geographical Association

Vol. 8. July 1933 No. 2

Proceedings of the 4th Geographical Conference of the Madras Geographical Association, Trichy Session

The Fourth Conference of the Madras Geographical Association commenced its sittings on the afternoon of Tuesday the 16th May 1933 at the Lawley Hall, Trichinopoly, under the presidency of Mr. K. A. Nilakanta Sastri, M.A., Professor of Indian History and Archaeology in the University of Madras.

Besides the following members of the Association, there was a large gathering of visitors:—Messrs. A. K. Krishnaswami Iyer (Madras), T. S. Suryanarayana (Madras), K. Rangaswami Iyengar (Madras), V. Saranath Iyengar (Trichy), K. A. Nilakanta Sastri (Madras), E. S. Radhakrishnan (Trichy), T. S. Anantanarayanan (Lalgudi), M. S. Sabesan (Madras), George Kuriyan (Madras), B. M. Thirunarayanan (Madras), S. T. Ramanujam (Trichy), S. Ramakrishna Avadhani (Trichy), R. Agoram (Tanjore), G. Narayanaswami (Madras), C. S. Rajagopalan (Madras), V. K. Sourirajan (Madras), N. P. Ramanathan (Namakkal), M. Krishnamurthi (Trichy), V. K. Rajagopalan (Chidambaram), N. S. Narasimham (Trichy), S. Natesa Iyer (Pudukottah), P. Natarajan (Pudukottah), R. Krishnaswami Iyer (Pudukottah), V. K. Rajagopalan (Pudukottah), Srinivasa Iyengar (Pudukottah), M. R. Rangaswami Iyengar (Periyakulam), V. S. Ramaswami Iyenger (Madras), J. N. Paramasivan Pillai (Coimbatore), S. Natarajan (Madras), V. Krishnan (Madras), T. S. Sundaram Iyer (Ambasamudram), S. K. Devasikamoni (Trichy), N. Subrahmanyam, Secretary (Madras), P. K. Ramanatha Rao (Chittoor).



S. S. Krishnaswami Iyer (Secunderabad), A. L. Sundaram (Karur), R. S. Srinivasa Iyengar (Karur), V. Pitchu Iyer (Negapatam), N. Achutharaman (Erode), S. Ananthanarayanan (Trichy), K. N. Krishnaswami Iyer (Srirangam), R. Ramakrishnan (Andiyur), N. Rangaswami Iyer (Kumbakonam), S. Srinivasamurthi (Kurnool), C. G. V. Subbiah (Nandyal), N. Divakar Rao (Coonoor), J. Sugirtha Raj (Tuticorin), G. Mahadeva Iyer (Madras), V. Sivasubrahmanyam (Madras), D. Narasimhachari (Madras), R. Srinivasan (Madras), R. Seshagiri Rao (Madras), N. Sitaraman (Batlagundu), C. Visvanadhan (Manamadurai), S. Raghunadhan (Madras), G. V. Rama Iyer (Kumbakonam), Vaitthinathaswami Iyer (Chidambaram), T. G. Panchapagesa Iyer (Perambalur), V. Garudadri (Devakottah), Seetharama Gupta (Madras), K. S. Seetharama Iyer (Kattuputhur), V. Ramakrishnan (Vizag), A. R. Srinivasa Iyer (Madras), A. S. Ramaswami Iyengar (Srirangam), K. N. Rangaswami Iyer (Srirangam), M. S. Paul (Udayarpalayam), T. D. Govindaswami Pillai (Lalgudi), Lakshmikantham (Vridhachalam), M. Gopala Iyengar (Chidambaram), A. N. Ardhanari (Bhavani), K. N. Subramania Chetty (Edappadi), B. H. Krishna Rao (Vizag), T. K. Kothandaraman (Namakkal), V. Guruswami Sastri (Tirukkattupalli), A. N. Schwartz (Madras).

WELCOME ADDRESS

Mr. Khan Bahadur P. Khalifullah Sahib, M.A., B.L., M.L.C., Chairman of the Reception Committee, delivered the welcome address in the course of which he said that man was a creature of environment, and History is but a study of the activities of man placed in the peculiar geographical conditions of his country and its environment. He was sure that Trichinopoly was not a great puzzle geographically and would give ample scope for study. As far as he was aware, in parts of Perambalur taluk, they had deposits of stone slabs which proved beyond doubt that the area must have been submerged under the sea at one time or other and he learnt on reliable authority that there were clear traces of petrol deposits in the northern part of this district and it was an admitted fact that there were rich mineral deposits in parts of Perambalur and Ariyalur, well worth investigation and research.

They were meeting at a time when there were several changes and alterations of a sweeping character in contemplation by the powers that be, which moved them to think deeply and deliberate on

everyone of those questions and convey in no unequivocal terms the views of this Conference thereon. It was a matter for deep concern that while subjects of great human interest like History, Geography and Science were accorded a prominent place in the curriculum of studies in several civilised countries of the world, in this country alone due prominence was not attached to the study of Science and Geography. They must be given a place in the 'A' group of subjects, in the S. S. L. C. Scheme, so as to stimulate the interest of the students in their study during at least the Secondary School years.

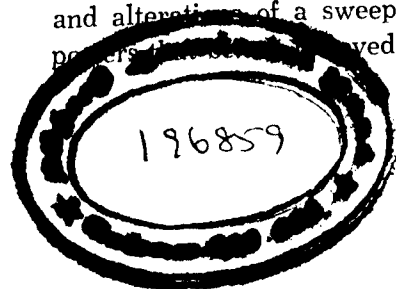
Mr. S. K. Devasikamani, Headmaster, Bishop Heber High School, proposed Professor Nilakanta Sastri to the Chair. He said that Mr. Sastri was a great educationist of Southern India and a sound critic. They required such a critic to guide their deliberations especially at a time when Geography is about to be disowned.

A time there was, he said, when Geography was like the Cinderella in the story. About three years ago it came to its own in the High School. It was grouped along with History. The circular recently issued by the Director of Public Instruction marked a new era in the study of Geography. Perhaps it may again go down; and they therefore wanted somebody like Mr. Nilakanta Sastri to champion their cause. He was lucid in his speech, had a capacious understanding and incomparable intellect and his wide knowledge of History and Archaeology eminently fitted him to preside over the Conference.

Mr. George Kuriyan of the Department of Geography, Madras University, seconded the proposition. He said that History and Geography had been closely allied subjects for many years; and Professor Nilakanta Sastri as the Head of the Department of Indian History and Archaeology deserved to fill the chair of their Conference.

Mr. M. R. Rangaswami Iyengar, Headmaster, Board High School, Periyakulam, supported the proposition which was duly carried.

Professor Nilakanta Sastri then delivered his presidential address.



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PRESIDENTIAL ADDRESS

Less than two years ago, in his retrospect of geographical studies in Britain the Rt. Hon'ble Sir H. J. Mackinder said:

"About half a century has elapsed since the Council of the Royal Geographical Society came gradually and with some controversy to the conclusion that if it would succeed in reforming geographical education it must transfer its attention from the Schools to the Universities. It was at Oxford, our senior University, that a beginning was made. My memory goes back to my first lecture as University Reader there forty-four years ago. I had an audience of three, one man and two women. The man was a Don who told me he knew the geography of Switzerland, for he had just read Baedeker through from cover to cover. The University of Oxford is now at long last to complete the work of my successors by electing a Professor of the subject with full status and emoluments. In the interval every University in the country has set going the teaching of Geography. Thus, the decision to establish the Oxford Chair comes as the endorsement of a general movement and crowns a national development." (Scott. Geogr. Mag. 1931. Vol. 47, p. 321.)

Geography as an independent subject of study is thus a new creation, and its place in the curriculum of studies and as a subject for research still provides matter for argument.

As a school boy I had a little to do with Geography. I recall that Geography was then, as it still is, an annexe of History: in the early stages, Geography was almost entirely a string of names, of continents, countries, peninsulas, mountains, peaks, rivers, tributaries, towns, and, last but not least, exports-imports: later, there was some talk of seasons, eclipses, tides and so on, and I belonged to a school which made a name for its enterprise in cultivating the newest methods and obtaining the best teaching appliances for Geography. I am afraid these opportunities were wasted on me, and the only thing I recollect of the most advanced Geography classes I attended is my having heard some fine descriptions of natural scenery read out to the class by my teacher. But I do not believe that many students of my generation had equally good opportunities of geographical education: speaking generally, it was the era when exports and imports made up Geography, and dates and events constituted the whole of History.

Geography has been gaining better recognition amongst us in recent years and the work of this Association is to serve as a clearing house of the latest researches in the subject. One of the features of the annual conference of the Association is to take up the detailed regional study of the locality of the meeting, and I have no doubt that, presently, you will be invited to discuss a number of interesting and instructive papers on the Geography of the Trichinopoly Region.

A geographer may feel that the recognition accorded to his subject is still slow, meagre, and half-hearted: it is still History and Geography, much to the detriment of the second member in the unequal combination. In the drama of human evolution, the geographer argues, the theatre has been of equal importance with the actor, and the prevalent partiality for the study of History as against that of Geography is somewhat irrational. I remember the brave efforts our geographers made some time ago to produce a syllabus of Geography for the S. S. L. C. which could hold its own by the side of the histories of England and India taken together: they succeeded better than they knew, and the result is seen now in the disaster that threatens to befall both History and Geography in our secondary education course. The same plan was followed by the enthusiasts for Elementary Science and the consequences are similar.

Though cultivated almost from the beginning of recorded history, Geography has always hovered between a hobby and a science. Parts of it, Cartography and Mathematical Geography for instance, were from the beginning characterised by a great amount of accuracy and certitude and have been steadily improved by generations of workers: the rest was superficial observation and vague descriptions. The new Geography which aspires to the position of an independent science is, as Mackinder has pointed out, a creation of the last half a century.

To one who is not a geographer, some puzzling questions inevitably present themselves on the nature and content of geographical studies. He is tempted to ask if Physical Geography is really more than a loose leaf album of strips torn from the natural sciences and manipulated by each geographer after his own fashion; if Mathematical Geography is not more Mathematics than Geography, and if Human Geography again is not a patchwork of data more systematically treated in Economics, Politics, Medicine

and other sciences. Geography in his view, seems to lack the unity which characterises the subject matter of other sciences, and consequently the geographer, being forced to be the Jack of all Sciences, is master of none.

To such enquiries and doubts the geographer must produce a convincing answer, or the future of his science is imperilled. He may indeed point out that criticism is easier than defence, and that defence even though well founded is often difficult. Of the positive contribution of Geography to human knowledge in one sphere, there can be no question. The task of describing the earth accurately by means of scientifically constructed maps based on travels, surveys, observations and so on is preeminently the work of Geography, and if the geographer had not done it, and done it so well, some one else would have had to do it. Then, the true relation of Geography to the other sciences cannot be understood without realising that the central aim of Geography is the study of the earth as the home of man, of 'the human habitat', of how it affects man and his work and is in turn transformed by these. Mackinder illustrates the position thus: "When I was in Africa", he says, "I remember seeing before me a great billowing slope, clothed with dense forest, dark green and burnished in the sunshine. I entered and traversed that forest for a long day. When I emerged and looked back there was the same forest, and yet to my vision it was not the same, for I could now appreciate its texture: I had not merely sight of it, but insight. So it is with the trained geographer: he starts on the shoulders of the scientific specialists, he traverses his natural regions, and emerges with a new grasp and insight of the world as a whole." (Scott. Geog. Mag. Vol. 47. 1931, pp. 328-9.) But having said this, he is modest enough to add: "This, if I mistake not, will be his essential contribution to the shaping of our human destiny in the not far distant future." Geography to-day resembles Economics in this, that no two Professors will agree on their estimates of the relative importance of the various factors at work in individual cases, with this difference, that Geography has never yet attained even the thin core of doctrine and method on which the economists of the world are generally agreed. Much hard thinking will be needed to effect the synthesis by which the two great branches of Modern Geography, Physical and Human, can be integrated into a united whole: but even here there is no lack of fertile suggestion. It has been pointed out, for instance, that both Physical and Human Geography are essentially "concerned with the carriage and stor-

age of energy on the surface of this earth, and the vehicle is the Protean element, water. Even the lightning is incidental to the cloud, and broadcast music depends on steam or water-power." (Scott. Geog. Mag., p. 334.) This perhaps sounds very much like poetry: but does it not sometimes happen that the poetry of to-day is the science of to-morrow?

I wish to say a word on the relation of Geography to History. Historical Geography is wider than what a historian like Freeman understood by that expression. To him it was only historical topography, in particular the shifting of political frontiers. The new conception of Historical Geography is that of a study of the effects of the surface relief upon political and racial boundaries, upon the whole course of civilisation. While the theoretical conception of the scope of Historical Geography is thus stated easily enough, there is not available as yet any scientific method of working out in detail the positive effects of geographical environment on History. That is the reason why, to the chagrin of the geographer, books on History open with vague, but respectful references to the influence of the Geography of a country on its History, and with more or less satisfactory descriptions of the Physical Geography of the countries to which they relate and for the rest of it, forget all about Geography, except when a battle or a campaign clamours for its mention once again. It is no use blaming the historian for this so long as geographers themselves do not speak with settled convictions or evolve a consistent method of study. So far the historian has not been much impressed by the attempts made by geographers and others to explain the course of History by the geographical environment and changes in it, with the result that he still prefers to build on the surer foundation of archaeology and literature.

Take, for instance, Huntingdon's theory of pulsatory changes in climate. It is a theory which has passed through many changes itself, and I shall sketch its outline from the most recent edition available to me of his *Civilisation and Climate* (1924). Climate, Race and Culture are "the three great factors in determining the conditions of civilisation. As to which of the three is most important it is impossible to say." (p. 387.) In historical times, climate "seems to have undergone a pronounced series of pulsations which have varied in character from one part of the earth to another" (p. 6.) and the effects of these changes have depended on the extent of the resulting departure from the optimum con-

ditions of climate (p. 6.), which vary according to a nation's stage of civilisation, and perhaps also from race to race. (p. 17.) The mechanism of these changes consists in variations in storminess and rainfall, rather than in temperature: a shifting of the areas of cyclonic storms alternately toward and away from the equator. (pp. 9-10.)

Criticism and reflection have led Huntingdon to formulate this theory which is so very different from Koropotkin's simple hypothesis of progressive desiccation. But one may ask if in introducing so many refinements into his theory of the climatic basis of History, Huntingdon has not greatly obscured the issue. Even if one concedes the pulsatory hypothesis without argument, and it will not be forgotten that several geographers do not concede either this hypothesis or the 'blanket theory of climate' used to cover such widely different facts as polyandry in Ladakh and the decline of Ancient Greece, one is at a loss to see what it all means. The effects of climatic changes depend not on the amplitude of such changes, but on the deviations they cause from the optimum climatic conditions. And these latter depend on the stage of civilisation reached and perhaps also on Race. I have a habitual distrust of positive arguments based on the conception of the optimum, for the optimum in the social sciences is not definitely ascertainable, and not definable except in relation to results. And where these very results form the subject of debate, the concept of the optimum can afford no help. Huntingdon is rather impatient with the historians who say that climatic changes are not needed in order to explain the historical facts. He argues that the primary question is whether climatic changes have taken place in historical times, and if they have, the historian is bound to take note of them and enquire into their effect, just as he inquires into the effects of barriers like Alps or of great men like Socrates. (p. 342.) But his own statement that the effects of climatic changes depend on the deviation from optimum climatic conditions caused thereby, that, in plain words, the effects of climatic changes may be great or small according to the circumstances of each individual case, makes it seem less worth while for the historian to pursue so elusive a game.

The historian cannot also help reflecting how little the conditions of physical climate seem to have with such world-historic events like the Reformation or the French Revolution, the Great War or the Russian Revolution, and how much more important

the moral and spiritual climate is in explaining these great occurrences. And if from what he sees more clearly, he makes an inference in relation to what is not so clearly recorded, and concludes that either there were no important climatic changes in historical times, (the case of Geological periods stands on another footing), or if there were, they had not such consequences as to merit the historian's attention, he is probably only following the best course that is yet open to him. His presumption that in the history of civilisation the "Social heritage" counts far more than the physical environment remains unshaken.

I think it was Buckle who first made an elaborate attempt to explain the history of India by the rice-eating propensities of her people. The modern geographer makes a more general effort and has a theory regarding the civilisation of the rice-fields. One of the most remarkable statements of this theory is the chapter on "The Civilisation of Rice Lands" in Huntingdon's *The Human Habitat*. It is not a mere description of the characteristics of rice-civilisation, but an attempt to explain the history of rice-lands in terms of their geographical environment. I have not the time to examine here in detail the amazing contentions and the highly imaginative excursions into pre-history calculated to arrest our attention, but this I will say, that when we come to historical times, it is no longer a case of Geography explaining History and bringing fresh light to it, but of History controlling the thought of the geographer. The chapter concludes with the remarkable statement: "Our purpose here is merely to point out that in the past, and perhaps in the future, the conditions that favour the greatest density of population and the greatest aggregations of human beings are those which make rice cultivation feasible for people with tropical appetites, desires and modes of living, and yet with a high degree of culture according to tropical standards." The climate, in other words, which is good for rice, also necessarily makes for low economic standards and a conservative social system. To me this looks more like propaganda and less like science. It is quite possible to explain much of the present backwardness of the tropics in terms of human action which has nothing more to do with climate than with the Binomial theorem; and Huntingdon makes not the slightest attempt to allow for these factors and to determine the residue that may, if at all, be attributed to climate, which at one time did not stand in the way of some countries in the tropics reaching a relatively high culture, not merely according to a tropical, but by a more absolute standard.

Let me point to another instance of the alliance between Geography and propaganda. This time I choose my example from a definitely propagandist book. For the benefit of an American audience whom he addressed in 1930, Lord Meston began his discourse on the origin and growth of Hinduism: "permeating our general conceptions of bygone India must be that of a country singularly isolated and absorbent, with few entrances and practically no exits. In Europe the ancient world was one of much racial movement and migration; the mediaeval world was busy with the comings and goings of soldiers and adventurers, travellers and scholars, for whom national boundaries were of small account. Not so with India. There was no continental interchange of men and thought. Almost a continent in itself, its land frontiers were great mountain masses, the loftiest and densest of this globe, while elsewhere the unknown terrors of the ocean guarded it. Into this pocket on the earth's surface there flowed wave after wave of human race—not to recede again—but to soak into the soil It lived in seclusion, in itself and for itself, churning over and over for centuries, under enervating skies, its own speculations on life and eternity. No cleansing winds of outside thought swept through the galleries of the mind".* In this tirade on India's isolation, Lord Meston grudgingly admits that there was some commerce by sea with the west and that we hear of occasional missions of western courts; but this intercourse with the outer world was all, according to his Lordship, very partial and spasmodic.

A mountain and a sea frontier are not the monopoly of India, and in sober truth they did not act as barriers to foreign intercourse more than they did in other countries, Italy for instance, and in the eyes of the historian, the isolation of India was never so pronounced as in recent historical times after the advent of the European nations on her soil. Much recent work in archaeology, philology and anthropology is calculated to show with increasing distinctness the place of Indian culture in a belt of closely related and freely communicating cultures spreading across the whole of Southern India and the Pacific ocean, and to bear down the superficial estimate of India's isolation held by the last generation of India's historians. A perusal of works like Hudson's *Europe and China* or Ferrand's *Textes Arabes* etc., bearing on the trade of the Indian ocean for many successive centuries will

* Nationhood for India (Oxford 1931), pp. 1-2.

show how regular and important were the contacts India maintained with the countries to the West and East of her. Stein's explorations on the one side, and the work carried out by the Dutch and French archaeological departments in the East Indies and Indo-China reveal the wide range and firm hold of Indian influence on the cultures of foreign lands.

Now my object in dwelling at some length on the limits of Historical Geography is not to argue that the historian has no interest in geographical studies or that the geographer should make no attempt to explain historical facts from geographical environment. Geography is a young science and it is perhaps difficult for any science in its adolescence to resist the temptation to be flighty and meretricious. Geography must beware of going too far, and asserting much more than it can, with the data in its possession, prove to the satisfaction of fellow-workers in other fields. When all is said, Geography is a science of things and at the other end of the pole is Man; the geographical outlook is apt to stress the influence of the environment too much, and unduly neglect the various human influences at work to transform the environment and overcome obstacles presented by it. Any suggestion that this privilege of humanity depends upon Latitude or Longitude cannot be received with too much caution. Geography is no stranger to exact and scientific methods in some of its branches and no one dreams of calling into question the great achievement of Geography on these lines. But in all that relates to human character and History, the geographer has perhaps unconsciously, been too often the plaything of accident or prejudice. With patience, a scrupulous regard for objective data, and readiness to allow for the play of extra-geographical influences on the problem on hand, better results will no doubt be reached. Historical Geography is an exacting study; the continuous action and reaction between environment and human progress is the most difficult aspect of dynamic human geography; and the problem is always complicated by the presence of the imponderable considerations attaching to race.

Of the teaching of Geography in our schools I cannot hope to say much, or indeed anything, that is likely to interest you. With your leave, however, I wish to make one general observation. I am tempted to make it for two reasons. First, I believe that there is a real need for a radical change in our methods of teaching not only of Geography, but of most of our school sub-

jects. It seems to me that our practice makes education too much of a process of stuffing the mind and too little of what it should be, a process of drawing out the latent capacity of the mind. We must put a stop at the earliest opportunity and as completely as possible to the phenomena of the teacher who lacks a full view of his subject and gets up 'notes' from day to day on the successive heads of a heavy syllabus, and of the pupil assiduously 'getting up' these notes for the examination. Secondly, the question of the content of our secondary education course is becoming a serious problem, and the authorities in charge of the secondary course appear to me to be embarking on a reform which, in the name of "freedom in education", seems calculated to maim the secondary course hopelessly. Geography loses heavily in the change and so does History.

We have short memories. Not many years ago, the cry was against the premature specialism of the old S. S. L. C. Course and for an all round general education. I believed in that plea then, and nothing has happened to change my belief. I must say this, however, that when we came to grips with the details, we saw that the enthusiasm of specialists outran the pupils' capacity for assimilation; and the demands of the men of science, that the pupils who seek scientific education in the University must have a special preparation for it at the school stage, had to be met somehow. We got a somewhat overloaded group of five compulsory subjects, and a single optional subject, literary or scientific for pupils seeking entrance to the University, that is, in practice, for every pupil, for there is none so mean as not to aspire for a University degree. Now the pendulum swings back to the old position, three compulsory subjects and two options. I am afraid that this course, if decided upon, would leave our secondary education course still in a position of unstable equilibrium, and we may be up against the whole problem in the course of a few years; for in this country, public opinion has a way of being somnolent at the proper time when reforms are on the anvil, and of beginning to kick against them just a little too late.

With the rapid increase of factual knowledge on all hands, the problem of the content of the school course is becoming increasingly difficult of solution in all countries of the world. Ours is not by any means the only country where the school curriculum is the battle ground of specialists, each sincerely actuated by the firm conviction that no education can be complete which does not

give a good grounding in his subject. But we have other difficulties besides. Our elementary schools are hopelessly backward, and in one word, we do not get our money's worth even for the small expenditure on this branch of our educational system; our secondary schools do not recruit pupils coming out of well managed schools, and we have no system of efficient and compulsory education to the age of fourteen on which the high school course may be built. And despite the option to teach through the mother tongue, our teachers still prefer the English medium for the bulk of their work, a medium which does not conduce to the comfort of either teacher or pupil.

It seems to me that to attain a proper balance in our high school course, we must not cut down the content so drastically as to confine the compulsory part of the course to the three R's and then give the choice of any two odd bits from a wide range of science and arts subjects. The better method seems to be to do away with the single optional subject and use the time so released not to intensify the training in the general subjects, but to introduce the much needed variety and interest in the school programme in the form of options with a vocational and technical bias. In the general and compulsory part of the course, there must be worked out a reasonable syllabus in each subject and an attempt made to diminish the strain of the examination. The aim of the syllabus in each subject must be to bring the pupil into intimate contact with a selected part of the subject; and equip him with the capacity and the desire to carry his studies further on his own. For this, more than the syllabus, the method of its treatment in the class-room counts. The teachers must be able to furnish skilful guidance through the subject-matter which lies before the pupil and teach him to put his time to the best use. And the type of examination must be such as will test, not the capacity to memorise and repeat facts at proper notice, but the general ability of the pupil and the extent to which he had been able to assimilate the subjects in his course and make them part of his permanent mental equipment.

I believe that experts in Geography, if they feel that there is something in what I have said, can and will contribute their quota towards improvements along such lines. It is with some diffidence that I commend to your consideration the method suggested by the following description of the teaching of Geography in a German school of to-day: "A class of twelve-year-old boys has recently

returned from a journey to the island of Sylt in the North Sea. There the thirty-eight lads spent two weeks with their teacher, who is continuing to use those common experiences in class work. On the walls of the room are many maps, sketches, and paintings made by the pupils during or after the trip. A picture-map of the journey down the Elbe River, a topographical map of the island, and other diagrams showing the region and route followed were made at home by the pupils after they had been given some instruction in the technique of enlarging maps accurately. There are many drawings and paintings of fish seen in the markets and in the waters around the island. A record of the tidal stages was kept during their stay at the seashore. A number of stories of camp life and descriptions of the trip have been written voluntarily."

SECRETARY'S REPORT

After the Presidential Address was over, Mr. N. Subrahmanyam, Secretary of the Association, then presented his report. He said:—It has been usual for the last three or four years at each Conference for the Secretary just to make a short retrospect of the work of the Association and speak about its progress. In the District of Trichinopoly in which our Conference is now being held we have sometimes plenty of members; sometimes there is a paucity in membership; at any rate for the public, the Geographical Association and its work may not be as well known as it ought to be.

The Association is now beginning its eighth year of existence; and it has been running its journal these eight years as a quarterly with a variety of aims and objects. The objects of the Association as published in the rules are: (1) to promote geographical knowledge, (2) to secure for Geography its proper place in the High Schools, the University and its constituent and affiliated colleges, (3) to help to improve the methods of teaching Geography, (4) to work for a School of Geography being started and (5) to promote regional studies about South India from various points of view.

All the foregoing aims and objects had been kept in view these years and some of them have borne fruit in fair measure. To promote geographical knowledge and to promote regional studies of South India have been the two most prominent, however,

and with these aims before us we have had a number of papers published in the Journal of the Association from time to time; and for the last four years we have been having conferences of this kind. Probably this year we will be having a short business session also. But till now it has been purely an academic conference. It was four years ago that we started this new activity of the Association at Coimbatore under the protecting wings of the S. I. T. U. For we thought it would conduce to the mutual benefit of the members of the S. I. T. U. as well as to those of the Madras Geographical Association to meet more or less simultaneously.

The main aim of the Conference has been to make a regional study of the particular district in which the S. I. T. U. Conference meets. The second Conference was held in Malabar, the third in Madura and this is the fourth.

The other aim, to help to improve the methods of teaching Geography, was kept steadily in view all these years and Summer Schools have been conducted—the fifth of which was held during the last two weeks at this very place under the joint auspices of the Geographical Association and the Provincial Educational Conference.

To secure for Geography its proper place in the Universities and their affiliated colleges, there has been a good deal of propaganda done both on the platform and in the Press as well as through the Journal of the Association. But there is once more need for doing such propaganda to avoid what we may regard as another calamity that threatens the position of Geography in the Secondary School.

The aim of starting a School of Geography has also been kept in view from the outset, and the University was persuaded directly and indirectly so that we have now a Department of Geography established in the Madras University. Though it is now kept on a temporary basis, it is hoped that this Department will soon be placed on a permanent footing.

As usual, we have received this year also quite a number of papers and I do not know how many of them could be read and discussed; but all will appear in a special number of the Journal, containing the proceedings of the Conference.

A message from M.R.Ry. Rao Sahib T. S. Subramania Aiyar, wishing the Conference every success, was next read by the Secretary.

A paper on *The Population of the Trichinopoly District* by Mr. B. M. Tirunarayanan, B.A. Hons. (London), was then read and discussed. (All the papers on the Trichy District with the discussions will be published in the next number of the Journal.) The Conference then adjourned for the day.

It re-assembled on the afternoon of the second day (17-5-33) at the Saraswathi Hall, National College, and devoted well-nigh two hours in the reading of papers and discussions thereon.

The papers read in this session were the following:—*The Meteorology of the Trichinopoly District* by Mr. B. G. Narayan, B.Sc., of the Kodaikanal Observatory; *The Influence of the Physical Features of the Trichinopoly District on the History, Communications and Economic Conditions of the area* by Mr. C. A. Krishnamurthi Rao, M.A., of the Madura College; *The Urban Geography of Trichinopoly and Srirangam* by Mr. R. Dann, Director of Town Planning, Madras; *Fairs, Festivals and Shandies* by Mr. V. Krishnan, M.A., Dip. in Geo.

In the intervals between the sessions members went on excursions in separate parties to the Golden Rock Railway Workshop, Grand Anicut, Upper Anicut and other places of importance in the neighbourhood.

The concluding session of the Conference was held at the Saraswathi Hall on the afternoon of Thursday the 18th May, when the following three papers were read and discussed:—*Mediaeval Town-Planning in India* by Mr. C. A. Krishnamurthi Rao; *Place-Names of the Trichinopoly District* by Mr. S. K. Devasikhamani, B.A., L.T., Headmaster of the Bishop Heber College; and a paper on *Human Geography* by Mr. T. S. Sundaram Aiyar, B.A., Geography Assistant of Ambasamudram High School.

For want of time, the following papers were taken as read:—*Physical Geography of the Trichinopoly District* by Mr. T. N. Muthuswami Aiyar, M.A., L.T., of the Engineering College, Guindy; *Soils and Products of the Trichinopoly District* by Mr. P. R. Anantarama Aiyar of Board High School, Lalgudi; *Economic Geography of Udayarpalayam Taluk* by Mr. M. S. Paul

of Board Secondary School, Udayarpalayam; *The Agricultural Geography of the Trichinopoly District* by Mr. A. S. Rajamanikam, M.A., University Research Fellow in Geography; *Communication-lines and Town-sites of the Trichinopoly District* by Mr. N. Subrahmanyam, M.A., L.T., F.R.G.S.; *Lalgudi and its Environs* by Mr. T. S. Anantanarayana Aiyar, B.A., L.T., of Board High School, Lalgudi; *The Urban Geography of Karur* by Mr. A. L. Sundaram, B.A., L.T., of Municipal High School, Karur; and *The Cauvery Delta and the Kallars* by Mr. J. S. Ponniah, M.A., of American College, Madura.

RESOLUTIONS

Two resolutions were then placed before the Conference for adoption. Mr. Sastriar took the opinion of the House, after reading the resolutions, as to whether or not they were non-controversial and having found the House agreed that they were non-controversial and with the approval of the House moved them himself and they were carried unanimously. The resolutions were in the following terms:—

“This Conference is of opinion that Geography should not be deleted from the compulsory A Group in the S. S. L. C. course, as in any system of sound Secondary Education Geography should find a place as a natural link between the Sciences and the Humanities.”

“With a view to help the growth of scientific study of Geography in all its aspects in this Presidency, this Conference recommends that each High School in this Province should make arrangements to record the daily temperature, pressure and rainfall and direction of wind in its locality and report the same every month to the Madras Geographical Association for consolidation and report in the Journal of the Association.

CHAIRMAN'S CONCLUDING REMARKS

In bringing the proceedings to a close, the Chairman made a few remarks on the work of the Conference and the possible lines of improvement. But before doing so, he said he must give expression to his feelings of gratefulness and thanks to Mr. Subramania Aiyar and the Geographical Association for the opportunity given to preside at that session and to learn so much that was of profit and pleasure to him.

There was an advantage as well as also some disadvantage, Mr. Sastriar proceeded to say, in a conference of that kind being

Human Geography *

By

MR. T. S. SUNDARAM AIYAR, B.A.,
Geography Assistant, Tirthapathy High School, Ambasamudram.

WHAT IT IS

Geography deals with a large number of phenomena connected with the earth, viz., structure and relief of land, atmospheric conditions, plant and animal life, man and his various activities such as, mining, manufacture, commerce and communication. The greater number of these phenomena are in no way influenced by human activities. "Whether man exists or not, water will evaporate under the heat of the sun, and air charged with vapour, when driven against a mountain wall, will rise, expand and cool causing precipitation. Whether man exists or not running water will carve valleys, and the detritus carried along by the waters of streams will tend to spread out in alluvial cones or deltas as soon as the force that carries it weakens. Whether man exists or not, the glaciers will smooth their rough beds, wind bearing grains of sand will sculpture the rocks of the desert and sea-waves will cause the cliffs to crumble." In fact the whole surface of the earth shows changes due to the various denuding agents that have worked upon it.

A considerable part of plant and animal life also escapes the influence of man; for the earth would be covered with vegetation and peopled with animals even if man did not exist. All these facts form the foundation of *physical*, or *scientific side* of Geography.

Besides these, we find, on the surface of the earth, a new and very extensive series of phenomena: groups of human beings, villages and towns, roads, railways and canals, cultivated fields and irrigated channels, domesticated animals, quarries, etc. All these facts in which human activity has a part form a truly special group of surface phenomena—"a

* A paper read at the Fourth Geographical Conference held at Trichy.

HUMAN GEOGRAPHY

complex group of facts, always within the limits of Physical Geography but having always the easily discernible characteristic of being related more or less directly to man." To the study of this specific group of geographical phenomena the name "*Human Geography*" is applied.

THE TWO ASPECTS OF HUMAN GEOGRAPHY

This *human geography* has two aspects:—

(1) Man's life is dependent upon his environment; i.e., his food, clothing and mode of life depend upon the physical features, climate and productions of the surrounding region.

(2) Natural features are modified by man's action; i.e., where nature is not favourable to him, man is able to conquer her and subdue her.

Let us now try to illustrate what we mean by these two aspects.

THE FIRST ASPECT

Let us first take the *tundra* which is a belt of frozen swamps along the Arctic coast. In summer the earth thaws only to a depth of less than two feet; hence agriculture is impossible and no food crops can be raised. But fish are found in the seas and rivers, and a few fur bearing animals on the outskirts of the forests in the south; so people have to live by fishing and hunting. The only useful animal that thrives here is the reindeer which lives on the moss that is found under the snow. It is the chief support of the scattered families that live here. It provides milk and meat for food, skin for clothing, horn or bone for tools and sinews for cord or thread. The reindeers wander freely in search of food, and so they have to be followed by their owner and his family. Hence the people of the tundra lead a *nomadic* life, and therefore they live in tents. Life is very hard and precarious; hence the old, the sick and the superfluous children are very often left to starve and perish. Thus we see that man's food, clothing, mode of living and his attitude towards his relations and fellow creatures are all affected by his environment.

In the Arctic Islands of North America and along the shores of the mainland live the *Eskimos*. Here the physical and climatic

conditions are the same as those of the Asiatic tundra. The Eskimos also live by fishing and hunting. They have no reindeer, but have eskimo dogs to draw their sledges. Men, women and children are all clothed in fur. In summer the Eskimos live in portable skin tents, but in winter they live in ice-houses, called *igloos*. The people do not wash themselves often, as water is hard to get except by melting the snow. Mothers often remove the dirt from the faces of their children by licking.

In the *steppes* or grasslands, the people are shepherds who pasture great herds of cattle, sheep, goats, horses and camels. When these animals eat a given area bare, they move to another place; hence the people of the steppe also lead a nomadic life. They live in convenient and comfortable round tents which can be opened in sunshine and closed in storm; but for winter they build houses and stables near a water supply. Meat, butter, cheese and milk form their chief food. They carry on important home industries such as the making of camel's hair cloth, carpets, rugs and hair-cushions. As food supply is greater here than in the tundra, the old and the sick are not left to perish. To tend and water large herds, a large number of people are required; hence the head of a family sometimes takes more than one wife.

In the *desert* nothing grows for want of moisture, even though the soil is fertile. But in the oases, agriculture and pasturing are possible; hence people lead a settled life there. In other places they are nomads. The camel is the chief beast of burden, for its feet are suited to walking on sand, and it can remain without food and drink for a long time. The Bedouin Arabs who are also tent-dwellers, live by guiding caravans or giving their camels for hire. They are sometimes driven to the necessity of plundering the caravans as food is scarce.

In *agricultural* areas, man cultivates the land and lives upon the produce got from it. Here the necessity for wandering ceases and fixed homes are made. People have leisure to observe and think, and have developed in all the arts of civilisation. It is remarkable that the great civilisations of the world have developed in the fertile river valleys of the temperate and sub-tropical regions. In China, the north of India, Mesopotamia, Egypt, Greece, Italy and later in temperate Europe and America, nations have advanced to high degrees of civilisation. Here nature gave abundant supplies, but demanded some effort, some observation and labour. The time and energy left to the peoples of

these regions enabled them to pursue the higher ambitions that go to make great nations. But in the equatorial regions, the luxuriant plant and animal life left neither room nor inclination for such activity. Hence people there are still primitive.

In the equatorial regions where temperature is very high and rainfall abundant, the plains are unhealthy and almost invariably fatal to the Europeans, and dangerous even to the natives. Hence, people had to seek more favourable regions on mountains and plateaus where at an elevation of more than 6500 feet the air is in general keen, dry and salubrious, and resources permitting people to subsist are not lacking: e.g., South America, Mexico, plateaus of Iran and Abyssinia. Whereas the lofty plateaus of these countries have become rallying points of human establishments, those of temperate lands like Europe have a restraining influence. On the whole plateau countries are thinly peopled, for they are not easy of access. Very high altitudes produce mountain sickness due to rarefaction of the air and the lack of oxygen. Out of three children born in a white family at Potosi scarcely more than one survives beyond a few hours. "Those who reach man's estate are able to form only a puny and stunted population."

The nature of the plant that is cultivated in a place depends upon the soil and water supply that are to be found there. In the southern districts of our Presidency, for instance the Tinnevely District, paddy (a wet crop) is cultivated in the river valley where there is facility for canal irrigation. On the red soils beyond the river valley where water is obtained from rain or well irrigation, dry crops, like millets, pulses and oil-seeds are raised, and in the black soil area cotton is grown. Rice is largely cultivated in Bengal and wheat in the Punjab. Why? This is due to the different climatic conditions required by the two plants. Rice requires great heat and a good supply of water both of which are to be found in Bengal, while wheat requires a drier and a cooler climate than rice; hence it is grown as a winter crop in the Punjab and is harvested in early summer which is sufficiently warm and dry to ripen it. Owing to the change of seasons and the geographical distribution of the different wheat-growing regions, there is always some spot on the earth where wheat is being gathered and threshed.

Millions of cattle and sheep are being raised on the great grasslands of the world, there being more cattle than sheep on

the tropical grasslands and more sheep than cattle on the temperate grasslands; but on the *pampas* of Argentina the number of cattle has increased while that of sheep has decreased.

Man not only cultivates plants and raises animals, but also *devastates them*. This economic plunder is intensely practised in the zone comprised between 36° and 56° North latitude where the most advanced civilisation is concentrated. In the plant kingdom, man's devastating activity is carried on particularly in forested regions. Forest devastation is especially the work of civilisation. This is because timber no longer seems to be indispensable as it was for long centuries. Coal or coke is used for warming; houses are built with iron, brick and concrete; locomotives of countries like Russia which used wood now burn petroleum. But to the modern industrial world wood is more than ever indispensable. It is used in mines, for railroad ties, posts for telegraph, telephone and electric power wires and for paving streets. Wood pulp is used for making paper. Hence in the lumber region of Canada, in order to keep up the future timber supply, a day is set apart each year when children plant young trees. In the tropical countries devastation makes its worst attack upon rubber. As there is an evergrowing industrial demand for rubber, in all European equatorial colonies an attempt is being made to develop cultivated rubber.

Man may kill animals for food and clothing. He will be raising them and not devastating them, if he takes care to provide for their reproduction. It is not devastation if as a result of increase of population, man restricts the sphere of animals. He has also a right to exterminate injurious animals. Hunting becomes devastation when he attacks animals that are not injurious. Many birds are killed for feathers for the purpose of feminine adornment. In temperate forests animals are hunted or trapped for their fur. The elephant is threatened for its ivory. It is already rare in the savannas and in the forests of Central Africa. "The hour of its complete disappearance will come with the establishment of better means of communication." The slaughter of seals and whales is the most disastrous devastation of the animal kingdom in the seas. Fishing in rivers and lakes is another form of animal devastation. But in many countries laws are being enacted to keep this devastation in check.

In *coastal regions* people are engaged in fishing, and hence fish form an important part of the diet of the people. Such people

get the *sea-habit*, and become good sailors. This paves the way for their becoming maritime nations, e.g., Great Britain and Japan.

In *mineral* areas people are engaged in mining and extracting the metals from their ores. In places where the coal and iron are found together or in close proximity, iron works are established as the Tata Iron and Steel Works at Tatanagar (Jamshedpur). The value of coal lies not only in the fact that it is used in the smelting of iron but also in the fact that it is used to convert water into steam which forms an important motive power. After the invention of steam-power, all factories have been established either on the coal-fields, or very near to them. In fact, in England, almost all the important industrial centres are on the coal fields.

There are two types of industrial cities; one born above and from the coal, e.g., Newcastle and Manchester; and the other (historically greater) powerful enough to summon coal to it and to transform itself into an industrial centre in spite of its distance from coal, e.g., London, Madras. In all manufacturing centres people crowd together, and the houses, unable to spread out in width, rise in the air, e.g., New York, Chicago.

Again, the location of a particular industry in a town, depends on the raw material that is available near it e.g. the cotton industry of Bombay and the jute industry of Calcutta.

The use of coal as motive power cannot continue for ever; for coal is likely to be exhausted sooner or later. Petroleum has an advantage over coal; for it can be easily carried in pipes over distances of many miles to the places where it is required. Both coal and petroleum will be exhausted, and so their place is to be taken by another source of power, viz., waterfall, or "white coal."

Mineral exploitation is also a kind of devastation, and this sometimes has a happy result. With the exhaustion of the mines comes poverty, and large groups of people find themselves forced to turn to more permanent occupations. In California the discovery of gold in 1849 led to a gold rush of great intensity. To-day the resources of soil and forests are of greater importance than the mineral products.

When a country produces anything in excess of what is required for its own people, it naturally wishes to sell it to others who may require it, and tries to buy things that it cannot grow

or make and that its people are in need of. This leads to *trade* between one country and another.

Foreign trade establishes the necessity for *sea-ports*. These come into existence only where there is a natural harbour as in the case of Bombay and Calcutta. They acquire importance if they are the natural outlets of rich hinterlands. Calcutta has for its hinterland the whole of the Ganges and Brahmaputra valley where rice, jute, cotton, sugarcane and tea are grown. Karachi has the rich wheat lands of the Punjab behind it, and Bombay, the great Black-Cotton area. Madras has no natural harbour; but on account of its political importance it has been made a port by the construction of an artificial harbour.

Cheap and quick *means of communication* are necessary to take products from one region to another. With the development of roads and railways, new lands in the interior of a country or continent become accessible. Roads are constructed to connect human settlements; and later on human settlements are formed along the roads. That is why it is said that the city creates the road, and the road in its turn creates the city. The development of the resources of a country is governed by the degree of ease with which its men can communicate quickly and cheaply with those who live far away. In modern times sea and railway routes are important. Countries near the sea coast have a greater advantage for foreign trade than inland countries. Navigable rivers too play an important part in inland communication.

Railways are at first constructed in places where they can be easily and cheaply made, i.e., where the country is flat, e.g., the Indo-Gangetic valley and the East Coastal plain of India. In mountainous areas, the lines are taken through natural passes, e.g., the Palghat Gap.

Towns are products of settlement; and settlement is decided by (1) regular food and water supply, and (2) security from invasion by hostile tribes. Hence towns are generally located on the banks of rivers. They may be at the junction of two rivers or near a ford. Where a river is obstructed by a fall or rapid, a break in the transport of goods becomes necessary and a town is formed. All the towns on the fall line east of the Appalachian Mountains are due to this cause, and in modern times they acquire

additional importance as they derive power from the falls. Peshawar is located near a mountain pass, because it can not only defend it, but also command the trade passing through it. In deserts, towns are formed on the oases, especially when they are the meeting places of caravan routes, e.g., Damascus, Timbukto. All railway centres become big towns. The importance of Kolar, Tatanagar, Tavoy, Kalgoorlie and Kimberley is all due to the minerals that are mined near them. Where there are natural harbours, ports are formed. A natural harbour may be (1) a fiord (Trondjem in Norway), (2) a drowned valley (New York, San Francisco), (3) a river mouth (Calcutta, Rangoon), (4) an island harbour (Bombay, Honk Kong), (5) an atoll (Suva in Fiji Islands), or (6) a submerged crater (Lyttleton in New Zealand).

A definite political interest may create an entirely artificial establishment. Aden is in an environment so inhospitable that all fresh water has to be brought by sea; but it is jealously guarded by England as it occupies a strategic position. An intense historical life may maintain a city in an environment which is geographically abnormal. Jerusalem possesses but two little insignificant springs, but its history attracts there 40,000 inhabitants.

From all we have said, we can see that almost all human activities are governed by natural causes.

THE SECOND ASPECT

We shall now see how Nature has been tamed and subjected to man's will and changed to suit his ends.

Man, when he finds that his own country cannot accommodate all the people in it, emigrates to foreign lands where there is room for him. Even if that foreign land is not climatically suited to him, he is able to create the necessary conveniences, but he does not stay there permanently. If the climate is suitable to him, he makes the new land his permanent home. It is the white men of Western and Southern Europe that have emigrated largely to foreign countries. In the hot wet tropical regions they clear the forests and have plantations, e.g., tea in Ceylon and India, rubber in Malaya, coffee in Brazil, cacao in West Africa. In all these areas white man is subject to diseases like malaria and other

fevers. He is able to manage his business there with his advanced ideas of sanitation and knowledge of medicine.

He lives even in deserts and in very cold places if only he has his means of living there. At Kalgoorlie in the West Australian desert where the mean annual rainfall is less than 8 inches and at Dawson City in the Yukon Valley where the January mean temperature is -24° Fahrenheit, man lives because gold is mined there. The West Australian mining centres get their water supply by means of pipes from a reservoir 1313 feet high to which water is raised from a west coast river through nine pumping stations. Thousands of workmen labour in the mills under the burning sun. But the mining population lives about the mine in temporary dwellings. It is a vast camp, a temporary refuge for a population which will scatter when the last veins are exhausted.

In South America, North Chile which is a desert has a large supply of nitrate which is used as a fertiliser for the fields of the world. The nitrate industry has given rise to certain towns along the sea coast to which food and drinking water have to be brought in ships. Now water is brought to Antofagasta by means of pipes from the distant Andes.

In the plateau of Peru there is a mining place called Cerro de Pasco at a height of 14,280 feet in an excessively rigorous climate. The ordinary phenomena of life cease here: "no child is born, the llamas do not bear young, even hens will not lay eggs." Even in such a place man manages to live because silver is obtained there.

Again, if in a new country man finds the native plants and animals useless to him as in Australia, he destroys those plants and animals, and introduces new plants and animals that are useful to him. When the first settlers came to Australia, there were no food plants, and the animals were not useful either for ploughing or for draught purposes. Therefore the settlers brought from their own country wheat and other cereals and cattle, sheep, pigs and other useful animals.

In the prairies of North America and in the pampas of South America the bison and the guanaco have been replaced by cattle and sheep. In these areas millions of cattle and sheep are slaughtered, and frozen meat and meat extract are exported.

Man's conquest of Nature can be grouped under four heads: (1) the Redemption of the Thirsty Land; (2) the reclamation of land from water; (3) the harnessing of water for industrial purposes, and (4) solving the transport problem.

THE REDEMPTION OF THE THIRSTY LAND

Rain does not fall in all places in the world; and in many places where it falls, it is either insufficient as in north-western India, or uncertain as in the Dekhan, or confined to only a few months in the year as in the south-east of our presidency. In such places land cannot be cultivated without the help of *irrigation*. In fact irrigation has completely altered the face of the Punjab and has converted barren wastes into fertile fields of wheat and rice. Where there are no rivers, wells and tanks are used.

Millions of cubic yards of water from the great life-giving rivers run to waste in the sea without benefiting the land at all. It is imperative to stop this waste, especially in a practically rainless land or land where rain is uncertain or insufficient. Hence barrages and dams have to be constructed across rivers. In India the Punjab, the Upper Gangetic Basin and the deltaic regions of the east-flowing rivers of Dekhan have many irrigation works. By the Sutlej valley canals irrigation is provided for enormous tracts in the Punjab as well as in the states of Bahawalpur and Bikaner which are on the desert border. The construction of weirs and thousands of miles of main and distributory canals will naturally affect the Indus in Sind; hence the Sukkur Barrage, the largest in the world has been constructed. It is estimated that in future 30 million pounds worth of crops will grow annually in Sind.

The Periyar Project in the Madras Presidency is an important irrigation work. A dam has been built across the Periyar (a small river in the Travancore territory flowing into the Arabian Sea) and the stored-up water has been led to the eastern side of the Western Ghats through a tunnel under it. It is this water that makes a large part of the Madura District fertile. The other irrigation works in our country are at Kannambadi (Mysore), Bhandhardhara (Bombay) and Mettur (Madras). The last-named is still under construction.

The Roosevelt Dam in America, the Assuan and Sennar Dams in the Nile Valley and the Burrin Juck Dam across the Murrumbidge in Australia are examples outside India.

In Eastern Australia almost a thousand artesian bores have been drilled, and they are of immense value for watering stock, though it is doubtful if they are an economic source of water supply for irrigation. Before the sinking of these Artesian wells, as many as 8 million sheep have been known to have perished in a single year of drought. Now these wells are furnishing a steady supply of water at all seasons.

The oases in the Sahara desert are natural "artesian wells"; only the water does not spout up. In the Algerian Sahara the French have created oases by sinking of artesian wells.

RECLAMATION OF LAND FROM SEA AND MARSH

A large extent of land (over 1,200 square miles) has been reclaimed from the Fens of England which were in the 17th century a wilderness of bogs, pools and reed shoals. The Netherlands afford the best example for the reclamation of land from fen and sea. It is said that every year about 40 square miles are being reclaimed. The low fens have been divided into small basins by means of dykes, and these have been converted into pasture lands by draining the stagnant water by steam engines or windmills. It is chiefly to these operations that Northern Holland owes its enormous cattle-rearing industry.

The sea-polders are formed by the gradual accumulation of silt on the outside of the sea dykes. Plants thriving in salt water consolidate this silt, and then other plants are allowed to grow. These plants form good pasture for cattle, the ground is then enclosed and protected against the encroachment of the sea. These sea-polders are for the most part drained at low tide. Thus the Netherlands, by their struggle against Nature, have acquired territory for an additional half million population.

Very recently the historic achievement of separating the Zuyder Zee from the North Sea by means of a huge dyke was accomplished. Over half a million acres of land have been added to the country. This increases the area of the Netherlands by 7 per cent, while giving an addition of arable land equal to 10 per

cent of that now available. The ground in the drained area is so soft that all farming machinery has to be fitted with "caterpillars."

In our own country the Back Bay Scheme in Bombay proved a failure; however, some land is every day being reclaimed from the back-waters of the west coast, especially between Alleppey and Cochin, but the method employed is somewhat primitive.

HARNESSING WATER FOR INDUSTRIAL PURPOSES

We have already referred to the use of coal and petroleum as motive power. Both these are likely to be exhausted sooner or later. Hence their place is to be taken by water. This water power is directly used to turn turbines as in the case of the cotton mills at Papanasam, Tinnevely District, or it is used to create electricity as in the case of the Sivasamudram Falls in Mysore. With the help of this electricity the Kolar Gold mines are worked, and the city of Bangalore is lighted. The Pykara Scheme undertaken by the Madras Government has been completed and will supply electricity to nearly half a dozen districts.

The Tata Hydro Electric Works in Bombay are supplying electricity to the city of Bombay not only to light the lamps but also to drive the cotton mills. By these works an immense quantity of water which before ran uselessly to the sea is made to do a great deal of useful work.

The Mandi scheme, another important hydro-electric work in our country has recently been opened. In America, in the countries of Central Europe, in Norway and Sweden, and in Japan there are several hydro-electric works. Many million tons of coal can be saved by utilizing water power. It is estimated that 200 million horse power (1 h.p. = 5 men's work) is available in the rivers and waterfalls of the world, but so far only 25 million h.p. has been harnessed for use. Thus we see that the Age of Coal is being succeeded by the Age of Water power.

SOLVING THE TRANSPORT PROBLEM.

Man includes not only the ordinary man, the settler and the agriculturist, but also the extraordinary man—the scientific man,

the inventor and the engineer. The engineering skill of man is well manifested in all the irrigation and hydro-electric works. It is also visible in all his attempts to solve the transport problem.

Just as land has been reclaimed from water, it has been drowned by the agency of man. The Suez canal built at a cost of £ 20 million is now 101 miles long, 36 to 39 feet deep, 148 to 195 ft. wide at the bottom and 400 to 460 ft. between the banks. By means of powerful electric lights ships can now pass as safely by night as by day. The saving of distance from London to Bombay is about 5,000 miles.

A more wonderful ship canal is the Panama canal. It is only 50 miles long between the Atlantic and the Pacific, but in making it the waters of the River Chagres have been blocked by building up a dam 1½ miles long and nearly half a mile wide at its base, rising to 105 ft. above sea level. Thus a lake has been created. The science of medicine has helped engineering. The war against the mosquito has been fought and won. Other features of the canal are the two sets of locks one at each end, and the Culebra cut for 9 miles. The saving of distance by sea from New York to San Francisco is nearly 8,000 miles. In many cases water transport has encroached upon land transport. Besides the great isthmus canals, the Great Canadian canals are good examples. Manchester has become a seaport on account of its ship canal. The Clyde river which in 1758 was only 15 inches deep at Glasgow is now capable of giving access to ocean-going vessels of large draught up to the city. In fact almost all the rivers of the civilised countries have been wonderfully transformed by the hand of man.

In India there are very few ship canals. The Ganges canal is used both for irrigation and navigation. The Buckingham canal of our Presidency is purely a navigation canal; but it is navigable only for small country boats.

Four kinds of barriers are set up by nature on land—mountains, forests, deserts and rivers. The mountain is tunnelled through; the forest is cleared; the desert is reclaimed; and the river is bridged.

Motor cars with wheels fitted with caterpillars are used to cross the desert. Wonderful tunnels have been made through the Alps—Mount Cenis (7½ miles), St. Gotthard (9½ miles) and Simplon (12½ miles). Engineers can do wonders if they are well supplied with capital. The Callao—Lima—Oroya—Cerro de Pasco

(S. America) line has 63 tunnels and in a distance of 86.9 miles rises 12,220 feet. In London railways pass through tunnels under the Thames, and in New York three are overhead railways. It is proposed to make a railway tunnel under the St. of Dover. The impossibility of to-day may become the commonplace of to-morrow. In connection with the Indian Mail, to avoid all transshipments across the St. of Dover, an entire train is run upon the deck of a properly adapted vessel called a ferry boat. In fact, all attempts to solve the transport problem are to diminish the time taken to cover long distances.

The development of the railway and steamship services led to the *telegraph* and *telephone* services. In all the great towns the telephone has partly superseded the telegraph as a means of speedy communication locally and with distant towns. *Submarine cables* link up the shores of the oceans. The twentieth century has seen the installation of *wireless* and *air services*.

There is now regular airmail service between London and Karachi, and the time of transit is a week. Attempts are being made to reduce the time. This service has been extended to Madras and Calcutta. The Karachi-Calcutta service may be extended to Rangoon and thence it may be linked up with the Australian service via Singapore and the East Indies.

Thus the elimination of distance, the greatest revolution in human life, is going on apace. Steadily and surely the world is becoming one continent; but the colour problem is becoming a most difficult and dangerous barrier to this. It has to be solved before man can think of making the world one continent.

From what we have said, we can see that the world is not as made by nature, but it is being "subdued, replenished recast and contracted by man." Formerly the richest countries were those in which nature was most bountiful; now the richest countries are those in which man is most active.

The Geographical Interpretation of History*

By

MR. G. VENKATA RAO, M.A., LL.B.,
Lecturer in History, Andhra University.

The conception of History as a science is of very recent growth. Early historians, with a few rare exceptions, thought their business was merely to narrate events and to enliven them here and there with accounts of prodigies and portents, moral reflections and political platitudes. They were mainly concerned with recording what had happened and that too in relation to dynasties of kings and hierarchies of saints and prophets. They hardly knew the value of other branches of learning as an aid to historical investigations. Their works were didactic in essence and parochial in outlook, and were dominated by political or religious considerations. Under these circumstances it was hardly possible for them to see an inter-relation between historical facts and geographical phenomena.

With the dawn of scientific historical studies in Europe during the nineteenth century, there came into existence not only a comprehensive view about the essential nature of the contents of History but also a widening of the scope of research in its investigation. Historical works no longer remained confined to an account of the fortunes of great men, but also they began to take into consideration the life of the people in its varied aspects. With this change in the purpose of history, an era of research was inaugurated and great savants began to spend much of their time in unearthing the antiquities of every kind, and using the results of researches in Archaeology, Geology, Philology, Geography, etc., in solving the complex riddle of human affairs. Bolder spirits among them went further than mere recording the true facts and tried to discover, on the analogy of other sciences, the laws that fundamentally influenced human action. They were not satisfied with the knowledge of *what* happened without the equally valuable knowledge of *why* they so happened.

* Summary of a lecture delivered at the Vizagapatam Branch of the Madras Geographical Association.

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But like all pioneering works, the initial efforts of the scholars in this line produced most divergent views on the influence of Geography on History; and one writer said that "monotheism is the product of the desert". This is as absurd an assertion as that of Karl Marx that the Reformation was the product of bourgeois capitalism. The greater flaw in the position of such scholars is that they were carried away by their pet theories and unduly emphasised the bearing of one factor upon History to the exclusion of all others. At present the more thoughtful historians are recognising that no single factor can explain the varied fortunes of mankind. Hence in historical studies, Carlyle's theory of the omnipotence of personality, Ratzel's theory of the rigid control of natural conditions on human activities, Marx's exclusively economic and Hegel's purely idealistic or spiritual interpretation have been either considerably modified or totally rejected by more critically minded thinkers. Buckle recognised that life is conditioned by an environment and is not an abstraction for metaphysics. He did not, as is generally believed, make food, soil and climate dominate all history. He distinctly stated that "the advance of European civilisation is characterised by diminishing influence of physical laws and an increasing influence of mental laws."

However, it is now accepted on all hands that History is not merely a statement of all the events that ever happened but also a record of the vicissitudes of mankind and the causes that influenced them in the progress or retrogression such as his surroundings. Personality and environment are the two factors of the everlasting fabric which hangs upon time's loom. No historical problem can be adequately interpreted independent of its surroundings.

If there is one single factor which influenced the course of history to a large extent, it is the geographical environment. Geography has been affecting human conduct since the advent of man upon this planet. The extent of that remarkable influence is to be seen more clearly in an early stage of society when man had least control over nature. Yet geographical influence can be traced on all the activities of man from the racial migrations of antiquity down to the modern democratic institutions and international relations. In order to understand why there are racial and institutional differences among various people, why the countries which were foremost in civilisation at one time are not counted among

the nations of the world to-day, why the history of the world has been one prolonged record of conflict among various states, or similar other problems, we must rely upon the geographical interpretation of History. This interpretation depends on a correct understanding of the influence of Geography on History.

Geography influences the course of History either by the changes it undergoes through the ages or by its assisting conditions. Past History cannot be truly explained by present maps and charts, howsoever scientifically they might have been prepared. The sacred books of the Hindus, the Persians and the Jews contain allusions to the cataclysmal changes that have overtaken the world ten millennia ago. Scholars have discovered that the epoch-making migration of the Proto-Aryans from the Arctic regions or the Central Asian Plateau was the result of such a cataclysm. Geologists tell us that the world is not what it had been millions of years ago. The present Mediterranean, Caspian and Black seas or the Indian ocean have been the outcome of great upheavals in the physical world. There are reasons to believe that many thousand years ago dry land connected the north-eastern corner of Asia with the north-western corner of America. Such conditions must necessarily have affected the movements of the people and their cultures, microscopic traces of which are to be found to this day. The enigma of the now extinct Maya civilisation of Yucatan and Guatemala might be solved some day by the discovery of the physical connection between the Mexican lands and the other parts of the world. That there have been immense changes in the physical characteristics of land and sea, and such changes have influenced the course of history is now beyond doubt. Even during the period of which we have accurate knowledge there have been alterations in the physical condition of the earth's surface. Fertile lands have changed into deserts, and rivers have either disappeared or shifted their beds, resulting in the depopulation of large tracts of country. The desiccation of the Central Asian lands was the cause of those ethnic waves that at one time flooded the European and Indian plains. Nearer home, we know that one huge river system based on the extinct Hakra, has wholly disappeared, and that the Indus and its tributaries are not flowing in their ancient beds. Unless the reality and the extent of such changes are constantly borne in mind past histories cannot be understood.

Geographical conditions, even without the changes of the type noticed above, have been influencing the course of history

in more than one way, and we will now notice its effects on certain important aspects of human life.

1. *Geography determined the position of early human 'Settlement,' and created the peoples of the world.*—In ancient times oceans, rivers, mountains and deserts proved unsurmountable impediments to the free migration of man from one part of the world to another. Human beings like water took the line of least resistance, so that the segregation by natural barriers resulted in the production of varied types of humanity and culture. Languages crystallised on their individual lines which further segregated one people from another, and created group consciousness so that even to-day with all the ideas of equality of men and all the facilities of communication, the individuality of the "peoples" persists. This can be illustrated by examples drawn from almost any part of the world. For thousands of years the Negroes of America remained isolated from the more civilized world due to the Sahara desert in the north and the surrounding oceans on the remaining three sides. In India the Himalayas acted as a check to the intermingling of the Mongolian and Aryan cultures. The incomplete Aryanisation of South India was mainly due to the Vindya range of hills and the Mahakantara forest.

2. *The physical barriers also determined the size of the early states.* This again finds ample illustration in the history of the world. The city-states of Greece and Rome and the innumerable small states in India were the direct result of the difficulties of communication from one part of the country to another. The attempts of Hannibal, Alexander, Chandragupta Mourya and Samudragupta to build up extensive empires achieved no permanent results due to geographical impediments. The physical contours of India made her an empire breaker. So long as Science did not conquer Nature, the territorial conquests of great military leaders remain only a dream.

3. *Climate, food and soil determined the growth of early civilizations.*—Rise and growth of civilization depends upon the accumulation of wealth, and the latter is dependent upon favourable physical conditions. In the words of Buckle "as long as every man is engaged in collecting the materials necessary for his own subsistence, there will be neither leisure nor taste for higher pursuits. If what a people consume is always exactly equal to what they possess there will be no residue" to main-

tain a leisured class to attend to social improvements. Thus Geography explains the backwardness of the Eskimoes of the extreme cold regions or the Negritoes of the extreme hot regions. The ancient civilizations of Egypt, Babylonia, Assyria, Greece, Rome, China and India were not the results of accident. The situation of these countries in the temperate zone between the latitudes of 25 degrees and 54 degrees called forth greater abundance of natural productions, and gave an impetus to a wider range of mental activities on the part of their inhabitants. Protected by deserts, seas and mountains, well watered by great rivers, and having room for expansion under a genial climate, the valleys of the Nile, of the Euphrates and the Tigris, of the Tiber and the Po, of the Hwang-Ho and the Yangtse-Kiang, and of the Indus and the Ganges became the radiating centres of civilization in the ancient world.

But those very geographical factors which contributed to the early development of these countries also brought about their fall. Their natural protection filled their inhabitants with so much self-confidence, and their genial climate and rich resources bred in them such a luxurious life and spirit of *laissez-faire* that they easily fell when less civilized but hardy tribes found their way to these countries. It is known to all how the Roman and the Greek civilizations were shaken to the foundation by the inroads of the Goths, the Vandals, the Franks, and the Huns. Even the Great Wall of China proved a broken reed when the nomads of Central Asia determined to exploit with the Chinese the natural resources of their country.

Of course the barbarians soon absorbed the civilization of the conquered and evolved even organized kingdoms and empires, so that those very ancient lands, with their favourable geographical conditions, continued to retain their leadership of the world in culture and wealth till the dawn of the modern oceanic era. The Semitic, Mongol and Tartar hordes, which had remained in semi-barbarous state in their uncongenial native land, when once they settled within this fertile zone, became founders of great monarchies in China, India and Persia, and attained a civilization in no way inferior to that of the people whom they conquered.

With the discovery of the sea-routes, the centre of gravity of the civilizations shifted from the ancient countries like Rome,

Greece, China and India to the countries like Portugal, Spain, England, Holland, France and Japan. Here also Geography determined which country should have a start and which should ultimately take the leadership of the world. It is not without significance that the age of discoveries and oceanic transport was started by Portugal and Spain which abutted on the Atlantic. But the continental countries including Spain and Portugal, could not persevere in the race due to their land connections, and insular England carried off the palm.

4. *Geographical influences on the growth of political institutions.* Bury says "The political history of all countries is in some measure under the influence of geography; but in Greece Geography made itself pre-eminently felt." The mountains and valleys of Greece and the adjoining archipelago were largely responsible for the growth of small communities, which made direct democracy possible. Somewhat similar influence of Geography in moulding the political life of a people can be traced in the history of other countries. England, protected on all sides by the sea, had not much to depend on standing armies for her protection during her early History. Her Kings mainly relied upon the militia for her national defence, and hence they could not establish despotism. France with a long land frontier to defend against the continental foes had a large military force at her disposal which could be utilised to crush the liberties of her people. Thus Geography gives a clue to the evolution of the divergent forms of government in England and France before the French Revolution. In the case of India too the geographical interpretation of her political history holds good. Till the discovery of the sea-routes, the north-western passes supplied the keynote to Indian politics. India being nearer the dry steppes of Central Asia, the home of the nomads, than either Europe or China, thousands of invaders streamed into Northern India through these passes and made stable central government impossible. The rich alluvial plain of Hindustan was easily accessible through them to the steppeland peoples of Iran and Turan. Those who guarded the passes often acquired so much power that they could easily overthrow the ruling power of Hindustan. Every revolution in the Sultanate of Delhi was either brought about by a foreign invader or by the Wardens of the Marches on the north-west. The necessity of maintaining a large force to protect the country from the foreign foe also resulted

in India, as elsewhere, in the evolution of a despotic form of Government.

5. *Growth of sea-power is also conditioned by the Geographical environment of a country.*—Among the ancient nations, land dominated the sea. India, Persia and China, with their extensive sea-boards, could not establish supremacy over the seas for two obvious reasons. Firstly their fertile soil supplied the people with all the necessities of life, and they were not in need of securing them from abroad; and secondly, they were always open to attack from the north-west and hence they had to concentrate their attention upon the army rather than the navy. Countries, adversely affected by Geographical forces, especially insular lands, were compelled to acquire a mastery over the high seas. It is noteworthy that mighty empire-builders like Xerxes, Kublai Khan and Napoleon were successfully overthrown by the small sea-states of Athens, Japan and England.

6. Similarly an investigation into the *Geographical background of various events* will show them in their true perspective. Nearly all the epoch-making movements of Europe were generated to a great extent as the result of Geographical position. For example, Italy grew immensely rich during the period of the Crusades, so that the Italian cities could easily welcome back their lost heritage of Greco-Roman civilization and thus start the Renaissance movement. The Protestant movement in Germany or the Great Revolutionary movement in France had also its share of Geographical factor in its genesis.

To conclude, the Geographical phenomena are not the sole arbiters of all the human affairs of the world. But they do have a profound influence on the course of history. Historical studies devoid of the Geographical background would be unscientific and inaccurate.

The Study of Geography in Schools*

By

MRS. P. S. SUNDARA RAJ, M.R.S.T.,

A change is coming over the whole teaching world. Fashions change, even in schools. The dull grind of learning by rote was succeeded by the Play Way; the lectures gave place to the individual assignment; the ancient strongholds of classical learning were assailed, and Science held to be the only thing worth teaching in an Age of Science. So, grammar books were cast aside and test-tubes became all-important—only generally it was the teacher who handled the test-tube, while the class stood at a respectful distance where they could not damage the apparatus. There was great talk about the bookishness of education; vocational training had a great vogue, and it still has its devotees, who seemingly think that schools exist to manufacture carpenters and clerks, factory hands and captains of industry. All these systems have their day; and there is a grain of truth hidden in each one of them.

What we know as Geography is something equally new. In this country it still has to justify itself and obtain proper recognition. Every geography teacher must of necessity be a pioneer—at least for some years to come. It is well for us now and then to take stock of our position; to justify the faith that is in us and to formulate at least to ourselves the principles and objectives of our work. Otherwise, Geography teaching itself may come to be classed among the fads and fashions that seem to afflict the teaching profession; and the recognition so hardly won may be withdrawn again.

There is another point to consider also. I have referred already to some of the many developments and tendencies of recent educational method; some of them were worth little, and soon had to be abandoned; others have made a permanent contribution to our schools. In recent months another tendency has made itself felt, and in some respects it is a surprising one. We have come to

* Inaugural address delivered to the Geography Section of the Teachers' Association, Teachers' College, Saidapet.

can have is a good daily newspaper. Only so will you keep your class up-to-date, only so will the pupils learn how to relate what they learn in class with what actually happens in the world.

Geography is valuable in another way. Properly taught it makes for understanding of other peoples, for the breaking down of barriers, for international peace. We do not hear much of internationalism nowadays; no sensible man would even dare talk of nationalism, when all the world has seen the failure of every attempt at agreement; but communalism flourishes and the clock is put back. The Geography teacher has it within his power to cultivate sympathy with those who are different from ourselves, because our understanding of Geography will make the reasons for those differences clear and understandable, and with understanding will come co-operation.

Sanderson said that 9 out of 10 people think with their hands. Geography ought to give scope to such people. One map is a good substitute for many pages of writing; maps built in clay or cement, models of life in other lands, physical features, astronomical bodies, meteorological apparatus, etc., give scope for endless activities. Skill is necessary, and the attainment of skill is being recognized more and more as equally important with the attainment of knowledge. There is a very wide and very urgent need in Geography lessons for this kind of activity.

Finally, I would say this: that Geography is a science, and must be treated as such. A good deal of slipshod superficial work is being done in the sacred name of up-to-date Geography. Nice little stories about Chin Chin Chow of China are very well in their way. But they must be as correct as we can make them; and along with this human side of Geography must come the real scientific discipline. What is science after all? It is only observation and recording, and then the classification of the facts recorded. The keeping of proper weather records and comparison of the local records with the general weather report or the atlas, is one way of cultivating the spirit of accuracy. The study of maps will help to teach the right way of searching for new facts and testing the facts gained. A boy, for instance, who has drawn a rainfall map or physical map of India ought to be able to construct a hypothetical rice map with pretty fair accuracy. In comparing his effort with the actual map he will learn a good deal.

Unfortunately we have come to think of science as physics and chemistry; but the boy who cannot tell a specific gravity from density can still be a good scientist. It is the attitude of mind that distinguishes the scientist, not the medium he works in. It is a love of truth, a patient observation of facts, a constant study of his records and a constant testing of his conclusions, that makes the scientist. Geography deals primarily with man, and the world in relation to man; therefore, I suppose, it is to be classed among the humanities; but the study must be carried out in the true scientific spirit, reaching out towards the exact sciences, and so giving an all-round development that will make the next generation better equipped than its father to meet the needs of life.

consider this as the age of the expert, the expert being, according to one definition, the person who knows more and more about less and less. Specialisation has been on the increase in schools; and the more specialists a school had on its staff, the more fortunate the pupils were supposed to be. Now a reaction has set in; and while the expert specialist still has his place, it is beginning to be doubted whether his place is in the school. A certain amount of specialisation is good: we want language teachers and science teachers and physical instructors; and most people do not combine all these—but within these broad classes, the specialist is beginning to totter on his throne. The world asks now that school should be a preparation for life; and the universe we live in impinges upon us at every point. As Jeans so forcibly puts it, "we cannot lift a finger without disturbing all the stars." At the same time, we are members of the natural world—we are only natural science specimens—and we have the physical instincts and desires and needs of the animal world to which we belong. But beyond this we belong to a moral and spiritual order, and our souls reach out beyond material needs through art and through religion, through all those mental activities and spiritual promptings which differentiate us from our relatives in the animal world. We all use language, whether we have a degree in it or not; we must eat, though we cannot be experts in dietetics; every time we rise from a chair or walk a step we set in motion a whole series of processes in mechanics and physics, of which we have probably never heard. Such a list might be infinitely extended.

The modern curriculum is seeking to present, not English and French, Physics and Chemistry, Botany and Zoology, but life: not isolated subjects but a co-ordinated whole. Some of you no doubt are Geography specialists: no doubt you are congratulating yourself on choosing a subject which until lately had no specialists. There ought to be plenty of scope for you. But the world changes quickly, and even a Geography specialist may find himself out of date unless he can adapt himself to a new order in which the part is subordinated to the whole. In a science book recently received from Canada, setting out a general science course approved by the Government and written expressly for the Minister of Education, I find a whole section given up to what I used to think was Geography. The whole book deals with plant and animal life, chemistry and physics, biology and mechanics, astronomy and geology, but it is written by one man, and not as one would expect by a

group of specialists. In the changes that are sure to come, Geography itself may be found as part of a general science course.

How can we be prepared for such eventualities? Only by realising that our specialisation must be broad-based upon a firm foundation. We sometimes hear of cultural and useful subjects, as though there were a conflict between them. But Geography may be included in both. It leads to a place from which many paths begin—geology and astronomy, botany and zoology, meteorology and economics, are all laid under contribution. Any one of these paths, if followed up by the pupils who leave school, will provide a valuable recreation for leisure times. There is no narrowing of interests. The pupil is learning about the world in which he lives, and how man is adapting himself to his environment under all sorts of conditions in different parts of the globe. This at least ought to help him in the task which any individual has to face of adapting himself to the world in which he finds himself.

Further, Geography helps other subjects. The key to much of our history is found in Geography. Delve into the causes of the great wars of history, from the struggle of Rome and Carthage to the Great European War, and in nearly every case you find the reason was geographical, the struggle for a more favoured land where food could be obtained for overpopulated empires. Or, study again the great racial migrations that have taken place. Nearly everyone of them was in search of a more fertile area, a better climate or a more protected land. History and Geography must be taught together, if History is to be properly understood.

Natural Science again presents problems that only Geography can solve. Why has Australia a peculiar fauna to itself? A study of Geography is necessary to understand this. Even pressing economic problems of the present day have a great deal of light thrown upon them by a knowledge of Geography. Ceylon was a prosperous island not long ago: and why did her coconut trade suddenly decline? No doubt 300 years ago in the once prosperous cities of Venice, declining trade was equally embarrassing. But in each case the answer was the same. Europe can buy from West Africa what used to come from Ceylon, and the distance is much shorter. The opening of the Cape Route to the East took away all the trade from the Mediterranean. Such developments are going on all the time; and the best text-book a geography teacher

The Geography of the Past

By

DR. B. SAHNI.

Under the auspices of the Vizagapatam Athenaeum, Dr. Birbal Sahni of the Lucknow University, delivered an interesting lecture on the "Past Geography of the World." Sir C. V. Raman presided.

Sir C. V. Raman, in his introductory remarks, humorously observed that the Punjab was so much associated with a fierce, bold, stalwart people, with manly vigour, that if the public expected to find in Dr. Sahni, a typical Punjabee of the conventional type, they would be disappointed. Dr. Sahni was a greatly reputed Doctor of Sciences. Dr. Sahni was so full of expert suggestions on every subject concerning knowledge that Sir C. V. Raman wondered what Dr. Sahni did not know. Dr. Sahni came to Vizagapatam apparently for the first time and no sooner had he seen the place for a few hours, he made a splendid suggestion that the place would be excellent as a first class station of marine biological research.

ORIGIN OF THE CONTINENTS

Dr. Sahni said that he chose as the title for his lecture of the evening, "Reconstruction of the Geography of the Past", because it had a great fascination for him. It was a subject that was of immense interest to the geologist, the geographer, historian, biologist, physicist, chemist and every other "ist" as well as the philosopher. The philosophy of science was not the conventional philosophy with which the majority of them were familiar; it did not allow unbounded, unbridled licence to the imagination, but was directly controlled by observed facts and experience.

Proceeding, Dr. Sahni said that if they looked at the map of the Atlantic Ocean they would find that the opposite sides of Africa and South America, if brought sufficiently close to each other, fitted together almost exactly as if forming one piece of land. A like similarity was to be found between the eastern coast of Africa

and the Island of Madagascar. He then explained that various hypotheses had been made regarding the similarity of the fauna and flora and the stratigraphical structure of land on both sides of the oceans where the sinuosities of coastline almost fitted into each other. According to one theory, the continents were like icebergs floating on a mass of lesser density, and that, at some remote past, what was one great mass of land consisting of Africa, Asia, Australia and Antarctica, covered over to a great extent by an enormous ice-sheet, had broken by rifts in the crust of the earth's surface and drifted away leaving the gap now occupied by the Indian Ocean. That India was once covered by ice was discovered in the early eighties of the last century by signs of glaciation found near Talcher about 200 miles north-west of Berhampore (Ganjam). In those far off days South India was said to have been in the same latitude as South Africa, and the eastern coastline of Africa and the western seaboard of India almost hugged each other. But by the process of 'continental drift', India had receded north-eastwards and in the same process the Himalayas were raised out of the bed of the sea by forcing up the strata in a series of movements. This drift of the continents, its extent and direction, had been recorded by observatories in various parts of the world by calculating the time of transit of the stars over particular spots.

THEORY OF LOST CONTINENTS

A different theory was that, while the continents had always occupied their present positions with the similarity of the fossils found and of the fauna and flora, there existed in those very remote periods land bridges connecting these great masses of land and that these bridges were now supposed to have gradually sunk into the sea-bed. According to this theory, two great masses of land that once existed in what were now called the Atlantic and Indian Oceans, i.e., Atlantis and Lemuria, had been lost and attempts were being made from time to time to discover these lost continents. Dr. Sahni stated that the great mass of evidence was in favour of the theory that the continents drifted away. The Nile Valley in Africa was supposed to be another great rift in the surface of the earth's crust which, in the distant future, would separate a big slice of north-east Africa by the inlet of the sea.

Sir C. V. Raman said, in his concluding remarks, that Dr. Sahni's description of the Poles wandering about, continents

moving up and down on a walk, and the prospect of Egypt some day going under the sea making two more continents of Africa and the Nile becoming a huge ocean, made his head reel with the stupendousness of the prospect. He insisted that it was the duty of a scientist to be meticulously correct in his calculations. The difference of a few thousands or millions of years in calculations on a speculative subject as the Geography of the Past did not matter very much. But a scientist must muster sufficient courage necessary to propound such profound matters.

An Outline Syllabus in Geography

For Elementary Schools.

Preliminary Stage:—(Standards II and III).

STANDARD II.

1. *World Geography:—*Children of far off lands (Pictures).
2. *Home Geography:—*The village or town.
3. *Practical Work:—*Visits to local bazar, the brook or river, tank, fields, public buildings, etc. Sketches and pictures. Cardinal points. Project: Model of the village.

STANDARD III.

1. *World Geography:—*Peoples of our own and other lands, e.g., the Bengalis, the Punjabis, the Eskimos, the Arabs, the Chinese, the Pygmies, the Swiss, etc.
2. *Home Geography:—*The Taluk or Home Region, Revision of the village: fields, and crops, water-supply, drainage, industries, trade, communications to headquarters and other important places from the village.
3. *Practical Work:—*Introduction to the globe. Picture-reading. Direction and distance. Scales and plans. Sketches and maps of the home area. Visits and excursions. Map project.

Junior Stage:—(Standards IV and V).

STANDARD IV.

1. *World Geography:—*Continents and oceans: imaginary voyages to different parts of the globe (with stories of some famous discoverers and explorers like Columbus, Vasco da Gama, Livingstone, Captain Cook, etc.). Life in the lands thus visited. The round globe.
2. *Home Geography:—*The District (descriptive and not logical study).

3. *Practical Work*:—Introduction to the world map. Clay-modelling of land forms in the district. Seasonal changes and human activities. Observation of simple weather phenomena. Day and night: rotation of the earth. Phases of the moon: 'thithis.' (திதி காலம்)

STANDARD V.

1. *World Geography*:—Continents and oceans: trans-continental routes from the great ports. Commodities of everyday use such as sugar, coffee, match-box, kerosine oil etc. and the lands from which they are obtained.
2. *Home Geography*:—A survey of the Presidency (including the adjoining Indian States.) Descriptive study of the different regions with imaginary journeys. Great mountains and rivers of India. Railway journeys outside the province to Calcutta, Bombay, Benares, Delhi, etc.
3. *Practical Work*:—Use of maps of the world, India and the Presidency. Observational study of weather phenomena. Position of the sun in the sky at different parts of the year: Introduction to the seasons: revolution of the earth: zones. Cultivation, trade and travel projects, involving detailed study of the district.

Senior Stage:—(Standards VI, VII and VIII).

STANDARD VI.

1. *World Geography*:—Australia and Africa: descriptive study of selected typical regions (with an outline survey).
2. *Home Geography*:—A survey of India (Junior course). Detailed study of the district, linking it with the home locality (village or town).
3. *Practical Work*:—Introduction to latitude and longitude. Beginnings of weather record. Excursions and projects correlated with district study. Varieties of district maps. Revision of the seasons.

STANDARD VII.

1. *World Geography*:—The Americas: descriptive study of selected typical regions.

2. *Home Geography*:—Detailed study of Peninsular India with greater emphasis on the economic side.
3. *Practical Work*:—Further work on latitude and longitude. Representation of heights: contour exercises. Continuation of weather record work. Representation of climatic data, curves and charts. Economic curves. Work of running water as field study.

STANDARD VIII.

1. *World Geography*:—Eurasia: descriptive study of selected typical regions. A general survey of the regions of the world.
2. *Home Geography*:—Detailed study of India (senior course).
3. *Practical Work*:—Advanced contour work. Map-making by chain, pacing etc. (projects). Ordnance survey map of the home region: its interpretation and use in excursions. The daily weather report and its interpretation. Climatic maps. Field study of weathering, formation of soils, rocks and minerals and changes in land forms. Economic maps and diagrams.

Geography Syllabus for a Secondary School

CLASS III.

I. HOME.

1. Excursion to a field and the story of a Mangalore farmer.
2. Excursion to a tile factory and the story of a tile factory worker.
3. Excursion to the coffee works and the story of a coffee worker.
4. Excursion to a weaving establishment and the story of a weaver.
5. Excursion to the seashore or fish market and the story of a fisher.

N.B.—The above are the chief occupations and industries of Mangalore.

II. REGIONAL (use the globe).

A. Stories of people in other lands—their life, food, clothing, homes and various means of travelling and transport.

1. On a rainy day or a visit to a woody place—the pygmy.
2. On a visit to a grassy plain—(a) the Red Indian; (b) the Khirghiz.
3. On a cold day—the Esquimaux.
4. On a visit to an arid place—the Arabs.
5. On a visit to a hill—the Swiss.
6. Picture of a Japanese home—the Japanese.
7. Picture of a British home—the English boy or girl.

N.B.—Large pictures can substitute if excursions are not possible. Excursions should be in the compound and near neighbourhood as far as possible. Excursions and pictures would be ideal.

B. Other practical work in connection with the above.

1. Clay modelling or drawing in crayon or chalk or paper silhouettes of the implements used.
2. Construction of their homes.
3. Dressing up dolls to represent different peoples.

III. PRACTICAL WORK.

1. Map to show where I sit.
2. Map to show how I go to my seat—(a) from entrance door; (b) from my teacher's desk.
2. Map to show the class garden.
4. Map to show how I go to the class garden from my class, and similar easy practical exercises. Actual measurements not necessary.

IV. OBSERVATIONAL WORK.

1. Watch the position of the sun, morning, noon and evening, four times a year in June, September, November and March. Draw a diagram.
2. Wind—strong wind, light wind—in what direction.
3. Temperature—hot and cold days—simple reasons.
4. Rainy days—effect of rain—the formation of rivers.
5. Weather chart showing sunny, cloudy and rainy days.

Books to be consulted:—(a) *Children Far Away* and *Homes Far Away* by Fairgrieve and Young; (b) *Primary Human Geography* by the above.

CLASS IV.

I.

1. Cardinal points.
2. World—the shape of the earth (from the globe) and elementary ideas of rotation.
3. Land and water on the globe.
4. Name and positions of the five continents and five oceans.

II.

1. The world to be divided as in the *World* by Elsa Stamp. Base the climatic regions on knowledge of Class III, on the tundras and on the Eskimo. Teach new regions by way of comparison and contrast. Story method may be used, but give importance to the stage and not the people.
2. Mangalore.

3. S. Kanara.

4. In traced outlines insert the regions of the world and also important features of (2) and (3).

III. PRACTICAL WORK.

1. Map to show my class room and its surroundings within 50 ft.
 2. Map to show the garden and its surroundings within 50 ft.
 3. Map to show the playground and its surroundings within 50 ft.
 4. Map to show a field and its surroundings within 50 ft.
- N.B.—No actual measurements are necessary.

IV. OBSERVATIONAL WORK.

1. Measurement of shadows on any mid-day in July, September, January and April.
2. Note the length of days on these same days and the difference in temperature, rain and vegetation.
3. How rain is formed—keep a rainfall chart of a month.
4. Weather chart.
5. Excursion on a rainy day to a streamlet or a runnel to explain these terms:—source, watershed, banks, mouth, estuary and alluvium.
6. Excursion to a neighbouring stream.
7. Excursion to a hill and explain gentle and steep slope, kinds of vegetation and the reason for it.

CLASS V.

I. MADRAS PRESIDENCY (Regionally).

West coast region, east coast region, Deccan. Include in study, relief, climate, rainfall, vegetation, occupation, products, population, important towns and communications.

N.B.—Much detail to be avoided.

II. INDIA IN DETAIL.

To be divided as in India by Elsa Stamp, to serve as a basis to Forms I and II. In traced outlines insert important features of India.

III. PRACTICAL WORK.

1. Map of a road about 150 ft. showing surroundings 50 ft. on either side.
2. Map showing the way from the gate to the class room and surroundings within 50 ft.
3. Map showing the way from the gate to the garden and surroundings within 50 ft.
4. Map showing an enclosed area of more than 500 sq. ft. with important details.

N.B.—Actual measurements are not necessary.

IV. OBSERVATIONAL WORK.

1. Direction of the wind for a week in July, September, January, and April—a diagram.
2. Establish connection between winds, rainfall and vegetation.
3. Path of the sun in the heavens noted by a shadow stick.
4. Very simple weather chart.
5. Excursion to a railway station and pier to see exports and imports.
6. Excursion to a bazaar to see buying and selling.
7. Excursion to a factory to get an idea of industries in cities.
8. Excursion to a thickly wooded place; to a waterfall; to extensive plains; to any plantations.

MIDDLE SCHOOL—FORM I.

I. GENERAL WORLD GEOGRAPHY (use the globe).

- A. Shape of the earth—its rotation, axis, poles, equator, Greenwich line—Its continents and oceans—Its spheres, northern and southern, eastern and western—Comparative extent of land and water in each sphere.
- B. Elementary ideas of latitude (angular distance) and longitude through plotting points and also time.

N.B.—Refer to Form I Syllabus on Practical Work according to the departmental syllabus, by Mr. N. Subrahmanyam, Teachers' College, Saidapet. (Published by the Madras Teachers' Guild).

II. PRACTICAL WORK.

1. Map work by measurement—plan of a class-room, school-house, garden, any enclosed space, etc.
2. Idea of contours—very simple contours. Isotherms—read from the map only.
3. Picture reading—Typical pictures of different regions.
4. Observational work—sunrise, sunset and sun's midday position every week or fortnight—midday shadows, hence vertical and slanting rays—wind directions, seasonal temperature and rainfall. Chart of any month and hourly temperature of any one day in each of the four seasons.
5. Excursions.

N.B.—Refer to above-mentioned book.

II. AMERICAS.

New world in general i.e. position, history before civilisation and now—structural regions—North America and South America compared—climate and vegetation—Canada—United States—Central America—West Indies—S. America.

AFRICA.

Position, size, coastline—relief, rivers and lakes—exploration—peoples and political divisions—climate and rainfall—Vegetation—North Africa—Suez Canal—Egypt—Sudan and Congo—South Africa.

AUSTRALIA.

World position—extent, build, coastline, drainage—climate, vegetation and animals—minerals—political divisions, chief towns and government.

NEW ZEALAND.

Position—climate—productions, minerals, industries—chief towns.

N.B.—Refer to same series as above; but Form III practical work which must be simplified for Form I. Let the matter

be more descriptive than detailed. Use the maps and Atlases and get much of your information from them.

FORM II.

I. EURASIA.

A. Asia—position, extent, coastline—relief and drainage, —climate and vegetation—natural regions, human life, occupations and industries—trade and communications —population, races and religions—political divisions, chief towns, government—main industries and occupations.

B. Europe—relief and rivers—regional study.

1. Mediterranean countries.
2. North-western countries.
3. Central countries.
4. Continental area of Russia.

II.

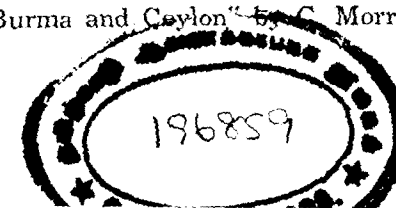
1. Longitude and latitude—more advanced. Exercises to find out places of given latitudes and longitudes and vice versa. Easy problems in longitude and time.
2. Observations—comparison of midday shadow, midday altitude of the sun, time of sunrise and sunset, and length of day in school locality weekly or every fortnight.
3. Apparent movements of the sun at different seasons.
4. Trade winds—by a diagram and not much theory.
5. Rainfall—effect of the sea—mountains and winds—Exercises on the map of the world—Isobars.
6. Simple contours and sections.
7. Temperature and rainfall charts.

N.B.—Refer to above-mentioned series of Madras Form II.

FORM III.

I. INDIA IN DETAIL.

Book to be used "The Indian Empire" by L. C. French and Dudley Stamp or "India, Burma and Ceylon" by G. Morrison.



Some help in exercises may be got from the above-mentioned syllabus of Form I (Madras).

II. GENERAL.

The swing of the sun and its effects—winds and rainfall regions—heat belts and range of temperature—major natural regions—important world productions—trade routes.

III. PRACTICAL WORK.

1. Advanced contours and sections.
2. Simple economic graphs and diagrams of exports and imports, production, population.

FOR TEACHERS ONLY.

Books for the Middle School besides the above-mentioned:—

1. Progressive Studies in Geography by Sankey and Meerut (Longmans), three books.
2. Elementary Exercises in Map Work by Spary (Longmans).
3. Intermediate Exercises in Map Work by Spary (Longmans).
4. Senior Exercises in Map Work by Spary (Longmans).
5. Wheaton's Modern Geographical Exercises—I, II, III, IV, VI and VII—A. H. Wheaton & Co., Ltd., Educational Publishers, Exeter, England.
6. The World by Dudley Stamp.
7. The Pupil's Class Book of Geography by Lay—Europe, Asia, the Americas, Africa, British Dominions of Australia.
8. The Indian Empire by Dudley Stamp.
9. A Text-book of High School Geography by N. Subrahmanyam.

The Old Observatories at Delhi and Jaipur

By

MRS. P. S. SUNDARA RAJ. M.R.S.T.

The visitor to New Delhi, as he drives from the station to the Secretariat buildings, passes one of the most interesting relics of the past. This is the old observatory of the Maharajah Jai Singh II of Jaipur, an astronomer-King who established five observatories, at Delhi, Jaipur, Ujjain, Benares and Mathura. I have seen only the two at Delhi and Jaipur, and therefore my remarks will be confined to these two only. I ought also to add that my visits to these two were prompted by their geographical and historical interest, as I am in no sense an astronomer. I may therefore be excused if the astronomical details given by me are insufficient for any astronomically-minded reader. A few words about the remarkable man who founded these observatories will not be out of place. He was born in 1686, the year in which Newton's Principia was completed, and he succeeded to the throne of Amber in 1699, when he was 13. He died in 1743, two hundred years after Copernicus, and says the historian, "his wives, concubines and science expired with him on his funeral pyre". The Maharajah Jai Singh was a remarkable man. He ascended the throne a few years before the death of Aurangzeb, and his reign coincided with a period of anarchy and warfare, in most of which he was involved. In spite of this he distinguished himself as a statesman; built himself a new capital, established observatories at five of the principal cities, and inaugurated and himself carried out a scheme of genuine scientific research. His observatories have been aptly described as "monuments that irradiate a dark period of Indian History".

No visitor to Jaipur, or Jainagar, the city which Jai Singh founded to take the place of that eagle's nest on the mountain side, the fortress of Amber, can fail to be impressed with the wide straight streets that would be a credit to any modern town planning scheme. In Jai Singh's own reign, his new capital became a centre of learning. Jai Singh himself was particularly attracted by astronomical work, and according to his own accounts he made himself thoroughly acquainted with its principles and rules. He



collected a library and had certain works translated. He employed a regular staff of workers, and sent some of them to foreign countries to collect information. He invited people interested in astronomy to Jaipur. He was attached to no one school of thought, but studied Hindu, Muslim and European methods impartially. He first built the observatory at Delhi and made observations there for seven years before building the other four. His aim was to prepare a new star catalogue, and to correct the defective tables then in use.

It is hardly necessary now, nor indeed have I the requisite qualifications, to enlarge upon the condition of the astronomical knowledge at the time of Jai Singh, but a few words are necessary if we are to place this remarkable man in his proper setting. As you are well aware, Hindu Astronomy goes back to remote antiquity. The astronomy of the Vedas is of poetical rather than scientific value, but the earliest formal astronomical works do possess "the crude elements of a scientific astronomy". Soon after the beginning of the Christian era, however, the old traditional system was largely discarded, and Greek theories were imported and assimilated. The representative work which exhibits this system is the Sanga Siddhanta, of which the recension now in use was made probably about 1,000 A.D. Since then very little advance has been made, and this text is still accepted as authoritative by the orthodox. The instruments described in ancient Hindu texts are very few, and there is no trace of any ancient observatory.

The Muslim school of astronomy were to some extent the direct successors of the Greeks, and frankly acknowledged their debt. In the middle ages they were the foremost astronomers of their time, and far excelled both their Hindu and European contemporaries. They recognised the necessity for methodical observation. So far as we know the first series of observations with fairly accurate instruments was made between 813 and 833 A.D. The Cairo observatory was founded in the 10th century, another in Persia in 1074 and a great observatory at Maragha in N. W. Persia in 1259. Old instruments were improved and new ones designed, and until the 15th century careful observations were carried on throughout the Moslem world. Then with Ulugh Beg, end.

In Europe practically no advance was made after the death of Ptolemy for a thousand years. Then, just about the time of Jai Singh, a great awakening took place. Copernicus wrote in the beginning of the 16th century. Galileo was about a century before Jai Singh. Greenwich observatory was founded some 40 years before that at Delhi. Newton's Principia was written at the time of Jai Singh's birth. Hamstead's catalogue of Stars was first printed in 1688, Halley in 1705 predicted the return of the Comet named after him. The Delhi observatory was built in 1724. While the Hindus almost completely relied upon tradition, and even the later Greek school tended to neglect observation and worked only upon observations recorded by their predecessors, the Arabs and other Muslim astronomers laid great emphasis upon direct observations. They verified and corrected Ptolemy's elements, but it never occurred to them to re-examine the Greek theories. The invention of the telescope, however, gave a great impetus to research and with the death of the Ptolemaic theory European astronomers were able to discard the methods of their predecessors, and they invented instruments of types altogether unimaginable by their Arabic teachers.

Jai Singh, as we have said, learnt from these schools of thought. The great library he collected is not now intact, but we know that he procured books from Europe, and it is safe to assume that he collected and studied all the available works on astronomy. Jai Singh's turn of mind was essentially practical. He realised the need for observation and measurement, and in his plans for building an observatory he had ready to hand the models of the Muslim astronomers. He decided that the metal instruments in use were subject to certain defects inherent in their construction. As we are told, "Finding the brass instruments did not come up to the ideas which he had formed of accuracy, because of the smallness of their size, the want of divisions into minutes, the shaking and wearing of their axes, the displacement of the centres of the circles, and the shifting of the planes of the instruments, he concluded that the reason why the determination of the ancients, such as Hipparchus and Ptolemy, proved inaccurate, must have been of this kind". In order to reduce such errors, he constructed his instruments of masonry and planned them on a gigantic scale. It is interesting to notice that the new European school also recognised the possibility of error, and made allowance for it, and this led to the invention of the micrometer and the

vernier scale, an exactly opposite line of development to that taken by Jai Singh. The old Muslim observatories had contained some large instruments, which no doubt served as a base for Jai Singh's new constructions. He, however, improved upon his models, and evolved new forms of his own. It is perhaps surprising that there is not more direct European influence to be seen, but two reasons may be advanced for this. He had probably settled the line of his own work before he became acquainted with the new developments in the West. It is supposed that his tables were completed somewhere about 1728, a few years after the building of the Delhi observatory. It was in 1728 or 1729 that he sent "several skilful persons" to Europe, and in 1734 he was visited by Father Boudier and his companions. The fact that Galileo died in prison in 1642—his books were actually not removed from the index until 1835—may also have had something to do with Jai Singh's neglect of the rapid and wonderful development that was going on in the West. He may have found it difficult to assess the value of these brilliant discoveries in the light of the persecution by authority.

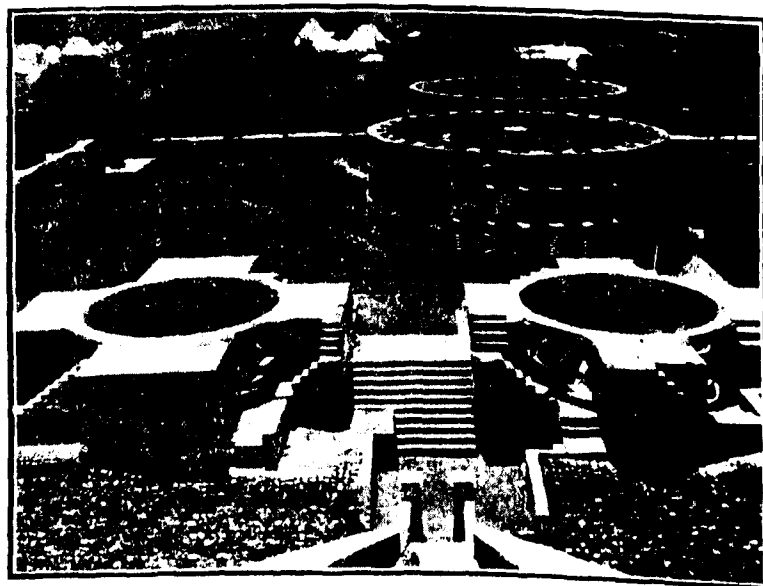


Fig. 9. General view of the Observatory, Delhi

Let us now turn to the actual observatories. That at Delhi has been restored by the present Maharajah of Jaipur, and the buildings given an attractive garden setting. The one at Jaipur

is situated within the palace precincts, and has therefore suffered less from the ravages of war and the vicissitudes of time. Both contain similar instruments, with some differences. That at Jaipur is somewhat larger, and still retains a number of metal instruments. There is some confusion about the date of the building of Delhi observatory. Sayed Ahmed Khan gives 1724-25 as the year in which Jai Singh carried out the "mighty task" set him by the Emperor Muhammad Shah, and "to accomplish the exalted command he had received, he bound the girdle of resolution about the loins of his soul and constructed (at Delhi) several of the instruments of an observatory, such as had been erected at Samarquand". The first object to strike the attention is the great Samrat



Fig. 10. Samrat Yantra, Delhi

Yantra, 68 ft. high (Fig. 10). The Jaipur one is even higher, 90 ft. high and 147 ft. long. It will be readily seen that Jai Singh's reasoning with regard to the construction of his instruments was only partially correct. It is true that his masonry was not subject to the wear and tear of brass, but on the other hand by their very size these erections prevented any improvement or modification. The Samrat Yantra is the most important of all the instruments. It is really "an equinoctial dial, consisting of a triangular gnomon with the hypotenuse parallel to the earth's axis, and on either side

of the gnomon is a quadrant of a circle parallel to the plane of the equator. (Only the gnomon appears in the picture.) It is in principle one of the simplest 'equal hour' sun dials". Each edge of the quadrants is graduated in hours and minutes, as well as in degrees. The shadow on the edge of the gnomon on the quadrants gives the local time. The dials give apparent solar time, which varies from day to day for several reasons. The two chief of these are, first the eccentricity of the earth's orbit, which gives a more rapid angular motion in winter, when it is nearer the sun, and its slower motion in summer; secondly, the obliquity of the ecliptic. Clock time therefore will not agree for very long with solar time as given by the dial.

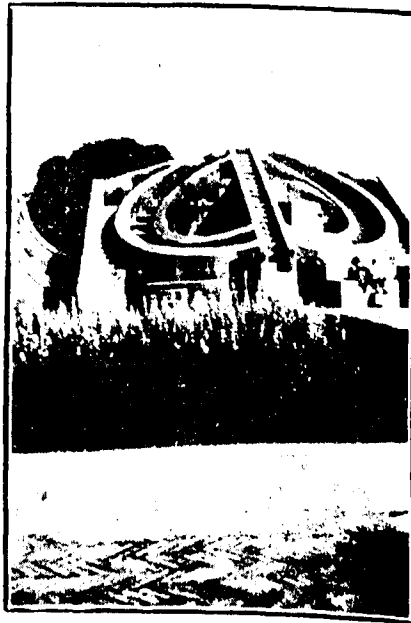


Fig. 11. Misra Yantra, Delhi

The Samrat Yantra is built into a quadrangular excavation 15 feet deep and nearly 125 feet square.

On the top of the gnomon is a circular pillar. This was probably originally used for rough azimuth observations, but it is now surmounted by a small dial of the European type, probably added in 1920.

In the front right hand side of the picture No. 10 appears part of a chamber containing the Shashthamsa Yantra, which is built

into the mass of masonry supporting the east quadrant. The Shashthamsa Yantra is a large graduated arc 60 degrees in length built in the plane of the meridian. The sun as it passes the meridian, shines through a small orifice on to the arc, and indicates its meridian altitude. The chamber is now closed.

To the north-west of the Samrat Yantra and about 140 ft. away, is the Misra Yantra, or "mixed instrument" (Fig 11). It is so named because it combines in itself four separate instruments. (1) In the centre is the Nujatchakra. This is a gnomon with two graduated semicircles on either side. These semicircles lie in planes inclined to the plane of the Delhi meridian at angles of approximately 77 degrees and 68½ degrees E. and W. These semicircles may be said to correspond to meridians at places whose longitudes differ from Delhi by these angles, and tradition names Greenwich and Zurich, Norkey, a village in Japan where there is an observatory, and Serichew, a town in the Pie Islands in the Pacific Ocean, E. of Russia as these places. On either side of the



Fig. 12. Pillars, Delhi

Nujatchakra, and joined to it, is half of an equinoctial dial, a smaller edition of the greater Samrat Yantra. The west side contains a second quadrant, the face of which is horizontal instead of being parallel to the axis.

In the east wall of the building is a graduated semicircle used for obtaining meridian altitudes. The north wall is inclined at an angle of 5 degrees and is marked with a large graduated circle. This is the "circle of the sign of Cancer". When it enters Cancer, the sun shines over the North wall for a short period and the shadow of the centre pin falls on the graduated circle. It is possible that the Misra Yantra was added by Jai Singh's son, who, we are told, inherited his father's love of science. To the South-West of the Misra Yantra are two pillars 17 ft. apart (Fig. 12). The line joining their centres points 35° E. of north. These are mentioned in none of the early accounts of the observatory. The custodian explained them to me as marking the shadow on the longest day, or something of that sort, but it is most likely that they were used to support some metal instruments such as those still to be seen at Jaipur.



Fig. 13. Jaipur

In Jaipur also two somewhat similar pillars may be seen (Fig. 13). It is not known what they were used for, unless for supporting metal instruments now lost. The shadow from the great Samrat Yantra can be clearly seen. In this the gnomon is 90 ft. high. It is graduated to read to seconds, but in practice this is impossible, owing to the size of the penumbra. Part of the gnomon of the smaller Samrat Yantra appears. Jaipur possesses two of these instruments. As in Delhi, the Shashtamsa Yantra, that is the meridian circle, is built into a dark chamber in the mass of masonry supporting the quadrants of the huge Samrat Yantra. Jaipur has two such chambers.

Close to the smaller Samrat Yantra can be seen Narivalaya Yantra or circular dial. It is a masonry cylinder some 10 feet in diameter. This marks the time of day, and also the passage of the sun across the equator. Below it, clearly shown, is the Dakshinavrithi Yantra (Fig. 13), or meridian circle, which is built into the supporting masonry work. This is a mural quadrant. On the East face are two quadrants of 20 ft. radius, and on the West face a semi-circle of 19 ft. 10 inches radius. It corresponds to the modern transit circle. It was used for taking meridian altitudes.

The next picture shows the Rasivalaya at Jaipur (Fig. 14). This instrument consists of 12 dials, one for each sign of the Zodiac, built on a common platform. You can see that they are exactly of the



Fig. 14. Rasivalaya. Jaipur

same type as the big Samrat Yantra, but "the quadrants lie, not in the plane of the equator but in the plane of the ecliptic when the particular sign is on the horizon, and the edge of the gnomon then points to the pole of the ecliptic". Four instruments have quadrants of 5 feet 6 inches radius, while the other eight have 4 feet 1½ inches. These instruments will indicate at the proper moment the sun's latitude, and with appropriate graduations, the longitude. The early lists do not mention the Rasivalaya.

Just beyond can be seen the Chakra Yantra, which appears plainly in the next picture (Fig. 15). There are two at Jaipur. Each is a metal ring of 6 feet in diameter, so fixed as to revolve

about an axis parallel to the earth's axis. At the southern end of the axis of the big circle is a small fixed graduated circle.

Both Jaipur and Delhi contain other interesting instruments which there is not time to describe in detail now. Some of them are very ingenious in design, and must be to a large extent attributed to Jai Singh's own personal enthusiasm and ingenuity. He claims himself to have devised the huge dials, Samrat Yantra, as well as certain other instruments. Without illustrations I do not think there will be much value in a description of instruments



Fig. 15. Chakra Yantra, Jaipur

so foreign to our modern ideas as these are now. I have given this short description only in the hope that some who may be travelling northwards may be encouraged to spend a little time in examining these memorials to a lover of science of other times. Although the observatories are not now used for practical purposes, a better set of instruments could scarcely be devised for teaching the elements of astronomy, and it will be a great pity if the schools in the neighbourhood do not take full advantage of them for teaching Geography.

Report of the Refresher Course in Geography held at Trichy in May 1933

The Working Council of the Madras Geographical Association presents the following Report of the Refresher Course in Geography held at Trichy in May 1933:—

On the invitation of the Committee of the XXVth Provincial Educational Conference, the Summer Course in Geography was conducted at Trichy from the 1st to the 13th May, 1933, at the National College and at the request of the same Committee the fee for the Course was reduced from Rs. 15 to Rs. 10, the period being also at the same time reduced to two weeks.

65 teachers, including 18 ladies, attended the Course (Appendix I).

At 10 a.m. on Monday the 1st May 1933, Mr. K. V. Subba Aiyar, M.A., L.T., Retired District Educational Officer, Trichinopoly, opened the Refresher Course at the Saraswathi Hall, National College (Appendix II), after which the classes were conducted as per time-table shown in Appendix III.

The Secretary of the Association who was in charge of the general organisation and conduct of the Course, did Climatology and the Pedagogy of Geography; Mr. S. Balakrishna Aiyar did Quantitative Methods; Mr. George Kuriyan did Mathematical Geography and Projections; Mr. B. M. Tirunarayanan did Map-work; Mr. G. Narayanaswami Aiyar Land Forms; and Mr. L. S. Natesan did Surveying in the St. Joseph's College and the National College compounds.

On the last two days, two shows of Geographical Films were given which were highly valued and appreciated (appendix IV).

As part of the Course, Excursions were arranged to the Rock Fort, Golden Rock, Upper Anicut and Gunasilam and Grand Anicut.

The Refresher Course came to a close on the evening of 13—5—1933 with formal thanksgiving, etc. (Appendix V).

Receipts and Payments are shown in Appendix VI.

As in the previous Courses, the Teachers who attended the classes went through every portion of the work earnestly and diligently, though the Course was generally felt to be a crowded one owing to the shortness of time. Printed certificates were issued in which special record was made of good work done by the Teachers.

(By order)

Gopalapuram, Cathedral Post,
Madras, 15th July 1933.

N. SUBRAHMANYAM,
Secretary.

APPENDIX I.

List of Teachers who attended the Refresher Course
in Geography, in May 1933.

Name.	School.
1. Sister Aloysia.	Holy Cross College, Trichy.
2. V. Aswathanarayana Aiyar.	E. R. High School, Teppakulam, Trichy.
3. K. Balakrishnan.	Nil On his own account.
4. M. Balasubramanyan.	Nil On his own account.
5. Sister Mary Canice.	Apostolic Carmel School, Mangalore.
6. K. Chakrapani Aiyar.	R. C. Bodg & Training Institution, Trichy.
7. M. Chandramouleswaran.	Nil On his own account.
8. V. Chandrasekharan.	Nil On his own account.
9. Paul Chellapah.	Training School, Palamcottah.
10. Suguna Chinnappa.	Christian Girls' High School, Tanjore.
11. Sister M. Clarissa.	Apostolic Carmel School, Mangalore.
12. Sister Mary Claudia.	St. Ann's Model School, Mangalore.
13. Miss Rita C. Desouza.	Sacred Heart High School for Girls, Tellicherry.
14. Miss F. Dinker.	Govt. Trg. School for Mahomedan Women, Guntur.
15. P. V. Duraiswamy Aiyar.	Bd. Hr. Ele. School, Kolakkudi.
16. Sister Eugenie.	St. Joseph's European High School, Trichy.
17. Sister Febronia.	Holy Cross College, Trichy.
18. Sister Mary Gabrielle.	St. Ann's Sec. Trg. and Model School, Mangalore.
19. Sister M. Gertrude, A.C.	St. Ann's Convent, Mangalore.
20. V. Gnanasiromany.	V. M. School for Girls, Neyyoor.
21. M. Gopala Ayyangar.	Pachaiyyappa's H. S. Chidambaram.
22. T. S. Gopala Ayyangar.	Sri Satyamoorthy Secondary School, Tirumayam.
23. K. Guruswamy.	Ponniak's High School, Trichy.
24. Godavarty Hanumantha Rao.	Town High School, Guntur.
25. K. Hariharan.	Nil On his own account.
26. Samuel Harris.	Duthie's Girls' English High School, Nagercoil.
27. C. T. Jacob.	B. E. M. P. High School, Tellicherry.
28. Jebagnanamani Ignatius.	Girls' Christian High School, Tanjore.
29. A. R. Krishnamoorthy.	Bd. Hr. Ele. School, Kolakkudi.
30. S. Krishnamoorthy Aiyar.	St. Xavier's College, Palamcottah.
31. Sister Mary Leocrice.	St. Agnes' Convent, Bendore, Mangalore.
32. Sister Melanie.	Holy Cross College, Trichy.
33. S. P. Nataraja Sastrigal.	S. I. Ry. School, Golden Rock.
34. K. N. Pasupathi Aiyar.	Municipal High School, Kurnool.
35. M. Raju Mudaliar.	Board High School, Cheyyar.
36. M. N. Ramachandran.	Board High School, Lalgudi.
37. N. V. Ramachandran.	Nil On his own account.
38. S. Ramakrishna Avadhani.	National College H. C., Trichy.
39. A. Ramakrishna Rao.	Town High School, Guntur.
40. T. S. Ramasubramanian.	Ranee's Free Girls' High School, Pudukkottah.
41. A. S. Ramaswami Ayyangar.	The High School, Srirangam.
42. B. Ranga Rao.	Board Higher Grade Ele. School, Thathiengarpet, Musiri.
43. K. N. Rangaswami Aiyar.	The High School, Srirangam.
44. Sister Mary Ruth.	St. Ann's Secondary Training and Model School, Mangalore.
45. A. Sadagopachari.	The High School, Srirangam.
46. R. Sadasiva Aiyar.	Reddiar High School, Rangoon.
47. K. S. Sadasivan.	Board High School, Uttiramerur.
48. John Henry Samuel.	Board High School, Lalgudi.
49. K. Sanjivi Sarma.	Board High School, Polur.
50. A. Sankaran.	St. Xavier's College, Palamcottah.
51. K. G. Sankaranarayana Aiyar.	Board High School, Usilampatti.
52. P. A. Shanmugasundaram.	Board Sec. School, Udayarpalayam.
53. T. K. Srinivasa Ayyangar.	Nil On his own account.
54. R. Srinivasa Pillai.	Board Middle School, Udayarpalayam.
55. S. Srinivasa Raghava Ayyangar.	Mahajana High School, Erode.
56. M. R. Sripathi Rao.	R. B. A. N. M. High School, Bangalore.
57. G. Subramania Aiyar.	Aided Higher Ele. School, Nagamangalam, Ariyalur.
58. G. S. Subramaniam.	Nil On his own account.
59. P. R. Subramania Aiyar.	Board High School, Kottayi.
60. M. B. Sundaresa Aiyar.	S. M. S. Vidyasala, Karaikudi.
61. S. Swaminathan.	E. R. High School, Trichy.
62. V. K. Swaminathan.	Board Elementary School, Ponneri.
63. Sister Therissa.	Holy Cross College, Trichy.
64. S. Venkatraman.	Board High School, Lalgudi.
65. M. Viswanathan.	St. Paul's High School, Phirangipuram.

APPENDIX II.**Opening of the Summer School of Geography.**

The Summer School of Geography organised in connection with the Provincial Educational Conference was declared open at 10 A.M. on 1—5—1933 in the National College by Mr. K. V. Subba Aiyar, M.A., L.T., Retired District Educational Officer, Trichinopoly, in the presence of a large gathering of teachers and educationists from the different districts of the Presidency.

Mr. M. Krishnamurthi Aiyar, Secretary of the Summer School Course, welcomed the teachers in a short speech.

Mr. N. Subrahmania Aiyar, Secretary of the Madras Geographical Association, made a statement regarding the genesis and the continuance of the Summer Schools and the Refresher Courses. He said that the first Summer School was started in 1926 even before the S. S. L. C. Scheme was ushered in. The idea was not to train teachers who did not know anything of Geography and make them experts in a fortnight, but to take in those who have already been teaching the subject and were enthusiastic in their own way, but were not quite modern and give them training in the modern methods, especially in practical work. They had 30 students in the first year and there was so much demand that they had to take in 60 in the second year. They had the same number in the two previous Summer Schools so that they had trained 210 teachers in that way. In the map of knowledge, the speaker went on to say, Geography had always a place, because it was the one subject that made the child know its own place in Nature and in Society. There was no other subject that was so immediately necessary as this science of human environment. The excuse of the Madras Geographical Association in running these courses was that there was a need; and the fact was proved by the numerous applications received from teachers who were willing to pay Rs. 10 for 14 days besides paying their own fares incurring boarding and lodging expenses. Though the period of training had been reduced to a fortnight, he hoped that they would take the fullest advantage of the opportunity and utilise the period successfully. He then requested Mr. Subba Aiyar to declare the school open.

MR. K. V. SUBBA AIYAR'S SPEECH

In declaring the Summer School open, Mr. K. V. Subba Aiyar said that ever since its inception he had been watching very closely the progress and development of the Madras Geographical Association and had also been a careful reader of the Journal of the Association which, among other things, had undertaken a critical, searching, geographical study of the districts of the Presidency and quite a complete study of the districts of Malabar and Coimbatore, Madura and Ramnad had been given therein. As an ardent student of ancient history and archaeology, the speaker found from a study of the journal new information altogether from all points of view. For the first time perhaps in the history of geography it had been raised to a high pedestal and it had been made the queen of sciences, exacting homage, allegiance and service of other sciences.

Almost every science had been brought into service to give complete information on the subject of Geography of the above districts and he was so pleased to see Geography elevated to its real position as he considered it to be the foremost and first of the general knowledge subjects. He considered it was useless to waste money on University Education if it would not prepare young men for life. They had to look to Secondary Education for the equipment of life, but the Secondary School Scheme has been most unfortunate. It has undergone many changes almost from year to year. The poor students were experimented upon, there was nothing final, nothing conclusive so far as the School Final Scheme was concerned. Even at the present time, it was in the melting pot. In his own opinion, whatever might be the subject introduced in the School Final Scheme, Geography and Manual Training must occupy the foremost place.

Mr. S. Ramakrishna Avadhani, M.A., L.T., Secretary of the Geographical Conference, proposed a vote of thanks to the distinguished guests after which the course was begun by Mr. N. Subrahmania Aiyar.

APPENDIX IV.

List of Films shown at the Refresher Course

1. The Earth. 2. Mount Everest. 3. Ocean Liners. 4. The Panama Canal. 5. London to Paris by air. 6. Animal Friends (London Zoo). 7. Sericulture. 8. Cotton Cultivation. 9. Comics : Pawn Shop, Iron Mule and Easy Street.

APPENDIX V.

Thanksgiving function : 13-5-'33, 5 p.m., Saraswathi Hall, Summer School of Geographical Refresher Course, Trichinopoly National Collgee.

Mr. K. N. Pasupathi Aiyar, B.A., L.T., of Kurnool, on behalf of the teachers proposed a vote of thanks and spoke as follows :—

Ladies and Gentlemen,

With to-day ends our Summer School of Geography and we have before us a very long vacation ! Born only 13 days ago, it may appear, at first sight, surprising that it should come to a close so soon ! But I am sure that all my fellow-teachers that attended the course will agree with me when I say that, judging from the volume of work done, it looks as though we had been at work for a full term !

Well, on this occasion, when we have the privilege of meeting all our lecturers, and on this last day of our Summer School, I wish to say, on behalf of you all, teachers who have come from various parts of the Presidency to attend the course, and on behalf of myself coming from far off Kurnool, a word of thanks and, if I may say so, a word of appreciation for the efficient and thorough manner in which the Geographical course has been organised and conducted by our able Professor, Mr. N. Subrahmanyam, M.A., L.T. He has secured, for our benefit and enlightenment, the kindly offices and valuable services of several learned lecturers—all experts and specialists in the various branches of the subject of Geography—and, thanks to him, it has been our rare privilege and opportunity to hear them talk on the subject.

APPENDIX III.

THE MADRAS GEOGRAPHICAL ASSOCIATION—TIME-TABLE.

Days.	7 to 9 A.M.	10 to 11 A.M.	11 A.M. to 1 P.M.	2 to 4 P.M.	4-15 to 6-15 P.M.
1st Mon.					
2nd Tue.					
3rd Wed.					
4th Thu.					
5th Fri.					
6th Sat.					
8th Mon.					
9th Tue.					
10th Wed.					
11th Thu.					
12th Fri.					
13th Sat.					

Surveying (Batch I)

Lectures on Pedagogy of Geography

Quantitative Methods (Batch I)

Climatology (Batch II)

Map Work (Batch I)

Quantitative Methods (Batch II)

Land Forms (Batch II)

Surveying (Batch II)

We have had a busy and useful time during these two weeks. And within the short compass of barely a fortnight, we have been equipped with information on the various aspects of the theoretical and practical side of the subject. We have learnt not merely the contents of geography in all its ramifications, but the proper methods of handling it in the class-room. We have been taught the various kinds of practical work to be done in the geography classes to enable the pupils to visualise properly the chief facts and principles of the subject. We have also had a practical course of Field and Compass Survey, a knowledge of which is helpful to map-making.

Friends, it is no exaggeration to say that the work done during the fortnight has considerably broadened our mental horizon in relation to the subject of Geography; and, this breadth of view gained here, is, I dare say, bound to improve our lines of teaching the subject to boys and girls when we go back to our schools. That is the general impression left on me by the Geographical Refresher Course we have attended, and I have no doubt, you all feel alike on the matter.

Speaking personally, I am thankful to all our learned lecturers—particularly to Mr. N. Subrahmanyam—for having aroused in me a new interest in Geography and for having clarified many of my vague notions on the subject. I earnestly trust that this new interest will lead me on to a deeper study of the subject and a right handling of it in the class-room.

Our Professor, Mr. N. Subrahmanyam, was pleased to take us round on excursions to a number of interesting places and enlighten us by his valuable explanations and talks on every object observed—all from the angle of Geography. He has such a vast enthusiasm for the subject that he is never tired of talking on it; and if only we teachers teaching it in schools were infected with his enthusiasm, I am confident that Geography in schools will not be the drudgery that it still continues to be in most places; but shall become an interesting study to children and yield much better results than at present.

So, Ladies and Gentlemen, I propose a very hearty vote of thanks to Prof. N. Subrahmanyam, M.A., L.T., for all that he has done for our good these two weeks, and for his highly instructive lectures on the pedagogical aspects of Geography. I also

heartily thank Prof. George Kuriyan of the Madras University for his learned lectures on such difficult themes as Cartography, Oceanography, and Mathematical Geography. I wish to tender my thanks also to Prof. S. Balakrishna Iyer, M.A., L.T., for quantitative methods. Our thanks are due to Mr. B. M. Thirunarayanan, B.A., (Hons.) (London) for his interesting talks and practical help on Map-study; to Mr. G. Narayanaswamy Iyer, M.A., L.T., for the fund of information provided by him on Land-forms and Geological aspects of Study; to Mr. L. N. Natesa Iyer for his lectures and field-work in connection with Survey; and to Mr. Krishna Iyer, M.A., (Dip. in Geo.), for the valuable tutorial work done by him.

Lastly, I wish to express my heartfelt gratitude to Prof. V. Saranathan, M.A., Principal of the National College, and Mr. S. T. Ramanuja Iyengar, B.A., L.T., General Secretary of the 25th Provincial Educational Conference, for the excellent arrangements made by them for our stay in the city during the Geographical Refresher Course and for making our short sojourn here happy and enjoyable.

One word more, and I close. I wish to touch upon the human aspect of the Geography Refresher Course we have been attending. To me, the course has been not merely a series of monotonous graph-work and map-work, but an opportunity to meet so many fellow-workers in the field of teaching, to come in contact with one another, and exchange and compare notes on the many things connected with our every-day school-work, as well as the service conditions that obtain in the several parts of the Presidency. Moreover, during these two weeks, I felt as though I were rehearsing my old happy college days, living a care-free life,—save the only care of studying Geography—and enjoying the company of learned lecturers and brother teachers.

I shall treasure the memory of this short period of student-life in the Summer School of Geography at Trichinopoly as a precious time in my career and I hope I shall, in future years, look back to this eventful fortnight with a reminiscent feeling of warmth and joy.

With these words, Ladies and Gentlemen, I request you all to join with me in proposing a hearty vote of thanks to one and all the gentlemen who have contributed to the success of our Geographical Refresher Course.

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With these words, Ladies and Gentlemen, I request you all to join with me in proposing a hearty vote of thanks to one and all the gentlemen who have contributed to the success of our Geographical Refresher Course.

APPENDIX VI.

THE MADRAS GEOGRAPHICAL ASSOCIATION, MADRAS.

The Refresher Course in Geography—Session, May 1933.

Statement of Receipts and Disbursements for the above Session.

Receipts.	Rs. A. P.	Disbursements.	Rs. A. P.
Fees	.. 650 0 0	Stationery	.. 83 11 0
		Postage	.. 20 0 0
		Freight, Cartage, Cooly and Conveyance	.. 27 4 0
		Remuneration to Lecturers and other Demonstrators	.. 480 0 0
		Water Supply & Sundries	.. 2 0 0
		Services of Clerk & Peon	.. 9 0 0
		Purchase of Equipment	.. 6 12 0
		Excursions	.. 4 3 6
		Exhibition of Films	.. 10 0 0
		Amount transferred to Association account	.. 7 1 6
Total	.. 650 0 0	Total	.. 650 0 0

Note.—Equipment purchased is taken over by the Association at the end of the Session.

C. M. GOPAL,
Treasurer.

N. SUBRAHMANYAM,
Secretary.

Checked and found correct in accordance with the accounts.

G. L. NARASIMHAM,
Auditor.

14—7—1933.

News and Notes

This number of the Journal contains the Proceedings of the Geographical Conference including the Presidential Address of Prof. K. A. Nilakanta Sastri. The papers read at the Conference have been held over for publication in the next number, as some of them have not yet been received.

* * *

The Refresher Course at Trichinopoly in May 1933 was conducted at the National College; and the Report about the same will be found elsewhere. Sixty teachers underwent the course, which was gone through with much enthusiasm and earnestness.

* * *

The Tiruvallur Regional Survey Committee of the Working Council of the Association has set to work about their business in right earnest. Mr. V. Krishnan, M.A., Dip. Econ., Dip. Geo., has been appointed to collect data and work out some of the maps, etc., on the spot under the general direction of the Committee, which has been meeting every fortnight.

A local visit was paid by the members of the Committee to the village of Thannirkulam in the Rural Reconstruction area. The response to the appeal for the Research Fund of the Association has so far not been encouraging. We repeat the appeal and hope that members will contribute their mite for the work undertaken which involves some considerable expense.

The pre-occupation with this all absorbing work has prevented the usual monthly meetings being held regularly.

* * *

Two suggestive Syllabuses in Geography—one for the Elementary School and the other for the Secondary School—are published in this issue. The latter is in use in some of the schools of the West Coast. The Departmental Syllabus for the first three forms is not quite satisfactory; and it is therefore necessary that Teachers' Guilds should try to prepare model syllabuses that are

modern, intelligent and workable; and try them in some schools. It is all the more so in view of the fact that the subject is likely to be removed from the A group of the S. S. L. C. course according to the present proposals of the S. S. L. C. Board. Middle School Geography had better be made more interesting and useful, though it is not possible to give the pupils below 14 years that rational understanding of the subject which they can have only in the High School.

* * *

It does not seem to be a commendable thing to drop altogether from the compulsory group of the High School course cultural subjects like Elementary Science, History and Geography on the plea of lightening the syllabus or of introducing variety in the course. The same consummation can be reached with less chance of lowering the quality of education by getting the syllabuses revised with a view to lightening them and by an easy compromise of having two or three alternative courses in the group under Elementary Science, History and Geography, so that instead of all boys being compelled to go through the whole of the syllabus in these subjects, they may be made to study some chosen part of each of them.

* * *

We welcome the new move of the S. S. L. C. Board in resolving to introduce shorter and more direct questions for S. S. L. C. Examination as being more objective and reliable and issuing specimen papers for the guidance of teachers. We doubt, however, if the modern tests are the right thing in Geography in an external examination in which more than 20,000 candidates are examined, and feel that the short essay type of questions would be preferable in Geography as in the other subjects. It will be difficult to foresee what effect the new mode of examination will have on the percentage of passes, as answers will have to be more accurate under the new order.

* * *

The teaching of Geography in the Intermediate course is still confined to Queen Mary's College alone; and it is hoped that since qualified teachers of the subject are now available, other colleges will provide for its teaching at that stage.

We have much pleasure in congratulating Miss K. S. Ranga Rao who has qualified herself in Geography with great credit and welcoming her back. It is hoped that the authorities will utilise her services in the best manner by opening Geography in the B.A. Degree course in Queen Mary's College.

* * *

In the Andhra University, Geography finds a place in the University Calendar alone, no college having as yet introduced it. In the Oosmania, Mysore and Annamalai Universities, even that theoretical recognition of this important branch of knowledge has not yet been vouchsafed. It will be interesting to know when these younger Universities are likely to come into line with Universities abroad in this respect.

* * *

The teaching of Geography is said to be at a low ebb in Travancore and schools seem to be improperly equipped for the proper handling of the subject. The Teachers' College at Trivandrum has not provided for the training of Geography teachers and the Arts College has not introduced the subject in the Intermediate stage. Now that a thorough reorganisation of the educational system of the State has been entrusted to an earnest, able and sympathetic officer like Mr. R. M. Statham we trust that important subject will be accorded its proper place in the school and the college and steps will be taken to improve the quality of teaching it at the various stages.

* * *

It is proposed to arrange for an excursion through Mysore during the ensuing Michaelmas Holidays, the places intended to be visited being Kolar, Bangalore, Gersoppa, Bhadravati, Mysore, Kannambadi and Sivasamudram. The approximate cost from and to Madras will be about Rs. 40-50.

The party will start on the 20th instant and be back in Madras on the 1st October 1933. Members wishing to join the party will write to the Secretary accompanied by a remittance of Rs. 4. Programme is given on page 132 of the Journal.

Reviews

Philips' Informative Geographies: Book I—The Physical Basis of Geography by F. M. Miller (George Philip & Son, London), Price 1sh. 2d.

This is a neat little volume on Physical Geography for pupils at the High School stage. The book is intended not merely to be mastered and laid aside, but, in the words of Prof. E. G. R. Taylor who has written the foreword for it, "constantly referred to, and more fully understood as a widening regional knowledge allows of more complete illustration of general principles."

Starting with an account of the relations between the *Earth and the Sun* and the results flowing therefrom and a chapter on *Maps and Map-drawing*, the pupil is taken through a course of study of the physical forms and physical laws which govern climate, water circulation and landscape under the heads of the *Atmosphere, Weather Maps and Types of Climate, Oceans and Seas, the Earth's Crust, Land Forms, the Work of Running Water, the Work of Ice and the Work of the Sea*. The last two chapters, which deal with *Life on the Earth* and *Man and his Occupations*, bring out clearly the objective in all geographical study, the understanding of man's life on earth.

The treatment is simple, clear and methodical; and suggestive practical questions and exercises are given at the end of each chapter. The book, which is illustrated with 63 useful maps and diagrams, may profitably be studied for C. group Geography in Madras schools.

The Columbus Regional Geographies: Senior Series, Book IV: The World of To-day by Leonard Brooks and Robert Finch (University of London Press, Ltd.). Price 3 sh. 6d.

This book by two well-known and experienced teachers of Geography is intended for use by pupils of the School Final stage, who have already covered the study of the continents and the mother-country in the earlier volumes. It is divided into four

parts, the first two of which summarise the chief points of Physical Geography and General World Geography as well as the continental studies of the earlier books, the regional treatment being more advanced; the third part puts the British Empire in its world setting; and the last closes with a summary of all that has been taught in this and the earlier volumes, in the form of a summary of the Major Natural Regions of the World. Exercises are set at the end of each chapter and in connection with several of the maps and illustrations, of which the book contains 147. The treatment is interesting and stimulating, and the get-up neat and attractive.

Junior School Geography by Albert Wilmore (G. G. Harrap & Co., London).

Book I. *Country, Town and Seaside*. 128 pages and 47 illustrations and maps.

Book II. *Peeps at Other Lands*. 158 pages, and 63 illustrations and maps.

Book III. *Britain and the British People*. 168 pages, and 66 illustrations and maps.

These are the first three books of a course of four years' study, intended for English children of the age of seven to eleven, when they are in the Junior School, prepared by a well-known author who is a master of the subject. "The general aim of the series is to awaken interest, to stimulate curiosity, to develop the faculties, to foster the love of knowledge and to awaken a desire for more. It provides the basis for work that will be done in the Senior School."

The 1st Book contains very simple lessons dealing with the homes, school, and immediate surroundings of the children, the emphasis being laid upon the homeland and homely phenomena. In Book II the pupils take peeps at other lands, visiting countries with diverse characteristics, and contrast these with their own native land. They return in III Book to a closer study of Britain and the British people, noting the simple features of structure and climate of the country.

While the interesting descriptions of scenes familiar and strange will rouse the curiosity of the children, the provision of

elementary problems and exercises at the end of each chapter will satisfy their desire for action by doing some simple practical work, suited to their age. Further they will be encouraged to make little excursions in their neighbourhood, and see things for themselves.

A fine get-up and plenty of useful and typical pictures make the books very attractive, while the language is simple and well graduated in the different books. Though primarily written for English children, they can be strongly recommended for use in the middle forms of Indian schools as *supplementary reading-books in English*.

The Physical Basis of Geography by V. F. Searson (G. G. Harrap & Co., London). 260 pages and 83 illustrations and maps.

This book aims at explaining the fundamentals of Geography by means of simple and telling experiments, which are suitable for class demonstration, but which can as well be performed by each student; and the apparatus required has been reduced to a minimum. By a reasoned use of the results of these experiments, the student is helped to understand more clearly the larger forces of nature and the physical processes going on round about him. The human side has not been, however, neglected altogether; and the influence of geographical environment on man and his work has been brought out wherever necessary. Suggestive and typical exercises of varying difficulty are inserted at the end of each section, which serve not only to test the success of the study but also to help the application of the knowledge gained. The book is suitable for use for C. Group Geography in Madras schools.

Principles and Practice of Geography Teaching by H. C. Barnard. (University Tutorial Press, London). 1933. Price 4sh. 6d.

This latest hand-book on the teaching of Geography falls into two parts, which although distinct, are not unrelated. The first seven chapters deal with Geography as an ordinary school subject. After considering in the first chapter the development of Geography teaching, the distinction between the old Geography and the new, the scope of Geography and its relation to the other school subjects, the author proceeds to discuss the Content of School Geography in the next three chapters under the heads of Fact

Knowledge, Geographical Reasoning and Geographical Imagination. Incidentally in chapter IV and specifically in chapter V, the various aids for the teaching of Geography are explained; and in the next two chapters, the syllabus and methods are considered in greater detail.

Chapters VIII to IX are concerned with work in Regional Survey, which the author attempts to connect closely with the Geography syllabus as a commentary upon it, illustrating it from realities round about. Most of his examples have been taken from south-east England; but the general methods suggested are capable of particular application in any locality. The last chapter discusses the place of Geography in education—the aims and values as well as the philosophy behind it. A list of important books on the teaching of Geography and a carefully prepared index add to the value of this useful volume, which can be studied as a text-book in Training Colleges.

A Geography of the World for High Schools: Part II. Section IV—India by N. Subrahmanyam. (The Indian Publishing House, Ltd., Madras). Price Annas 7.

This section completes the Regional Geography of the World, prepared by the author in accordance with the Madras S. S. L. C. Syllabus. Being a study of the native land, the treatment is naturally fuller than in the earlier parts, and the method adopted is descriptive. In the presentation of facts, right proportion has been observed; and local colour adds interest in several places. The book is illustrated with a colour relief map and several other useful maps and diagrams.

A Geography of the World (Tamil): Book III: Regions of the World by S. A. Subrahmanya Aiyar and T. S. Anantanarayana Aiyar (T. C. Gopal Pillai). Price As. 12.

The earlier parts of this book were reviewed in Vol. VI, Nos. 3-4 and Vol. VII, No. 2. This part completes the series; and its treatment is similar to that of the earlier books. Schools that teach the subject through the mother-tongue in the High School stage can use the book with advantage, as there are few good text-books in Geography written in Tamil according to the S. S. L. C. Syllabus.

Books and Journals Received

- A Geography of the World* (Tamil) by S. A. Subrahmanya Aiyar and T. S. Anantanarayana Aiyar.
- Philips' Informative Geographies: Book I—The Physical Basis of Geography* by F. M. Miller (George Philip & Son).
- Columbus Regional Geographies: Senior Series: Book IV—The World of To-day* by Leonard Brooks and Robert Finch (University of London Press).
- The Atlas Geography of the Madras Presidency* by S. Ramakrishna Avadhani.
- Historical and Statistical Handbook of Sweden* (Two volumes) by J. Guinchard (Government Printing Office: Stockholm).
- Ancient Inland Dunes of Northern and Middle Europe* by Ivar Hogbom (Centraltryckeriet, Stockholm).
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**PROGRAMME OF EXCURSION TO MYSORE
DURING THE MICHAELMAS HOLIDAYS**

Wednesday, 20th Sept. 1933. Departure from Central by Bangalore Express at 1 P.M. Arrival Bowringpet at 6-2 P.M. Supper at the Refreshment Room.

Thursday 21st „ „ Departure Bowringpet at 7-45 A.M. Arrival at Marikuppam 8-32 A.M. Visit to the Gold Fields 9 A.M.—2 P.M. Departure Marikuppam 3-20 P.M. Arrival at Bangalore City 6-45 P.M.

Friday 22nd „ „ Seeing Bangalore.

Saturday 23rd „ „ Leave Bangalore at 7-30 A.M. Arrival at Shimoga at 6-18 P.M.

Sunday 24th „ „ Gersoppa—To and fro.

Monday 25th „ „ Bhadravathi—Supper at Berur or Arsikere.

Tuesday 26th „ „ Departure Arsikere 6-40 A.M. Arrival Mysore 5-5 P.M.

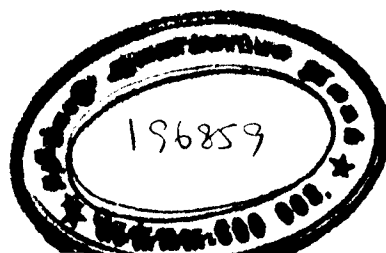
Wednesday 27th „ „ Kannambadi and Seringapatam.

Thursday 28th „ „ Mysore—Dasara Day.

Friday 29th „ „ Sivasamudram—Night reach Bangalore.

Saturday 30th „ „ Back to Madras.

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THE MADRAS GEOGRAPHICAL ASSOCIATION RULES

1. The name of the Association shall be 'The Madras Geographical Association'.

Objects.

2. The objects of the Association shall be:—

- (A) To promote geographical knowledge;
- (B) To secure for geography its proper place in the High School, the University and its constituent and affiliated colleges;
- (C) To help to improve the methods of teaching geography;
- (D) To work for a school of geography being started;
- (E) To promote studies about South India from various stand-points.

3. These objects shall be secured by:—

- (A) Holding meetings and conferences, and publishing periodicals and occasional bulletins;
- (B) Organizing geographical exhibitions and excursions;
- (C) Helping in the preparation of geography books in the languages current in the Presidency;
- (D) Forming a central library of geographical literature, and collecting maps, charts, plans, models, slides and instruments;
- (E) Providing for circulation to members, of books, periodicals and other collections;
- (F) And by such other ways as are deemed necessary to effectuate the objects of the Association.

Membership.

4. The membership of the Association shall be open to all those who are interested in the promotion of geographical knowledge or in the teaching of geography.

5. There shall be two classes of members, honorary and ordinary.

6. Honorary members are those who shall be so elected by the council by the majority thereof present at its meeting. They shall be exempt from liability to pay subscription, and shall have all the privileges of ordinary members, except voting.

7. A person shall become an ordinary member upon the proposal by a member, the seconding by another member and approval by the council by the majority thereof present at its meeting. He shall pay an annual subscription of rupees two, payable in one instalment or in two equal half-yearly instalments at his option.

8. Those who pay an amount of hundred rupees in two years become LIFE MEMBERS, and they shall be exempt from payment of any further subscriptions.

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