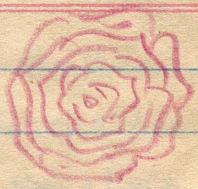
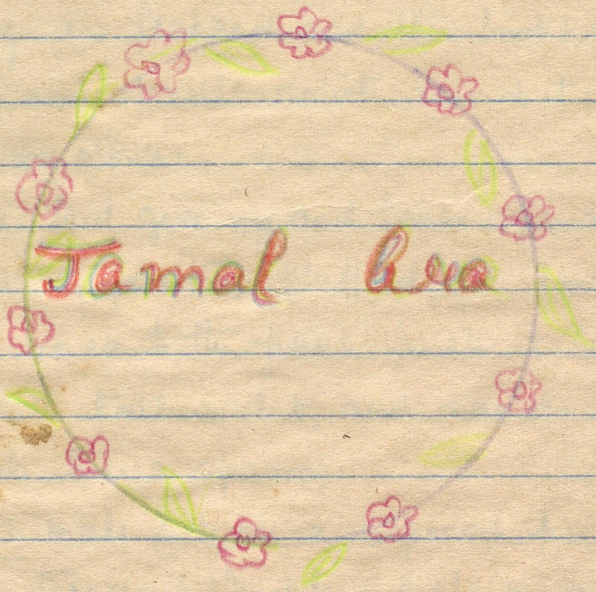
EXERCISE BOOK

NO. 6




Jamal Lua

approach consisting in stretching the wings, vibrating them quickly, fanning the tail, with the head lowered. The performance is repeated after short-flights.

Stone chat (S.H)

Dhayal :— Consists of spreading out tail, puffing out, nodding, and short-spiral flights, all to the accompaniment of sung.

Bay-b. shrike (S.H)

Wood shrike :— Hops, flicks its wings, & sitting on a thin perch moves from side to side, calling all the time.

Streaked 7-tail Warbler :— (Whistler)

Ashy W. Warbler :— climbs to a perch on a bush and sings tee-tee-tee, Flits about excitedly, jerking its tail up & down, and fluttering its wings.

Baya :— slightly spreads his wings and vibrates them before the ♀, with his head tilted slightly upwards. On the approach of the other ♂, the wings are fully stretched & vibrated like a

butterfly.

sparrow :— (See note)

Indian pipit :— Soars and flutters a few feet up into the air, uttering a feeble song and descending to earth in a few minutes.

Sky lark :— He springs up from its perch and soars vertically upwards, singing, and going higher & higher until it is almost — invisible. There he hovers with wings vibrating for about 10 minutes or so, singing all the time. Then the bird closes his wings and drops like a stone for some distance, and so on in a series of steps, until he finally glides to a rest near the starting point. It's a sight to see when several males indulge in this display at the same time.

Purple sunbird :— Hovers vertically in the air, wings beating so quickly that only a haze of feathers is seen, in front of which its breast-feathers show like a blaze, then the bird flies away with a flick of its wings, only to return to the

spot- and repeat the performance. Sings sweetly Cheewit- Cheewit- Cheewit.

C.B. Barbet :— Slightly fans its tail, wags it quickly vertically, then fired- calls whir- r-r-r, before starting its ~~usual~~ usual tune which is repeated with great fervour, the feathers being puffed at the same time until resembles a ball. The head is shaken from side to side, as also the female is circled round in a dancing movement.

Koel :— Approaches the female with the feathers of the head & neck fluffed. Wings drooped, and the tail occasionally cocked, calling all the time softly. The female evades him, and the male chases her from branch to branch.

Parakeet :— Hops about, fluffs the head feathers, sits close and peeks the head of the female, rocks and twists his head. or twisting itself into all sorts of ridiculous positions, uttering a low twittering note, wings half spread & head rolling from side to side.

Roller :— The male does a series of aerial displays rocketing in the air, looping & diving; screaming all the time, its brilliant colours flashing in the sunlight.

G. pigeon :— Male puffs out his throat and breast, ruffles his feathers & prances solemnly up & down a branch, bowing his head & whistling all the time

spotted dove :— goes straight up into the air, with a volplane downwards. Wings & tail stiffly spread. On the trees or on the ground the neck and breast-feathers are fluffed so as to almost touch the ground. Wings are lowered, and the female approached with a prancing walk, the head bobbing and cooing continuously.

Kalij ph: The male on the ground draws himself up to his full height, fluffs his feathers, and makes a peculiar drumming whirring noise, by rapidly vibrating his extended wings.

P. Snipe :— The female displays by spreading her wings and tail in the form of a fan, whilst

crouching on her breast, with loud hissing.

G. Bustard (S.A.)

L. F. lonicean :— From a high ground, every now and then he leaps up into the air with his peculiar croak, specially in the morning.

Ringed Plover :— Low mothlike flight in which the birds flit and zig-zag about, the male marking time. Male bows & scraps before female or chases her on the ground.

B.N. Stork :— The approach each other and when about a yard apart, extend their long wings, flutter them rapidly so that the ~~forthin~~ points of one are touching the points of the other, at the same time extending their heads till they nearly meet. The mandibles are clattered. After a minute, one walks away and is then approached by the other.

Egret :— Flaps wings with ♀, flies and settles down near her, making a noise all the time, chases her over water too. She tries to escape.

Little Grebe:— They erect feathers of the neck, shake their heads, preen themselves, spread wings and dance on the water breast to breast.

A reference to list of Birds and animals given in Hunter's statistical accounts of the different districts of Bihar will bring out vividly the extent to which our wild life has been depleted. Since 1870 when those - the first of our district gazetteers were compiled. Still more revealing would be a comparison with the extensive natural history notes left by Dr. Francis Buchanan Hamilton who surveyed a number of districts in Bihar between the years 1807 and 1814.

The steady diminution of wild life in Bihar began according to authorities in 1780, i.e. about 90 years after the founding of Calcutta. The districts along the Ganges suffered first because till 1850 the main means of transport was that river.

By By 1850 almost all forests in

North-Bihar and the plains areas of South Bihar were destroyed. With the forests was destroyed the shelter and cover in which wild life could take refuge and multiply. After the opening of the railways forests in South Bihar began to shrink before the repeated assaults of the axe. With the disappearing forests the wild life also vanished. The process of destruction of forests was halted only in 1946, and from settlement reports it appears that between 1907 and 1946 half the forests of Ranchi district had been destroyed. That is why Ranchi is the poorest in wild life of all Chotanagpur districts, except Manbhum which has still less forest cover. The districts richest in wild life are Palamau and Singhbhum where early forest reservation took place, and

forest- management- and shooting control have been in operation for about- 80 years.

It would be interesting to point- out here that in Hunter's reports for the different districts, Palamau and Singhbhum included, the poor quality of the forests commented upon and doubt is expressed if high forest- would ever grow. Through scientific management not only high forest- has been grown in Palamau and Singhbhum but to a limited extent- replenishment of wild life has taken place. Wild elephants after the mass captures of the 1860's had become extinct in Bihar, now once again in Singhbhum they number over a hundred. The establishment of Sanctu- aries since 1930 has helped the

Sambhar, the hiran and the deers to multiply. It has also afforded some protection to the bison.

Strategically the most important area for wild life Conservation is North Bihar. The absence of forests there prevents the multiplication of rhinoceros and wild buffalo. The last rhinoceros was shot in Champaran in 1939 and wild buffalos were frequently shot in the Darbhanga Raj forests near the confluence of the Kosi and the Ganga till as late as 1936. Till 1870 rhinoceros and wild buffalos were quite frequently encountered in Purnea, North-Bhagalpur (now Saharsa) and Champaran. In Francis Buchanan-Hamilton's time wild elephant used to occur in the Kosi wilds as also in the hills

of Rajmahal and South Munghyr.

Even now given adequate forest-cover in North Bihar it is possible that vagrant rhinos from Purnea and wild buffalo may be re-established. There are probably still a hundred square miles in Purnea - Saharsa and North Bihar districts which could be managed as forests and wild life reserves.

The establishment and protection of forests in north Bihar, especially those still in existence around the Jheels in the Bakhtiarpur - Simri area of North Munghyr may help re-establishment of the resident deers which are in a precarious condition. Most of these deers are beautiful creatures and a visit to the Patna Museum will prove what beauty man has destroyed by his carelessness. A stuffed specimen

of the Pink-headed duck is kept there, and this bird which was confined to North Bihar is now extinct.

Though some animals and birds have been described as extinct isolated pairs may still exist and become the nucleus of a future bigger stock. The tiger at the rate at which it is being killed now it may well become extinct in the next 15 years.

If the forests occupy 13% of the total land area they must yield 13% of the total land revenue of the province. That should be the target to be achieved in 25 year's time. Land revenue can be assumed to be static; forest revenue can be made dynamic.

Out of the total forest revenue only 80% should come from Sal, the rest must come from other sources, mainly development of industrial and furniture timbers.

All this calls for intensive utilisation on the one hand and development of exotic or nearly exotic plantations.

In regard to intensive utilisation the following points deserve attention:

(1) a market for Sal as pit-props in Britain should be developed. The British purchases on this account still are a good deal from non-Sterling

sources as well as from non-Commonwealth Companies. To get in touch with the British Forestry Commission, the U.K. Timber Trade, our own Commissioner in London. To study the use of pit-props in our own Coalmines and to prepare a short propaganda literature on the subject. The points to be emphasised are the smaller size of props required. The official channels might be tow, and, therefore, the Bengal Timber Company should be interested in it. They can do a lot in this direction if sufficiently prodded.

(2) Organise an exhibition of industrial forest products of Bihar and of furniture made from Bihar Woods. The exhibition may be held at Jamshedpur and Patna, and then the exhibits might be kept permanently

at Ranchi Museum. To prepare a small write-up and circulate it, including the Press.

(3) Investigate the possibilities of establishing more paper manufacturing units in Bihar. Rajkharsawan, Sahebganj and Fulwa would be ideal sites. Circulate Commercial firms about this. A small write-up should be prepared and circulated including the Press.

(4) Investigate the possibilities of establishing a newsprint (from Salai) manufacturing unit at Gomoh or some such place. To get in touch with the C.P. authorities. They have encouraged one scheme in which Govt. are financing 50% of the capital.

(5) Revive the machine tool-handles scheme. Put up a note to Government on this account, even though

apparently the last word might have been written on this. The manufacture of bobbins for jute factories might be included.

(6) Now that a number of chemical and glassware factories have come up in Bihar, there should be a greater need for packing cases. A write up on this as well as on prospects of ply-wood manufacture.

(7) On all the industrial projects — including that of wood alcohol distillation — should get in touch with the Development and Industry ministries and the Semi-official Bihar Industrial Finance Corporation.

So far on utilisation. This side is purely propaganda but effectively done it can yield results. At least it will give the impression of much

work being done. If all the 7 items listed above done, a small directory of Bihar's forest-products of economic importance can be prepared, the uses, the areas, they are found in, potential uses, and the rough estimate of the amount that can be extracted annually.

The above listed activities which even the most Blimpish persons would not consider hair-brained. Below are items, with which people may not agree in the first instance, but only a bold policy can really effect that economic transformation that planned forestry should bring about.

(1) Briefly sketch an afforestation plan, emphasis being on (a) preservation of planned fuel reserves in the kosi reclamation area — reserves which should be of a size to enable good

revenue being subsequently developed as they will lie in an agricultural region with no forests left;

(b) development of fuel plantations in the Rajgir Hills for supply to Gaya and Patna. Incidentally quick growing exotics like eucalyptus may be used for aesthetic effect, stimulating tourist traffic, and manufacture of eucalyptus oil. Quick-growing timbers are shisham and rosewood may also be used because of the furniture demand, so that in time the fuel plantation may have a solid revenue status. The scheme should be such that from the fifth year of the initial plantation fuel supply may begin.

(c) development of "deal" or carpentry uses soft-wood plantations on the

Ranchi plateau. This is the boldest of the lot - and I may be laughed at - for proposing it, but I won't mind that. Prepare a scheme and then try out experiments. The results will be astounding. It will not only be preserving the landscape, but to a small extent changing it for which the country will be thankful later.

Now that pine-wood supplies from Pakistan have been cut off, the scheme has a long range economic value also. It should aim at building up a pine-wood working circle on the Ranchi plateau, with cypresses and Chir as the principal species, but having the Araucaria and the Florida yellow pine as subsidiaries. Government owned depressed slopes

which are plentiful on the plateau may be used for the purpose; their isolation from the deciduous forests may protect them from fire-hazard. Also likely sites are the forest-blanks.

Cypresses — planted ones, mind it — have proved economic in Kenya. Chir, naturally grown is economic in India, planted with white labour (which is so much costlier) it has proved a success in South Africa. Cypresses have grown very well in Nelairhal, even naturally reproducing there, but they have not been an economic proposition there because the plantations are too small and the location is so distant from rail-head. Tried out in fair size plantations on the plateau, within 15 to 20 miles of

railhead they would be economic.
Chir grows in Ranchi. Though it
is on a garden scale. the attention
given in those gardens is less than
what they would receive in forest-
blanks. The same is true with
Araucaria, but it has to be found out
its economic value from the text-
books or the Australian High Commis-
ioner. Yellow-pine is useful for ship-
building and naval stores.

With increasing industrialisation
the country will need huge amounts
of soft-wood which can be easily
used by carpenters. these wood will
supply that need.

the seeds of cypresses, Chir and
Araucaria — easily available
in India — they them out in big
patches, so that the opprobium

of garden scale can be disproved once for all. The likeliest sites are the Tikri Sanatorium forests, the Mandar hospital Woodland, waste lands by the Kanke Mental hospital, the Compounds of Ministers and at Pisha. If this scheme is not taken up now, be sure it will be taken up 10 years hence when trial plantations have proved it.

(d) Induce Government to establish five departmental nurseries for supply of plants for the tree-Planting Day (August 15). There may be located at Chaibassa, Ranchi, Hazaribagh, Patna and Muzaffarpur.

(e) Suggest to the Refugee Rehabilitation and Cottage Industries Departments the two following schemes (a)

distribution tasar silk cocoons in forest-villages, and (b) resettlement of refugee Tantis (weavers) from East-Bengal on land which would be put under mulberry and a sericultural industry built-up.

As regards game preservation — a sanctuary must be declared in Dhalbhum and another in Santal Parganas. Open correspondence with the Bamaili proprietor and the Parasnath Temple trustees for declaration of sanctuaries in those two areas. The Parasnath sanctuary would be of particular value. A tour of all the existing sanctuaries and the suggested sites would be done. A Deputy Game Warden may be appointed. Punjab and Bengal had such schemes

before Partition.

Three Divisions — Utilisation, Afforestation and Game Preservation.

The main thing to keep the Govt. flooded with schemes, all on paper no doubt, but of much educative value.

Pine plantations — A plan for planting 100 sq. miles in 10 years would be quite a modest beginning which could be accelerated after the results of the first five years.

Forest Museum — Should be developed into a Natural History and Furniture Exhibits wings. Make a beginning with seized trophies; later on more active Collection could be done and a taxidermist employed. For the

furniture section only a local carpenter needed or get things from Dehra Dun. I remember at Semra village a Contractor used to have an elephant's head, only bones. It can be obtained for the museum.

Extensive photography of forest-scenery and landforms could be done. Enlargements could be hung in the museum. When 30 or 40 enlargements are collected an exhibition of Bihar forest-scenery could be held. This would be some activity in developing "invisible" revenues. There are some photographs with the Department already. Some can be collected from officers and enlargements made and hung. A good beginning it would be. It will have tremendous propaganda

Value.

Investigate the prospects of planting the U.P. Gogra area grass which makes excellent material for making kraft-paper. It could be planted in the Bagaha area of Champaran and the semi-inundated areas of the Kosi — tracts which could not be fit for reclamation for sometime.

Display →

(1) Threat Display → aggression against another ♂
(2) Pre = nuptial Display
(3) Post- = nuptial Display ♂♀
(4) Fake nest- = building
(5) Ceremonies Connected with nest- = building.

Birds of an Indian forest-

1. The area and types of forests
2. Types of forests and characteristic avifauna with life histories, field characters
3. Bird succession in forest- — clear felled & rotation and,
4. Afforestation areas
5. Birds of small towns in forests
6. Birds of fields in forests
7. Bird Song
8. Choice of nesting ~~habitat~~ habitats
9. A chapter on Display.

Subjects for articles:

(1) Wonders of an Indian Forest — for Statesman
(2) Life in an Indian Forest — " "
(3) Life in a Forest-village — for Hindu Standard
(4) Fascinating Work in Forest-Research — for Statesman
(5) Science on the Forested Hillside — for H. Standard
(6) The Chequered story of Sal from seed to log. } for I. Weekly
(7) Benefits of Forest for human living — for All India Radio (in Hindusthani)
(8) The Forest for the Townsman — for Indian Travel & Holidays.
(9) Motoring through the Forest — for Statesman
(10) Does an Indian know his own country — for Indian Travel & Holidays (Hindusthani) for All India Radio
(11) 24-Hours In Bird land — for H. Standard.

Subjects for articles.

(1) Forestry and National Reconstruction
(2) Soil Conservation
(3) Water Conservation
(4) Green Vaults of White Coal
(5) A plan for Water-transport in Bihar
(6) Upland Agriculture vs. Forestry
(7) Forestry and better Agriculture
(8) Chotanagpur rain for the crops of Bihar
(9) Nature Conservation and Development
(10) Contribution of forests towards food production
(11) Forest Industries
(12) Better village houses and forests
(13) Storehouses of beauty and wealth
(14) Forests and All-Round Prosperity
(15) A Forester's vision of future Bihar
(16) Forest roads as opening backward Country

The Romantic

(a) Scenery — sylvan, rural, topographical & landforms;

(b) Preservation of nature and natural beauty in a Country rapidly being industrialised and urbanised;

(c) Preservation of wild life;

(d) Roads for motoring with facilities for stay;

(e) Rock-climbing of landforms;

(f) Shooting;

(g) Photography; and

(h) other recreation — hiking, cycling, plant-collecting, flower-viewing, butterfly-collecting, ~~health~~ health-resorting, boating, etc.

Note:— In the recreational and romantic aspects, the emphasis should be on attracting the lower-middle class, because they are more numerous than those well-to-do people to whom these appeals have so far been directed. The well-to-do ~~people~~ prefer and can go to the Himalayas, or

Even overseas, and the appeal goes waste.
Democratisation of the appeal is necessary.
The electorate is more important today than
the Governor, or the Zamindars.

The Scientific

Forests can interest botanists, geologists, zoologists
hydrologists, and others directly if these men of
science can be brought closer to the forest dept.
They must be given the feeling that they are
required to contribute to the evolution of forest policy.
A 'DATA COMMITTEE' corresponding to the
Ubidisation Advisory Committee may be usefully
formed. University teachers of geology, botany,
zoology and geography may be co-opted with
the Research officer, the working plans officer and
a few other forest officers as well as an agriculture
department representative.

Closer contact with the University would be
beneficial in more ways than one. A series of extra-
curricular lectures at the University each year

by a forest officer would be the means of such contact. The lectures would attract students of geography, biology, botany, and all those desiring admission into the forest services. Since recruitment to those services is going to be at a expanded rate in the near future, these lectures would benefit the forest department directly by attracting the better-type of students and candidates.

I might also refer to the membership by forest officers of the Indian Science Association and Congress. Since 'Agriculture' is a department of the Congress and Association activities, if a number of forest officers join the Association, they can demand that the department should be 'Agriculture and Forestry'. Even before such an expansion occurs forest officers can read papers at the Science Congress on specialised scientific subjects, except straight sylviculture.

The ECONOMIC

My interest in forestry is purely economic. By economic I mean the social — for the social and economic are very closely related.

If 26% of the total land surface is under forests, nearly one-fifth of the entire national economy would be a "forest-Economy". The social implications of such a happening must be emphasised. That would be the most convincing of all the arguments on behalf of proper forestry.

The economy of most countries is of two varieties:— (i) Land economy i.e. agriculture and forestry; and (ii) Industry. In India a separate forest-economy has to be recognised because forest-products enter in the export-trade, and help to secure foreign currency. Which can buy the entire country a considerable amount of goods that it may not have been able to buy otherwise. The value

of such foreign export and the extent to which it can be expanded (if 26% of the land was under state-owned and managed forests and if proper wood technology was practiced), should be brought out in forest-propaganda.

The second factor in favour of recognition of a separate forest-economy is the fact that-since most of the forests are or will be state-owned and managed, the appropriation of the value (or wealth) produced would be more equitable than in other economies — either industrial or agriculture. (According to Prof V.T. Shah (I am quoting him from memory) the present appropriation of wealth is as follows:

The first-33% of the national wealth goes to 1% of the population, the second 33% of the N.W. goes to 24% of the population. The third 34% of the N.W. goes to 75% of the population.

This inequitable distribution obtains in both industry and agriculture. In agriculture under

both the Zamindari and ryotwari systems this happens as also under capitalised agriculture of the type of plantations and tenant-cultivation. In both industry and agriculture the state is only able to recover 12% of the private appropriations by taxation. This small amount is alone available for expenditure on nation-building departments, social services, administration or policing. The demands of administration and policing are more in the industrial and agricultural economies, and hence very little is available for nation-building departments or social services. On a national scale both agriculture and industry as at present practised, is hardly self-sufficient.

Look at the state forests on the other hand. There is hardly any private appropriation. Whatever there is in the processes of utilisation, and so the entire value produced by the state forests goes to be spent on the

habin-building departments and on social services which make living more worthwhile in this poor country. The expenditure on administration and policing in forest-areas is negligible. It is not-only a self-sufficient department, but a surplus economy. The growth of forest-revenue, the forest-revenue surplus and the possibilities of further increase in both have to be emphasised and indicated.

The third factor is more evident. Agriculture and forestry, owing to our unplanned national life, are generally considered competitive. There is a tendency to bring more land under plough rather than increase the production of the cultivated land. The increase in land under plough is at the expense of forests. Now forests exist only in areas, where owing to topography or geology, agriculture is less paying than agriculture elsewhere. Forest-propaganda moved more by yield figures that in the presently ~~possibly~~ forested areas is not only agriculture

less paying than elsewhere, but is less paying than forestry. Only figures would convince.

When we can prove that forest economy is separate from agricultural economy, and that both are complimentary rather than competitive, We can proceed to plan how our lands shall be utilised. There would be areas where agriculture is more paying, and that should be primarily under agriculture with forests only to supply local needs of fuel and timber. There will be other areas where forests would pay better, and there forestry shall be the predominant occupation with agriculture only to meet some pressing local needs.

The Coordination of forests with industry is done easier. It does not need comparative yield tables, but indicating what industries can be based on forests. That in itself would convince and confirm the earlier lesson that all land cannot be brought under agriculture.

When forest-propaganda can establish forestry as a distinct national economy, it can proceed to educating the people to other important facts.

The first and most important fact is that the value of is not only as source of one-fifth of the total national productivity. Its value to the other two economies is very important. Both agriculture and industry cannot develop properly, if all the forests are cut down, or exist in a poor condition. This brings us to educating the people to the problems of Conservation and development of India's natural resources.

So far India's natural resources have been considered vast. These supposedly vast resources are — (i) agricultural, and (ii) mineral. Let us take mineral first. Coal is not as vast as it is supposed to be. Good coking Coal (essential for the iron and steel industry, and the various metallurgical processes) is in short supply. It will last us only 80 years more if we continue

to mine only 20 million tons each year. With more industrialisation and railways, the consumption would increase and if industrialised to the extent of relieving agricultural land from its present uneconomic burden by half, the good coking coal would not last us even 40 years. That is a fine prospect for a country with our popn. ahin, our great human demand, our inexhaustible supply of excellent iron ore and our potential industrial output. The solution lies in conserving coking coal and preventing its present waste in railway traction, ordinary industrial power and domestic use. The waste can only be prevented by developing hydro-electricity and making wood fuel easily available. Both can only be done through forest conservation and development.

Coal is an extreme case, but a vital mineral. You can not run your industries without power. The other fuel which can serve as a source of power

is Wood Which can come only from forests. The other source of power is either Water-power on a small scale or hydro-electricity on a large scale. Both can be developed only through forest-department. Yet if you do not conserve Coal today, your metallurgical industries would suffer.

But erosion affects minerals like iron-ore and mica, of Which we have limitless supplies. Washing of eroded iron-ores and mica is expensive; Water and electricity for mining operations and the living of the mining Colonies is an absolute necessity.

Forest influence on agricultural resources is still greater. Attention must be drawn to the general desiccation, to sheet erosion and impoverishment of soil, of the loss of Cowdung manure owing to absence of Cheap Wood fuel.

A more direct illustration Comes through the need for irrigation. Irrigation so far has been Considered necessary as a protection against-

the vagaries of the monsoon rains. But now that this War has shown that India is deficient in the production of her food requirements, there is going to be greater attention given irrigation. Irrigation whether for prevention against failure of rains, or for increasing production and double-cropping needs water. This water may be procured from streams, canals or tube-wells. In each case the storage and perennial supply can only be done if water is conserved. Such conservation should be proved to be possible only through forest conservation and development. Forest propaganda should insist on irrigation being given a proper place in agricultural economy, and should show what reservoirs of water the forest area.

FORESTS & NATIONAL RECONSTRUCTION

At the present moment public opinion is attuned to know the means of national reconstruction. The central problems of national reconstruction

is a higher standard of living for the people. A higher standard of living is not possible without the following:

(i) Increased agricultural productivity;

(ii) Lessened to burden of population on agricultural land;

(iii) Rapid and extensive industrialisation.

(iv) Maximum intensive land utilisation.

Increased agricultural productivity can be attained through: mechanisation of agriculture irrigation, manuring, use of better tools & mechanisation is not possible, good seed and giving the cultivators a proper stake in land. Lessened burden of population on agricultural land can be secured by industrialisation so that 50% of the population alone should depend on agriculture for living as against the 80% of today. Increased agricultural productivity would also reduce a part of the burden, by making agriculture more economic

and by creating the purchasing power of the peasantry necessary for industrialisation. Rapid and extensive industrialisation is possible through raising the purchasing power of the peasantry by making agriculture more productive, and cheap power. Maximum land utilisation means a fully productive economy, in which agriculture is at its highest; industry fully developed, and land is classified and utilised scientifically — the land best-for mineral development should be so exploited; the land best-suited for agriculture should be under the crops it would grow best-; all upland and poorer soils must-be under forest.

In each of the four conditions for improved standard of living forests are a factor: its source of water for irrigation, of wood fuel which can conserve cowdung manure; as the basis of new industries; as the most-important sector of land utilisation activities. The illustration of

Then makes good reading as well as makes things understandable.

Two other conditions for improved standard of living are: (i) Electricity, and (ii) cheap transport. Electricity can perform a thousand chores, which make life more worth living and satisfy comforts to register an improvement in the standard of living. Cheap transport makes internal trade develop, quickens industrialisation and by reducing prices creates purchasing power. Both rural and urban electrification in India is not possibly without utilising our rivers and water falls. Cheap power is essential for industrialisation and in any scheme of national reconstruction development of perennial water-supplies is the first step. That is a subject of forestry. Cheap transport is possible only either if long distance water-transport can be developed, or if electricity can be utilised for transport. Water-transport

is cheaper than even electric haulage.

MULTI-PURPOSE SCHEMES

Conservation and development of water-supply is a very important aspect of national reconstruction. Every river-work can have three purposes: (i) Irrigation, (ii) electricity, and (iii) navigation.

Since water-conservation is possible only on the watersheds and uplands which are under-forests, water-conservation becomes one of the activities of forestry. Forest-propaganda should take the lead in this matter and suggest all the various multi-purpose schemes. Specific schemes attract attention more than generalisations. A watershed survey, and river-schemes enumeration is a detailed and ambitious project outside the scope of individual forest-officers but specific plans about the multi-purpose utilisation and conservation of rivers within his territory should be possible. They would at once be noticed. Most forest-officers have enough

engineering knowledge to be able to give rough idea about the amount of energy and water that would be available for the scheme. Also the industries that can be developed may be indicated.

SCOPE OF FORESTRY

Forestry becomes the service of nature conservation and development. The most important aspects of the service are: (i) Soil Conservation (ii) Water Conservation and planning (Initial only) (iii) Timber supply Development & Wood industries (iv) Animal Control — Bionomic planning (v) Preservation of Scenery for recreation.

To man such a service recruitment has to be still better. The best youth should come here, and while forest propaganda should go on emphasising the importance of the service, it should not fail to emphasise the need for good staff which can only be got on good pay i.e, better pay. In future India forest-

service would occupy the same key position as the I.C.S. did. Why should not they have the same pay.

MEANS OF PROPAGANDA.

These are: (i) Radio, (ii) Lectures, (iii) Literature — newspapers and books, and (iv) the Forest-Museum, Demonstration stations & tours.

The All-India Radio station at Calcutta can be <u>battled</u> into giving sometime on the air to Forest propaganda. Letters have to be addressed to them officially, and a few scripts have to be sent to them. The languages used should be Hindi, Bengali, and English. If the Calcutta station are not responsive the Ministry in Behar and the Delhi headquarters might be approached.

Lectures are useful because most of them are reproduced in newspapers. To be useful lectures have to be given in Patna. The University, as I have indicated, is a good platform.

Literary propaganda has been carried

for something and has borne fruit. It has to be addressed to the people instead of to authorities. An illustrated book would be useful. Since in this province the people of the districts of Patna, Gaya, Monghyr and Arrah have greater influence than of other districts, all sources of propaganda amongst them should be exploited. Flood fear and benefits of irrigation both should be worked up.

Newspaper propaganda is however the cheapest. An illustrated article, particularly about game or Water-Conservation, can be printed in the Illustrated Weekly. Illustrated articles can also be printed in the Orient. Tourist- and road interest- articles can be published in the AAB magazine. Other articles can be retailed to Mysindia, Whip, Behar Herald & Searchlight.

Photographs tell much more than words. Forest-areas should be well-photographed - peaks, hills, ranges, valleys, streams, lakes, bits of roads, places, forests, bungalows, tiers, ghats, effects

of erosion, benefits of this Conservation, illustrations of Water Conservation, etc. Forest-place names should be made popular.

The Forest-Museum at present is of only trade interest. The romantic or Scientific appeals are hardly satisfied. A natural history section and and a photographic section would make it more popular. Illustration of Water-Conservation and soil-Conservation methods and schemes (in hand) would make the place both attractive as well as instructive.

Demonstration stations should be established. they should be so located as to make them more accessible. A demonstration station ~~at~~ near Ranchi could be very popular, if properly advertised.

Other demonstrations could be carried out on the hills round Gaya and Munghyr (to prevent their excessive insolation and heat radiation in summer) at Rajgir to improve

the scenery. Being near towns they would be more valuable.

Tours of MLAs, newspaper editors and University teachers should be organised.

Saralā

Hemantā

Basantā

Basantā — Feb. M. A.

Grishma — M. J.

Barsha — July Aug.

Sarata — Sept — Oct

Hemanta — Nov - Dec

Sishir — Dec - Jan - Feb.

1. Simal
2. Paras
3. Panjan — White
4. Woodfordia — red
5. Cochlospermum — yellow
6. Bauhinia
7. # B. Vahlii

Wild flowers of Bihar I

Hot-Season :— best for the flowering of Woody species.

January :— Worst for flowering of Woody species.

Cold Season :— Many herbs or suffruticose perennials flower — Perennial grasses & bamboos flower.

Hot-Season :— after the jungle fires and at the break of the monsoon — many bulbous & rhizomatous Liliaceae, Amaryllidaceae, Scitaminae, etc. flower many are beautiful. Tree orchids flower.

Monsoon :— new leaves and shoots of trees — development of undergrowth — innumerable annuals which flower during the rains or after their cessation Scitaminae flower, ground orchids flowers.

Plains grasslands — after burning the savannah tracts become pretty with numerous herbaceous perennials — Careya herbacea, (large white & pink) Olax nana, Grewia sapida, G. scabrophylla, Ochna pumila, with beautiful large yellow flowers, Aneilema scapiflorum with blue flowers, and species of Pancratium with pure white flowers.

About this time also the Imperata flowers with its white plumes, through most of the grasses flower in the cold season after completing their season's growth. (cf. Effect of grazing)

English Wild flowers found in Bihar II

(1) Blue Pimpernel (pp 506)
(2) violets (pp 33)
(3) Pansies } pp (33)
(4) Hearts-ease }
(5) Wild Rose (pp 340)
(6) Saxifrage (pp 341-363)
(7) Wild strawberry (pp 339)
(8) Wild Thyme (pp 743)
(9) Capsella or shepherd's purse (pp 27)
(10) Ivy-leaved Toadflax (pp 620)
(11) Madderwort (pp 683)
(12) White Water lilies (pp 309)
(13) Eye bright (pp 640)
(14) Ragwort (pp 490)

(15) Yellow Sorrel (pp 156)
(16) Black night-shade (pp 610)
(17) Vetch (pp 249)
(18) Wild Mustard (pp 25)
(19) Celery-leaved Crow foot. (pp 6)
(20) Fennel (pp 411)
(21) Fumitory (pp 23)
(22) Queen Weed (pp 873) Fern

Wild flowers of Bihar closely allied to Common garden flowers.

(1) Tropical gentian or Exacum tetragonum (pp 567 to 1243) (Also other wild gentians)
(2) Purple-eyed Geranium (pp 155)
(3) Violets, Pansies and Heartease (pp 33)
(4) Potentilla (pp 339)
(5) Wild Rose (pp 340)
(6) Saxifrage (pp 341 - 1240)
(7) Primulas - 4 genera (pp 505)
(8) Salvia plebeja (pp 743 - 744)
(9) Lilies (a) Red or Nymphea lotus

(b) Small White or N. esculenta
(c) Blue or N. stellata
(d) Zephyr flower

(10) Amaryllis (pp 1107)
(11) Nasturtium (pp 26, 155)
(12) Alyssum maritimum (pp 27)
(13) Erigeron asteroides close to Aster (pp 462)
(14) Balsam-Impatiens balsmina (pp 158)
(15) Begonia picta (pp 400)
(16) Tecoma undulata (pp 654)
(17) Canna Indica (pp 1147)
(18) Cock's Comb (pp 759)
(19) Ipomeas and Convulvulus —
Morning glory & Moonflower & Railway creeper
Sweet-Potato (pp 1602)
(20) Ixora (pp 419, 434, 435)
(21) Jasminus (pp 523, 615)
(22) Lagerstroemia (pp 374)
(23) Passion flower (pp 384)
(24) Portulaca (pp 26, 606)

(25) Cosmos — C. Caudatus (pp 484)

(26) Coleus (pp 735)

Bihar Wild flowers Which have easy English names III

(1) Angel's Trumpet — Daturra A (pp 615)

(2) Thorn Apple — D. stramonium (pp 614)

(3) Bridal creeper — Porana paniculata (pp 590)

(4) Campanula — C. canescens (pp 503)

(5) Creeping plume Thistle Cnicus arvensis (pp 491)

(6) Globe Thistle (pp 490)

(7) Wild Indigo (pp 236)

(8) Sensitive plant (pp 322 — 644)

(9) Love lies bleeding — Amarantus Candatus (pp 76)

(10) Lobelia (pp 500)

(11) Indian laurel — Actinodaphna angustifolia (pp 191)

On the trail of the blue pimpernel

(1) Beginnings of the Hunt – quotation from Haines – paucity of Wild flowers and their study.

(2) The Pimpernel country – general description of Bihar flowers.

(3) The Enchanted Forest – Compilation of articles already written on Sal forests and their flowers.

(4) Temptations One the Way – Orchids and ferns.

(5) Beckoning Osbeckias – forest-flowers again

(6) On the Scent of Wendlandia (?) fragrant flowers.

(7) Fields of Morpheus – poppy and field flowers.

(8) Himalayan Interlude – Himalayan flowers

(9) Marshes of the purple Hyacinth – marsh flowers of N with Bihar.

(10) Date With Strobilanthes – Six to 8 years wait.

(11) The Pimpernel found.

Wild flowers, reasons, places where they can be found.

British Trees And Their Indian Equivalent

A — Hard Woods :—

(1) Acer.
(2) Maple.
(3) Horn beam.
(4) Horse chestnut.
(5) Oaks.
(6) Alders.
(7) Elm.
(8) Ash.
(9) Willow.
(10) Birch.
(11) Sycamore.
(12) Walnut.

B — Soft Woods.

(1) Pines.
(2) Spruce.
(3) Firs.
(4) Yew.
(5) Cypress.
(6) Juniper.

The World today is an inheritor of a vast amount of thought accumulated over 3,000 years or more. The vandalism of Conquerors and plunderers has destroyed very little of it, though a moderm modern student might well have wished that more had been destroyed. This thought has taken two main lines — (i) man is the product of supernatural causes, and so is his society and he has limited if any scope to change things as they are — (ii) man is the product of natural evolution, society is largely man made and can be changed by man. The first is characteristic of belief; the record of knowledge and reason. From the earliest ages when man practiced and believed in magic there two rival systems of thought existed. In magic man's ~~abili~~ ability to do things was more pronounced; When religion succeeded magic that confidence receded. In Ancient Greece, however, science appeared, and as a result the authority of religion was questioned. About the same time as Ancient Greece, in India and China also similar sceptic movements arose, but organised religion crushed

them. In Greece also Christianity crushed science, but some Arab intellectuals read the Greek writings as also ancient Indian and Chinese thought- because the spread of Islam over the Asiatic Continent put the Arabs in touch with all these Countries. These Arab scholars handed over the knowledge about 1000 A.D. to traders in Italy.

The re-discovery of Greek thought brought about a great widening of the mental horizon in Italy and for a century that Country led the World in intellect. That was the early European Renaissance or the Italian Renaissance. From Italy the knowledge spread to France and later Britain. The knowledge that France received from Italy was not just Greek knowledge, but also the knowledge accumulated by the Italian men of learning during the period of the Italian Renaissance. Similarly France added to the knowledge and finally Britain opened up the modern system of scientific enquiry.

III

Since the Renaissance for 500 years Europe has had a Continous development of science and learning. But it is in the last 100 years that the most Wonderful additions have occured. Before this modern period scientific enquiry was largely directed against the external World, that is the non-human phenomena. Plants and animals were studied but not men except for purposes of medicine. Man's mind, society and morality were Considered as something which Could not be studied by scientific methods. The result was that there has been a terrible ignorance about those things which affect human life most. In the absence of scientific knowledge no reorganisation of human society, morals or thought Could take place. A huge gap yawned between scientific advance in physics and engineering and between social and moral progress. This gap represented a disequilibrium.

Towards the middle of last Century Darwin

IV

Who went around the World to study plants and animals published his theory of evolution and asserted that man was continuous with nature, a higher development of the animal form. The logical corollary of this assertion was that man could be as well studied by scientific methods as plants and animals.

About the same time appeared on Europe's intellectual horizon that bearded gentleman Karl Marx who has been adored and hated as no other person has been in history. He borrowed Darwin's methods and applied it to the study of human society and traced its growth from animal-like savagery to modern civilization. Marx had, however, concentrated on the economic and political evolution of society, only throwing a few suggestions about thought and morals.

A little later an Englishman Locke subjected the human mind to scientific investigation and laid the foundations of Experimental

V

Psychology. One of his contemporaries Fraser studied the evolution of religion from its primitive forms and magic and challenged that it had been revealed by God.

Towards the beginning of this century Freud, a psychologist, began to analyse both mind and thought and take it to component parts. Incidentally he discovered some of the bases of morals.

Morals had remained to be the last of human institutions to be scientifically studied. The work of Fraser and Freud was helpful to its understanding, but the man who applied strictly scientific methods for the study of morals was an American ~~th~~ John Dewey, who claimed that "the facts of man are continuous with those of the rest of nature and ethics should be allied with physics and biology".

Dewey published his contention in 1920 and since then much work has been done to establish that morality is a biological function and like

VI

society has evolved.

Now there is no phenomena on earth which cannot be subjected to scientific enquiry; the last one being aesthetics.

All this progress is not merely a passion for knowledge but has a practical side too. I have already referred to the gap between living and science. Unless our social organisation and ethics could be adjusted to the advancement of science, wars could not be avoided.

But the lack of adjustment is not so easy. Previously our lack of knowledge about society and morals was a handicap; now the absence of a will to perform the adjustment is the obstacle. And by the time that this will is generated by propaganda and some adjustment begun science would have advanced further.

Today we are at the threshhold of revolutionary scientific discoveries. We have seen that some of the animals (bat, and owls) do not use the

senses of seeing and hearing as we do, but have been using ultrasonic waves. So far we had assumed that the senses had arisen in response to the environment on earth. Knowledge about the use of ultrasonic waves by biological ~~organisms~~ organisms will call forth a revision of our view of the environment, physiology and psychology. In fact a revision of the theory of evolution and adaptation in details would be necessary. And at that time our religious people will come back with their demand for humanity to return to faith, this time not in a supernatural God but in the supernatural powers of primitive man. They will deny the validity of progress and desire a retreat to a primitive world which admittedly had less strain for the human mind in some aspects. The objection to progress, however, is the fact that the primitive man was always cowering with fear, and if war can be abolished modern

men need not have much fear.

June

It is surprising what a lot of knowledge is expected of one today. I want to study the whole history of thought, particularly more detailed reading about the following land marks in human history. Firstly the Greeks, then the European Renaissance and lastly modern science. The pity is that reading not only requires time and energy but also money to buy books. It is the last handicap which we are ~~freed~~ feeling most today.

July

The following is a review of the progress of Ornithology in India in the 25 years before 1937 as published in a Science Congress report:

" One outstanding Contribution to Indian Ornithology during the last 25 years has been that of Stuart Baker (1922–30) in his Fauna. It is a feature of Ornithological studies in India that they fall into well-defined periods, each marked by the appearance of an important and Comprehensive work in which the researches of the previous period are embodied, and which furnishes the starting point for further studies. Thus the first- or pioneering epoch of Indian Ornithology may be said to have culminated with the Completion of Jerdon's Birds of India (1862–64) the publication was followed by detailed and specialised studies undertaken by a number of workers, the place of honour among whom is occupied by Allan O. Hume. Then came the first edition of the Fauna by Blanford and Oates (1889-98)

which was the standard work for over quarter of a century. Stuart-Baker opened the fourth period.

The most important innovation introduced in Stuart Baker's work was in regard to nomenclature and classification. Baker adopted the trinomial system. He defined species as forms with no known direct connection with other forms. He recognised subspecies or geographical forms when they differed in degree ~~whether~~ whether in size, colour or some other characteristic from the forms with which they were most closely connected but were themselves constant within a given area (geographical isolation or climatic variation) though linked with these forms by others which were intermediate.

Stuart Baker also published his Game Birds of India (1921–30) and Modification of Indian Birds (1932–35).

Regional surveys have contributed a great deal to our knowledge of Indian birds. Thus

the birds of the Western Himalayas, the Punjab, Kashmir, and the adjacent regions have been carefully and systematically described by Hugh Whistler. The great merit of Whistler's researches lies in the collection of a great mass of detailed information bearing on the features of zonal distribution and migration and other movements of various species of birds along the Himalayas. His studies further indicate how such movements have a definite bearing on the status of the species. Ticehurst's painstaking studies afford complete data of immense value for the purpose of determining geographical races. Other notable workers on the avifauna of the north-west are Ward, Donald, Osmaston, Magrath, and Jones. The first two have described the birds of Kashmir and the Birds of prey of the Punjab respectively. A monograph which no one

Concerned with the Ornithology of the Himalayas can afford to overlook is Meinert-Zhagen's Some Biological problems connected with the Himalaya. Mention should also be made of his Birds Collected in Ladak and Sikkim (1927) and of Ludlow and Kinnear's Work on the Birds of Bhutan and Sikkim and Tibet (1937), which throw a flood of light on the birds of the Eastern Himalayas.

The birds of the Vernay survey of the Eastern Ghats are being studied by Whistler and Kinnear. Regional Surveys have also been extended to Hyderabad, Travancore and Cochin states. The taxonomic results of these surveys are being published by Whistler with field notes by Salim Ali.

Minor or regional Surveys have also materially added to our knowledge of Indian birds. Ticehurst studied birds of

Baluchistān and Sind, D'Abreu of C.P., Steven-thon of upper Assam and ~~Sa~~ Sikhim Himalayas, Harington's Timaliidae, Gill's Wren and Birds of Common Birds in the U.P., and Bates' Birds Nesting With A, Camera are other contributions of the highest interest.

Bibliography:

Popular:: (1) Bates' Bird Life in India and (2) Holmes's Indian Bird Life and Bird study in India, and (3) Law's Pet Birds of Bengal.

Scientific:

Books: Hume's Scrap Book or Rough Notes on Indian Oology and ornithology.

Journals: Gill (U.P. Birds) J.B.N.H.S. XXVIII-XXX, 1923-25.

Lindlow & Kinnear 16th Series 14, 1, 1937.

Meinertzhagen: Nis, Series 12, III 1927.

Indian Institute of Field Ornithology

(1) Study of Indian birds in all aspects particularly ~~birds~~ bionomic role of species, distribution, habitats, field characters, general habits, voice, display, nesting, breeding, Control methods, Calendar fluctuations, local migrations, etc.

(2) Making available to agriculturists, foresters and others an easy means to get acquainted with birds and to identify them in the field without killing.

Towards this:

(1) Display of Coloured illustrations of the Common Indian birds on the walls of the institute;

(2) Taxidermist-museum of birds and eggs, with-as far as possible illustration of habitat-, food and nesting.

(3) Library of books on birds; general; Indian birds & local avifaunas;

(4) Small aviary for study of habits;

(5) Taxonomic chart of Indian birds;

6, Field Characters key of Indian birds;
7, A model sanctuary for tree birds and another for Waterbirds;
8, Chart of bird provinces and sub-provinces;
9, Bird census;
10, Summary of experiments in management of bird population;
11, Record of song, Call & Voice of different Indian birds;
12, Year charts of different Indian birds;
13, Maps of distribution of different birds in India.

Typical habitats

Survey the birdlife of one sample of each of the following habitat-subdivisions:

FORESTS: (1) Heavy large blocks or Reserved forests;
(2) Evergreen moist-patches;
(3) Dry deciduous scrub;
(4) Quality I Sal;
(5) Hill Working Circle areas;
(6) Coppiced areas;
(7) Newly clear-felled areas;
(8) Plantations if any;
(9) Sabai areas;
(10) Preservation plots;
(11) Neighbourhood of forest-villages;
(12) Riverine tracts in forest-areas;

FIELDS: (1) Fringing Woodland or village forests;
(2) Fields on outward fringes of forests;
(3) Fields or dry Jhum lands;
(4) Rivers;
(5) Marshes or jhils or boggy pools;

VILLAGES: (1) Country lanes;

(2, Thickets or mango groves;

TOWNS: (1) Parks;

(2, Big gardens;

(3, Reservoirs;

(4, Sewage farms — (not present here).

(5, Built-up areas.

Bird Population of Kolhan Forest-Division

In the absence of any reliable data, and the inability to run transects the bird population of Kolhan Forest-Division was Calculated by the following means.

1. Firstly, the total number of counted birds on 43 days was taken (2502) and the average of 58 birds were counted in each day, and an area of 10 acres was traversed during Counting on each such day.

   From the above Calculation for Kolhan's 160,000 acres a total bird population of 928,000 was obtained.

2. Secondly, the total area of kolhan was sub-divided into the following habitat-acreage:

English figures taken arbitrarily for application here.

(a) Dry Scrub — 40,000 acres with population of 80 birds to each 10 acres or 80,000 for the entire area.

(b) Sal — 100,000 acres with a population of 40 birds to each 10 acres or 400,000 birds for the entire area.

(c) Evergreen, fringing & Coppice — 20,000 acres @ 50 birds to each 10 acres or 100,000 birds for the

entire area.

Total for Nothan Division — 580,000 birds.

3. Thirdly - it was again arbitrarily assumed that the English population density approximately obtains in Nothan Division also, and since the area of Britain is 350 times Nothan's area the figure of 500,000 birds for the Division would not be excessive. Britain would on the same basis have 17 3/4 Crores while the authoritative English figures are 12 Crores i.e. a variation of 50% which can be accounted by the richer plant and insect life of the Nothan area.

Insect Control

Taking for a rough guide the observed fact that a pair of Tits and their progeny account for 120 million insect eggs and 150,000 caterpillars, larvae and pupae, the following calculations of the insecticide ability of the 5 lakh Nothan birds have been obtained:

Insect Eggs per year destroyed 60 English Billions

Caterpillars, larvae & pupae per year destroyed } 1 English Billions

Total 61 English Billions.

Those were promising times. The preceding age, which is now called neolithic, had stabilised agriculture and stock-raising. It had brought some prosperity; much knowledge had been gained about the working of iron and other metals. From that knowledge had also proceeded a few discoveries about the nature of the physical world and humanity seemed set for a career in which good living could be universal if some effort was made.

It was a critical age too. On earth inequality of power and wealth had grown. And this inequality was entrenched by the monopoly of knowledge and skill that the powerful possessed. It seemed within their means to wreck whatever had been built up. Stricken with fear humanity had turned to the Gods but they had begun to fail. So far their wishes had been totems and their displeasures tabus; but the Gods of natural religion had rubbed shoulders with men. Now the powerful among men could defy the Gods and there was the search for a deity who would be more powerful than all others.

The arrangements seemed ready for one of the Gods to claim overlordship by performing the horse Sacrifice, but no steed could be found to run through the universe. The search for a symbolic medium was going on.

I argued on a strictly earthly plane. So far all social intelligence and labour surplus from production of goods had been devoted to create Gods and embellish them. I anticipated that the all powerful God would demand more of this effort and drain humanity of all its resources.

A new human race which would be able to set its house in order without being bidden by the Gods seemed more plausible, rational and humanly economical to me.

1928 (When is WAO 5)