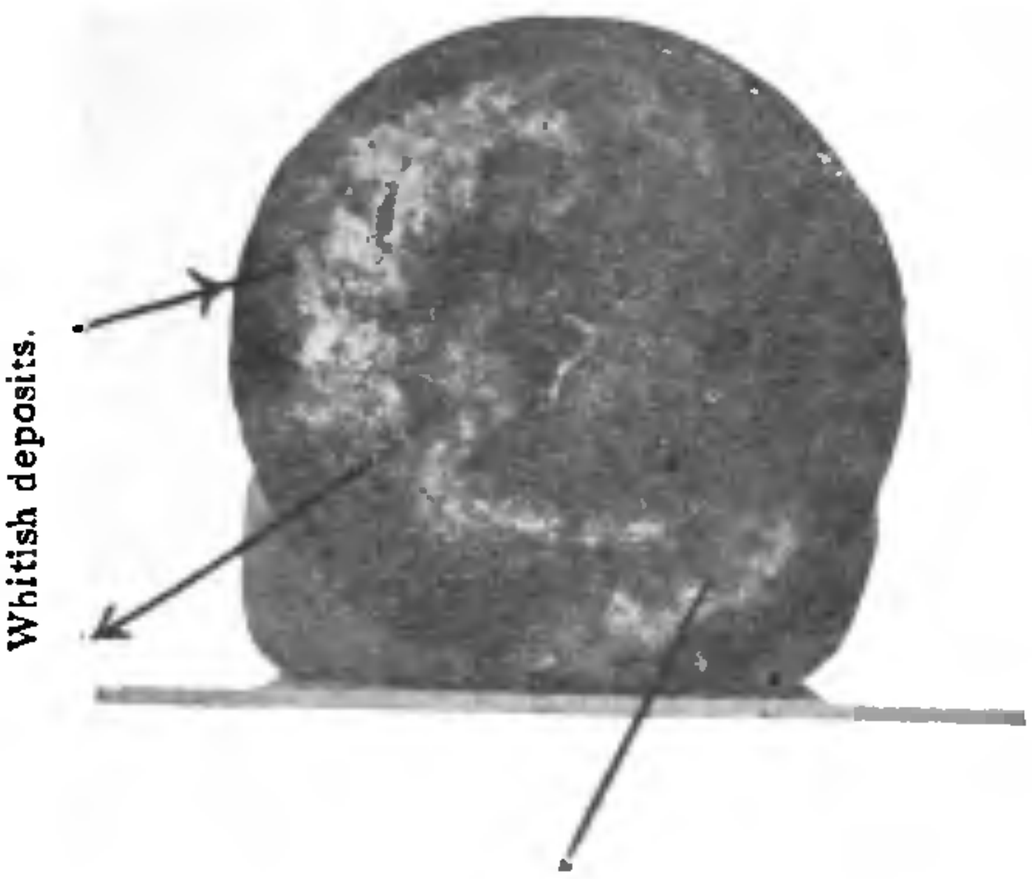

Whitish deposits

FIG 10

Whitish alkaline deposits at the rivet head

In another similar case of boiler-rivet failure inter-crystalline cracking and whitish alkaline deposits at the rivet heads are depicted in Figs 9 and 10. The rivet steel itself gave excellent properties on physical and metallurgical tests. Its chemical composition conformed to I.R.S. specification No. -M7-39 for boiler quality rivets.

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1. Colbeck, Smith and Powell, "Metal Treatment, Winter, 1942-43," **9**, (32), 171. 2 Parr and Straub, *Proc. Amer. Soc. Test. Mat*, 1926, (26), 52. 3. Partridge and Schroeder, *Metals and Alloys*, 1935, **6**, **145** ; *Ibid.*, 1935, **6**, 355 ; *Trans. Amer. Soc. Mech. Engrs.*, 1936 **58**, 223. 4. Straub and Bradbury, *Mech. Eng.*, 1938, **60**, 371. 5. Athavale, *Korrosion and Metallschutz*, **1939**, **15**, 73. **6.** Desch. J., *Iron and Steel Inst.*, 1941, **143**, 94

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NATURE CONSERVATION AND NATIONAL PARKS

THE concept of nature conservation embraces several distinct purposes such as conservation of plant and animal life, the scientific aspect which includes biological research; field research and experiment; the amenity aspect which deals with æsthetic and recreational side and the educational aspect. The æsthetic and recreational approach placed the main emphasis upon preserving the characteristic beauty of the landscape and upon providing ample access and facilities for open-air recreation and for the enjoyment of beauty in those areas. The major features of the Park are made easily accessible by providing roads, trails and bridges, and living accommodation in the form of hostels, etc. The scientific approach which in no way underestimates the æsthetic values, was primarily directed to the advancement of knowledge and its application to human welfare. "The educational aspect" as the Special Committee on Wild Life Conservation observes "is in many ways complementary to each and all of the others. True appreciation of scenery rests in part upon, and is certainly enhanced by, some understanding of the rocks and the variety of landscape which these induce, the shapes of the rocks and the variety of landscape which these include, the shapes of the valleys and summits, the flow of the streams, the cliffs and dunes and flats of the coast, and all the rich verdure with which they are clothed, are things which can invigorate and refresh the mind and upon which a deep culture can be based. The more widely this appreciation can be diffused, the sounder will be the mental and physical health of the nation."

The type of areas which are in need of conservation can be classified under the following categories:—

I.—*National Parks and Nature Reserves*: National Parks may be defined as extensive areas of beautiful and relatively wild country with characteristic landscape beauty which are also wild life sanctuaries for the preservation of big game, or other mammals and birds, in which access and facilities for public open air enjoyment are also provided, so that the people may be able to observe wild life of all kinds in its natural surroundings at close quarters. There is also need of nature reserves in the national parks, which act as breeding reservoirs for shy animals, which it is desired to encourage and which are not accessible to visitors.

II.—*Geological Monuments and other areas of outstanding value*: These include rocks, exposures or sections which because of their great geological interest should be preserved as Geological Monuments, and which

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* Abstract of Presidential Address delivered by Mr. M. S. Randhawa, before the Section of Botany, 36th Indian Science Congress, Allahabad, 1949.

should be given the same protection as to archæological buildings and monuments. These should be protected from mining, excavations, prospecting and drilling or similar operations.

III.—*Local Educational Reserves*: These include small areas of local country containing representatives of local flora, which are reserved for educational purposes for the benefit of schools and colleges.

National Parks

Uncontrolled destruction of wild life has been going on in many countries all over the world, and as a result of this natural fauna has dwindled and many species have become extinct. In countries of Western Europe like England the process of death and destruction has reached such limits that the sight of a wild bird or animal is regarded as an event of such importance, that it inspires many lovers of nature to write letters for publication in *Times*, saying that they heard a cuckoo at such and such a place. With the modern means of rapid transport such as motor car, jeep, and aeroplane, the whole world is becomng so speedily opened up to travellers, tourists and traders, and with the increasing population, so much uncultivated land is coming under the settler's plough, that the need for the preservation of fauna in national parks and reserves is being increasingly felt.

National parks and reserves were originally established in the United States of America. There are 26 National Parks in America covering a total area of 1,500 square miles. The first National Park to be established in the U.S.A. was the Yellowstone National Park in 1872.

The lead of U.S.A. has been followed by other countries such as Canada, Australia, New Zealand, and the Union of South Africa. In South Africa, the Sabi Game Reserve was founded in 1898, and in 1926 it was renamed as Kruger National Park. The Albert National Park in Belgian Congo was created mainly due to the efforts of an American naturalist Carl Akeley. Due to the creation of this sanctuary for wild animals the Gorilla has been saved from extinction. The Swiss National Park is about 62 square miles in area, and arrangements are provided in it for enabling the student and tourist to enjoy the more spectacular fauna and flora.

National Parks In India

In India the necessity of creating National Parks has found a tardy recognition. Dr. Baini Prasad has thus summarised information about National Parks in India:

"In 1934 a very great advance was made in the United Provinces through the great personal interest taken by the enlightened Governor of the Province, Sir Malcolm Hailey, as a result of which the National Parks Act of 1934 was passed. This Act provided for the establishment of National Parks and for the preservation of wild animal life or other objects of scientific interest and for incidental matters provided therein. As a result, the Hailey Park was demarcated as a National Park in the famous Patli Doon and the hill forests to the south of it consisting roughly of an area of 99·07 square miles. Reference may also be made here to the Chamrajanagar Sanctuary of the Mysore State Forests which had been established with a view to offering complete immunity for animals and thereby making it possible for them to thrive without interference. Introduction of other animals not found in the area was to be attempted, and the sanctuary was to provide facilities for the scientific study of the life-histories of different indigenous species of game."

National Nature Reserves

There is also a clear need of establishing nature reserves within national parks. The principal purpose of such nature reserves is to establish breeding reserves for scientifically encouraging particular species or communities of species the preservation or wider spread of which within the park it is desired to promote. In such reserves public access would have to be more or less restricted.

The authorities who are made responsible for the management of the reserves should keep close touch with University or educational centres, as well as main local natural history societies. A need would also arise of providing small handbooks on nature reserves, explaining with the aid of maps, photographs, and sketches the scientific significance of the reserve.

Local Educational Reserves

Lack of field training for teachers as well as students is one of the most serious deficiencies in current biological education in India. Without field training or facilities for nature study, teaching of Botany or Zoology tend to become lifeless and warped. Thus here is need of local educational reserves for all colleges where biological sciences are taught. The local Educational

Reserve is the counterpart of the college museum and the laboratory. These reserves would open a vast and a stimulating field of knowledge in a discipline which trains such mental attributes as acute power of observation, patience, concentration, detailed ordering of thought, and the appreciation of form and colour. Visits to these reserves under proper guidance would provide a liberal education to the students in one of the most stimulating and formative fields of thought. These are gains which cannot be quantified in terms of money. A beginning in this direction has been made in Delhi Province, where the local government has placed an area of 20 acres on the 'Ridge' at the disposal of the University of Delhi, Department of Botany. This piece of land will be enclosed with barbed wire, representative trees and shrubs would be labelled and efforts would be made to introduce other local plants also which can grow under these conditions.

Need of New Policy

With the liquidation of the feudal order and the merger of states into unions, the problem of wild life preservation has acquired a new significance. Whatever may be the faults of princes and rajahs, it must be said to their credit that they preserved the wild animals and forests of their states rather well. With the growing demands of cultivators who want to save their crops from harmful animals, there is need of clear formulation of policy. There is immediate need of initial survey of all proposed National Parks Areas. While there is necessity of preservation of rich flora and fauna in the National Park Areas, the general wild life policy must be such as will not prejudice the use of developed agricultural land. The interests of the cultivator and the lover of nature must be harmonised. The apprehensions of farmers that National Parks and Nature Reserves will develop into uncontrolled sanctuaries where pests and weeds will be allowed to flourish, and which will spread into surrounding agricultural lands must be allayed. The biologists must give lists of harmful and useful birds and animals. While the friends of the cultivator should be encouraged in the National Parks, the enemies must be exterminated. The biologists should also give a finding whether campaigns should be started for the destruction of wild boars, porcupines, monkeys, bats and parrots who cause enormous damage to crops and gardens. Before any such campaigns are started, it should be ascertained whether wholesale destruction of certain birds or animals may not have harmful repercussion, elsewhere, on account of the upsetting of balance of power between various organisms. An action which *prima facie* may appear sensible and desirable may have far-reaching and most unpleasant and unforseen consequences fifty years hence.

Need of a Central Biological Service for India

In India also there is need of a Central Biological Service under the Ministry of Agriculture of the Government of India to deal with problems relating to conservation of nature, national parks and fisheries.

The Committee further enumerates the functions of the proposed Biological Service as follows:—

The scientific and practical management and maintenance of the series of National Nature Reserves in such a way as to provide:—

(*i*) Reservoirs for the conservation of the main types of wild life (plant and animal species and communities) represented in the country;

(*ii*) Facilities for the conduct of fundamental and applied research and survey;

(*iii*) Certain educational facilities for students;

(*iv*) Facilities for the amateur naturalist and members of the public to observe and enjoy nature.

The Central Biological Service may be co-ordinated with the Indian Forest Service and may form a part of it. It should be staffed by scientists with appropriate qualifications, and should be equipped for survey and research in the field and in the laboratory, with the object of determining the distribution, ecology, genetics, general structure and behaviour of natural populations and physical conditions in which they live. The reserves will be used by the scientists of the Central Biological Service as field laboratories for the study of wild life and its control, and to elucidate the causes which promote or modify the maintenance of the living equilibrium in such areas. In conjunction with the Universities fundamental research on problems of nature conservation

can also be fostered. Best results will, however, be obtained if free flow of staff between the Universities and the Central Biological Service is allowed. This will be of mutual advantage. The scientific workers in Universities will benefit by field experience, while the field workers of the Central Biological Service will maintain contact with problems of fundamental research, and recent advances in research in biological sciences.

Protective Legislation

In January 1935, the Government of India convened an All-India Conference for the Preservation of Wild Life at Delhi, with a view to reviewing the position of fauna and flora as it existed at the time and considering generally problem of protection of the animals peculiar to India. The Conference prepared two lists of species, first of animals that were to be protected as completely as possible, and second of those which could only be hunted, killed or captured under a licence, in some cases subject to a bag limit. The Conference further laid stress on the establishment of wild life sanctuaries. It was further recommended that the duty of preserving of fauna should be assigned to forest departments in the areas under their charge, and the necessity of co-operation of police and magistracy was also urged.

A comprehensive protective legislation was enacted in 1933, in the Punjab Wild Birds, and Wild Animals Protection Act.

Protecting Plants

There is need of protective legislation on the lines of the Punjab Act of 1933 in other provinces also. Moreover the Act should be made more comprehensive and cognizance should be taken of the plant world too. Plants which are rare or striking, beautiful or odd should be scheduled for protection in areas where this is necessary. Rare plants like species of *Lycopodium, Ophioglossum,* and *Osmunda;* and other beautiful plants like *Orchids, Rhododendrons* and *Meconopsis,* etc., which are liable to excessive collection by botanists and which are widely plundered and uprooted by 'pleasure' pickers should also be given protection. Their collection should be permitted only under proper control.

Plant Sanctuaries in the Himalayas

Some of the Himalayan Valleys are in grave danger of losing their character on account of excessive grazing and growth of *Rumex.* Apart from other vegetation, the sheep and ponies which are taken to Alpine meadows above the tree line by graziers in the months of April and May, graze mainly on *Rumex.* A symbiotic relationship has developed between the sheep and *Rumex.* While the sheep feed on *Rumex* in their turn they manure the pasture land with their droppings, which in turn further encourages extensive growth of *Rumex.* The result has been that more attractive, but less edible alpine plants are driven out by *Rumex,* which now covers big areas in Himalayan alpine valleys like that of Pindari Glacier. In the interest of tourist industry, it is very necessary that some of the beautiful alpine Himalayan valleys should be declared as plant sanctuaries; and not only collection of beautiful and rare plants should be controlled, but at the same time, the grazing of sheep and cattle should also be prohibited. This is necessary in the interest of not only tourist industry, but also for checking of soil erosion as well as botanical studies.

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THE INDIAN CHEMICAL SOCIETY

ON the occasion of the celebration of the Silver Jubilee of the Indian Chemical Society in January 1949, Prof. P. Ray, M A., F.N I., the President of the Society, delivered a thought-provoking address in which he has raised a number of important issues like, the standard of under and post graduate training in science, pure *versus* applied science, the medium of instruction, and multiplication of scientific associations in our country. A Silver Jubilee brochure also was published on the occasion.

The Silver Jubilee Address

In taking stock of the progress made, Prof. Ray has observed as follows:—

> "Looking back upon the past twenty-five years of our existence and making a dispassionate analysis of our achievements and activities, we can discover little justification for complacence or gratification. The standard of our publications has failed to reach the level which we might have not unreasonably expected from the number of